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A

DICTIONARY

OF

PRACTICAL MEDICINE.

VOL. III. — PART I.

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A

DICTIONARY

OF

PRACTICAL MEDICINE

COMPRISING

GENERAL PATHOLOGY,

THE NATURE AND TREATMENT OF DISEASES,

MORBID STRUCTURES,

AND

THE DISORDERS ESPECIALLY INCIDENTAL TO CLIMATES, TO THE SEX,
AND TO THE DIFFERENT EPOCHS OF LIFE.

WITH NUMEROUS

PRESCRIPTIONS FOR THE MEDICINES RECOMMENDED;

A CLASSIFICATION OF DISEASES ACCORDING TO PATHOLOGICAL PRINCIPLES;

A COPIOUS BIBLIOGRAPHY, WITH REFERENCES;

AND

AN APPENDIX OF APPROVED FORMULÆ.

THE WHOLE FORMING A LIBRARY OF PATHOLOGY AND PRACTICAL MEDICINE AND
A DIGEST OF MEDICAL LITERATURE.

BY JAMES COPLAND, M.D., F.R.S.

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FOR DISEASES OF CHILDREN; ETC.

"Gladly wolde he lerne and gladly teche."—CHAUCER.

IN THREE VOLUMES.

VOL. III. — PART I.

LONDON
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1858

LEEDS SCHOOL OF MEDICINE

"Read, and fear not thine own understanding; this book will create a clear one in thee; and when thou hast considered thy purchase, thou wilt call the price of it a charity to thyself."

Shirley.

"One caveat, good reader, and then God speed thee! — Do not open it at adventures, and, by reading the broken pieces of two or three lines, judge it; but read it through, and then I beg no pardon if thou dislikest it. Farewell." Thomas Adams.

"Where there is much desire to learn, there will of necessity be much arguing, much writing, many opinions,—for opinions in good men are but knowledge in the making." Milton.

"Uti ratio sine experimentis mendax, ita experientia sine ratione fallax."

Brunner.

"Antequam de remediis statuatur, primum constare oportet, quis morbus et quæ morbi causa; alioquin inutilis opera inutile omne consilium." Baglivi.

"It is the great excellence of a writer to put into his book as much as his book will hold."

S. Johnson.

"What dire necessities on every hand
Our art, our strength, our fortitude require!
Of foes intestine what a numerous band
Against this little throb of life conspire!
Yet Science can elude their fatal ire
Awhile, and turn aside Death's level'd dart,
Soothe the sharp pang, allay the fever's fire,
And brace the nerves once more, and cheer the heart,
And yet a few soft nights and balmy days impart."

Beattie.

"Go, little book, from this my solitude;
I cast thee on the waters,— go thy ways;
And if, as I believe, thy vein be good,
The world will find thee after many days." Southey.

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LEEDS SCHOOL OF MEDICINE

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PALATE. — Syn. *Palatum, P. molle et durum. Palais,* Fr. *Der Gaumen,* Germ. *Palato,* Ital. *The fauces.*

1. The mucous membrane covering the isthmus faucium — the soft palate and uvula — may be simply relaxed, or inflamed, or ulcerated. The hard palate — the bones of the palate may be also diseased,— may be inflamed or ulcerated and carious; but chiefly as a symptom of serious constitutional disease, especially of syphilis, more rarely of scurvy.

I. Relaxation of the Palate and Uvula. — *Relaxed throat — Relaxed sore throat — Catarrhal relaxation of the throat — Relaxation of the fauces.*

Classif. — I. Class. I. Order (*Author*).

Defin. — *Uneasiness or soreness in the fauces, often with slight cough, without fever.*

2. This affection occurs *primarily*; but it also attends catarrhal and other inflammations of the mucous membrane covering those parts and the tonsils and pharynx. It is also symptomatic of catarrhal affections, of chronic bronchitis, of the several states of indigestion, and of numerous other diseases. The anterior fauces or *velum palati* appears more or less relaxed, very humid or watery, with little or no increase, or only with slight increase of vascularity, and the uvula is *elongated*, and hangs down upon the base of the tongue, often reaching to the epiglottis, and is sometimes also *œdematous*. More or less uneasiness in the throat, somewhat increased on deglutition, and occasionally a dry, tickling cough, particularly when the relaxed uvula irritates the epiglottis, are complained of. Indeed the elongation of the uvula is generally the cause of the chief uneasiness attending relaxation of the palate or fauces, which often becomes a chronic disorder, especially in leucophlegmatic habits, and in persons who live irregularly and intemperately.

3. This affection, when it appears *primarily*, is generally *caused* by the same influences as produce inflammatory attacks of the palate or fauces (§ 6.), and catarrhal affections. It rarely continues limited to these parts, but extends to the adjoining surfaces — to the pharynx, epiglottis and larynx, causing a tickling cough, with slight mucous expectoration. It is frequent in spring and autumn, especially during humid states of the air, and usually, with relaxation or irritation of the Schneiderian membrane, constitutes a principal part of the common catarrhal affection. (See art. Catarrh, § 7.).

4. The *treatment* necessarily depends upon the causes of the affection, and upon the nature of the disorders of which it is symptomatic. If a part of, or connected with, the common *catarrh*, the treatment advised for that disorder (§§ 16. *et seq.*,) should be employed, and a warm embrocation may be applied to the neck or throat. If it be a symptom of indigestion, tonics and astringent gargles, after biliary and intestinal secretions are evacuated, are generally useful. In persons subject to dyspepsia, in those of a relaxed habit of body, and in the irregular liver, relaxation of the soft palate and uvula often becomes chronic, whatever means of cure may be prescribed, especially if the liver be at the same time torpid, or otherwise disordered. In those persons the elongation is often attended by œdema of the uvula, and is productive of the most unpleasant part of the symptoms. Amputation of the part has therefore been often recommended and too often allowed. Several persons who have had the uvula removed, have consulted me on account of disorders which had either continued or appeared after this part had been extirpated. The function of the uvula is evidently to convey the mucus and saliva over, and thereby to lubricate the base of the tongue and epiglottis; and when it is no longer, or is imperfectly discharged, not only those parts, but also the pharynx and glottis become the seat of a chronic irritation more serious than that caused by an elongation, which a judiciously directed treatment to the original source of disorder would remove.

5. If the elongation continue after such treatment, the hydrochloric or nitric acids, or both conjoined, may be given in the decoction of bark, or in syrup with a tonic tincture, and astringent gargles may be employed. If these fail, the uvula may be touched by a solution of the nitrate of silver, or by a powder containing the sulphate of alumina or sulphate of zinc.

II. Inflammation of the Palate. — Syn. *Palatitis, Isthmitis,* Hildenbrand. *Isthmitis simplex; Angina simplex; Cynanche simplex; Angina gutturalis; Angina mitis; Angor Faucium; Inflammatio Palati; Inflammatio Faucium,* Auct. Var. *Angine simple, Palatite,* Fr. *Die Rachenbraüne, Halsentzündung, Entzündung der Fauces,* Germ. *Sore-throat, Quinsey, Inflammatory Sore-throat. Inflammation of the Fauces.*

Classif. — III. Class. I. Order (*Author*).

Defin. — *Redness of the soft palate, generally with elongation of the uvula, pain on swallowing, and slight fever.*

6. i. The Causes of Palatitis are chiefly those

productive of CATARRH (§ 4. *et seq.*). The disorder is most prevalent in spring and autumn, in which seasons especially it is sometimes *epidemic*. It is an *endemic* in the vicinity of rivers, lakes, canals, and stagnant pools and marshes. It may affect all ages and both sexes; but it is more frequently observed in young persons and sanguine temperaments than in others. Cold and humidity, vicissitudes of temperature, weather and season, cold applied to the extremities, or currents of air passing over the face and neck, and exposure of the neck or throat, especially after having been overheated, or to the night-dews and fogs, are the most common causes, particularly of the catarrhal form of the complaint. The ingestion of too hot or too cold, or of acrid substances, and the abuse of spirituous liquors may also occasion inflammation of the fauces, in either its simple or its associated states.

7. Disordered states of the stomach and bowels, or accumulations of vitiated secretions in the biliary organs, or of excrementitious matters in the circulation, remarkably *predispose* to this affection. Palatitis, in either of its forms, is sometimes caused by, or is *symptomatic* of, disorder in these quarters, and it often attends, or ushers in, the eruptive fevers. Palatitis, in a *chronic, specific*, and generally *complicated form*, accompanies constitutional *syphilis*, and, in its *acute* and *diffused states*, it is frequently caused by the use of *mercurials*, especially if exposure to cold in any form concur to develope their effects.

8. ii. SYMPTOMS. — Inflammation is seldom confined to the soft palate, constituting the *simplest form of palatitis* or angina; but frequently extends more or less to the surfaces of adjoining parts, — to those of the tonsils and pharynx, and occasionally to those of the posterior nares, of the upper part of the œsophagus, and even of the glottis, although in a slighter degree. This is more especially the case in respect of catarrhal palatitis and in some epidemic visitations of the complaint.

9. *a*. The symptoms vary not only with the extent of surface that is affected, but with the constitution and habit of body of the patient, with the *character* of the affection, with the limitation of it to the mucous membrane, or with its extension to the sub-mucous cellular tissue. On inspection, the soft palate,— the velum and pillars of the fauces, are seen red and somewhat swollen. Slight heat, pain and uneasiness, with dryness at first, are complained of, and are increased on swallowing. The uvula is much elongated and hangs down upon the base of the tongue. There is generally a tickling or hawking cough from this cause, or from the extension of the inflammatory irritation to the lips of the glottis. There are often more or less mucous expectoration, and hoarseness of voice or speech. The tongue is loaded, and red at its point and edges. The pulse is accelerated, the bowels confined, and the appetite impaired. Chills and flushes continue to be felt, alternately, for two or three days. After the first or second day, a more abundant secretion of mucus takes place from the fauces and their vicinity, and in a few days more the complaint ceases.

10. *b*. Such is the usual course of the *simple* and more *mild palatitis*, particularly in its catarrhal form. But the inflammation often is more severe, and is attended by a lower or more *asthenic* fever, or it continues a longer period than that just stated. It may extend to or more immediately affect the Eustachian tubes, the pharynx, &c., and thus be complicated with pain in one or both ears, and deafness, or with pharyngitis, and even, although rarely, with œsophagitis, especially when the stomach and liver are much disordered. In some cases the inflammatory irritation, of a catarrhal or more phlegmonous character, subsides in the fauces, whilst it continues in the pharynx, occasioning painful or difficult deglutition, or even the forcible regurgitation of substances attempted to be swallowed, through the nostrils. The inflammatory or catarrhal irritation, however, more frequently extends to the glottis, and thence, in delicate persons, sometimes to the bronchi, occasioning cough, and catarrhal or slight, or even acute bronchitis; but in these cases the pharynx is generally mediately affected.

11. *c*. In other *complicated* instances, in addition to redness of the surface of the tonsils and fauces, the *tonsils* are enlarged, chiefly owing to effusion of lymph and serum under the mucous membrane in the connecting cellular tissue; and, in many cases, more or less tumefaction of the fauces is produced by the same cause. (See art. TONSILS.) When the disease is thus more deeply seated, more pain, uneasiness, and difficulty of swallowing are experienced, and the patient opens his mouth with an increase of pain. A copious secretion of mucus, mixed with a ropy saliva, takes place, and as this becomes less abundant and thicker, it sometimes also appears slightly puriform, especially in children. In these acute states, the symptomatic inflammatory fever is usually more fully developed; and, if they are *complicated* with inflammation of the tonsils, as they very frequently are, this fever assumes a highly inflammatory character, particularly in children and young persons.

12. *d*. In cold, humid, and low situations, seldom in sporadic or in few instances, more frequently in an epidemic form, the inflammation is, apparently, more confined to the mucous membrane of the palate and adjoining parts than in others, or in the common sporadic or more phlegmonous cases; and a greyish albuminous fluid is effused upon the inflamed surface, which immediately concretes into a false membrane. In this complication, the constitutional disturbance is extremely great, the powers of life often quickly sink, and the inflammation spreads rapidly over, if it does not simultaneously attack the mucous surface of the whole throat — of the soft palate, tonsils, pharynx, and even the Eustachian tubes, often extending also to the larynx and trachea, thereby inducing one of the forms of *croup*. (See art. CROUP, § 16.) In some cases, the inflammation spreads down the œsophagus also, particularly in children. (See art. THROAT.)

13. *e*. In the *thrush* and in other aphthous affections, the soft palate is implicated in common with the other parts of the throat and mouth, but this association of palatitis is fully considered in the article THRUSH. Palatitis, moreover, may supervene upon *erysipelas* of the face, and assume a very acute and diffuse character, the inflammation extending to the pharynx and larynx, and placing the patient in the most imminent danger.

14. *f*. The *chronic states* of palatitis differ from the simple and more common form, chiefly in the slighter grade and longer continuance of the

complaint. The surface appears irregularly red, or is reddened in patches, points, or striæ. Sometimes the vessels are more enlarged and conspicuous than usual; and the patches or points are of a more livid or dark hue. In some, dryness of the mouth and throat is complained of, and in others the mucous secretion is irregularly increased. This form of the complaint is generally prolonged by chronic disorder of the digestive organs, and by cachectic states of the system, or by constitutional disorder. Of the *specific forms* of inflammation of the palate, as the *acute form* caused by *mercury*, and the *chronic form* consequent upon the *syphilitic* infection, it is unnecessary to treat at this place. (See art. THROAT.)

15. *g.* The *duration* of the *acute states* of palatitis is seldom long: and generally *terminates* in a few days by resolution. These states seldom pass into *suppuration* unless they are very acute or phlegmonous, or are caused by some acrid or powerfully stimulating substance brought in contact with the palate and fauces. They rarely terminate in *gangrene,* unless in malignant *scarlatina,* and much more rarely in the membranous angina alluded to above (§ 12.) as occurring epidemically, especially in certain localities. (See art. THROAT.) I have observed this termination take place in two or three instances of erysipelas of the head and face, extending down the nostrils to the fauces. These cases occurred in persons addicted to spirituous liquors, whose liver and other digestive organs were much disordered.

16. *Ulceration* occurs chiefly in the more *chronic states* of the disorder, which are usually of long and very indefinite duration, owing to their dependence upon the constitutional maladies alluded to above (§ 14.), on which maladies, specific *inflammation* and *caries of the bones of the palate* may also supervene. Ulceration may occur also in the asthenic or more complicated and malignant states of acute inflammations of the throat, but not so frequently as it was formerly supposed to occur. (See art. THROAT.)

17. iii. The *Prognosis* of palatitis is commonly favourable, unless it assumes a very asthenic and complicated character, or extends to adjoining surfaces, owing to impaired vital energy, to disorder of the digestive and assimilating organs, or to contaminated states of the circulating fluids, in which circumstances it is apt to induce dangerous laryngitis. When it is associated with, or is symptomatic of, the diseases named above (§§ 14. 15.), the prognosis will altogether depend upon the nature of the primary malady, the state of the constitutional derangement, and the appearance of the local affection.

18. iv. TREATMENT. — *a.* There are few cases of palatitis which are not more or less benefited by an *emetic,* especially if its operation be duly promoted by diluents or the tepid or warm infusion of chamomile flowers, or if the affection be simple and mild, or caused by gastric or bilious disorder. The emetic should generally be followed by an active purgative and the warm pediluvium, a diaphoretic medicine being given at bed time, and continued as the presence of fever may suggest. These remedies, in the slighter cases, will generally remove the complaint; but, in the more acute, they may be insufficient, and general or local depletions may be also required, particularly when the patient is strong or plethoric, and the complaint complicated with tonsillitis. Antimonial diaphoretics, the solution of the acetate of ammonia, and the spirits of nitric æther will generally be of service in these cases; and, when *blood-letting,* general or local, has been resorted to, *sinapisms,* or *embrocations,* will be applied to the neck or throat with marked benefit. In the more acute or phlegmonous cases, particularly in robust and plethoric persons, the blood-letting will advantageously precede the emetic; and it should be also followed by a brisk cathartic, or a powder containing calomel and antimony, given at bed-time, and a purgative draught in the morning.

19. *b.* In this early or acute stage of the complaint, astringent or stimulating gargles are seldom beneficial; but the vapour of warm water impregnated with camphor, or the vapour of chamomile flowers and poppy-heads, or of an infusion of hops, &c., passed through the mouth, will often be of service. — Afterwards, warm gargles with small quantities of nitrate of potash, of the hydrochlorate of ammonia and camphor, will be of use.

20. *c.* After the acute symptoms have been removed, and relaxation of the parts, or a *chronic state* of *irritation* or *congestion* remains, *gargles,* containing the muriatic or sulphuric acid, or the sulphate of alumina, and one or more of the tinctures of myrrh, bark, capsicum, &c., will then prove beneficial. When the uvula is elongated, gargles, with the nitrate of silver, or a stronger solution of this salt, applied to the part by means of a small brush, or the applications already noticed (§ 5.), are then most efficacious. If an œdematous state of the palate continue after the acute stage has subsided, or if it have existed from the commencement, the terebinthinate embrocation (F. 311.) I have so frequently recommended, may be applied on warm flannel around the throat, or a blister may be applied on the back and sides of the neck.

21. *d.* If the inflammation proceed to *suppuration,* giving rise to a small abscess in the cellular tissue of the velum, &c., an early outlet should be given to the matter, and afterwards similar means to those already advised ought to be employed, or varied with the circumstances of the case, particularly the external applications mentioned above (§ 20.)

22. *e.* If the disease assumes the *asthenic* or diffused, or *complicated form* alluded to (§ 13.), or if membranous *exudations* form upon the inflamed surface, permanent stimulants and tonics, in the former case, and discutient and resolvent applications, in the latter, as fully shown in the article THROAT, are imperatively required, as the only means of preventing fatal sinking of the powers of life, in the one, and extension of the disease to the larynx and trachea, in the other. (See *arts.* CATARRH, CROUP, SCARLET FEVER, THROAT, THRUSH, and TONSILS, for important pathological connections of diseases of the palate.)

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PALPITATION. See art. Heart — *Functional Disorders of*.

PANCREAS. — Syn. — Παγκρεας (from παν, all, and κρεας, flesh), *Pancreas*, Fr. — *Gekrösdrüse, Pankreas*, Germ. *Pancreas*, Ital.

1. *The diseases of the Pancreas* have attracted but little attention, partly from the belief in their rare occurrence, and partly from the difficulty of recognising them during life. — The *functions* of this viscus have been rather inferred than demonstrated. The similarity of the *secretion* produced by the pancreas to saliva has been shown by Magendie, Tiedemann, Gmelin, Lassaigne, Leuret, and others. But the pancreatic fluid contains no mucus, whilst saliva does. The former seems to contain a little free acid, the latter is nearly neutral. No analysis, however, of the pancreatic fluid from the human subject, has been furnished of sufficient accuracy to be confided in; and all we know respecting it is, that it resembles the saliva, but differs somewhat from it in chemical composition. The precise amount of function performed by the pancreas not having been ascertained, it has been supposed that the fluid secreted by it dilutes the chyme, and assists in the change of chyme into chyle. This office at least may be conceded to it; but it is not improbable, that it also aids in the complete conversion of chyle into blood, or in the formation of hæmatozine, as great emaciation and anæmia have been present in cases where chronic disease and obstruction of this viscus have been found after death. Drs. Tiedemann and Gmelin think that it assists in animalizing vegetable food not containing azote, as it contains a large quantity of highly azotised principles.

2. Formerly several diseases were considered to have their seat in the pancreas. Fernelius believed that this viscus was concerned in the production of diarrhœa, dysentery, cachexia, atrophy, languor, slow fevers, &c.; and Riolanus added to these, hypochondriasis and some other chronic disorders. Morgagni and Portal have adduced several instances of its change of structure; but some recent writers have made but little mention of its diseases. Although these diseases are seldom observed, and but rarely detected during life, owing to the want of precise knowledge of the functions of the organ, and to the situation and relations of it in respect of other organs, yet there are several reasons for inferring that they are more frequent than has been generally supposed. I shall, therefore, notice, — 1st. Those *functional disorders* which may be imputed to the pancreas, although with much doubt and reservation; — 2d. *Inflammations*, of it and the *consequences* they usually produce; — and 3d. Those *lesions of structure* not necessarily consequent upon inflammation.

I. Functional disorders which may be imputed chiefly or partly to the pancreas.

Classif. — I. Class. I. Order (*Author*).

Defin. *Alterations of the quantity or quality of the pancreatic fluid so as to disorder the functions of digestion or defæcation.*

3. Although I have inferred, that a material change in the quantity or quality of the pancreatic secretion will be productive of disorder of the stomach or bowels, still the exact characters of such disorders, and the differences subsisting between them and other disorders of these viscera, cannot be fully shown, or illustrated by satisfactory proofs. — *A. Deficiency of the pancreatic secretion* — *Torpor Pancreatis* — cannot be ascertained: although it very probably often occurs independently of organic lesion, and owing to impaired vital action of this gland. The extent of disorder, or the symptoms produced by this condition, hardly admit of remark; but it is not improbable, that indigestion, costiveness, flatulence, and many of the symptoms I have assigned to functional disorder of the *duodenum* (see art. Duodenum, § 2. *et seq.*), may partly depend upon this state of function of the pancreas. Indeed, when the vascular and nervous connections of this organ, the duodenum, the liver, and of the stomach are considered, it will be admitted that impaired energy of one or more of them will readily extend itself to the others. Emaciation, anæmia, or imperfect sanguification and assimilation, in any of their grades, may not improbably partly depend upon this state of function. In the experiments by Brunner of extirpating the pancreas, the alvine evacuations became scanty and indurated; and, although but little reliance can be placed upon the results of so violent an operation as this, still they correspond with rational inferences.

4. *B. Increased secretion of the pancreatic fluid, with or without change of its qualities or properties*, may take place, independently of structural lesion of, although hardly without vascular determination to, this organ. Analogy supports this inference, although demonstration of the fact cannot be adduced; and it may, upon the same evidence, be admitted, that some agents will have the effect of increasing this fluid, although the proofs of such an effect may be disputed. In some cases of diarrhœa, the stools present appearances so closely resembling those of the salivary and pancreatic fluids, that it is not unreasonable to infer, that they consist, at least in part, of an increased flow of the latter fluid. But when diarrhœa follows the suppression or disappearance of salivation, the stools presenting these appearances, the inference as to its nature and origin — as to its being actually a form of *pancreatorrhœa* — is still more conclusive. In those cases, also, where watery and ropy evacuations have followed the exhibition of chologogue purgatives, with the view of removing dropsical effusion, it is not unreasonable to suppose, that a portion of these evacuations has consisted of an increased flow of pancreatic fluid.

5. Since I commenced lecturing in 1825, I have argued, that the discharge from the stomach in Pyrosis (*see that article*), chiefly consisted of an augmented, and probably also of a somewhat altered pancreatic secretion, — that this secretion, owing to its properties or its quantity, or to both, had been regurgitated into the stomach, and that its accumulation there had occasioned pain and

irritation, followed by its rejection. Thus I have viewed pyrosis as being more correctly a form of *pancreatorrhœa*, and have considered that alteration of the quality of the fluid has caused its ejection upwards, instead of its passage through the bowels. More recently, MM. MONDIÈRE and GUERSENT have espoused nearly the same view of the origin of pyrosis, ascribing it to the irritating quality of the pancreatic fluid. It should not be overlooked, also, that WEDÉKIND and PORTAL ascribed chronic diarrhœa and dysentery, with watery, colourless, or ropy discharges, chiefly to a morbidly increased secretion from the pancreas. But DUPUYTREN went still further when he believed that the enormously abundant discharges in epidemic cholera proceeded from this viscus.

II. INLFAMMATION ON THE PANCREAS. — SYN. *Pancreatitis, Inflammatio pancreatis.* — *Pancreatite*, Fr. *Gekrösdrusenentzündung*, Germ.

CLASSIF.— III. CLASS. I. ORDER (*Author*).

DEFIN. — *Deep-seated pain, somewhat below the pit of the stomach, or between this part and the umbilicus, extending to the back and under the left shoulder-blade ; occasional vomiting of an albuminous and ropy fluid, great thirst, and symptomatic fever.*

6. The pancreas may, like other organs, be inflamed either in an *acute*, *sub-acute*, or *chronic form.* It is doubtful whether or not the second and third of these states, owing to the comparative mildness of the disease, and the frequent association of it with inflammation of adjoining parts, can be certainly detected during life — most probably only in a small proportion of instances ; and it is not improbable, that enlargement and induration of the organ are consequences of one or other of these states of inflammation, more particularly of the chronic. It has been doubted by MM. BÉCOUR and MONDIÈRE, whether *acute*, *sub-acute*, or *chronic* pancreatitis is of most frequent occurrence, but the point hardly admits of solution, nor is it of much practical importance.

7. i. SYMPTOMS.—*a.* The phenomena attending the *acute* state of pancreatitis are chiefly dull, gravative, or even acute and deep-seated pain a little below the pit of the stomach, extending to the back and below the left shoulder-blade, increased by bending the body forwards, and but little affected by pressure ; a sense of constriction or of anxiety at the præcordia, and an unusual dryness of the fauces and thirst, with more or less symptomatic fever. There are other symptoms which are less constantly observed than the above ; and there are some which occur more frequently in the course of the *sub-acute* and *chronic* states of the complaint than in that of the acute. Occasionally, a painful feeling of heat is complained of at the epigastrium, and sometimes a sense of tension in this region. There is every reason to infer, that the pancreas is greatly tumefied when it is inflamed in either of the forms just mentioned, and hence jaundice, owing to the pressure of the tumefied gland upon the common bile-duct, may be expected sometimes to occur. In some cases, also, more or less tumour has been detected between the scrobiculus cordis and umbilicus ; the tumour being hard, painful, deeply seated, and distinct from the liver and stomach. Occasionally there is a discharge of a ropy fluid from the stomach without retching, or even without nausea or anorexia ; and, in other cases, both nausea and vomiting occur, a ropy mucous fluid, of a whitish-grey colour, occasionally tinged with bile, being thrown up. Sometimes a more copious flow of saliva than usual takes place. The state of the bowels varies. When a ropy fluid is discharged upwards, the bowels are generally confined ; but occasionally a mucous diarrhœa, or loose ropy stools are observed.

8. *b.* The more *chronic states* of pancreatitis are recognised with difficulty. Many of the symptoms above detailed are present in a slighter or less manifest form ; but several of them, particularly the pain, sense of tension, and heat, are either felt only after a meal, or are aggravated by it. In addition to these, flatulence, acrid eructations, or pyrosis, various dyspeptic symptoms, and pain or uneasiness in the back, are complained of. According to HEINECKEN, EYTING, MONDIÈRE, FALLAT, and others, some degree of tumour, or fulness may be detected in the epigastrium ; and a ropy mucus, resembling saliva, is generally vomited every morning ; or, when this is not observed, regular attacks of pyrosis occur, or evacuations from the bowels of matters partly resembling those which have been brought up by the œsophagus. In a few instances salivation has alternated with the above symptoms.

9. One question suggests itself, viz. whether the augmented pancreatic secretion attends the acute, sub-acute, or chronic states of the disease? An increased discharge of this fluid appears often in connection with inflammation of the gland ; but whether it is antecedent to, coetaneous with, or consequent upon, the inflammation, has not been determined. It is not unlikely, that the most acute states of the disease, when the substance of the gland is the seat of the inflammation, are not attended by an augmented, but rather by a diminished secretion of the pancreatic fluid.

10. *c.* The *complications* of pancreatitis generally obscure, or altogether conceal, the disease of this viscus. Indeed, even when pancreatitis is the primary complaint, the inflammation may soon extend to the duodenum, or to the stomach, or to the liver, or to the root of the mesentery, or even to any two of these viscera ; but probably the pancreas is more frequently affected consecutively of inflammation of one or other of these organs, than primarily. The *symptoms* attending these complications have not been satisfactorily observed ; but they may be inferred to consist of an association of many of the above symptoms (§ 7.) with the phenomena characterising inflammation of either of those viscera complicated with pancreatitis.

11. *d.* The *Terminations* and *Consequences* of pancreatitis are, 1st. Resolution ; 2d. The effusion of coagulable lymph upon the surface of the organ ; 3d. Suppuration ; 4th. Gangrene ; and 5th. Chronic enlargement and induration.

12. (*a.*) HARLES supposed that a copious sweat or diarrhœa is critical in pancreatitis, especially if the latter present a ropy or mucous character ; but facts are wanting to prove these points. It is, however, not unlikely that the complaint is resolved in the milder cases by a copious secretion, causing more or less diarrhœa, or even vomiting or pyrosis, without the symp-

toms having been so prominent as to lead to the detection of the antecedent pancreatitis.

13. (*b.*) The *effusion of coagulable lymph* upon the external surface of the pancreas, gives rise either to a false membrane, or to adhesion of it, owing to the extension of inflammation to the external surface of an adjoining viscus, as the duodenum, pylorus, stomach, liver, spleen, mesocolon. These adhesions vary in thickness and form with their situation, age, organisation, &c.

14. (*c.*) *Suppuration* has been noticed by LIEUTAUD, HARLES, BAILLIE, PORTAL, MOULON, BÉCOURT, and others; but it has been most accurately described by M. GENDRIN, who states that it generally commences with infiltration of the interlobular tissue of the part of the organ affected. The glandular granules are soft, of a reddish grey colour, and diminished in size, although the organ is enlarged. The capsule is much inflamed, and sometimes thickened by the formation of a false membrane. At an advanced period of suppuration the matter is collected in one cavity, generally of moderate size. The pus is occasionally intermixed with the pancreatic fluid, which exhibits a clear yellowish appearance. In some cases, the abscess is so large as to destroy the whole substance of the organ. In these cases M. GENDRIN describes the matter as inodorous and creamy; but PORTAL states that it is sometimes very offensive.

15. Pancreatic abscess may be *discharged* either into the stomach, or into the duodenum. It may pass even into the duplicature of the mesocolon, where it may be retained, or whence it may pass into the peritoneal cavity. It may even pass along the duct into the intestines, and be evacuated by stool. A case communicated by Dr. HAYGARTH to Dr. PERCIVAL seems to have been of this kind.

16. *Secondary abscesses*, or collections of matter after phlebitis, or consequent upon the absorption of matter in situations more or less remote, have been found in the pancreas in post-mortem examinations, but not so frequently in this viscus as in some others, as the liver, lungs, &c. They have been found chiefly after puerperal or uterine phlebitis, and after phlebitis consequent upon extirpation of the testicle. The occurrence of abscess in the pancreas, after extirpation of the testis, was first remarked by A. PETIT and PORTAL; but its actual dependence upon inflammation of the veins after the operation was not known until more recently.

17. The *symptoms* indicating suppuration of the pancreas have not been precisely observed; but they probably differ in few respects from those attending suppuration in other internal parts, which is usually insidious and obscure. If an abscess of considerable size should form, so as to occasion a tumour, the situation of it may assist in indicating its nature; but, if it should cause jaundice by pressing on the common duct, it might be mistaken for tumour in the liver, or for an overdistended gall-bladder, from occlusion of the common bile-duct, which latter generally attends enlargement or tumour of the pancreas of any kind.

18. (*c.*) *Gangrene* has been very rarely observed in this organ. Two cases of it have been recorded by M. BÉCOURT, and one by M. PORTAL. In one of these, the patient had been subject to occasional colicky pains, which were deeply seated above the umbilicus, and were sometimes preceded, at other times followed, by nausea or by diarrhœa. He became emaciated, the pains were more acute, and the pulse rapid. The heat of the skin assumed an acrid or morbid character; the abdomen became tender; the urine scanty and red; and death followed a few days afterwards. The pancreas was found of a livid-red hue, very much softened, exuding from its whole surface a blackish, fœtid fluid, and gangrened almost throughout its extent. The stomach and duodenum were inflamed.

19. (*d.*) *Enlargement* and *Induration* of the pancreas are probably also consequences of chronic inflammatory action, or irritation; or of prolonged excitement, followed by a change of the nutrition, of the organ; but more particular notice will be taken of these lesions in the sequel (§ 25.)

20. ii. *The* CAUSES *of Pancreatitis* are not fully ascertained. Many foreign writers consider the abuse of mercury to be the most frequent cause of it; and, next to mercury, HILDENBRAND views the use of tobacco, particularly the smoking and chewing of this noxious herb, as most influential. The immoderate use of spirituous liquors; a frequent recourse to purgatives; falls, blows, and other external injuries; and the extension of inflammation from adjoining organs, are probably also causes of this disease. Pancreatitis may even occur sympathetically of inflammation of the salivary glands. M. ANDRAL found the pancreas greatly injected in a patient who died of fever with enlargement of the parotids. M. MONDIÈRE refers to a case in which these glands were remarkably enlarged. The enlargement disappeared rapidly, but was followed by symptoms of disease of the pancreas; and this disease, in its turn, was superseded by inflammation of the testicle. The enlargement of the parotid again appeared, the affection of the testicle subsided; and the application of a blister upon the parotid fixed the inflammation in this latter part, suppuration being the result. I have met with several cases in which inflammation, in a sub-acute or chronic form, seemed to exist in the pancreas, but chiefly in pale and debilitated persons, who had complained of prolonged disorder of the digestive organs. Only one opportunity, however, was afforded me of verifying the diagnosis by an examination after death; and in that case, the pancreas was very much enlarged and somewhat indurated. The following case recorded by Dr. SCHMACKFEFFER will illustrate the history of acute pancreatitis: —

21. A female, twenty-nine years of age, contracted syphilis, for which she was treated by means of corrosive sublimate. Violent ptyalism took place, four pounds of saliva being excreted in the twenty-four hours. As this secretion diminished, diarrhœa appeared and increased. Soon afterwards the patient complained of anxiety and heat, with a fixed, obtuse, and deep-seated pain, at the epigastrium; of loss of appetite, nausea, tension of the abdomen; of great thirst and dryness of the throat; and rapid pulse. These symptoms were aggravated when the stomach was full. During five days, some amelioration was remarked, but bilious vomiting supervened and the pain and diarrhœa increased. The frequency of

the calls to stool became remarkably great; a watery yellowish fluid resembling saliva being voided. The deep-seated pain above the umbilicus prevented the patient from lying on her back and left side; and was increased by a full inspiration. Some days of relief followed, after which a violent increase of fever appeared, with a return of the diarrhœa, an acute pain at the epigastrium, and cough and orthopnœa. Bloodletting was prescribed. The following morning the parotids were hot and painful; the mouth was burning, the pulse small, and the stools were suppressed. Mercury, camphor, and opium were ordered, and leeches, blisters, &c., to the parotids. Towards evening, the breathing became stertorous, the anxiety extreme, the pulse thready and intermittent, the extremities cold, and the face Hippocratic. She expired in the night. The pancreas was found red, swollen, and somewhat more consistent than natural. It weighed eight ounces; and blood ran freely from it upon dividing it. The duct was dilated. The parotids were also inflamed.

22. iii. *The* TREATMENT of pancreatitis differs but little from that of other inflammations of an acute and sthenic character. General or local bloodletting, or both, according to the state of the pulse and vascular system generally, and to the condition of the patient; warm baths, fomentations, and diluents; cooling diaphoretics and sedatives, are the most appropriate means. If diarrhœa be present, it merely should be moderated, by absorbents and opiates, or small doses of Dover's powder; and the circulation determined to the surface of the body by promoting a copious perspiration. A large blister, sinapisms, or warm turpentine embrocations, placed over the epigastrium, will generally alleviate the deep-seated pains, as well as the vomiting, when these symptoms are present. If the disease appears to have passed into a *chronic state*, these external derivatives may be rendered more permanent by repetition, or by procuring a discharge from the blistered or inflamed surface; and, if indications of suppuration of the gland occur, the constitutional powers should be supported, and absorption promoted by prescribing the iodide of potassium, and liquor potassæ with sarsaparilla and tonic vegetable infusions or decoctions; a discharge from the external surface being also procured. The pale and anæmial state of some patients in whom I have had reason to suspect the existence of inflammation of the pancreas, seems to contra-indicate the propriety of general, and even of local bloodletting, and to suggest very different, if not opposite means of cure; and in a very few instances I have prescribed the sulphate of iron with camphor and opium; sulphate of quinine with camphor and hyoscyamus, or conium, or extract of hops; the trisnitrate of bismuth with ipecacuanha and either of these narcotics, and similar medicines with marked benefit; but more or less doubt existed as to the exact seat and nature of the malady.

III. STRUCTURAL LESIONS OF THE PANCREAS NOT NECESSARILY DEPENDENT ON INFLAMMATION.

CLASSIF.—IV. CLASS. I. ORDER (*Author*).

23. The *organic lesions* of the pancreas, as those of other organs, have been chiefly referred to diseased nutrition, when they appear to differ from the more obvious consequences of inflammation. Still this diseased nutrition, varying as it does in character, form, and results, must itself depend upon some pre-existing morbid state or states, originating either in the organic nerves of the part, or in the capillary vessels, or in the secreting apparatus of the part, or in these collectively — in the vitality, in short, of the organ. Modern pathologists, in grappling with this and several other subjects which have long been matters of discussion, have had recourse to new names and terms, believing that they afford explanations, even if they do not actually constitute discoveries. But the reader will soon be enabled to estimate the true value of terms or epithets when he reflects upon their meaning, and their applicability to visible phenomena and changes, — to deviations from the healthy condition, which are never stationary or exactly identical with one another, but varied in form, character, appearances, associations, morbid relations and results, to an extent that precludes the possibility of description; and he will readily detect what portion of sense and precise information may be concealed beneath the rubbish of phraseology, and the affected use of novel terms. Still terms and names of some kind are conventionalities that must be resorted to, in order to convey accurate ideas of certain morbid conditions, and their probable results; but these should not be multiplied beyond the necessity of the occasion; nor be used when generally received and well understood words are altogether applicable.

24. i. *Atrophy* or *wasting* of the pancreas sometimes occurs, according to SIEBOLD and LOBSTEIN at an advanced age. It is occasionally also the result of disease, either of itself or of adjoining organs. Dr. LOBSTEIN records an instance of the pancreas being atrophied and somewhat indurated, independently of lesion of any other organ. Most frequently, however, the wasting is connected with organic disease of the liver, duodenum, stomach, or of the mesenteric glands or consequent upon tumours developed in its vicinity, as scirrhous enlargement of the pylorus, aneurisms of the aorta, &c. Dr. HULL found the pancreas wasted owing to the pressure caused by a scirrhous tumour in the mesentery. M. GUERIN observed this lesion produced by a similar cause; MORGAGNI by a tumour in the liver; M. BERJAUD by aneurism in the aorta; and M. MONDIÈRE by scirrhous pylorus. In this last case, it is supposed that the atrophy of the pancreas is the result rather of interrupted or diminished function, owing to the small quantity of chyme passed into the duodenum, than of any pressure produced by the thickened pylorus. M. DARCY has adduced a case of *rabies*, in which the pancreas was remarkably small. In a case recorded by Dr. WOLF of a person who had complained of nausea, vomitings of bilious and mucous fluids, of a burning sensation along the œsophagus, of alternations of constipation and diarrhœa, and ultimately of excessive emaciation, the pancreas was found very small, indurated, of a greyish colour; its arteries being ossified, and its duct obstructed.

25. ii. *Hypertrophy* or *enlargement* is the most frequent lesion observed in the pancreas; but it is rarely seen without some change in the structure of the organ. Chronic inflammatory action, and the consequent deposition of albuminous

lymph in the areolar or cellular tissue, especially the interlobular tissue, this lymph having become more dense by the absorption of its more fluid parts, and ultimately partially organised, are probably the changes constituting a large proportion of the cases of enlargement of this organ; and these in a more advanced and indurated state, have not unlikely been mistaken for, and described as, scirrhus of the organ, by several writers who have recorded instances of scirrhous tumour in this situation. It is even not improbable, that obstruction of the pancreatic duct may be followed by a form of enlargement which has not been accurately described. An out-patient of the South London Dispensary, under my care, in June, 1821, had complained of fever, pain below the epigastrium, of nausea, vomitings, thirst, emaciation, &c. She was pale, debilitated, and ultimately deeply jaundiced. A manifest tumour was detected in the lower part of the epigastrium. The body was examined after death by myself and Mr. Bryant, my colleague. The gall-bladder was distended by thick black bile, the common and pancreatic ducts were entirely obliterated by a remarkably enlarged and indurated pancreas. Upon examining the structure of this organ more minutely, it seemed as if the glandular structure was more dense than natural; the connecting cellular tissue was infiltrated with albuminous lymph, which had become condensed by the absorption of its more fluid parts, and the ramifications of the ducts were dilated and filled with the albuminous and more consistent constituents of the pancreatic secretion, the more watery portion having apparently been absorbed.

26. It is not unlikely that these more simple changes, giving rise to enlargement of the organ, whether consequent upon chronic inflammation or upon obstruction to the discharge of the pancreatic fluid, may be followed by other important changes, several of those about to be noticed actually originating in these. The infiltration of an albuminous fluid or lymph into the connecting cellular tissue; the subsequent organisation, partially or fully, of this, and the growth of it afterwards as the organisation of it becomes more perfect; the changes produced by it from pressure or otherwise, upon the natural structure and secreting apparatus; and the alterations of organic nervous influence, of vascular action and nutrition, of which the organ is subsequently the seat, may reasonably be viewed as not altogether an insufficient explanation of several of the changes and transformations observed in this and other glandular structures. Several interesting cases and notices of enlargement of the pancreas have been recorded by Sewall, Crampton, Gregory, Abercrombie, Bécourt, Bedingfield, and others referred to in the *Bibliography*.

27. iii. *Softening* of the pancreas, as well as enlargement, may result from acute inflammation; but it has been observed chiefly in scorbutic and scrofulous persons. M. Portal found this organ remarkably softened, without being either reddened or enlarged, in two children who died in measles. This change has been also remarked in fatal cases of confluent small pox, and of malignant scarlet fever. I have observed it in malignant remittent fever and in scurvy, but only in common with softening of several other organs, as the spleen, &c. I am not aware of any instance having been recorded of *hæmorrhage* into the substance of the pancreas, independently of *wounds* or *rupture* of the organ.

28. iv. *Induration* of the pancreas may exist independently of scirrhosity, and it is extremely doubtful whether or not simple induration is the commencement of scirrhus, as supposed by some writers. Some degree of induration sometimes exists with hypertrophy; but, in simple induration of the glandular granules of the organ, increased bulk is rarely observed, the connecting cellular tissue being neither thickened nor indurated, as in cases minutely described by MM. Mondière and Bécourt, in which the granules only were remarkably indurated, the connecting cellular tissue being sound. The subject of one of these cases died of chronic duodenitis. In incipient scirrhus a portion only of the organ is affected, and the cellular tissue is either primarily attacked or early implicated. Although simple induration of the pancreas is thus independent of, yet it is sometimes associated with hypertrophy, as in the case already noticed, and in another which was more recently observed, in neither of which nor in the two cases described by Dr. Sewall, did the disease present a scirrhous character.

29. v. *Cartilaginous induration* or *transformation* of the pancreas was met with by Morgagni, Andry and Lilienhain, who have described the organ as somewhat enlarged, its surface irregular, and its substance of a cartilaginous consistence. This change was found in persons who long experienced nausea, vomitings, thirst, pain at the epigastrium, costiveness, &c., and was probably the remote consequence of chronic inflammation.

30. vi. *Concretions* similar to those found in the salivary glands and ducts, have been met with in the pancreas in rare cases. These are either small and numerous, or few and large. In some instances, they are found apparently in the substance of the organ, but probably formed in the ramifications of the ducts; but more frequently they are lodged in the excretory duct. Graeffe found seven of the size of peas in the right portion of the gland. Galeali found about twenty contained in a cavity the size of a hen's egg, in the head of the viscus. Portal met with a dozen, some of which were as large as a nut. The gland was greatly enlarged, and the duct much dilated. The concretions were rounded, whitish, and when reduced to a powder, were dissolved by boiling water. They had an insipid taste. Merklin found a concretion as large as an almond; and Meckel states that he has seen the organ changed to an almost tophaceous mass. Those commonly found in the excretory duct are often large, about the size of a nut, and composed of the carbonate or phosphate of lime. They are generally whitish, and their surfaces irregular. By obstructing the duct, they occasion swelling and enlargement of the gland. The salivary secretion continuing for a time after the obstruction, the ramifications of the obstructed duct are distended by this fluid, which becomes inspissated by absorption of the watery parts of it, and thus a form of enlargement already noticed (§ 25.), is produced.

31. vii. *Tubercular formations* have been seen in the pancreas by several modern pathologists, and have been fully described by Nasse, Bouillaud, Reynaud, Mitivie, Harles, and Bécourt. They

appear to have been attended by hectic fever, emaciation, occasional salivation and diarrhœa, and by pain at the epigastrium or a little below it; and to have existed chiefly in the first and second stages of developement.

32. viii. *Transformation of the pancreas into a fatty substance*, has been observed by MM. DUPUYTREN, LOBSTEIN, and BECOURT. This lesion is different from, and should not be confounded with, an accumulation of fat in the cellular tissue uniting the lobes and lobules. The change may affect either a part or the whole of the organ, as in the cases observed by the writers just cited. The symptoms remarked in those cases were a sense of oppression at the epigastrium, pain between the umbilicus and pit of the stomach, constant cardialgia, salivation, and jaundice.

33. ix. *Cysts* have been found in this organ by MORGAGNI, and M. BECOURT has described a preparation in the museum of the medical school at Strasburg, of a cyst of a very large size in the body of the viscus.

34. x. *Scirrhus and carcinoma* of the pancreas have been observed by most of the writers referred to in the *Bibliography;* but many of the cases adduced as scirrhus have been more correctly instances of enlargement with induration. True scirrhus generally affects, or commences in, a part only of the organ; but it may extend to the whole. This malady appears to attack the pancreas primarily in a large proportion of cases, as it alone has been found affected; although, in others, it has also been found in other parts. In a few cases the pancreas only is diseased; but in the great majority, lesions of some kind — non-malignant or malignant — slight or extensive — are also observed in other, most frequently in adjoining organs, particularly the duodenum, the stomach, the pylorus, the liver, the spleen, the mesentery, the adjoining or connected ducts, blood-vessels, &c., or any two or more of these or other viscera. Scirrhus of the pancreas may exist without any increase of size. Most frequently, however, the bulk of the organ is more or less, or even very remarkably enlarged. The scirrhous pancreas sometimes adheres to one or more adjoining organs or parts; most frequently when the scirrhus has gone on to *ulceration* — a result not frequently remarked, probably owing to the circumstance of scirrhus, and the lesions associated with it in other organs usually terminating fatally before ulceration commences. Cases, however, of open cancer of the pancreas have been recorded by HASENOEHRL, BERTHEAU, MATTHEIS, MABILLE, VAN DOEVEREN, LERMINIER, PORTAL, and VIDAL. Scirrhous enlargement of the pancreas is generally attended by very obstinate vomiting, particularly when the pylorus or duodenum is much pressed upon, or constricted by it; and by acute pain in the back. Instances not only of constriction of these and of the common bile-duct, causing deep jaundice, but also of compression of the aorta, by this lesion of the pancreas, have been recorded by RAHN, PORTAL, SALMADE, and BRIÈRE DE BOISMONT. The compression and constriction of the aorta may even occasion aneurismal dilatation above the seat of constriction, as seen by PORTAL and SALMADE.

35. xi. *Fungo-Hæmatoid disease* has been found in the pancreas in three cases by Dr. ABERCROMBIE, and in single instances by Dr. BRIGHT and others. I found this lesion in the pancreas of a boy about fourteen years of age. Several other organs were also the seat of this malady.

36. xii. *Melanosis* has been found in a few cases: but this disease has not been accurately observed and described, as it affects the pancreas.

37. xiii. *The symptoms of organic lesions of the pancreas* are often very obscure: and although it may be inferred, from the grouping of morbid phenomena, that the pancreas is the seat of disease, the exact nature of that disease, or the extent of lesion of other organs associated with it, can rarely be recognised during life. The symptoms which are most frequently observed, although not constantly, are cardialgia, nausea, vomiting, and other disorders of the stomach; pain at the lower part of the epigastrium; tumour in the same situation; salivation; diarrhœa, or constipation; emaciation; and jaundice.

38. (*a.*) *Cardialgia* and other symptoms of severe indigestion had been early remarked in all the cases of organic lesion of the pancreas which I have had an opportunity of observing. The appetite at this early period was not usually impaired. It was even increased, in some cases. Thirst was often complained of at an early stage, but not so much as in the acute state of disease. To these symptoms generally succeeded *nausea* or *vomiting*, either occasionally or at intervals. At first, only eructations of a ropy fluid occurred; but subsequently vomitings, two or three hours after a meal, supervened. As the disease proceeded to a fatal issue, the vomiting was more frequent and obstinate.

39. (*b.*) *Pain*, deep-seated in the lower part of the epigastrium, with a sense of heat, was also an early symptom, and was most complained of when the stomach was empty. It was aggravated at intervals, especially by flatulence, which frequently attended it, and was relieved for a time by eructations, which sometimes were attended by a discharge of a ropy fluid, sometimes insipid, at others acid. The pain usually extended to the spine, and to either hypochondrium. It seems to have been most severe in the cancerous cases, as in that described by M. ANDRAL, in which it was very acute, and seated chiefly in the back, whence it irradiated to the chest and abdomen. In some instances, as observed by Dr. SEWALL and others, it was increased by the vertical position, the patient generally bending forward to obtain relief. In order to ascertain the exact seat of pain, and to distinguish between disease of the pancreas and that of the pylorus, the epigastrium should be examined or pressed upon at the same time that the left hand presses firmly against the back. When the pylorus is affected the pain is felt more superficially, chiefly to the right of the epigastrium, is more aggravated by pressure than in disease of the pancreas, and is more relieved by vomiting; but disease of both parts is often associated.

40. (*c.*) *Tumefaction* between the pit of the stomach and the umbilicus was found deep-seated, in the more emaciated subjects, when there was considerable enlargement of the organ. The tumour was generally, at first, very difficult to detect. When this is the case, the examination should be made in the manner just now directed.

In some instances, in addition to a tumour, there was a feeling of weight in the back, with a sense of pulsation, which was perceived externally, or felt by the hand placed on the epigastrium.

41. (*d.*) *Salivation* occurs in both acute and chronic diseases of the pancreas, and in both the early and late stages of the latter. J. P. Frank saw a case in the last stage of emaciation from scirrhus of this organ, in which six pints of saliva were discharged daily. Similar, but not so remarkable instances, have been recorded by others. Salivation is one of the most frequent symptoms: it was sometimes followed and relieved by vomitings; and it was also often superseded by diarrhœa, in the cases which I have seen.

42. (*e.*) *Constipation* and *diarrhœa* are generally present at certain stages of organic lesion of this organ. They often alternate; but constipation is commonly observed at an early period, and is obstinate. Diarrhœa presents unusual characters, the stools being frothy and ropy. Dr. Bright has directed attention to a very remarkable state of the evacuations when scirrhus or other disease of the pancreas is associated with ulceration, or other lesions of the duodenum. In several cases of this complication, the stools contained much semi-fluid, fatty or oily matter, which was of a fetid odour, and somewhat resembled adipocere.

43. (*f.*) *Emaciation* and *Anæmia*, the former especially, always attend the advanced stages of chronic alterations of the pancreas. Dr. Pemberton considered that emaciation is more extreme in these, than in any other malady. The anæmia is also remarkable, and is obviously owing to the impaired chylification resulting from the disease of this organ.

44. (*g.*) *Jaundice* is a frequent symptom, particularly where the head or the whole of the organ is enlarged. The pressure on the ducts is often also attended by great distension above the seat of pressure and accumulation of bile in them and in the gall-bladder. In these cases, the tumour caused by the distended gall-bladder may be distinguished from that caused by the diseased pancreas, by the more superficial position of the former.

45. xiv. *The Treatment of chronic maladies of the Pancreas* is very generally inefficacious. Hoffmann placed more reliance on diet than on medicine for these diseases. Pemberton entertained a similar opinion, and recommended a vegetable and milk diet for them. Still there is reason to believe that, in an early stage and when not malignant, they may be influenced by medical treatment; more especially by local bloodletting, by diaphoretics, by cooling or saline purgatives when the bowels are costive, and by absorbents and antacids, with ipecacuanha and opiates, or with Dover's powder, when the bowels are relaxed. Bloodletting can be ventured on only at an early period of the malady, and even then it should be local. The anæmia attending an advanced period of these lesions forbid a recourse to it subsequently. Besides determining to the surface of the body by diaphoretics, by warm or vapour baths, and by ipecacuanha with opium or other narcotics, blisters may be applied over the epigastrium, or in the vicinity, and a discharge procured from them for a considerable time, or an issue may be formed. If there be any evidence of deep-seated tumour, the iodide of potassium may be prescribed with liquor potassæ and conium, or with other medicines, according to the peculiarities of the case; an external drain or purulent discharge being procured in any way that may be least unpleasant.

46. When the disease is attended by vomitings, opiates, creasote, the hydrocyanic acid, and small doses of calcined magnesia, with a few drops of laudanum in mint water, may be severally prescribed. Dr. Carter recommends a drachm of the tincture of senna, with five minims of laudanum, in an aromatic fluid; or small doses of calumba, soda, rhubarb, and capsicum, conjoined in the form of powder. — Mercurials ought not to be employed; and drastic purgatives are generally injurious. When the bowels are confined, enemata are preferable to purgatives, unless those of a mild kind, taken by the mouth.

47. If the disease be inferred to be of a scirrhous nature, the remedies just enumerated, with conium, the iodide of potassium in small doses, and liquor potassæ or the liquor hydriodatis hydrargyri et arsenici with tinct. opii, may be tried; and unpleasant symptoms should be alleviated as they appear. In the more chronic cases, the deobstruent and alkaline *mineral waters* may be taken, and subsequently those which contain iron along with deobstruent salts. The *diet* should be light, nutritious, and after short intervals, but in small quantities. When an external drain or discharge is continued for a long time, the diet should be more nutritious than in other circumstances; and wine in moderate quantity may be allowed, according to the state of the case. Change of air, sea air, and gentle exercise in a dry atmosphere, are generally beneficial, especially when aided by the use of deobstruent and chalybeate mineral waters.

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PARALYSIS. — SYNON. Παράλυσις (*resolutio, dissolutio*), πάρεσις ; —*Resolutio nervorum*, Celsus ; —*Paralysis*, Pliny, et Auct. Recent. ; — *Carus paralysis*, Good ; — *Paralysie*, Fr. ; — *Lähmung*, Germ. ; —*Paralisia*, Ital. ; — *Palsy*.

CLASSIF.—IV. CLASS.— III. ORDER (*Author in Preface*). See also APOPLEXY.

1. NOSOLOGICAL DEFIN.—*A diminution or loss of motion, or of sensibility, or of both motion and sensibility, in one or more parts of the body.*

2. PATHOLOGICAL DEFIN.—*Disease generally organic, either of the cerebro-spinal axis and ramifications, or of adjoining parts implicating these, so as to impair or altogether to abolish motion or sensation, or both, in a part, or more extensively throughout the frame.*

3. PARALYSIS presents itself in several *forms* and *states*, according as the *sensibility* or the *power of motion, or both,* may be affected ; and according to the *degree* and the *extent* of the affection. It varies thus in grade, character, and extent, from the numbness or weakness of a single joint or finger, to a complete apoplexy, in which the sensation and motion of the whole body is abolished. These circumstances have led to the use of various terms, as respects the *form* and *extent* of the disease, that may briefly be noticed. As regards the *form* or *character* of the malady, when either motion or sensation is entirely lost, the paralysis is *complete* as respects that function ; if either be impaired only, or not altogether lost, the disease is *incomplete.* If only one function is affected, the paralysis is *imperfect ;* if both sensation and motion are lost, the disease is *perfect*, as suggested by Dr. BENNETT. Thus palsy may be not only complete or incomplete, perfect or imperfect ; or both complete and perfect, or incomplete and imperfect ; but it may even be complete as respects either function, and yet imperfect, inasmuch as one only is lost ; or it may be incomplete and yet perfect as regards the affection of both functions.

4. Palsy has been divided, as respects its *extent*, into *partial* and *general ;* the former has been further divided into *hemiplegia*, when one side or lateral half of the body is affected ; *paraplegia*, when the inferior half is attacked ; and *local* when a smaller portion of the frame is affected. It has, moreover, been called *idiopathic* and *symptomatic ;* but those who have thus divided it have not pointed out in what its idiopathic nature consists. Palsy is generally, if not universally, a symptomatic malady, inasmuch as it depends upon lesion of the central nervous masses, or of the principal nervous trunks or chords, or of parts implicating them ; as it is rarely owing to an affection of the parts themselves which betray the disorder, unless in a few instances of palsy from cold or from some agents directly influencing these parts.

5. Paralysis has been termed *continued* or *intermittent, fixed* or *moveable*, according as it presents these characters. It has likewise been called *plethoric, serous, bilious, febrile,* &c., according to its presumed cause, or to these states of concomitant disorder. Its origin in certain metallic and vegetable *poisons* has also been used, and with true practical advantage, to distinguish those instances which are thus produced. To these forms and characters of the malady attention will be directed in the sequel, as well to the *complications* presented by them in practice. In describing the several states and forms of paralysis, *loss of sensation* will be first considered, and afterwards the several forms of *loss of motion.*

I. VARIETIES AND STATES OF PALSY.

6. i. PARALYSIS OF SENSATION. — *Loss of Sensibility.* — A particular sense, or the feeling of a limited, or even of the greater, part of the body, may be impaired or altogether lost — the *palsy of sensation* may be *incomplete* or *complete* in the part affected ; the affection being either *limited* or so extended as to be almost *general.* — Under the head of *local, limited or partial loss of sensation,* may be comprised incomplete and complete palsy of the several senses, although some of these affections of sense are treated of in separate articles.

7. *A. Loss of Smell—Anosmia,* is commonly a symptom of some disease, as a catarrh, &c. It is rarely observed as a simple affection unless it be caused by the abuse of stimulants or of irritants, as of snuff, &c. Dr. TODD and Dr. GOOD mention instances of this having been a congenital affection. It often attends *coryza, ozæna,* nasal *polypi,* diseases of the spongy bones, &c. ; and it is sometimes caused by external injuries ; by prolonged irritation or ulceration of the Schneiderian membrane ; and by diseases of, or tumours pressing upon, the olfactory nerves. M. SERRES states that disease of the roots of these nerves, and more particularly of the external root, is not an infrequent cause of defect or loss of this sense.

8. *B. Loss of Taste — Ageustia,* sometimes also attends other diseases. It occasionally accompanies palsy of the tongue, or of the muscles of the face. It is frequently observed in continued and exanthematous fevers ; and is in them, as well as in some other acute diseases, partially caused by the fur and viscid mucus covering the tongue and adjoining parts, that prevents the sapid body from coming into close contact with the nerves of taste. It may be produced also by the use of tobacco, especially by chewing it, or by other acrid substances. It has even arisen from want of exercise of the nerve of taste, as in a case detailed by Dr. ROBBINS (*Lond. Med. Gazette*, vol. x. p. 175.), in which, owing to an unsound tooth, substances were usually taken and masticated in one side of the mouth, without being brought in contact with the side on which the diseased tooth was situated. After the tooth was removed, it was found that taste in that side of the mouth was impaired. A slight degree of ageustia often is associated with loss of smell in severe catarrhs and coryza ; and it is then owing chiefly to the state of the nerves of smell and taste. Marked impairment, however, of the former sense often also slightly impairs the latter. *Defect or loss of sight and loss of hearing* are fully discussed in the articles AMAUROSIS and HEARING.

9. *C. Defect or loss of Feeling.— Absence of the Sense of Touch. — Anæsthesia. — Insensibility of a part, or of the general Surface of the Body.—* Incomplete or complete loss of the sensibility of a

part sometimes occurs *alone* or independently of any other form of palsy; but it more frequently *precedes* or *attends* loss of motion, generally of the same part—in rare cases of another or opposite part. It very rarely *follows* paralysis of motion. It more commonly *precedes* loss of motion of the lower than of the upper extremities; but paralysis of motion is often unattended by loss of sensibility.

10. *a.* The *access* of anæsthesia is often sudden and without any premonition. Sometimes it is characterised by a perversion, rather than by an absence of feeling; the sensation of fine sand, or of some intermediate substance between the skin and the object touching it, being for some time present, before feeling is lost. In other cases, formications, slight tinglings, and incorrect reports furnished by the sense of touch, precedes for a short time more or less complete numbness.

11. The loss of sensibility may be very *partial* in any part of the surface. It may exist in one or more fingers only; and in this partial state may have been *congenital*, or have occurred soon after birth. Partial anæsthesia is observed most frequently in one limb, or in one half of the body, or in one side of the face. In this latter situation, when any substance is put between the lips, the sensation of its being broken is occasioned. Anæsthesia of the surface has been observed by M. Andral in a number of round spots, the surrounding skin being quite sensitive. When loss of sensibility of any of the extremities is considerable, muscular motion of the same extremity is generally more or less impaired. In many cases, however, the defect of the muscular power of the part is caused by the want of report between sensation and voluntary action; for in holding an object in a hand which is deprived of sensibility, it is readily dropped if the eyes are not fixed on it: — the sensation of its presence not being conveyed by the nerves of feeling in the part, the act of volition is either imperfectly excited, or is not excited at all. In some such cases, also, it is probable, that volition is not transmitted in sufficient force to the muscles to produce prolonged or energetic action. In the familiar instance of numbness from pressure on one of the lower extremities, it will be found that the limb will not support the weight of the body unless volition be strongly exerted.

12. *b.* It is rare to find the sensibility of a part *completely* lost, so that it is insensible to the severest kinds of injury, as to fractures, burns, &c. Cases, however, of this kind have been adduced by Yellowley, Good, Earle, Broughton, and others. It is also rarely observed to be *universal;* although it sometimes commences partially and extends gradually and generally, until nearly all the surface of the body is implicated. The more extended forms of *partial* anæsthesia generally appear in one half of the body — *hemiplegic anæsthesia* — and is limited with precision by the median line, or in the lower or upper extremities. In these forms it is most frequently followed by, or associated with, loss of motion of the same part. Cases, however, sometimes occur of complete anæsthesia, of one side existing without palsy of motion, or with very slight local palsy. In some cases of this kind recorded by Mr. Broughton there was slight impediment only of speech. In the cases of hemiplegic anæsthesia which I have seen, the temperature of the surface was below that of the sound side, whilst in hemiplegia with loss of motion only, the temperature was somewhat higher than that of the opposite side.

13. *c.* The *duration* of anæsthesia is very indeterminate, and depends much upon the remote causes, upon the pathological conditions producing the affection, and upon the treatment. The affection may continue but a short time, as in cases of concussion, or of temporary pressure on a nerve. It may be very protracted, and terminate only with life. The sensibility may be restored unexpectedly, and sometimes even suddenly. When the anæsthesia is associated with loss of motion, it is generally protracted, although it is often removed, whilst the palsy of motion continues, or is but little relieved.

14. *d.* The *pathological changes* producing anæsthesia are not always obvious: they have even been incorrectly assigned; and it is doubtful whether certain of the localities, which are at the present day supposed to be especially and solely concerned in the propagation of sensation, are really thus exclusively employed. The alteration producing anæsthesia may exist in the brain, in the spinal chord, or in the nerves themselves; but, although the posterior roots of the spinal nerves appear to be more especially concerned in the function of sensation, it has not been fully shown that the posterior columns of the spinal chord are the appropriated channels for the transmission of sensation. Numerous cases are recorded, in which the posterior columns have been disorganised, or even the whole chord pressed upon, softened, or otherwise disorganised, and yet the sensibility has either been unimpaired or even increased. Some of these cases have been referred to by M. Ollivier, and others have been lately published in recent transactions of societies and periodical works. To these a more particular reference will be made in the sequel. I may here, however, briefly remark, that anæsthesia has followed causes affecting chiefly the surface of the body, as the prolonged influence, or excessive degree of cold. It has been likewise produced by torpid or interrupted circulation of blood in the part. It is sometimes a symptom in hysteria and hypochondriasis, in all which cases it is usually partial or limited as to extent; and it has occurred in the puerperal states. It has also appeared in connection with certain epidemics affecting the system generally, and the cutaneous surface and extremities more particularly, as that which prevailed during the summer and autumn of 1828 in Paris, — a circumstance calculated to support the view of the pathology of anæsthesia which I shall have to state hereafter.

15. ii. Paralysis of Motion. — *A. The more local and partial states of Palsy.*—Under this head are comprised those varieties of the disease which affect a part only of the body. They are divided, as already noticed, into — 1st. Local paralysis; — 2d. Hemiplegia; — and 3d. Paraplegia.

16. *A. Local paralysis* implies loss of motion, or of sensibility, or of both, in some part only of the body, and to a small extent. Although sometimes a permanent state of the disease, it is more frequently the commencement of a more extended malady.

17. *a. Paralysis of motion of particular muscles and parts* is not infrequent, occasioning affections, to which certain names have been applied according to their seats. — *Strabismus* is often caused by palsy of one or more muscles of the

eyeball, although not by this in all cases.—*Ptosis*, or falling of the upper eyelid, often arises from an atonic or paralytic state of the *levator palpebræ superioris*, owing to some alteration implicating the nerve which supplies it; although it may arise also from a spasmodic action of the *orbicularis palpebrarum*. A slight examination, or the degree of resistance opposed to raising the eyelid, will immediately show the nature of the affection. Ptosis from local palsy is often associated with squinting, showing that the third pair of nerves is palsied. It is always a serious affection, particularly when thus associated; and is often indicative of cerebral disease, being frequently a precursor of hemiplegia or even of apoplexy. It is a common and most unfavourable symptom of the advanced stages of diseases of the brain in children. It is, however, sometimes caused by a tumour pressing upon the nerves in some part of their course.

18. *b. Lagophthalmia*, or gaping of the eyelid, the eye being generally open or imperfectly closed, sometimes proceeds from paralysis of the *orbicularis palpebrarum*, owing to disease of, or implicating the *portio dura*. When this is the case, the affection is associated with a state of partial palsy about to be noticed.

19. *c. Palsy of the muscles of the face* is not infrequent, and is generally caused by pressure, injury or disease of the portio dura, and fifth pair of nerves. If loss of motion is complete, the portio dura and motor branches of the fifth pair are affected; if sensibility also be abolished, then the sensitive part of this nerve is implicated. Where the *portio dura* only is paralysed, there is little evidence of palsy until the muscles supplied by this nerve are called into action. As long as the patient neither speaks nor smiles the countenance presents nothing remarkable; and the sensibility of the face is unimpaired. But when laughing, coughing, sneezing, crying, or any of the actions of excited respiration are produced, the deformity of the countenance is apparent. The mouth is drawn to the sound side; the derangement of the features being remarkable in proportion to the intensity of the respiratory act. The affected cheek remains motionless, while the other is thrown into unusual action, is flaccid or swells out at the moment of expiration, or when the patient attempts to pronounce a word with emphasis, and appears broader and more prominent than the sound one, which is more contracted or wrinkled. The muscles moving the jaws and used in mastication, which are supplied by the motor portion of the fifth, still perform their functions. Owing to the palsy of the lips on the affected side, the labial consonants are imperfectly articulated; and saliva, or even aliments sometimes escape from the palsied side of the mouth. The patient is unable to spit out his saliva, or to blow fully, or to snuff up with the nostril of the affected side. Lagophthalmia generally accompanies this state of the disease, the eye appearing more prominent, and, being exposed to constant irritation, generally becomes inflamed. In protracted cases the muscles are wasted; and hence the face acquires a peculiar expression.

20. Palsy of the portio dura may be occasioned by severe or protracted cold, or currents of air, giving rise to what was usually termed a blight: but it is probably more frequently caused by an inflamed or enlarged state of the parotid gland or a tumour in the vicinity of the stylo-mastoid foramen, or inflammation or abscess of the internal ear, or by disease of the petrous portion of the temporal bone, or by a tumour or abscess compressing the nerve at its entrance into the internal auditory foramen; by disease of the brain at the origin of the nerve; or by ulceration implicating the nerve in some part of its course; or lastly by a wound or injury of the nerve.

21. When the *motor portion of the fifth pair of nerves* only is palsied, there is generally slight loss of sensibility of the parts supplied by this nerve; but the motions of the jaw on the affected side are impaired. Mastication is impeded, and is not performed on that side, owing to the palsy of the muscles which convey the morsel to the operation of the teeth, and to the lost action of the masseter and temporal muscles. There are still, however, command over the countenance, little or no distortion of the features, and no loss of expression. The jaw is in some cases a little depressed; but this disappears when the patient smiles or laughs, a circumstance distinguishing this variety of palsy from that caused by disease implicating the portio dura. This state of disease may exist alone; but it is commonly associated with loss of sensibility (§ 10. *et seq.*), and is usually further complicated with hemiplegia. The disease of the motor portion of the fifth pair may be seated in the course of the nerve, or in or near the origin of it in the brain.

22. As Dr. BENNETT has very justly remarked, it is rare that the lesions are confined to the fifth or to the seventh pair of nerves. In general the symptoms of disease of the one and the other are conjoined; although they seldom indicate an equal affection of both nerves. Commonly the disease appears first in the one, and then in the other; and, when the muscles on which the nerves first affected ramify are completely paralysed, the muscles supplied by the second are partially affected. In some of these cases, also, the paralysis is accompanied with neuralgia of a very acute description. Palsy of either of these nerves is very rarely met with in both sides in the same case. Dr. ABERCROMBIE met with an instance of palsy of the fifth pair on one side of the face, and of the portio dura on the other occasioned by a tubercle in the brain.

23. *d. Palsy of particular muscles or of a single limb* is not uncommon. Temporary palsy is not infrequently produced in these by casual pressure of the nerves supplying them. It may arise also from overstraining the nerves, or the muscles themselves, by over-exertion, as by lifting very heavy weights. Dr. HEALY has described instances of palsy of the hand and forearm owing to pressure caused by the head resting on the arm when asleep, which could be removed only by electricity; and Dr. DARWELL has ascribed the palsy consequent upon over-exertion to the injury done to, or overstraining of, the nerves supplying the affected muscles.

24. Palsy of a single limb is not infrequent in children. It is often congenital; and the upper are more liable to it than the lower limbs. It is sometimes owing to congenital disease or deficiency of the brain; but, when it takes place subsequently to birth, it has been imputed to a loaded state of the bowels, or to disorder of the stomach; but

disease of the brain or spinal chord is probably more immediately than those connected with its occurrence. Some of these cases grow up, and present the limb of a child joined to the body of an adult. I have met with several instances of this occurrence,—one in a physician, another in a medical student; both being characterised by remarkable irritability of temper. An upper extremity, which contrasted remarkably in size with the sound limb, was affected in both these cases.

25. Palsy of a part or of the whole of one limb, is very generally the commencement of a more extended malady; and instances are sometimes met with where only a few of the muscles of an extremity are affected; these being, according to Sir C. Bell, muscles naturally combined in action, although supplied with different nerves and different blood-vessels. Sometimes all the extensor muscles lose their power, while the flexors preserve it. In rare instances, also, as in the case of a lady lately under my care, the motions necessary for writing, or for any fine work, were completely lost, whilst the arm could be moved as strongly as ever. It has been supposed that the nerve in these cases is incapable of performing its functions owing to pressure or disease; and this is probably the case in some instances, as in those recorded by Drs. Abercrombie and Storer, and more especially when partial paralysis follows acute or chronic *neuritis*. It is even possible that, in other cases, the palsy is caused by imperfect or interrupted circulation through the blood-vessels of the limb, owing to disease of them, as supposed by Graves, Stokes, and others. But, in some instances, there are no indications of disease of the nerve itself, and the circulation is perfect in the affected extremity. In the case of the lady just alluded to, who is about 60 years of age, and of a full habit of body, there was no sign of disease in either the nerves or the blood-vessels of the limb itself. I prescribed for her blood-letting, which was performed under my own eye, twenty-four ounces being quickly taken away without any faintness being caused. After the depletion and purging, the partial state of palsy gradually disappeared.

26. *e. Paralysis of the tongue and muscles of articulation*, although occurring frequently in connection with hemiplegia and apoplexy, is very rarely met with alone. I have, however, been consulted in several cases, in which it was either the chief part of the disease, or was associated with difficult or impossible deglutition. In a case from the country, which I recently attended, complete loss of the power of articulation was associated with partial palsy of the extremities, the patient being deficient chiefly in the power of contracting the muscles of the hands and forearms. Both lower extremities were also weak. He returned without benefit from treatment, and died soon after. I have not learned the particulars connected with his death. In this case, loss of articulation was the first and chief symptom, yet the tongue could be protruded, without being drawn to either side.

27. Some years ago, Mr. Winstone consulted me in the case of a professional gentleman, aged about 50, who had, for many months, lost all power of uttering the most simple articulate sound, and who swallowed substances with the utmost difficulty, or not at all, unless they were conveyed over the base of the tongue. The tongue could not be protruded, and indeed was incapable of motion. The mouth also could be opened only imperfectly, but the sense of taste was not affected. He had neither headach nor any other ailment; and no other part was paralysed. He attended regularly to his profession during the usual hours of business; but was obliged to write down all he wished to say. The disease was ascribed to pressure or structural change at the origin, or in the course of the lingual and glosso-pharyngeal nerves; and the prognosis of suddenly fatal apoplexy or general paralysis was hazarded, which occurred some months after my attendance ceased. Various means were prescribed without any effect on the disease.

28. Most frequently, however, paralysis of the muscles engaged in articulation, or in deglutition, or in both functions, follows upon severe or renewed attacks of apoplexy, or of hemiplegia complicated with apoplexy. I have seen it occur after inflammation of the brain, and after cerebral convulsions in children, as in the case of a fine boy, respecting whom I was consulted by my friend Mr. Worthington of Lowestoft. The disease may continue for many months unmitigated by treatment; it is generally ultimately fatal; death taking place after or during a convulsive attack.

29. *f. Aphonia*, in the true sense of the word, can occur only when the *larynx* is affected—either its muscles being paralysed, or its structure changed, by serous or other effusion between its ligaments, tendons, or cartilages. Loss of the power of articulation depends upon paralysis of the tongue, cheeks, and lips; and this loss may be so complete as to prevent all *articulate* sounds from being produced; still the power of uttering sound remains, but in its simplest form only. When articulation is entirely gone, the motions of the muscles of the pharynx and base of the tongue are also lost. Simple aphonia is often caused by temporary inaction or torpor of the nerves of the larynx, in hysterical or nervous persons. Loss of the power of articulation is a much more serious and permanent malady than aphonia, and is either attendant upon, or followed by, the most general or fatal states of palsy, unless in hysterical cases; and in these, the motions of the tongue are also sometimes temporarily lost. In catalepsy, voice and articulation are quite lost, with all voluntary motion, but they return as soon as it is restored. In incomplete palsy of the tongue, protrusion of it may generally be effected; but it is generally drawn to one side, particularly if hemiplegia also exist. In other cases, it is usually protruded in a straight direction. The tongue, even in cases of hemiplegia, is not always drawn towards the sound side. Sometimes it is drawn to the paralysed side. Lallemand imputes its direction to this side to the action of the genio-glossus muscle of the unaffected side, drawing the base of the tongue forward, and turning the apex to the opposite side. Cruveilhier attributes the direction of this organ, when protruded, to feebler resistance on one side than on the other.

30. *g. Paralysis of any of the muscles of organic life* rarely takes place to any extent, and is indeed incompatible with the continuance of life, unless in those viscera which are particularly influenced by volition, as the urinary bladder, the sphincters, &c. A temporary state of relaxation, or loss of

the contractile power, of portions of the alimentary canal not infrequently occurs in the course of various diseases, and constitutes a part of the pathological conditions obtaining in inflammations of this canal, in colic and ileus, in lead colic, in hysteria, &c.: but it rarely continues for any considerable period, at least in a complete form, and in the same portion of the tube, without being followed by a fatal result.

31. *h. Palsy of the urinary bladder*, owing to over-distension, is a frequent occurrence: it is likewise connected with paraplegia; and in both circumstances of the complaint retention of the urine is the prominent phenomenon. Hysterical paralysis of the bladder is often met with. Dr. TODD says that there is much truth in Sir B. BRODIE's remark that, in these cases of hysterical paralysis, " it is not that the muscles are incapable of obeying the act of volition, but that the function of volition is suspended." Of course the muscles possess their capability of motion, no one could have suspected the contrary; that the function of volition is suspended in these cases is, however, a more doubtful proposition. The truth is, that a careful inquiry into the phenomena of hysterical paralysis, in some cases which have come before me, has shown that, owing to a weakened or exhausted state of the spinal chord and motor nerves, volition is not transmitted in sufficient force to produce muscular action; and that volition is not suspended, although it may be weakened; but that it must be made with more than usual energy to act upon, or even to be transmitted to the muscles.

32. *i. Palsy*, more or less complete, *of the rectum*, is not infrequent in aged persons, and in hysterical females. In these cases fæcal accumulations often form in the rectum and colon, owing to their inaction or want of power to overcome the resistance of the sphincter.

33. *k. Palsy of the sphincters* of the rectum and bladder attends most maladies in which either the brain or the spinal chord is oppressed, or has lost its power. The inability to retain the fæces, or the incontinence of urine which results, becomes one of the most troublesome and unfavourable phenomena of the disease. As, however, this form of local paralysis very rarely occurs unconnected with a more extensive malady, it will be more fully noticed hereafter.

34. *B. Hemiplegia* (from *ἥμισυ, the half*, and *πλήσσω, I strike)—semisideratio*—is used to denote paralysis of one side, extending to both the upper and the lower extremities. When the upper limb of one side, and the lower of the opposite side is affected, the palsy is usually called *transverse* or *crossed palsy*; but this form is comparatively rare. Hemiplegia is the most common form of the malady; and it occurs more frequently on the left than on the right side — the proportion being as three to two, according to the observations of Sir G. BLANE. Generally the paralysis extends to the side of the face, the angle of the mouth being drawn to the sound side, and a little upwards. The tongue also is often more or less affected, and on the same side, as shown either by its imperfect protrusion, or by its being drawn to one side—usually to the same side as the mouth. The pharyngeal muscles are sometimes also affected. Hemiplegia is limited exactly to one half of the body, the median line being the boundary, owing to the distribution of the spinal nerves.

35. The attack of hemiplegia occurs variously. 1st. It may appear gradually; local palsy, affecting first the fingers or toes, leg or hand, taking place, and extending slowly and gradually until the lateral half of the body is implicated. In some cases of this form of the disease, convulsive movements of a limb, or even of both limbs, are remarked, and continue until the loss of motion is complete.

36. 2d. After various chronic cerebral symptoms, and affection of one or more of the senses, the speech becomes affected, the tongue more or less palsied, or protruded with difficulty, and the face distorted. Upon these, complete hemiplegia supervenes in a short period. This form is not infrequent in aged persons. In this and the preceding variety, several organic lesions, as tumours, tubercles of the brain, or its membranes, are often present.

37. 3d. After cerebral symptoms of a more acute and painful character,—after severe headach, febrile commotion, sometimes delirium or intellectual disorder, spasm or twitchings of the muscles, pain in the limbs, occasionally spastic rigidity of some of the flexor muscles, or even convulsions, complete hemiplegia takes place. In this variety, inflammatory softening of a portion of the brain is often present; and pain is complained of in the paralysed limbs.

38. 4th. After injury of the head at a more or less remote period, or after chronic cerebral symptoms, and various affections of some one or more of the senses, convulsions or epileptic seizures occur, which, after a more or less frequent recurrence, are followed by palsy of a limb, most frequently the arm, extending to the whole side; or at once by complete hemiplegia. In three cases of this variety, I found one or more abscesses in the brain. In these several states of hemiplegia, the sensibility is generally unimpaired, or but partially affected.

39. 5th. Hemiplegia may occur suddenly without any previous indication. In some of these cases, I have ascertained the existence of inflammatory attacks of the brain at a remote period, recovery having taken place long previously to the hemiplegic seizure. This variety is often followed by *apoplexy*, but at no precise period.

40. 6th. Hemiplegia frequently immediately follows an *apoplectic seizure*; or attends it, or appears in its course. In this variety more especially, and very often in that immediately preceding, hæmorrhage within the cranium has occurred. Generally the hemiplegia is observed only when the stupor subsides; but in many instances, it may be detected at first by a careful examination of the state of the extremities and features. According to my experience the sensibility is most frequently implicated in the fifth and sixth of these varieties of the seizure.

41. Although some reference has just now been made to the cerebral lesions upon which those varieties of hemiplegia individually appear most frequently to depend, still no precise or constant connection between the one and the other has been ascertained, and most probably it does not exist. Nevertheless, the relation is too frequent and too obvious to be entirely overlooked. Of hemiplegia it may be remarked, in general terms, that it may proceed from any one or more of the numerous organic lesions which are described in

the articles on the morbid anatomy of the brain and its membranes, and of the cranium. (*See these articles.*)

42. One fact may be relied on, viz. that the lesion exists, with very few exceptions, and these not very precisely determined, in the side of the brain opposite to the seat of palsy. Dr. R. B. Todd remarks that, according to the views of Foville and others, we should expect to find the optic thalami and corpora striata, or some of the fibrous radiations which pass through these bodies, the seat of disease in hemiplegia; and in fact in the generality of cases, those bodies, or some portion of the cerebral hemisphere, present alteration of structure, variable in extent as well as in degree. It must be admitted, however, that cases occur in which one only of these bodies is the seat of disease, or in which no appreciable lesion can be detected in the hemisphere. Such occurrences, however, as Dr. Todd justly observes, can hardly be deemed to militate against the theory of Foville, inasmuch as our ignorance of the mechanism of cerebral action, whether healthy or morbid, is alone sufficient to make them appear anomalous to us.

43. Hemiplegia is very rarely produced by disease of the upper part of the spinal marrow. In several cases of lesion of this part, in which I have been consulted, the paralysis has been at first local or partial, generally affecting one arm, but it has soon become more general. In some instances, however, one side has been affected more than the other, or one or two limbs more than the rest. Instances, however, have been observed of loss of motion on one side, and anæsthesia of the other, but these are remarkably rare. One has been adduced by Portal and another by Mr. Dundas. This latter case was consequent upon concussion of the spine produced by a fall. The temperature of the side and limbs deprived of sensation, but possessing muscular, power, was 1½° Reaumur, below the side which retained sensation without motion; the heat on this side being rather beyond natural, and the sense of feeling morbidly increased.

44. Hemiplegia may be *congenital*, or may occur soon after birth. M. Cazauvieilh has shown that congenital hemiplegia usually depends upon an arrest or defect of development or growth in a portion of the brain. The limbs of the affected side, particularly the arm, were stunted in growth, and flexed and contracted. The opposite hemisphere of the brain was generally smaller, the convolutions imperfectly developed, the capacity of the ventricle less, and the corpus striatum and optic thalamus of smaller size. Cases of this kind may attain an advanced age. Most of the instances I have had an opportunity of observing were idiotic, as well as incompletely paralysed on the deformed side. Cases of hemiplegia have occurred in which the opposite side has become similarly affected, either soon after the first attack, or during convalescence from it. In these, the sensibility has sometimes either been only partially, or not at all affected.

45. The paralysed side may be the subject of *pain*, the result of morbid action in the brain, or of *spasm*; hence designated spasmodic hemiplegia by Sauvages and others. In these, inflammatory irritation in the brain or its membranes, in the vicinity of the primary seat of lesion often exists. Deep-seated pain or spasm may occur in a limb, the superficial sensibility of which is either impaired or altogether lost; and either, or both phenomena, may affect the opposite or sound limb, although less frequently than the paralysed side. I have never seen an instance of hemiplegia with spasm of the paralysed side, to which the term of *hysterical* imposed by some nosologists, was strictly applicable. Hysteria very rarely occasions true or complete hemiplegia, but I have met with several cases of paraplegia caused by hysteria.

46. *Intermittent hemiplegia* has been noticed by Sauvages, Morgagni, Cullen, Elliotson, and Todd; but examples of it have been rarely and imperfectly observed. It would seem, that the congestion of, or vascular determination to, the brain, during the febrile paroxysm, occasioned a condition of one of the hemispheres, or of a portion of it, so as to interrupt the action of volition; but that the change was only temporary, and depended upon the state of circulation attending the febrile paroxysm—that it consisted neither of softening nor of hæmorrhage.

47. Much variety in the symptoms are observed in the course of hemiplegia, depending upon circumstances that will be alluded to hereafter, and upon a partial or more complete return of sensibility when this has been also lost, and upon a slight recovery of some of the motions of the limbs, particularly of the lower limb; but generally when the patient is able to walk a little, or with the aid of a stick, the lower extremity is usually thrown forward by the inclination of the trunk to the sound side. The foot is pointed outwards when the limb is raised, and falls from its own gravity. The affected arm is applied to the trunk, and the forearm is slightly flexed on the arm; the wrist and fingers being also slightly bent inwards, and occasionally somewhat œdematous.

48. *C. Paraplegia* (from παρὰ, *vitiose*, and πλήσσω, *percutio*,) has in modern times been applied to that form of palsy in which the lower half of the body is deprived of motion or sensation, or of both. Hippocrates denominated all paralytic affections paraplegia, which were consequent upon apoplexy: and Aretæus employed the word to designate any form of palsy. Boerhaave and Van Swieten defined paraplegia to be a palsy of all parts below the neck—or viewed it as a *general palsy* (§ 65. *et seq.*)—and in this sense it has been used by Ollivier and several modern pathologists. I shall, however, apply the term *paraplegia* to that form of palsy which affects the lower half of the body on both sides. When palsy extends to the upper and lower extremities of both sides it may be denominated, although it is not strictly, *general palsy*.

49. The symptoms most characteristic of *paraplegia* are, *loss of the power of motion in the lower limbs, with inaction of the urinary bladder and rectum, with loss of power over the sphincters, and often with impairment or entire loss of sensation.*

50. The *accession* of the symptoms of paraplegia, as well as the character, range and grouping of the symptoms themselves, varies with the pathological changes or physical causes of the malady—as it proceeds from injury, from inflammation and its consequences in the spinal chord or its membranes, or from organic lesions of these parts, or

of the bones and cartilages of the spine. When the disease is consequent upon injury, the symptoms are generally sudden in their accession and fully developed, although this is not always the case, especially if the accident be slight, and serious only as regards its consequences. When it proceeds from disease of the chord or of its envelopes, some disorder of sensation or of motion, or even of both, is first experienced, which becomes more or less rapidly increased to numbness, or diminished power of motion, of the lower extremities. The patient trips when walking, is unable to stand for any time, and complains of a sense of weight in the limbs, and of pains extending to the legs and feet. He cannot walk without the aid of one or two sticks, or of another person. The urinary bladder, rectum, and sphincters, soon afterwards become more or less affected, and various other phenomena supervene, according to the seat and extent of the organic change occasioning the affection. In some cases *sensibility* in the lower extremities is but slightly, or even not at all impaired, particularly when the lesion is seated high in the spine; and when this is the case, even the patient's power over the excretions and the sphincters may not be materially impaired. It is comparatively rare that sensibility is impaired or altogether lost in the lower limbs, without the power of motion being also diminished or abolished.

51. *a.* The *symptoms, progress,* and *consequences* or *terminations* of paraplegia vary with the lesion producing it; and it is difficult, if not impossible, to connect the symptoms in their full extent and course, with the particular lesion upon which they depend. The exact seat of lesion, in respect not only to the portion of the chord which it affects, but also to the roots of the nerves connected with the part implicated; the nature of the lesion, particularly as regards the degree of pressure, or of irritation, it produces; and the suddenness or slow progress of the change, all influence very remarkably the phenomena and course of the malady.

52. There are few diseases which have been more lucidly illustrated than paraplegia consequent upon injury has been in the admirable paper upon the subject published by Sir B. C. BRODIE; and as injury often causes inflammation and its usual consequences of the spinal chord and its membranes, the subject has both a medical and surgical bearing. Many, however, of the changes consequent upon injury — even hæmorrhage upon or into, and softening of, the spinal chord, — and various organic lesions of these parts or in their vicinity, may occur independently of external injury, and cause paraplegia. It will be proper to enumerate these.

53. 1 *a. Concussion* of the spinal chord affecting the intimate structure of some part of the chord, although not evidently to the unassisted eye; — 2 *b. Manifest laceration* or *division* of its substance; — 3 *c.* The *pressure* or *irritation* caused by *extravasated blood*; — 4 *d.* The pressure or irritation produced by *displaced bone*; — 5 *e. Sanguineous congestion*, particularly of the spinal veins or sinuses; — 6 *f.* The usual *consequences of inflammation* of the chord or of its membranes, especially effusion of coagulable lymph, induration of the substance of the chord, &c.; — 7 *g. Softening* of the chord, whether it be consequent upon inflammation, or upon impaired nutrition or lost vitality; — 8 *h. Inflammation* and its *consequences of the vertebræ*, or of the intervertebral substance, as *caries, exostosis, anchylosis, &c. of the vertebræ*; — 9 *i. Scrofulous disease* and *tubercles* in these parts; — 10 *k. Tubercles* or *tumours in the chord* or its membranes; — 11 *l. Hydatids* in either of these situations; — 12 *m.* And *fungoid* or *malignant tumours* implicating the chord or the roots of the spinal nerves, are severally pathological causes of paraplegia; but the symptoms of individual cases, as well as the issue, depend upon the part of the chord affected; upon the extent of the particular lesion; upon the slowness or rapidity of its development; and upon the manner in which the chord or roots of the spinal nerves is implicated—whether by pressure, loss of substance, softening, irritation, interrupted circulation, &c., or by two or more of these conjoined.

54. It would be inconsistent with a proper consideration of this subject, were I to overlook the physical condition of the spinal chord, especially in relation to the fluid surrounding it, to the membranes enveloping it, and the bony case protecting it. The physiological view here suggested materially aids the pathological consideration of the subject. This interesting physical condition also obviously concerns the roots of the spinal nerves, and serves to explain several circumstances connected with them, as well as with the spinal chord itself. These parts, being thus surrounded by a limpid fluid, and being protected by membranous coverings, and by a bony case and muscles, are thereby rendered much less liable to disease and injury, than if they were otherwise circumstanced, as first insisted upon by COTUGNO, more recently by MAGENDIE, and most satisfactorily by Dr. TODD. Before pursuing further this part of the pathological bearing of the subject, I will notice more fully the chief phenomena of paraplegia.

55. *b. Paralysis of motion* is the chief characteristic symptom of paraplegia, and it affects more or less all the muscles supplied with nerves from the seat of, and below, the injury or disease in the chord. If the disease be slight, only one limb, or a set of muscles, may be affected, as above adverted to, especially if the roots of a nerve or nerves on one side only be implicated; or one limb may be more severely affected than the other; or a slight affection may soon become severe, or the converse. Complete paraplegia may thus be gradual and slow; or it may be sudden. It rarely happens that the palsy extends to parts supplied with nerves proceeding from a portion of the chord above the seat of injury. Instances, however, of this occurrence are recorded by Mr. STAFFORD and Sir B. BRODIE. In these cases, it may be presumed that the consequences of the injury, as softening of the chord, effusion of blood or of lymph, had extended upwards from the part primarily injured.

56. Although voluntary motion is completely abolished in the lower limbs, involuntary motions and spasms of their muscles are not infrequent. When the lesion is seated high in the chord, spasmodic contractions, either of more or less permanency, or of a momentary or short continuance, may affect the abdominal muscles, as well as the muscles of the lower limbs, and these may be attended by much or by little pain, either in

some portion of the spine, or in the limbs. Occasionally the involuntary motions are of a tremulous kind, and often the flexor muscles are those more permanently contracted. The pains, involuntary motions and spasms, are manifestly caused by inflammation or irritation of the chord or of its membranes, or of the roots of the nerves, at the seat of lesion, especially by extravasated blood; by pressure or irritation of tumours, displaced bone, effused pus; by caries of the vertebræ, by malignant or other formations.

57. *c.* The *affection of the urinary organs* consequent upon paraplegia from injury or disease of the spinal chord varies in different cases. It may be considered with reference to the functions of the kidneys, and the states of the bladder. Paraplegia from severe external injury is very frequently followed by diminished secretion of urine, or even by complete cessation of the function; but this is often only temporary, and the urine is secreted in variable quantity and altered quality. In some cases, it is at first acid, very offensive, of a yellowish colour, and deposits a yellow amorphous sediment. More commonly, however, especially after two or three days, the urine is ammoniacal and turbid when voided, and deposits on cooling a quantity of adhesive mucus. At a later period, a white substance — phosphate of lime — may be detected in the mucus, which is often tinged with blood; and subsequently blood and bloody coagula are blended in the urine and mucus. These changes generally take place between the third and ninth days from the paraplegic attack, when it is sudden and complete, especially if caused by injury; and when the bladder becomes distended from loss of its contractile power. At the same time that this distension exists, a dribbling of urine often takes place, if the fluid is not drawn off. In other cases, especially in those caused by disease seated in, or implicating, the chord, the voluntary power over the sphincter of the bladder only is paralysed, there being incontinence, but no retention of urine. In the most severe cases, the urinary affection continues and hastens a fatal issue; but in others, the power of evacuating the bladder, or of retaining the urine, is restored; and the urine assumes a more acid and healthier character. This amelioration of the urinary disturbance is one of the chief indications of restoration of the functions of the chord; but the state of the urine often varies from time to time, before it becomes permanently healthy, or before the muscles of the extremities obey the will.

58. In these cases, where the urinary bladder is paralysed, and the urine retained, a state of septic or asthenic inflammation is rapidly produced in the mucous membrane of the bladder, ureters, and pelves of the kidneys, occasioning the chief changes observed in the urine, particularly the ammoniacal state, the presence of mucus, and coagula of blood, &c. Sir B. Brodie has put the question, whether the injury of the chord operates directly on the mucous membrane, or whether its first effect is to alter the quality of the urine, the mucous membrane becoming affected afterwards owing to the unhealthy and irritating secretion? Instead, however, of imputing the effect on the urinary organs to one of these causes only, I believe that it may be justly imputed to both of them — that the unhealthy and irritating secretion rapidly induces inflammation of the surfaces with which it remains for a time in contact, owing to the marked disposition of these surfaces to become inflamed, when deprived of that portion of nervous influence which they derive from the spinal chord; and that they partake in this disposition to be inflamed and ulcerated with other parts below the seat of spinal lesion. In some instances, particularly when the lesion is seated high in the chord, or when the paraplegia is incomplete, or the power of motion principally affected, the urinary disturbance is not considerable, and the powers of expulsion and retention but little impaired.

59. *d.* The *bowels* are generally not only torpid in paraplegia, but the evacuations are very dark and morbid. This latter state is the more remarkable the higher in the chord is the seat of lesion. In a case lately under my care, the evacuations, which were procured with difficulty, were nearly black, or of a deep greenish black, and of a treacle or tar-like appearance and consistence. This colour is probably owing to impaired decarbonisation of the blood by respiration, the liver and digestive mucous surface performing a vicariously increased function in respect of sanguineous depuration, or of removing the superabundant carbon from the blood. This explanation of the phenomenon was published by me as early as 1815, and subsequent observations induce me to re-assert it now.

60. One of the earliest phenomena associated with paraplegia, is palsy or *inaction of the rectum and colon;* the latter viscus especially being unable to propel its contents. At the same time the sphincter ani is not relaxed, but subsequently, or as soon as the fæcal matters accumulate in the lower bowels, they pass involuntarily, owing to reaction of these bowels on their contents, and the loss of voluntary power over the sphincter. Incontinence of the fæces generally accompanies retention or incontinence of the urine; whilst, on the other hand, it is not remarked in the same states of the disease that are unattended by the urinary disturbance (§ 57.). Still, although the patient has power over the fæcal evacuations, particularly when the upper portion of the chord is affected, or when paraplegia is consequent upon disease slowly developed and implicating the chord, the stools are not the less black and offensive. They are often also very abundant, and the intestines are usually distended by gases, and are tympanitic.

61. *e.* The *sensibility* in paraplegia varies remarkably. When the palsy is caused by concussion or other severe injury of the chord, both sensation and motion are abolished. In slighter cases, and in diseases or spontaneous lesions implicating the chord, and occurring gradually and slowly, the sensibility may be unaffected, whilst motion is altogether lost. In other cases, sensation may be only blunted, or it may be impaired in one part, and perfect in another, or entirely lost. Very frequently sensibility of the surface only is impaired or abolished, whilst deep-seated parts retain their sensibility; and often pains, more or less acute, or feelings of heat, burning or constriction, are felt in the back, abdomen, or loins; or even in limbs or parts which are altogether insensible to touch and even to external punctures or injuries. Sensation is sometimes gradually, oc-

casionally suddenly, lost; but, as in hemiplegia, so in paraplegia, it is restored before the power of motion.

62. *f. Priapism* attends paraplegia from concussion or injury of the upper portions of the chord; but it sometimes occurs in those cases which are caused by disease. Sir B. BRODIE has not met with this symptom where the seat of lesion was below the sixth dorsal vertebra. It is observed even where the sensibility is altogether abolished. It seems to be occasioned, in some cases, by the irritation consequent upon the introduction of the catheter.

63. *g.* The *temperature* of the paralysed parts is generally above the healthy standard. This is most manifest in complete paraplegia from external injury; but I have observed it also increased in cases produced by disease, although not so generally and remarkably; and where the sensibility of the surface was unimpaired. This increase of temperature appears to be chiefly owing to the dry and unperspiring state of the surface of the paralysed parts, in connection with the state of the circulation and blood.

64. *h.* The occurrence of *gangrenous sores*, upon the least injury or pressure of any of the paralysed parts, is generally observed and is often remarkable. It seems to be attributable to an impaired vital cohesion of the tissues, caused by a loss of that portion of nervous energy bestowed on them by the spinal chord. It is most manifest in cases of severe injury of the chord, and when sensibility is altogether lost. When the lesion is seated high in the chord, and is more or less chronic, a scurfy, dry or furfuraceous state of the surface is often observed.

65. *D.* GENERAL PARALYSIS.—When palsy extends to both sides of the whole body — when all the limbs and trunk of the body are deprived of motion — the disease has usually been viewed as *general palsy*. In this very extended form of the malady, voluntary motion may alone be lost, sensibility still remaining. But the general sensibility is sometimes also more or less impaired, as in cases of paraplegia, much more rarely altogether abolished. Indeed, general palsy may be viewed as a more extended state of paraplegia, as it has been by some of the older as well as of more modern writers. In some rare instances the senses, or one or more of them, have been impaired, or even lost, as well as the power of motion and sensation. Instances of this kind have been published by M. DEFERMON and Mr. DAVIES GILBERT. In the more common states of general palsy, the affection extends no higher than the upper extremities; and depends upon some lesion implicating the spinal chord or its membranes below the origin of the pneumogastric nerves. In the rare instances where the senses are also implicated, the lesion is generally seated within the cranium, or in one or more of the parts composing the base of the brain. In the case described by Mr. D. GILBERT, it was found upon dissection that "the dura mater lining the basis cranii was deficient, and its place occupied by a thin and transparent membrane, loosely and singularly arranged; the tentorium cerebelli was likewise deficient, so that the posterior lobe of the brain rested immediately upon the upper surface of the cerebellum. All the nerves were regular."

66. *a. Concussion of the brain* and the *more severe states of apoplexy* are attended by general palsy; concussion of the brain especially implicating also the senses. These, however, occur differently, and are attended by phenomena which remove them from the category of paralytic diseases. The relation between them, however, is intimate. Motion, sensation, and consciousness are all lost in these maladies; respiration and circulation alone continuing. As soon as the respiratory nerves are affected by direct or counter-pressure in apoplexy, or by the change produced in the intimate structure of the brain or medulla oblongata, in concussion, life is soon terminated. When, on the other hand, the mischief is less extensive, and the patient regains consciousness, a more or less general state of palsy may remain, at least for a time, and either recovery take place, or hemiplegia or more partial palsy only remain. The *apoplectic* or *cerebral form* of general palsy may be viewed as an indication merely of the nature and extent of the cerebral lesion. A person may be seized with hemiplegia consequent upon softening of a portion of one of the hemispheres, or upon hæmorrhage in the brain, or upon any other organic lesion. A greater amount of the same lesion, or others concurring with it, may so completely subvert the powers of motion, and even of sensation, as to give rise to a general palsy, circulation and respiration alone remaining. These occurrences are not rare. Thus, inflammation limited to a portion of the brain may first occur, and be manifested by symptoms, which the close observer will detect. At an indefinite period subsequent to this attack, the patient may be suddenly seized with hemiplegia, and may continue in this state for weeks, months, or even years, when a profound apoplectic seizure occurs, occasioning general palsy, extending ultimately to the muscles of respiration, and causing death by asphyxia. But, in rare instances, instead of an apoplectic seizure, the other side may become palsied, as respects the power either of motion or sensation, or of both, and either before or after the side first affected has recovered any, or much of its powers. In this case there is general palsy, incomplete probably as regards one or other function, in either side, with certain of the senses and many of the faculties of the brain but little affected, until apoplectic coma or paralysis of the muscles of respiration terminates life. An instance of this kind recently occurred in the practice of my friend Dr. BABINGTON, and, upon dissection, lesions were found in both hemispheres of the brain.

67. *b.* The forms of general palsy to which I am most desirous of directing attention are altogether *spinal*. They may occur *suddenly*, as in cerebral general palsy, or *gradually*, and even slowly. Severe injuries, as dislocation of the cervical vertebræ, laceration of the chord, violent concussion of the spine, hæmorrhage upon the cervical portion of the chord, &c., usually occasion general palsy instantly; but disease seated in the spinal chord or its membranes, or implicating these consecutively, produces the paralytic phenomena much more slowly. Even severe injuries may not be followed by palsy for a considerable period; still it may be stated, that the accession of general palsy from injury, as well as the phenomena characterising it, will vary with the immediate or more remote effects of the injury upon the chord

or its membranes; it being either instantaneous or remote according to the extent and nature of the lesion produced. A muscular man, aged about sixty years, the father of a late medical friend, when turning in bed, his head being forcibly pressed on the pillow, so as to partially raise the trunk, felt something snap in his neck. He was afterwards unable to bend or to rotate the head without causing much pain in the neck. I inferred that rupture or laceration of some of the small muscles or ligaments had occurred, and advised quietude and various means, which palliated the more painful symptoms. Still the least movement of the head caused distress. Notwithstanding this, he travelled outside a coach, during the summer, to Cornwall, and returned to town; and not till sixteen months after the accident, he complained of numbness and want of power in the left arm. In a day or two the palsy extended to both the upper extremities, but was incomplete in the right; it soon became more general, and in a short time, difficulty of breathing, rapidly terminating in asphyxia, supervened. The body was examined by Prof. R. Quain and myself, and the second cervical vertebra was found fractured completely across on both sides, the fracture on one side passing close to the base of the odontoid process. Chronic inflammation had extended from the fracture to the theca and membranes of the medulla oblongata; lymph was thrown out upon the arachnoid surfaces; the membranes, particularly the dura mater, were much thickened, and ultimately the chord at this part was pressed upon.

68. Next to injury or concussion of the spinal chord, *caries* of one or more of the cervical vertebræ may be considered as a cause of general palsy; but the palsy rarely occurs until the disease of the vertebræ has induced chronic inflammation of the membranes of the chord, with thickening and effusion of lymph, or such a degree of angular curvature as to affect the physical condition of the chord itself. I was lately consulted in the case of a child, twelve years of age, who presented unequivocal indications of caries of one or two of the cervical vertebræ consequent upon malignant scarlatina. To these supervened incomplete palsy of motion in one arm and hand, which gradually increased and extended to the other arm and lower extremities, until general and complete palsy of motion existed; sensibility was unimpaired. The bowels were obstinately constipated, and the evacuations black and tar-like. The sphincters were not paralysed. Respiration was performed by the diaphragm; and all parts below the face were deprived of motion. The head could neither be rotated nor bent without great pain. The body and limbs were much emaciated. The skin was cool and dry, and covered with a furfuraceous scurf, particularly the scalp. The pulse was very frequent, weak and soft; the tongue furred and loaded. After persisting for many months in a treatment hereafter to be described, this young lady recovered the use of her limbs, the neck, however, remaining stiff, shortened, and turned a little to one side. In this case, the change produced in the membranes enveloping the chord, or in the theca, was most probably limited to the diseased vertebræ and their immediate vicinity. It is not unlikely owing to this limitation of the disease, and to the gradual accession and increase of it, that the sphincters continued unaffected.

69. *c.* General palsy may be only an *extension of paraplegia*; or, in other words, the disease may commence and continue for a time, as paraplegia, either complete or incomplete, and gradually extend higher and higher until the trunk and upper extremities are deprived of motion, sensibility being generally either not at all or but little impaired. In some of these cases, the palsy of the lower extremities, as well as that consecutively affecting the upper parts of the body, continues incomplete for a long time; the motions consequent upon volition being imperfect, weak and vacillating, and executed slowly, tremulously, and with difficulty. In these, the patient often complains of spasmodic or severe pains in the limbs, with a sense of constriction; of spasm and flatulent distension, with occasional attacks of painful constriction in the abdomen; of want of power over the sphincters, and involuntary discharges. This last symptom often varies much in different cases and different times in the same case, according to the treatment, &c.

70. In other cases, the paralytic symptoms either appear nearly contemporaneously in several parts or limbs, soon becoming general or more complete, or extend much more rapidly from the lower to the upper extremities, than in the immediately preceding class of cases. Still the same symptoms are generally present, only varying in some subordinate phenomena, sometimes continuing nearly stationary for months or even for years, and ultimately terminating in a similar manner. I occasionally attended, during nine or ten years, a gentleman somewhat above the middle age, who was affected with this particular form of general palsy. It was long incomplete, sensibility being but little impaired, even when the power of motion was altogether lost. Power over the sphincters was only partially retained for some years; but was very considerably increased by opiates conjoined with stimulants and aromatics; at last it was altogether lost. The intellectual powers were unimpaired. Ultimately cerebral symptoms, followed by coma and death, supervened. Permission to examine the body was allowed by his accomplished and highly intelligent relatives. The membranes at the base of the brain were more vascular than usual, and a considerable quantity of serum was effused. All the spinal arachnoid presented appearances of previous chronic inflammation. It was thickened, covered in parts with false membrane or adherent to the opposite surfaces by means of cellular bands. The whole dura mater or sheath of the chord was more or less thickened throughout, and the arachnoid of the chord, where it was not adherent, was opaque and thickened. The venous sinuses, placed between the bodies of the vertebræ and the sheath of the chord, were remarkably dilated and congested, so as manifestly to encroach upon the spinal canal and diminish its calibre, especially at the lowest part of the chord. The chord itself was firmer than usual, particularly in this situation, was somewhat atrophied, and its grey substance was wasted and less apparent. Its vascularity also was diminished, although the spinal veins and sinuses external to the sheath were remarkably dilated, and congested with coagulated blood.

71. Whilst I was treating the above case, a respectable tradesmen, aged about fifty, came under my care, and was seen by me occasionally until his death, which took place three or four years afterwards. The symptoms, protracted course, and termination of the disease, were altogether the same as those just described. On examination after death, the lesions found in the spinal chord were also similar to those observed in the preceding case. The chief difference was the less remarkable congestion of the spinal veins or sinuses; although this was considerable. The consequences of the chronic inflammation of the membranes, and the state of the chord itself, were nearly the same as those already described. There was, however, a more abundant effusion of serum between the membranes of the chord than in the former case; and much fluid was found in the ventricles of the brain. The upper portion of the medulla oblongata, and the membranes at the base of the brain, presented appearances of recent acute inflammatory action, especially increased vascularity and congestion, with a turbid serous effusion: these corresponded with the cerebral symptoms preceding death.

72. I have occasionally seen, during the last few years, with Mr. Pettigrew, a gentleman, between thirty and forty years of age, whose complaints are nearly the same as those characterising the above cases, and are most probably owing to similar changes existing in the spinal chord and its membranes. In this case, the loss of power over the sphincters is more remarkable than in the preceding cases, or rather appeared earlier in the course of the disease.

73. The above cases of general palsy from *chronic inflammation of the membranes of the chord and its consequences,* came before me when the paralytic symptoms were more or less fully developed. I had an opportunity many years ago of observing the disease from its commencement. In 1820, a boy, aged thirteen, was brought to my house with chorea. He had rheumatism of the arms and wrists, associated with rheumatic pericarditis. After a few days the rheumatic affection subsided, and the chorea returned, with pain in the course of the spine. Leeches, &c. were applied along the spine; but the disease passed into a state of general palsy which was complete in respect only of motion, from the head downwards. All power over the sphincters was lost: sensibility of the surface was at first acute, and, although it became somewhat impaired as the general palsy was developed, still it was not materially diminished. After death, coagulated lymph and turbid serum were found effused between the opposite surfaces of the arachnoid of the chord in a very remarkable quantity, and so as to press upon the chord itself. (See *Lond. Med. Repos.*, vol. xv.)

74. *d.* It has been stated above (§§ 52, 53.) that *softening of the spinal chord*, whether it be the consequence of concussion of the spine, of inflammatory action, or of some other morbid condition of the vessels, or constituent tissues of the chord, is not an infrequent cause of paraplegia, when seated in any portion of the chord below the fourth or fifth cervical vertebra. When the disease is seated at or above this part, the palsy is nearly general. In a very remarkable case recorded by Dr. Webster, the spinal chord was soft and pulpy in this situation, particularly the posterior columns; the membranes were adherent to the chord; close to the softened part, the medulla was of a dusky red tinge; but above and below this part it was healthy. The subject of this case "was for many months totally unable to move, even in the slightest degree, any muscle situated lower than the neck, but still retained the capability of feeling quite perfect throughout the surface of the body; whilst the other senses and intellectual faculties were unimpaired to the last moment of his existence. Indeed, the patient's cuticular sensibility even appeared, in the latter stages of the case, to be more acute than natural." The evacuations took place involuntarily; and violent spasmodic twitchings frequently affected the lower extremities.

75. *e.* Although general palsy as well as paraplegia is most generally caused by some manifest lesion seated in, or implicating, the spinal chord or its membranes, when the functions of the brain are unimpaired, still it is not to be inferred that the lesion is always of a nature which may be detected. Cases sometimes occur that present no appreciable lesion, at least to the unaided eye, upon dissection; and others recover after a treatment not obviously calculated to remove any serious lesion of the chord or its membranes. Sir B. Brodie refers to a case (*Lancet*, No. 1060. p. 380.) which commenced as paraplegia and terminated in general paralysis. The spinal chord and solar plexus were examined with the greatest care after death; but they presented no change from the natural state. Sir B. Brodie justly remarks, that it is not, however, to be supposed that this is a mere functional disease, because we see no lesion after death. The minute organisation of the brain and spinal marrow is not visible to the naked eye, and even with the microscope we can trace it only a little way. Some defect in the minute organisation, some change of structure not perceptible to our senses, may exist in the part and interrupt its functions.

76. Some years ago, I attended with my friend Dr. Roscoe a gentleman who had resided many years in an intertropical country. On his voyage across the Atlantic to this country, in the winter season, he was seized with general palsy of the powers of voluntary motion immediately after prolonged exposure to cold and wet. The functions of the brain were unaffected; and neither pain nor uneasiness was felt in the neck or in any part of the spinal column, under any circumstances of position, flexure, rotation or pressure. No evidence of inflammatory action or of congestion in the spine could be detected. Cutaneous transpiration was suppressed, and the bowels were costive and torpid; but he retained the sensibility of the surface, and command over the sphincters. He was treated, at first, upon the supposition of either serous effusion or vascular congestion having taken place in the spinal canal, but without receiving any benefit. He ultimately, however, quite recovered by having a frequent recourse to warm baths containing stimulating substances.

77. That form or state of general palsy in which structural lesion may be inferred to be most decidedly absent, and which consists entirely of functional disorder, is the *cataleptic seizure.* In this affection, as shown elsewhere (*see art.* Catalepsy), voluntary motion is altogether sus-

pended; but, in two very remarkable cases which I had an opportunity of observing attentively, consciousness and sensibility remained, with the senses of seeing and hearing. Yet no part— neither the muscles of the tongue or jaw, nor the eyelids—could be moved during the attacks, which often continued for many hours. Nor did the least muscular contraction take place on tickling the soles of the feet, or on pinching any part, although the sensibility was affected by these acts. Recovery from these seizures was generally sudden and complete; little disturbance, beyond slight hysterical disorder on some occasions, being observed.

78. *f. The symptoms of general palsy* vary much with the lesion occasioning it. — *α.* The *accession* of the attack also varies. In the *cerebral form* of the malady, particularly when it depends upon *apoplectic* or *epileptic seizures*, and when it assumes the cataleptic form, the accession is sudden or rapid. In the *spinal form*, the symptoms appear gradually, and generally slowly, when it is the result of disease, but often suddenly and completely when it proceeds from severe injury. In the cerebral state, the *sensibility* and even consciousness are abolished or nearly lost; but in the *spinal states* (§§ 67. *et seq.*) of the malady, sensibility, the functions of sense, and the intellectual powers are either unimpaired, or but little affected. In a few cases only is the sensibility of the general surface remarkably diminished, and in still fewer is it altogether lost.

79. *β.* The *loss of voluntary motion* is most sudden and complete in the cerebral states of the disease, and in cases of injury of the cervical portion of the chord, or of concussion of the spine. When the palsy proceeds from disease of the spinal medulla or of its membranes, the loss of motion is rarely complete at first, and often does not become complete until after several years, and until the organic lesions have advanced so far as evidently to interrupt the functions of the chord. Still there are exceptions to this, as the case noticed by Sir B. BRODIE. During the protracted progress of the malady, the patient often experiences spasmodic actions, or more permanent contractions of the muscles, particularly of the flexors; frequently a sense of painful constriction around the abdomen and the thighs; and sometimes, especially when the upper part of the cervical medulla is implicated, even convulsions or complete epileptic attacks. These are evidently the consequence of inflammatory action or irritation in or near the portion of the chord or its membranes which are the seat of lesion.

80. A compositor, who was engaged in printing a work which I was editing many years ago, came to me with caries of one or two of the upper dorsal vertebræ. Matter had evidently formed and was making its way externally. He became paraplegic, and subsequently generally paralytic; but at a very early period of the paraplegic state fully developed epileptic seizures occurred. These became more frequent, and ultimately terminated in coma and death. On examination, a sanious pus was found collected around the second and third dorsal vertebræ, extending between the muscles, and between the theca vertebralis and bodies of the vertebræ. The membranes at, and to a considerable extent above, this part were inflamed, the arachnoid surfaces being partially covered with lymph or adherent. Injection of the vessels and effused serum were traced thence along the membranes to the brain. The chord itself was not, however, materially changed.

81. *γ. Pain*, even of a most severe character, is often remarked, particularly in the inflammatory states of the spinal disease, and when the roots of the nerves, or when the nerves as they pass through the spinal foramina, are implicated in the lesion. The pains are usually deep-seated in one or more limbs, and are often not the less acute where the cutaneous sensibility is much impaired. In some instances of spinal general palsy the sensibility of the surface, particularly at first, is painfully increased, and sometimes even perverted. Pain is often felt in the part of the spine affected, either primarily or consecutively. In some instances, particularly when the disease commences in the lower portion of the spine and extends upwards, it may be confounded with lumbago; or it may be viewed as originating in lumbago; the pain in the loins being caused either by inflammatory action or softening, or by congestion of the spinal veins and sinuses. When the disease is consequent upon masturbation or venereal excesses, it is often preceded and attended by pain in the loins, extending upwards with the local lesion and the paralytic symptoms.

82. *δ.* The *bowels* are remarkably torpid, and the evacuations in the more complete states of the disease, dark, and like tar or treacle (§ 59.). The *urinary organs* are affected in the more complete and advanced forms, in the manner already noticed (§§ 57, 58.); but, in the less complete states, and when the spinal chord itself is not materially changed, the patient still retains more or less power over the evacuations and actions of the sphincters. In the more severe and sudden cases, particularly those consequent upon injury of any kind, and attended by marked disturbance of the urinary functions, priapism is a frequent symptom.

83. *ε.* The *external surface* is always dry, often scurfy, sometimes discoloured in the extremities, or presenting livid spots resembling vibices. It is generally emaciated, and colder than natural, even when the patient complains of a sensation of heat. The disposition of the surface to ulcerate or slough on pressure, so remarkable in paraplegia, is less so in general palsy, unless at the last stage or more severe and complete state of this latter form of the disease.

84. *ζ.* The *cerebral functions*—sensation and intellectual power—are unaffected in general palsy as well as in paraplegia, and continue unimpaired until the malady terminates either in fatal congestion of the lungs, or asphyxia, or in congestion of the brain with serous effusion.

85. II. OF PARALYSIS IN NEW-BORN INFANTS AND YOUNG CHILDREN. — Paralysis is sometimes met with in new-born infants. It may be the effect of injury to the nerve either in the part paralysed or in its course after its transmission through the cranial or spinal aperture. Dr. E. KENNEDY remarks that we have examples of this fact in injury to the portio dura, as in face presentations; or where the head has been long pressed in the pelvis against the projecting ischiatic spines; and he adds, that several cases of this kind had occurred to him, in which the disease was quite local, the paralysis being removed on

the subsidence of the swelling produced by the protracted pressure.—*a.* I have already mentioned (§ 44.) that the paralysis may be the result, not merely of spontaneous lesion of some part of the nervous centres during fœtal life, but also of arrested developement, or insufficient growth, during the early periods of this epoch. In this latter case the palsy is often associated with idiotcy. The cerebral or spinal lesion may, however, occur shortly before, as well as during the period of parturition. In the following case, recorded by Dr. E. KENNEDY, the lesion must have existed some time before birth; and, probably, from the speedy recovery, consisted merely of congestion of one side of the brain.

86. Immediately after birth, a large soft tumour was observed on the right side of the head, principally on the vertex, with two or three small excoriations on the left side. The left eye was closed; the mouth drawn to the left side; and when the child cried, the *ala nasi* and angle of the mouth were drawn up; the right eye was open, and the right side of the face unaffected during crying. The left side of the body was completely paralysed. The extremities of this side were of less bulk than those of the right, and were rough to the touch; the muscles were flabby. Both pupils were insensible to light. The child was unable to suck; but deglutition did not seem to be affected. On the third day it had several slight convulsions confined to the upper half of the body. A leech was applied to the vertex, followed by the warm bath: stimulating liniments were rubbed over the spine, and the child recovered. In this interesting case, the portio dura of the right side, and the levator palpebræ of the left side, supplied by the third nerve, were paralysed, in connection with hemiplegia of the left side.

87. It is often difficult to ascertain the extent of paralysis in new-born infants and very young children, as the paralysed limbs are generally either so much convulsed, or so spasmodically contracted, as to be removed from under the influence of volition. When the spasms cease, the paralysed state of the limb sometimes becomes more evident in the more unfavourable cases. The lesions which most frequently occasion paralysis in this class of subjects are, congestions of the brain and spinal column, serous effusion either between the membranes or in the ventricles, and extravasation of blood. This last is much less frequent in children and infants than in adults, and very rarely occurs in the cerebral structure. When hæmorrhage takes place within the cranium or spinal canal of infants, it is generally found to proceed from the surface of the membranes, and seldom causes permanent paralysis, but usually apoplectic attacks, or eclampsia, trismus, or convulsions terminating generally in death. In these cases, the effused blood produces either coma, spasm, or convulsions, according to the quantity effused; and ultimately, if the child live a short time, inflammatory action in the parts into which it is extravasated, owing to the irritation it occasions.

88. *b.* Paralysis, sometimes partial, at other times more or less general, accompanies the advanced progress of the disease usually called acute hydrocephalus, and of true or chronic dropsy of the brain. In the former of these maladies (*see* DROPSY, *acute, of the brain*), I have shown that the palsy is the consequence of the softening of the more central parts of the brain, rather than of the effusion into the ventricles which either attends or supervenes on the softening. The tubercles sometimes found in the brain, or its membranes, of children, either associated with, or independent of, softening and serous effusion, are rarely a cause of paralysis, unless at an advanced stage of these lesions, or as a termination of convulsions or spasms, with which, however, some degree of paralysis is occasionally associated.

89. *c.* But palsy is sometimes met with under different circumstances, especially during suckling and teething; and, although not so frequently as immediately after birth, still sufficiently often to have procured for it, as occurring at this period, more attention than has been paid to it. From the first dentition to the period of puberty, paralysis is generally the consequence of scrofulous caries or disease of the vertebræ, or of softening of a portion of the brain, or of tubercles within the cranium or spine. In cases of softening or tubercles in the brain or its membranes, convulsions, more or less of an epileptic character, almost always precede the paralysis, which commences generally in one arm, and sometimes passes into hemiplegia. When these lesions are seated within the spinal canal of young children, convulsions, of a more limited character, often spasms or contraction of a limb, are more frequently remarked either before the developement of palsy, or in connection with it; although, even in these cases, the convulsions may assume an epileptic character, particularly when the upper part of the chord is implicated.

90. *d. Infantile paralysis* may, therefore, be divided as follow: — 1st. The congenital, and then it is commonly a consequence of arrested developement or congestion of a portion of the cerebro-spinal centres: —2d. That caused by the accidents attending parturition, as shown above (§ 85.): —3d. That consequent upon lesions or spontaneous disease, of a demonstrable nature, implicating the brain or some portion of the cerebro-spinal axis: — and 4th. That which presents no obvious lesion in the brain and spinal chord beyond slight congestion; and from which recovery often takes place, without sufficient evidence of organic lesion having been afforded. This last class of infantile palsies generally occurs in infants at the breast or during the first dentition. It is often sudden in its accession, and is preceded by no very apparent state of disease, beyond the usual irritation often attending dentition, or disorder of the alimentary canal or biliary functions. The arm is commonly the part affected; but the leg of the same side is sometimes either also paralysed, or contracted and drawn up, or both palsied and contracted. Sensibility has not been, as far as I have observed, impaired in the affected limb, but, on the contrary, sometimes morbidly increased. A large proportion of the cases which I have seen of this description has recovered after the means that will be noticed in the sequel have been employed.

91. My very learned friend, Dr. M'CORMAC, of Belfast, has noticed cases of paraplegia in infants, which he considered to proceed from concussion of the spinal chord — a cause by no means unlikely to produce the disease in both infants

and children, and to be followed by either hæmorrhage, inflammation, softening, serous effusion, or other change of the parts lodged in the spinal canal. He believes also, that injury to the sciatic nerve may produce paralysis of the limb in infants; but this is manifestly a rare occurrence.

III. Shaking Palsy.—Synon.—*Scelotyrbe festinans*, Sauvages;—*Paralysis Agitans*, Parkinson;—*Synclonus ballismus*, Good;—*Tremor*, J. Frank;—*Tromos* (*Τρόμος*), Swediaur;—*Tremblement*, Fr.;—*Zittern*, Germ.;—*Trembling Palsy*.

92. This disease is *characterised by a tremulous agitation—a continued shaking, and by great weakness of one or more parts or members of the body.* Although it was described by Harscher, Diemerbroeck, Schelhammer, Hamberger, and others, and more recently by Parkinson and J. Frank, it has not received the attention which the frequency of its occurrence, and the obscurity of its nature, should have obtained for it. Even its symptoms, its relations to other nervous affections, its course and terminations, have been imperfectly observed and described; and no accounts have been furnished of the appearances observed in fatal cases.

93. Shaking palsy may affect either a single part or limb, or many parts, or even the greater part of the body. It may continue *limited* to its original seat for many years, and even never extend beyond it; or it may not only increase gradually in the part first affected, but *extend* to two, or to all the limbs of the body. Generally the power of motion only is affected, and usually is only partially impaired; and it continues long in this state; so that the complaint may be viewed as *imperfect palsy of the power of motion, with shaking of the part.*

94. The affection usually commences imperceptibly, and proceeds slowly. It often begins in the head, or in one or both arms, and it frequently is confined to these parts for a long period, or even for years. It is generally attended by a feeling of weakness of the part. In two instances I have seen the complaint limited to the lower jaw, which was moved by a rotatory or lateral action in one case, and by a vertical action in the other. When the head is affected, it is commonly moved upwards and downwards; but it is in some instances in a constant state of rotation. In these situations, as well as when it affects the hands and arms, the motion often does not exceed that of tremor, or a gentle but quick shaking; but in others the agitation is more remarkable and violent; and even the slighter cases may be more severe when the patient is influenced by any excitement or marked emotion of mind.

95. The affection commences usually with a slight sense of weakness and proneness to trembling, especially on any emotion or after physical exertion, and commonly in the hands or arms, but sometimes in the head, or in the tongue or lower jaw. These symptoms gradually and slowly increase; and usually after one, two, or three years, but in some cases not until after a longer period, they extend to the lower extremities; and the patient finds great difficulty in walking; bends his body forwards, and is obliged to assume a hasty or rapid pace, from the fear of falling forwards. The tremulous agitation has now extended to his legs, and the limbs have become less and less capable of obeying volition. Suspension of the agitation is seldom experienced, unless in some cases when the limbs are held or supported; and, when it ceases from this circumstance in one limb or side, it continues in the other. Thus it sometimes ceases in the arm or side on which the patient lies or reclines, but as soon as he changes to the opposite side it begins in the former. Occasionally, attempts to restrain the agitation only increase it; and it is often exasperated at the sight of strangers. When the patient walks, he is often thrown on the fore part of the feet, and impelled to adopt a quick or running pace, from fear of falling at every step on his face. At an early stage, or in less severe cases, the affection ceases for a short time, or is ameliorated after a refreshing sleep; and it is often then controlled by the will or by earnest attention to the part, but it soon afterwards recommences.

96. At a far advanced stage, the tremulous motions of the limbs occur during sleep; and, particularly when the patient dreams, waken him, often in agitation. The power to convey food to the mouth ultimately becomes so impeded as to oblige him to be fed by others. Mastication and deglutition are impeded, or difficult, and the saliva dribbles from the mouth. The trunk is permanently bowed from the general want of power in the muscles. The bowels are costive; are acted upon with difficulty; and sometimes require mechanical means to remove them from the rectum. Ultimately the agitation becomes more vehement and constant; and when exhaustion passes into sleep, it sometimes becomes so violent as to shake the room. The head falls down, so that the relaxed or shaking jaw meets the sternum. The power of articulation fails or is lost, and the urine and fæces are passed involuntarily. Slight low delirium, passing into coma, usually terminates life.

97. I have met with this affection both as the chief and primary malady, and in connection with disease in some distant organ, of which it appeared either as a consecutive change, or as a concomitant disorder. I have seen it more frequently in males than females, and chiefly in persons about fifty years of age and upwards. I observed it to a very remarkable extent in a man aged about sixty, who had valvular disease of the heart, upon which pulmonary congestion and dropsy supervened; but I could not obtain permission to examine the body. I observed it also in a lady in a similar form of complication, but I ceased to attend her long before her death. I was recently consulted by a gentleman from Lancashire, affected by this complaint in the arms; and in every other respect he professed himself to have been in good health. I have seen it both in plethoric and in thin and spare habits; but more frequently in the fair and sanguine than in any other temperament. I have never had an opportunity of observing the changes that existed after a fatal termination of the complaint, and I do not recollect of any case being recorded where such an opportunity had been enjoyed. It is frequent in very aged persons in its slighter forms.

98. In rare instances, *hysteria* assumes a form very nearly allied to, or closely resembling, this affection. In 1842 I attended with Dr. N. Grant

a girl aged about sixteen, on account of various anomalous nervous affections consequent upon obstructed catamenia. After passing through various phases, in which the tongue, larynx, diaphragm, seemed spasmodically affected, violent tremulous agitation of the head and arms supervened. The head was rotated from side to side without intermission for several days. She received benefit from treatment, and ultimately recovered.

99. In the absence of *post-mortem* examinations, opinions as to the origin and seat of this complaint must be viewed as suppositions merely. But it is not unreasonable to infer that the medulla oblongata and upper part of the spinal chord are the chief seat of the affection. J. Frank adduces the case of a widow, aged forty, who had experienced an interruption of the catamenia, had complained of pain in the spine, and had recourse to a vapour bath; after coming out of the bath she was exposed to cold, and suddenly was attacked by this affection. Her head was in a constant state of rotation; and the arms, hands, legs, and feet were in continual motion. Blood was taken from the spine by cupping, and she recovered sooner than was expected. It is not improbably connected with congestion of the venous plexuses or sinuses placed between the sheath of the chord and bodies of the vertebræ, particularly in persons of a plethoric habit, and when it is consequent upon suppressed evacuations. In other cases it appears to depend more upon the states of the chord and nerves, or to be more strictly nervous.

100. IV. Paralysis from Poisons.—*Paralysis venenata*, Cullen. — *Paralysis e venenis.* — Palsy, varying as to seat and character, is not infrequently observed consequent upon the operation of several poisonous substances of either a mineral or vegetable nature, especially the former. The poisons most liable to cause palsy are lead, mercury, arsenic, ergot of rye, monkshood, thornapple; and in rare instances, palsy occurs as a contingent remote effect of most of the acro-narcotic poisons.

101. *A. Palsy from lead.—Lead palsy* generally occurs after one or more attacks of colic (see Colic from Lead); but it occasionally appears without any severe disorder of the digestive organs. When the palsy is connected with colic, it usually becomes manifest as the colic subsides; but both affections may be associated or contemporaneous. When the palsy occurs independently of colic, costiveness and indigestion, with or without slight pains in the abdomen, are generally present both before and concomitantly with it. The palsy usually presents peculiar characters. It is seated chiefly in the upper extremities, and affects the extensor more than the flexor muscles. It is attended by great emaciation of the affected muscles; and the loss of power is most remarkable in the muscles which move the thumb and fingers. The palsy is seldom complete even in these except in the extensors. The hands and fingers are constantly bent, unless when they hang down by the sides. The patient, in the most severe cases, is unable to raise them; and, when one arm is more affected than another, he raises the one by the aid of the other. Severe pains are also felt in the lower limbs and arms. Attacks of colic, severe fits of indigestion, and obstinate constipation are apt to occur, especially after irregularities of diet or exposure; and generally carry off the patient. The palsy of the arms is sometimes associated with deafness, owing to palsy of the auditory nerves.

102. In fatal cases, the paralysed muscles have been found pale, bloodless, and flaccid; and in cases of long standing they have become still more pale and fibrous. The nerves have also appeared atrophied and firmer than natural. It is not improbable that the lead, in a state of oxide, has in some measure combined with these tissues. In this case, however, it ought to be detected by chemical analysis; but, whilst some chemists avow that they have detected it, others assert that they were unable to do so. Dr. Christison's able researches into this subject do not countenance the opinion, that a combination takes place between the lead and tissues affected in these cases. That the metal affects the states of these tissues cannot be doubted; but whether by its actual presence, or by its indirect operation on the nerves and nutrition of the muscles, independently of its presence, has not been demonstrated. Most probably its operation is direct in the state either of an oxide or of a salt, in either of which states it may pass into the circulation, and act immediately upon the nerves and muscles.

103. *B. Mercury*, when carried into the system in the form of an oxide or of a salt, sometimes causes palsy, but generally in the form described as shaking palsy (§ 92.), or *incomplete palsy of motion with tremor*— the *tremblement métallique* of French writers. It usually occurs in miners, in gilders, and in other workmen exposed to the operation of mercurial substances. It usually commences with unsteadiness of the arms, and afterwards with tremors, which extend more or less with the continuance of the malady; and often becomes associated with convulsions. For a fuller account of this affection I may refer to the article Arts and Employments (§§ 24.).

104. *C. Arsenic* sometimes occasions limited or partial palsy, when it has failed of causing fatal effects in a short time; or in the advanced stage of the more prolonged cases of poisoning by it. In some cases, an incomplete form of paralysis, resembling palsy from lead, and affecting one or more of the extremities, is caused by this poison. Occasionally the palsy is preceded by cramps, tenderness, and weakness of the extremities; the palsy being sometimes attended by contractions of the joints. The affection is not confined to the power of motion, but generally also extends to that of sensation. Dr. Falconer observed a case in which the palsy was limited to the hands, and another in which it gradually extended to the shoulders.

105. *D. Paralysis from narcotic or acro-narcotic poisons* is sometimes observed contingently upon their more remote effects. I was consulted many years ago respecting a case of hemiplegia caused by eating the root of monkshood by mistake. The more immediate effects had been numbness and palsy of the tongue, followed by apoplexy, and a state of the cutaneous and mucous surfaces closely resembling that existing in fully developed purpura hæmorrhagica. The apoplexy had been either associated with hemiplegia from the commencement, or the latter rapidly followed it. The patient, aged about 20, ultimately recovered; and

I lately saw him without any remains of the paralytic affection, which, however, had continued during two or three years. Paralysis from this class of poisons generally affects the powers of sensation more or less remarkably.

106. *E. Ergot, or spurred rye*, sometimes occasions palsy, especially of sensation: but the effects of this substance are fully treated of in the article Ergotism.

107. V. General History of Palsy. — i. Of the various Disorders preceding and attending Palsy. — From the description of the several varieties of palsy, it will be seen that the power of motion is much more frequently impaired than that of sensation; that either may be singly, or both jointly, affected in various grades, but that, when motion is totally lost, sensation is frequently more or less impaired; that sensibility is very rarely entirely lost in a paralysed part, and still more rarely over the surface of the body; and that palsy is both preceded and accompanied by considerable derangement of the general health as well as of the nervous system, to which especial attention should be directed.

108. *A.* It is impossible to notice all *the premonitory symptoms of palsy*, as the varieties and relations of the malady are so numerous as to render them both diversified and inconstant, and as they depend very much upon the nature of the pre-existing disorder and of the remote causes. *Hemiplegic palsy* is often preceded by the same premonitory symptoms as have been mentioned in connection with the accession of Apoplexy (§ 4.), especially by various affections or disorders of one or more of the senses, particularly of hearing, sight, and touch; by neuralgic pains about the face or head; by twitchings, spasms, or convulsions; by weakness of muscles or of a limb; by headaches, restlessness, sopor, lethargy, or watchfulness; vertigo, faintness, and unsteady gait; irritability of temper, loss of memory; imperfect or difficult utterance; flatulence, costiveness, and various dyspeptic symptoms; more or less manifest indications of irritation or inflammatory action in some part of the brain; epileptic seizures; and most frequently apoplectic attacks. (*See above*, § 40. and Art. Apoplexy, § 4.)

109. The *paraplegic and general states of palsy* are often preceded by pain in the course of the spine, sometimes resembling, and frequently mistaken for, lumbago; by spasms or cramps of particular muscles; by pain in the neck, or wry-neck; by neuralgia or neuralgic pains; by numbness of the toes or fingers; by attacks of nephritis; by increased sensibility of the surface of one or more limbs, or of the body generally; by costiveness and colicky pains, or obstinate constipation; by retention of, or difficulty of voiding, the urine; by chorea, partial convulsions, or various anomalous nervous disorders; and by the more limited forms of partial palsy.

110. *B. The disorders of the nervous system, and of the general health accompanying palsy*, are various in different cases according to the seat of the malady. — *a.* In *hemiplegia* and palsy of any of the organs of sense, the memory, and in severe or prolonged cases, even the intellectual powers are more or less impaired; the palsy extending even to the mental powers. This state, however, is the most remarkable in the complication of general palsy with insanity, hereafter to be noticed. The temper and disposition are often changed from their usual characteristics, persons of a mild disposition becoming peevish and irritable, and those who have been irascible becoming placid; in some cases the memory, chiefly of words or of names, is impaired or perverted, so that the patient substitutes those which either are inappropriate or have an opposite meaning to that which he wished to convey. The powers of attention and application, and mental energy generally, are usually impaired.

111. The action of the *heart* and *lungs* is seldom much excited in hemiplegia or cerebral palsy, unless when inflammation of a portion of the brain supervenes upon or attends the lesion causing the hemiplegic state. Nor is the action of these organs oppressed or impaired, unless effusion, so as to cause direct or counter pressure, takes place, or the medulla oblongata becomes in any way implicated. Hence the temperature of the surface of paralysed parts is seldom lower than natural; and frequently, owing to diminished transpiration from the surface of these parts, it is higher than in other situations.

112. *Digestion* and *assimilation* are often but little disturbed or impaired. In some cases, vomiting or nausea, with or without flatulence, attends the accession of hemiplegia; but subsequently acidity, heartburn or flatulence, is complained of. The appetite is but little impaired; it is even frequently keen or craving, and is generally too great for the amount of exercise taken and of air consumed by respiration, and consequently for complete digestion and assimilation. This keenness or craving appetite I have often remarked as an indication of latent irritation in the substance of the brain. The bowels and liver are usually torpid, and often require powerful chologogues and purgatives to act on them.

113. The *nutrition* of a paralysed part is often not materially affected when the disease occurs after the growth of the body has been matured. Occasionally, however, some degree of shrinking or atrophy exists, especially in prolonged cases, owing chiefly to disuse of the muscles. The nerves are also somewhat atrophied. Very frequently an œdematous state of a paralysed limb is observed, increasing its bulk, although the muscular and other soft parts may be more or less wasted or atrophied. The urinary functions are seldom much affected in hemiplegia and other cerebral forms of palsy.

114. *b.* In *paraplegia and general palsy* the attendant phenomena have been already fully noticed (§§ 48. *et seq.*), and consist chiefly of lesion of those functions which depend upon, or are influenced by, the part of the chord which is the seat of disease. As the brain continues unaffected until the fatal termination of the disease draws near, so the mental powers continue unimpaired till that period arrives.

115. When the medulla oblongata or upper part of the chord is affected, the *action of the heart* and *lungs* is often much disordered; and if these parts, especially the former, are pressed on, or much disorganised, death by asphyxia is more or less speedily produced. In slighter lesions of these parts, remarkable slowness of the pulse, in some cases, and great rapidity of it in others, are often observed.

116. Respiration is usually performed chiefly

by the diaphragm, and the quantity of oxygen consumed during the process is very small: consequently the heat of the surface is low, and transpiration from it much diminished. The skin is dry, becomes covered with a branny or furfuraceous substance, owing to rapid exfoliation of the cuticle. When the lesion is seated lower in the chord, or so as not to impede the motion of the chest, and consequently not to diminish the action of the air on the blood, the parts below the seat of injury experience diminished or interrupted cutaneous transpiration; and, instead of any diminution of temperature, they present an actual rise of temperature, owing to the interrupted transpiration, the functions of respiration not being impaired.

117. The *heat of the surface* of paralysed parts depends upon the state of respiration and the consumption of oxygen, in connection with the amount of transpiration from that surface; for, whilst the oxygenization of the blood proceeds without diminution, suppression of the cutaneous transpiration will raise the temperature of the surface on which transpiration is suppressed; but when the oxygenization of the blood is impaired, suppressed transpiration cannot have this effect, or only to a small amount. If the change produced by respiration on the blood be much impeded, the temperature will generally continue much below the natural standard. This appears to me to be the true cause of the different states of temperature of paralysed limbs in different cases; and it is preferable to account for the phenomenon conformably with established principles, upon which a sound and safe practice may be based, than to mould it so as to suit a pre-conceived hypothesis, and to make it subserve a doubtful or hazardous treatment.

118. It may be objected, however, that the rise or fall of temperature in a paralysed, or in an inflamed part, may be independent in some degree of states of respiration; and this is actually the case; for, although the passage of oxygen into the circulation takes place in the lungs, the oxygenization of the blood, or rather of certain elements of the blood, occurs chiefly in the systemic capillaries, under the influence of the organic nervous power; the oxygen combining partly with these elements for the nutrition of the tissues, and partly with the carbon of the blood. The change in the capacity for latent heat consequent upon the combination of oxygen with these elements in the several parts of the body, is great in proportion to the extent of combination; and, as this combination is strictly a vital process, or at least brought about by vitality, although conformably with chemical laws, so it takes place independently of the cerebro-spinal nervous system. Notwithstanding that this combination and the change of capacity for caloric consequent upon it are independent of this system, and are effected chiefly by vital or ganglial nervous power, still they may be influenced by the cerebro-spinal system. The passions and emotions show this; but they also prove the predominant influence of the organic nervous system; their physical action — their operation on the circulation and the tissues — being through the medium of this latter system. Fear blanches the cheek and lowers the temperature of the surface; sexual passion produces turgescence of the erectile tissues and heightens the temperature: but these, as well as other mental emotions, change the state of the circulation and temperature by depressing or exciting, according to the nature of the emotion, the organic nervous or vital power in the first instance, the effect upon the circulation and temperature being consecutive. The independence of the organic or vital nervous system of the cerebro-spinal is shown, even in those vital organs which are most influenced by the mental emotions and the spinal chord, in the course of paralytic cases. Thus palsy, even when general, does not extend to the organs of generation. Erections take place in almost all the varieties of the disease, if no other concomitant complaint exist to prevent them; they are even morbidly frequent or constant when the upper part of the spinal chord is congested, inflamed, or otherwise implicated. Pregnancy proceeds in its usual course, and parturition takes place, in the natural way, in cases of paraplegia or general palsy in females.

119. When the upper part of the chord is the seat of lesion, the *stomach* is sometimes so much disordered as to reject its contents. The bowels are obstinately confined, as above noticed (§ 59.); the tongue is furred and loaded; the urinary organs remarkably affected (§ 57.); and the vital cohesion of the superficial and other tissues below the diseased portion of the chord is more or less impaired, disposing them readily to undergo asthenic inflammation, sloughing, &c. (§§ 64.)

120. ii. The Associations and Complications of Palsy. — As palsy is generally a symptom or consequence of some lesion sustained in a part of the cerebro-spinal nervous system and nerves, it will readily be admitted, that it will frequently present itself in practice as an accident or result of an immediately antecedent and intimately related disease, and often be associated with such disease — with apoplexy; with inflammation and softening of the brain; with similar lesions of the spinal chord; with structural changes of the membranes of the brain, and of the spinal medulla; with disease of the cranial and spinal bones; with epilepsy, convulsions, hysteria, and catalepsy; with insanity, imbecility, and idiotcy; with rheumatism, lumbago, and congestions of the spinal sinuses; with neuralgic affections; with inflammation of the kidneys, or other parts of the urinary apparatus. In the progress of all these maladies, some form or other of palsy may appear, whenever lesions of structure, or even congestions, take place in, or extend to, any portion of the cerebro-spinal axis, or nerves proceeding from it, during their course; or, in other words, when palsy is complicated with any of these maladies, it is a consequence of the vascular and organic lesions characterising or supervening in the progress of such malady. The importance and danger of these complications require that a brief notice should be taken of them.

121. *A.* Of all diseases, *apoplexy* is the most frequently associated with, and the most intimately related to palsy, especially to, hemiplegia, and to some states of general and partial palsy. The complication of apoplexy with palsy is fully described in the article Apoplexy (§§. 31—49.). I have there shown that it generally presents itself as follows: — 1st. *The apoplexy occurs as the pri-*

mary malady, and is either associated with, or followed by, paralysis; — 2d. *The paralysis, in some one or other of its partial states, often in that of hemiplegia, first appears, and is followed, after a very indefinite period, by an apoplectic attack more or less profound.*

122. *a.* In the *first* of these complications, the paralytic affection may disappear in a short time after the apoplectic seizure, or not until after several days or weeks. It may be permanent, or continue for years, or until another apoplectic seizure carries off the patient; or it may be rendered more complete or general, or it may affect additional or different parts, those first affected being either partially restored or unchanged, by renewed seizures of apoplexy, or by coma attended by sinking or exhaustion. In these cases, death is usually produced by the apoplectic state, or by a comatose sinking, attended by a general palsy, in which, owing probably either to nervous exhaustion, or to counter pressure on the base of the brain, or on the medulla oblongata, or to lesions extending to these parts, the respiratory organs participate. I have described fully, in the article just referred to (§§ 34. *et seq.*), the lesions usually observed in these circumstances; and I need not, therefore, allude to them further, than to state that, in the slighter and less prolonged instances, they consist chiefly of congestion and serous effusion; and, in the more severe and permanent cases, of extravasations of blood, softening of portions of the brain, and of extravasation and softening conjoined. In some cases, little or no lesion is seen, or at least lesions insufficient to account for the phenomena and for death; and in other cases, in connection with one or more of these lesions, effusion of serum in the ventricles, or between the membranes; inflammation of a portion of the brain, or of the membranes; and other concomitant or contingent lesions, are observed. (See art. Apoplexy, § 36. *et seq.*)

123. *b.* In the *second* of these forms of complication (§ 121.), the palsy in some one or other of its more partial forms, frequently in that of hemiplegia, is the primary seizure; and is generally then caused by alterations in some part of the substance of the brain, especially by softening, hæmorrhage, cysts, tumours, tubercles, and by almost any of the diversified lesions described in the article Brain and its Membranes, particularly when they have arrived at an advanced state of developement. Many of these lesions are followed by inflammation, softening, congestion, or effusion of serum or of blood in the brain or its membranes, causing either a more complete or a more extensive palsy, or spasms or contractions of one or more limbs, or superinducing apoplexy, which may either terminate life, or be removed, leaving the pre-existing palsy more complete or extended than before. (See arts. Apoplexy, § 46. *et seq.*, and Brain.)

124. *B.* Palsy may become associated with *epilepsy;* but it is generally a consequence, even when thus associated, of repeated returns of the epileptic paroxysms. Even in the earlier attacks of epilepsy, occurring in young persons, the epileptic fit may be followed by incomplete palsy of the limb, or of certain muscles, especially of an arm, or of the muscles of articulation, &c. In these cases the palsy may soon disappear, and follow the next or subsequent attacks; and may continue without much variation, or become more complete until either hemiplegia, or even more general palsy, supervenes. In some instances, the epileptic seizure may present a mixed character, or a state intermediate between apoplexy and epilepsy; or it may be viewed as apoplexy attended by convulsions — a form of seizure which had been overlooked until it was described in the early parts of this work. These mixed forms of seizure are not infrequently followed by palsy. It has been stated in the articles Brain and Epilepsy, that any organic lesion of the brain or of its membranes may be followed by epileptic attacks; and these lesions, in a more advanced stage of developement, may occasion either palsy or apoplexy — often both in succession, at very indefinite intervals. The slighter states of palsy consequent upon the epileptic fit may be viewed as the result of congestion, more particularly affecting that portion of the brain that has most intimate relations to the paralysed part. Where, however, the palsy is more complete or extensive and permanent, it may be viewed as depending upon similar changes to those which have been alluded to as causing palsy in connection with apoplexy (§ 121.); and if the palsy be attended by contractions or spasms either of the paralysed or of the sound limbs, inflammatory action or irritation may be inferred to exist either in the vicinity of the cerebral lesion, or in another part of the brain, according to the seat and character of the spasms, &c. In rare instances, the same lesion of the brain that causes the epileptic or convulsive seizure may induce at the same time a paralytic state. These cases usually soon terminate fatally.

125. *C. Inflammation of the brain* may be complicated with palsy; but in this state of disease, the inflammation is generally limited to a portion of the brain. Either affection may be primary, and thereby give rise to two states in which this complication presents itself in practice. 1. *The changes consequent upon the inflammation may induce those further changes upon which the palsy depends;* thus, inflammatory softening favours cerebral hæmorrhage, and this latter usually causes the paralytic state. 2. *The lesion primarily causing the palsy may induce inflammation of the adjoining parts of the brain, and the phenomena usually consequent upon this state;* thus, blood extravasated, or a tumour formed in the brain, will occasion palsy, and inflammatory action will often follow in the surrounding cerebral structure, or in the adjoining membranes, or in both structures, and give rise to the association of the chief phenomena of inflammation of the brain, or of its membranes, with the paralytic state. Both these states of association may present themselves even in the same case; thus, a gentleman attended by Dr. Paris and the author, had inflammation of the brain, and after the more acute attack had been removed, hemiplegia supervened. The hæmorrhage, consequent upon the inflammatory softening, and productive of the palsy, after a short time reproduced the inflammation, which was again subdued; but after some months an apoplectic seizure took place, and carried off the patient. In cases of this complication, the membranes may or may not be implicated, according to the seat of primary lesion, or to the nature of that lesion.

126. *D. The complication of insanity with palsy* has been very fully discussed in the article on INSANITY (see §§ 33—36., and 167—172.); and I, therefore, need not further allude to the subject at this place than to state, that the palsy generally does not appear until after the mental disorder; often not until the latter has continued for a considerable time, and assumed a chronic and general form. In some cases, however, insanity and palsy occur almost simultaneously; and, in a few, the paralytic affection precedes the mental derangement. Palsy thus associated is commonly *general*, or soon becomes such. It is usually incomplete, especially in its early stages, and affects chiefly the muscular system. The sphincters and consequently the evacuations are uncontrolled by volition. This form or association of palsy is usually a result of chronic inflammation of the brain, and is distinct from palsy caused by cerebral hæmorrhage, softening, tumours, &c., which, however, may also occasion the more partial, or an hemiplegic form of palsy in the course of insanity; but these latter are not so frequent as the general palsy just alluded to, and fully described in its more appropriate place (INSANITY, §§ 167. *et seq.*). The paralysis of the insane may be further *associated* with epileptic, convulsive, apoplectic or comatose states, either of which may terminate life, or the patient may sink from vital exhaustion. The appearances observed after death from these complications are minutely described in the art. INSANITY (§§ 235. *et seq.*).

127. Palsy is not infrequently also associated with *idiotcy*, and with *puerile imbecility* (see art. INSANITY, §§ 522. *et seq.*). In these complications the palsy may be either general or partial; but when it is general, some parts are usually more affected than others, and imperfect developement of portions of the cerebro-spinal axis is often seen on examinations of them after death.

128. *E.* Although both *paraplegia and general palsy* are often produced by the more common consequences of *inflammation of the spinal chord* and *of its membranes*, still the inflammation, as well as those consequences, may still continue after the paralytic state has been produced, and thus become *associated* or *complicated with it.* The history of cases of this description, and some of those above noticed, suggests this position; and the appearances I have observed during the examination after death sufficiently confirm it. The importance of attending to this circumstance cannot be over-estimated in a practical point of view, as being suggestive of a rational treatment of these cases. The persistence of inflammatory action in the spinal chord and its membranes, particularly the latter, during the paralytic states depending upon lesions of these parts, is often evinced by pain in the spine, by spasms or contractions of the muscles, by pains in the limbs, and by the various phenomena usually attending inflammations. In some instances, the inflammation occasions not merely spasm, contraction, or pain of the muscles supplied with nerves from the part of the spinal chord which it affects, but also more general convulsions; or, when the upper parts of the chord is implicated, epileptic seizures or coma and asphyxia.

129. *F.* Disease of the *cranial and vertebral bones*, or of *the periosteum*, sometimes *complicates* as well as *causes palsy*, particularly in the scrofulous diathesis. In these cases, the disease of the bones extends to the membranes enveloping the brain or chord; and inflammation, with its usual consequences, when affecting these membranes, supervenes and interrupts the functions of, or extends to, the inclosed portion of the cerebral or spinal structure. Thus, I have repeatedly met with instances of caries of the petrous portion of the temporal bone, consequent upon neglected ottorrhœa, that were followed by inflammation and abscess of the adjoining membranes and cerebral structure, and by palsy, with various concomitant and consecutive phenomena. Cases of this description not infrequently occurred to me in dispensary practice, and in children at the institution for their diseases. Lesions of the *cranial bones* associated with, as well as causing palsy, may be the result of disease or of injury. Thus, a portion of the parietal bone was remarkably and permanently depressed in a boy by accident, and coma with hemiplegia was the result. The coma soon passed off, but the hemiplegia continued for a time. Ultimately, the palsy also was altogether removed; and, long before he reached the period of puberty, the paralysed side had become as strong as the other. The depression, however, continued as remarkable as before; yet, notwithstanding this, the subject of this accident became, and still is, a most powerful and talented man, with whom I have been acquainted for more than thirty years.

130. Disease, particularly *scrofulous caries of the vertebræ*, is a frequent cause and concomitant of paraplegia and even of general palsy, as in the case above noticed (§ 68.); and not only may the palsy be associated with disease of the vertebræ, but also be further accompanied with epileptic seizures. A young man several years ago consulted me respecting epileptic attacks, each of which was preceded by the *aura epileptica*, which proceeded from the palm of the left hand to the lower cervical vertebræ. On examining the hand, the palm of it was found swollen, and obscure fluctuation was detected in it. The part was opened and matter was discharged from beneath the palmar fascia. The fits disappeared for a considerable time; but pain and stiffness in the lower cervical and upper dorsal vertebræ were complained of, and were attended by a diffused swelling. The epileptic attacks returned and paraplegia, nearly amounting to general palsy, supervened. An abscess pointed between the scapula and spine which was opened; and the patient soon afterwards was carried off by an epileptic seizure. In this case, caries of the vertebræ, purulent infiltration of the adjoining muscles, and inflammation of the membranes of the chord, with effusions of coagulated lymph, adhesions, &c. were found after death: and the inflammation of the spinal arachnoid, with serous effusion above the seat of adhesions, had extended to the arachnoid of the medulla oblongata and the base of the brain.

131. *G. Neuralgic affections* of the face, head, or limbs, not only *precede* but also occasionally *accompany palsy*. The pain sometimes ceases when the palsy takes place, especially if the muscles supplied or connected with the pained nerves are those paralysed; but it is sometimes only alleviated. The neuralgic pain is occasionally complicated with the palsy, particularly when they occur on different sides of the body. Neuralgic pains may thus accompany hemiplegia, paraplegia, and any

of the more partial states of palsy, the latter affection supervening after the former has been of long duration (see Art. Neuralgic Affections, (§ 72). It is only in rare instances that neuralgia appears in the course of palsy, or that the latter is the primary affection.

132. *H.* Palsy is sometimes *associated with rheumatism*, but not so frequently as might appear on a superficial view of the matter. The pains, whether dull, gravative, gnawing, &c., sometimes complained of both before and during paralytic affections, are often mistaken for rheumatism, or for neuralgia, although they are the not infrequent attendants of that change of structure at the origins of the nerves supplying the pained parts that ultimately produces palsy. The pains may be even felt in different parts from those which are paralysed; and they are then to be viewed as the extension of inflammation, or of other organic lesions, to parts differently related. The pains in the loins or back, so often viewed as *lumbago*, and felt more or less by persons addicted to venereal excesses or to manustrupation, are occasioned either by congestion of the spinal sinuses, or by inflammatory action of the membranes of the chord; and although they are most frequently the precursors of palsy, particularly of paraplegia, still they not infrequently accompany it, and extend either to the sound or to the affected limb, or even to both.

133. *I.* Palsy, or palsy associated with apoplexy, is not infrequently consequent upon *organic disease of the heart*, particularly hypertrophy of the left ventricle, and lesions of the valves or auriculo-ventricular orifices. The remarks which I offered in the Art. Apoplexy (§ 96.) on the connection subsisting between that disease and structural changes in the heart are quite applicable to the complication of those changes with palsy, especially with hemiplegia. In this complication, the disease of the heart is generally the primary malady, and more or less aids in the production of the paralytic affection, although some lesion of the vessels or substance of the brain may have pre-existed, or have been contemporaneous with the cardiac disease.

134. *K. The association of palsy* with *disease of the kidneys* and *urinary organs generally* has already been noticed, with reference only, however, to the supervention of disease of the latter upon paraplegia and general palsy (§ 57.). But the complication now to be noticed is of a different kind. When the kidneys, either from intense inflammation, or from a primary state of inaction or palsy, cease to perform their functions, and retention of urine from this cause results, a state of excrementitious plethora is produced, not infrequently terminating in fatal coma or apoplexy. These may assume the form of general palsy; and, in rare cases, hemiplegia may take place. In these, the procession of morbid phenomena is sufficiently manifest; but in others it is much less so; especially in those which present the occurrence of paraplegia consequent upon the nephritic disease. Mr. Stanley in an interesting memoir (*Trans. of Med. and Chirurg.* Soc. vol. xviii. p. 260.), has adduced several cases, in which inflammation of the kidneys existed in connection with paraplegia, and appeared as the primary malady, and yet no change was observed in the spinal chord or its membranes. Some of the cases deserve a brief notice.

135. A man complained of retention of urine conjoined with paraplegia; motion and sensation being lost. Tenderness on pressure was felt at the third lumbar vertebra. After death, no lesion could be detected in the vertebræ, spinal chord, or its membranes. The kidneys presented inflammatory changes with small abscesses dispersed through their substance.

136. A man had retention of urine consequent upon the suppression of gonorrhœa by injections. He complained of pain in the back, paralysis of the lower limbs, and of the sphincters. He distinctly traced the course of the pain from the bladder, upwards to the kidneys and across the loins. On dissection, the kidneys were inflamed, with minute purulent depositions throughout their substance. The bladder was inflamed, and its inner surface partly covered by coagulable lymph. The brain and spinal chord presented no disease.

137. A man, aged thirty, stated that he had been suffering for a day or two from pain in the loins, when he was seized with paraplegia extending to the umbilicus. The loss of motion was complete, and the loss of sensation nearly so. The functions of the brain were unaffected. The urine flowed involuntarily, and three pints were drawn off by the catheter. In sixteen hours from the attack of paraplegia, the man suddenly died. The kidneys were found gorged with blood and nearly black. The mucous membrane of the urinary passages was congested. The substance and membranes of the spinal chord and brain were sound, vascular turgescence of these parts being but slightly greater than natural.

138. I believe that, if cases of the kind now adduced were carefully observed at an early stage of their course, sufficient evidence would be found of congestion of the veins or sinuses placed between the sheath of the chord and the bodies of the vertebræ. This congestion would of itself be sufficient to cause disorder of the urinary functions and inflammation of the kidneys and urinary passages, which would re-act upon, and aggravate the spinal lesion. In the examinations of these cases no mention is made of the state of the venous sinuses of the spine.

139. *L.* Palsy is sometimes *associated with hysteria*, and the association has been noticed in the article Hysteria (§ 35.). A remarkable case of this complication was lately attended by Mr. Flockton and myself: — A young lady had experienced hysterical symptoms with irregularity of the catamenia, to which had supervened suppression of this discharge, attacks of vomiting, sometimes alternating with diarrhœa, and complete paraplegia, as respected the power of motion. The sensibility was only slightly affected. The urine required to be regularly drawn off. There was no tenderness in the course of the spine; and all the cerebral functions, the organs of sense, the intellectual powers, and the moral feelings seemed to be in unimpaired vigour and duly regulated. She had been long ill, and had been under the care of various eminent men both in London and in fashionable watering-places. The treatment, which will be noticed hereafter, restored her in the course of a few weeks, and after three or four months she was quite recovered.

140. It is very difficult to explain the connection between hysteria, or disordered states of the female organs, and palsy. But it is not im-

probable that many of the symptoms, and particularly those of a paralytic character, arise not merely from irritation propagated from the uterine system to the roots of the spinal nerves, or to the spinal chord itself, but rather from super-induced congestion of the spinal veins and sinuses, the congestion being attended either by interruption to the circulation in the chord, or by compression, or even by both. This change will account for the frequent connection also of palsy of the urinary bladder with hysteria, even when paraplegia is not present. Yet even in these cases, pains in the limbs, with weakness and partial loss of power, are often complained of. When the remote causes of hysteria are considered, particularly in connection with the effects they produce upon the spinal chord and roots of its nerves, the frequent supervention of congestion of the spinal veins and sinuses may be viewed as altogether conformable with the laws of the animal economy.

141. VI. Diagnosis.—Palsy, in a simple and primary form, cannot be mistaken for any other malady. It is only when it appears secondarily, or associated with any one of the diseases just mentioned, that the diagnosis requires attention; and, even then, the object is chiefly to ascertain which is the primary affection, to trace the nature of the connection between them, and to form some idea as to the structural changes, upon which the paralytic symptoms — which are usually sufficiently manifest — depend. It is to this last that our chief attention should be directed: this is the great object of diagnosis, and one which is not only very difficult to determine on many occasions, but almost impossible on some.

142. *a.* When palsy presents any of its more *partial states*, the question of its origin will suggest itself; and the chief point to determine is, whether the affection depends upon lesion at the origin of the affected nerve in the cerebro-spinal centre, or whether it proceeds from disease in the course of, or in the nerve itself. If there be no symptoms of disorder referable to the brain or spine — if neither pain, disordered function, nor sensation, can be observed — and more especially if disease implicating the nerve can be detected, the source of the palsy becomes manifest. In palsy of the face, disease of the portio dura, and tumours or matter pressing upon the nerve, are readily detected. When the ganglionic portion of the fifth pair is implicated, the affection of the eye, and the symptoms mentioned above (§§ 19—22.) in connection with the states of the other senses, and of the functions of the brain generally, will readily indicate the seat of the disease. The various circumstances of the case will also aid the diagnosis. Previous injury, the presence of tumours, or of periostitis, the scrofulous diathesis or manifest scrofulous disease, the occupation of the patient, and the operation of lead or arsenical poisons, &c., severally aid the diagnosis.

143. *b. Hemiplegia* is generally caused by disease in one side of the brain; but it may be produced by lesion in one side of the spinal chord, although very rarely. When it proceeds, as it usually does, from the former source, it is often preceded by cerebral symptoms, or attended by an apoplectic seizure. The chief difficulty is to determine the nature of the lesion producing it; for the several changes, upon either of which hemiplegia may depend, are not attended by determinate phenomena. When it proceeds from hæmorrhage it is usually, as above noticed (§§ 39, 40.), both sudden and complete in its accession, is often not preceded by pain, and is frequently associated with apoplexy. If it proceed from softening, or from tumours or morbid growths of any kind (see art. Brain, § 111. *et seq.*), it is generally preceded by cerebral symptoms, by various nervous disorders, by pain, &c., and attended by spasms, convulsions, contractions or pains; its accession is usually slower, and it is at first less complete than in other circumstances. Tubercles in the brain or in its membranes are not infrequently causes of palsy in children from one or two years of age to twelve or fourteen, as stated in the art. Brain (§§ 19. 115.), and more recently by Dr. H. Green.

144. I may here remark, that considerable lesions, or morbid growths, may exist in or near the periphery of the brain, or implicate chiefly the cineritious substance of the convolutions, without causing palsy, although coma, convulsions, or epilepsy generally result. I have remarked this circumstance in several cases; but I have never seen any marked lesion of the central parts of the brain without palsy being present.

145. *c. Paraplegia* has been assigned above (§ 53.) chiefly to disease of, or implicating, the spinal chord or its membranes. But it was supposed by Dr. Baillie, Dr. Good, and others, to arise much more frequently from disease within the cranium. Many years ago I controverted this doctrine (see *Lond. Med. Repository*, vol. xviii. p. 522. 1822). I then took occasion to state "that, although I admit that paraplegia will sometimes result from lesions seated at the base, or in both sides of the central parts, of the brain, still I contend that it most commonly arises from diseases of the spinal chord." "The chief reason of the prevalence of the cerebral pathology of paraplegia appears to be the old physiological opinions respecting the nervous system still entertained by many; and the circumstance of the brains of paraplegic subjects being, in conformity with preconceived notions, the only parts of the nervous masses which, until lately, had attention paid to them. It is by no means unlikely — and many pathologists have recorded the fact — that a patient, who has been for some time paraplegic from lesion in the spinal chord or its membranes, shall die apoplectic, or shall expire from lesions subsequently developed in the brain. This latter morbid structure, instead of being consecutive, may be even co-existent; but, at the present day, I should not expect to hear a pathologist conclude, because he found lesions in the brain, that the paraplegia therefore arose from the cerebral disease only. I would be still more surprised were I to hear the same inference drawn without any examination of the spinal canal or medulla oblongata having been made. Now I do contend that such conclusions have been actually drawn from such inconclusive data as the above, by those who suppose — for the inferences of those investigators are but suppositions at the best — that paraplegia is generally seated in the brain." Thus I wrote in 1822, in opposition to the then received doctrine; and now the justice of my views, which even then were based upon tolerably extensive observation, are almost universally acknowledged.

146. Admitting, as I have done, that paraplegia

may occur, in rare instances, from disease in both sides of the more central parts of the brain, or near its base, it will be asked, How is paraplegia from this cause to be distinguished from spinal paraplegia? In many cases, the evidence of the former is negative only. There are no circumstances nor symptoms indicating disease in the spinal chord, membranes, or containing parts, and then we are constrained to look to the brain for it. But where, in addition to this evidence, there are indications, antecedently or concomitantly, of cerebral affection,—if any of the functions of sense or manifestations of mind be impaired, or otherwise affected, or if headache or vertigo be present,— the source of disorder may thus be conceded to the brain.

147. Where it is manifest that the paraplegia proceeds from disease implicating the spinal chord or its membranes, the question as to the nature of that disease is often solved with great difficulty. When paraplegia is caused by accidents, injuries, wounds, &c., the nature and seat and direction of these often assist the diagnosis. The suddenness or slowness of the accession of the malady, viewed in connection with the presence or absence of pain and tenderness in the spine, will often suggest correct views. Thus antecedent pain, tenderness on pressure, &c., and the continued presence of these, constrictive pains in the limbs or in the abdomen, spasms or contractions of the muscles, &c., will indicate congestion or inflammation in some one or more of the constituent tissues of the part, particularly if the palsy supervene gradually, and if the remote or exciting causes are such as are likely to occasion these lesions. If pain in the back occur suddenly, and is attended almost immediately by paraplegia, extravasation of blood may be dreaded; or the displacement of a previously diseased vertebræ, or sudden effusion produced by disease of the spinal bones, may be inferred. (See SPINAL CHORD AND MEMBRANES, INFLAMMATION OF.)

148. Debility of the muscles of the spine causing curvatures of the column is rarely attended by any considerable degree of paraplegia. When this palsy is associated with disease of the spinal bones, the curvature is *angular*, owing to caries and absorption of one or more of the bodies of these bones. In the former case attempts to straighten the spine are not attended by pain or risk, and the patient can lie on the back or abdomen without pain. In the latter, such attempts are dangerous, or even fatal; as in a case of caries of one or two of the cervical vertebræ, for which a surgeon was consulted, and an attempt which was made to straighten the part was soon afterwards followed by general paralysis. I was afterwards called to the patient, who recovered after a most protracted confinement. When palsy is associated with angular curvature, as in a case now attended by Mr. CHILCOTE, which I occasionally see, any attempt to lie on the back, or to straighten the spine, is followed by pain; and in another case just seen by me, such attempts produce convulsions. These attempts always interfere with those processes from which alone recovery is to be expected. (See art. SPINAL COLUMN.)

149. vi. CONSEQUENCES, TERMINATIONS, AND PROGNOSIS. — *A*. Several of the *consequences* of palsy have been already alluded to (§ 56. *et seq.*), but as the affection is chiefly a consequence itself of pre-existing disease, it seldom induces further change unless what becomes speedily fatal; and that change is seated chiefly around, or in the immediate vicinity of, the lesion causing the palsy. Owing to such change, the mental powers are often weakened, or altogether lost in hemiplegia, or attacks of apoplexy or coma supervene: a partial palsy may become more extended; and even imperfect paraplegia may gradually increase and be more complete or be general, ultimately terminating in coma or apoplexy, or in asphyxia from injury to, or counter-pressure on, the medulla oblongata. The principal consequences of palsy, especially when the spinal chord is implicated, are manifested in the urinary organs, the digestive canal and respiratory functions, and in the weakened state of vital cohesion of the tissues of the paralysed parts; and these have been severally noticed at length (§§ 57—64.).

150. *B*. The *terminations* of palsy are chiefly *apoplexy*, *coma*, *sinking* of the *vital powers*, *asphyxia*, *convulsions* or *epileptic seizures* terminating fatally, and more or less complete *recovery*. — *Apoplexy* frequently supervenes on hemiplegia or partial palsy, and either aggravates it or terminates life. A state of gradually ingravescent *coma* may also terminate these states of palsy and even general palsy, although this last variety frequently causes *asphyxia*; death occurring sometimes gradually, at other times suddenly—*gradually*, from defective oxygenation of the blood and diminished production of carbonic acid, coma usually intervening; *suddenly*, owing to the arrest of the actions of the respiratory muscles and functions, and of the heart, consequent upon lesion at the origins, and complete paralysis of the respiratory nerves. In both these latter classes of cases the blood after death is fluid and of a dark venous colour.

151. Paraplegia either passes into general palsy and terminates as stated above (§ 150.), or becomes fatal owing to consecutive changes produced in the urinary organs, or to sloughing of the parts upon which the body rests, sinking of the powers of life, and contamination of the circulating fluids arising from these alterations. When the upper portions of the chord or the medulla oblongata become affected, epileptic attacks or convulsions occasionally occur and even terminate existence, rather by the attending or superinduced asphyxia, than by the amount of injury sustained by the brain.

152. *C*. The *prognosis* of palsy depends much upon the grade of severity, or the complete or general character of the malady, and upon its duration. In forming a prognosis, the circumstances alluded to when noticing the consequences and terminations of the disease should be taken into account. When the palsy is *local* and independent of lesions in or near any part of the nervous centres, or where it is caused by any of the metallic poisons, hopes of recovery may be reasonably entertained. But when the disease depends upon organic change of these centres or of their envelopes; when it is complete and extensive; when a whole side of the body is affected; and when it has been of considerable duration, perfect recovery rarely takes place. I have met with this favourable result only in two or three cases. Yet, although perfect recovery so rarely occurs, the state of the patient may be ameliorated, and the patient may live many years

without the occurrence of any of the unfavourable consequences or terminations of the malady, if a suitable diet and regimen be pursued. In all cases, the causes of the attack, and the nature of the antecedent disorders and attendant symptoms should be considered. When the palsy is attended by great disorder of the digestive organs, when the urinary organs are remarkably affected (§ 57.), and when the sphincters are relaxed, when spasms or contractions of the muscles are present, or convulsions supervene, and when the nature of the organic lesion implicating the brain, spinal chord, or their envelopes, is manifestly such as cannot be entirely removed, the most unfavourable opinion may be formed of the result, although the ultimate issue may be deferred for a considerable time.

153. The *complications* also of palsy should influence the prognosis. The most unfavourable of these are the associations of hemiplegia with apoplexy or coma; with inflammation of the substance of the brain, as indicated by spasms, contractions, and pains of the limbs; with neuralgia of the nerves of the face or head; with epilepsy or convulsions; with insanity, imbecility, or idiotcy; with disease of the heart or of the liver; with lesions of the cervical spine; and with inflammation of the kidneys. If the palsy supervene in the course of these, it may be generally assumed as the result of severe, if not irremediable, organic change in the brain or spinal chord.

154. Palsy of the muscles of articulation, of the tongue, or of deglutition, whether appearing alone or in connection with hemiplegia, is a most dangerous state of the malady, and often precedes more complicated and severe forms of the disease, that will soon pass into fatal convulsions or apoplexy, or asphyxia. Fully developed *shaking palsy* is rarely materially ameliorated by treatment; although patients afflicted with it may live many years without much increase of the symptoms.

155. Recovery often takes place from the *hysterical* or *uterine complications* of palsy, although even in these the absence of all organic lesion of the nervous centres or of their envelopes ought not to be generally inferred; for irritation of the uterine organs or suppression of the catamenia may be followed by inflammation and its usual consequences in these parts, particularly in the spinal chord, or by congestion, especially of the venous sinuses of the spine, sufficient to produce interruption of the act of volition from the brain to the nerves of the extremities, owing to the pressure which such congestion may occasion.

156. Recovery from the less complete, and least complicated states of palsy from the metallic poisons, is sometimes brought about, by careful treatment and suitable precautions and regimen. A case of complete hemiplegia consequent upon apoplexy caused by monkshood, respecting which I was consulted many years ago, quite recovered after a protracted treatment.

157. VII. CAUSES. — i. The *remote causes of palsy* are more strictly the causes of those maladies in the course of which alterations of the nervous centres most frequently occur, and are so entirely the same as those which I have adduced in the articles APOPLEXY, EPILEPSY, INFLAMMATION OF THE BRAIN, &c., as to require merely to be enumerated at this place.

158. *A*. The *predisposing causes* are chiefly hereditary predisposition, advanced age, the male sex, mental labour, luxurious habits and sexual indulgences. I have observed a greater frequency of palsy in the children of those who have died of diseases of the brain, than in others. Palsy is much less frequent in children and young persons, or in those under thirty years of age, than in persons further advanced. According to the Registrar-general's report, the deaths in the metropolis, in two years, from palsy, were 33 under fifteen years of age, — 614 from fifteen to sixty, — and 932 at sixty and upwards; and from the same authority it would appear, that the number of deaths is as great in females as in males. Palsy is most frequently observed in persons whose habits are sedentary, and in those of feeble constitution. It is said to be more frequent in the sanguineous and nervous, than in other *temperaments*; but this is not established. There can be no doubt of mental labour, depressed and anxious states of mind, luxurious habits, and venereal indulgences, being most influential causes of predisposition to palsy. Indeed the various circumstances which I have assigned as predisposing to APOPLEXY (§ 77.), have a similar influence in respect of palsy. Amongst these vascular plethora may be mentioned; and when this state is present, hemiplegia either alone, or complicated with, or consequent upon, apoplexy, is the form of palsy most frequently observed.

159. Various *arts* and *employments* (see that article) remarkably predispose to palsy, especially all those in which lead, arsenic, and mercury are much used; as painters, plumbers, glaziers, &c. &c.; and in persons thus exposed, the disease occurs at earlier epochs of life than in other circumstances. It is least frequently observed in those who lead a sober and active life, and are much in the open air. It is rarely met with in sailors and soldiers; but this is partly owing to comparatively few of them being far advanced in life. The influence of the *seasons* or of *weather* in favouring attacks of palsy, has not been shown with any precision; but cold and moist seasons and weather, and cold, humid, and miasmatous localities, are certainly more productive of paralytic affections than other seasons, weather, or situations.

160. *B*. The *exciting causes* of paralysis are — 1st. *Physical, mechanical and external agents*; — 2d. The *mental emotions*; — 3d. *Pathological states or pre-existing lesions*; — 4th. *Poisonous substances*. These may act — (*a*.) directly upon the ramifications or trunks of nerves; — (*b*.) or directly or mediately upon the cerebro-spinal axis.

161. *a*. Of the *physical agents*, the most influential is certainly *cold*; particularly when severe in grade, or long applied to any part, or to the general surface. Cold directly depresses the nervous power and benumbs sensation, thereby affecting the nerves themselves; it may also occasion congestion of the nervous centres, and particularly of the veins and sinuses of the spine, and consequently more or less complete forms of paraplegia or general palsy, as in the cases already alluded to.* All applications to the surface of a

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* The celebrated SCARRON was deprived of the use of his limbs by prolonged exposure to cold during a fit of

part, that conduct either the animal heat or the electricity from it, may excite paralysis of it, particularly when long continued; as sleeping, sitting, or lying on the ground, or on stones; wet or damp clothes; the continued contact of metallic or earthen substances, &c. Pressure of any kind upon a nerve, whether produced by external substances or by tumours, abscesses, aneurisms, dislocations, or other lesions, in the vicinity of the nerve, or by disease of the nerve itself, or of its neurilemma; and wounds, contusions, or other injuries of one or more nerves, are occasional causes of local palsy. Causes of a similar kind implicating the brain or spinal chord, especially depressions or displacements of the cranial or spinal bones; concussions or other injuries of the cerebro-spinal axis; depending or constrained positions of the head or spine; congestions, tumours, morbid depositions, or other changes, in the nervous centres, their membranous envelopes or bony cases, occasion hemiplegia, paraplegia, or general palsy, according to the seat of lesion, as above assigned. To these may be added intemperance, fatigue or exhaustion, changes of temperature and of the atmosphere, inanition, &c.

162. *b.* The influence of the *mental emotions* in causing palsy is undoubted; but it is not so directly manifested on the brain, in all cases, as may be at first supposed. The emotions, whether exciting or depressing, act primarily upon the heart and circulation, and through them upon the brain and spinal chord. Undue excitement of the imagination, sudden mental shocks, fits of anger, and venereal excesses or masturbation, are not infrequent causes of palsy. Indeed, the several states of paraplegia and general palsy are oftener produced by the last of these causes, or by masturbation, than by any other.

163. *c. Pathological states* or lesions occurring in the course of pre-existing disease, as already stated and sufficiently insisted upon, not only in this article (§§ 34—53.), but also under the heads APOPLEXY (§§ 34. *et seq.*) and BRAIN (§§ 50. *et seq.*), are the most frequent and immediate exciting causes of the several varieties of palsy, in their primary and associated forms. These, in fact, constitute the *chief morbid appearances* furnished by paralytic cases, and consist chiefly of exostosis, tumours, or morbid growths, in the cranial bones (see art. CRANIUM); — tumours, effusions of blood or of serum, fungoid productions, congestions, and the more common consequences of inflammation, of the membranes of the brain; — congestion and inflammation, extravasations of blood, effusion of serum, abscesses, softening, induration, atrophy, ulceration, apoplectic cysts, tumours, tubercles, morbid or malignant productions, aneurisms, hydatids, watery cysts, sloughing or gangrene consequent on severe injuries in parts of the brain; effusions into the ventricles, or between the membranes; disease of the blood-vessels or aneurismal tumours, ossification of the coats of the arteries, varices or dilatations of the veins or sinuses, and coagula, or fibrinous or other concretions, in these vessels, are the chief lesions which have been found in cases of hemiplegia, and of partial palsy of the senses. The changes just particularised, affecting the spine, or the membranes or substance of the spinal chord or medulla oblongata, are the usual causes of the spontaneous cases of paraplegia and general palsy, or those cases which occur independently of the more direct effects of external injuries. The occurrence of these forms of palsy in the course of caries of one or more of the vertebræ, owing either to the extension of inflammation to the membranes, to effusion of lymph or of serum, or to pressure on the chord owing to the acute angle formed by the consequent curvature, is sufficiently familiar to physicians. But *cancerous* or *malignant disease* of the vertebræ, consecutive of cancer of the mammæ, or occurring primarily in these parts, may also occasion paraplegia. Mr. CÆSAR HAWKINS has adduced three interesting cases of paraplegia from this cause, and my friend Dr. ABERCROMBIE, of Cape Town, has communicated to me a similar case to two of those observed by Mr. C. HAWKINS, which had occurred in his practice. In this instance, the breast was greatly enlarged, was quite adherent to the ribs, and its lower surface ulcerated. A prominence was observed in the situation of the second and third dorsal vertebræ, with tenderness on pressure; paraplegia followed by its most unfavourable consequences shortly afterwards took place.

164. *Periostitis*, especially *scrofulous periostitis*, is not infrequently productive of partial palsy, and of paraplegia, or even of more general palsy, when affecting portions of the vertebral column. In these cases, as far as my observation has enabled me to state, the bladder is more or less paralysed, the urine soon becoming alkaline; and neuralgic pains of the limbs are often present to a distressing degree.

165. *d.* Sufficient notice has been already taken (§§ 100. *et seq.*) of the *poisonous substances* which occasion palsy. The slow introduction of mineral poisons, as lead, arsenic, mercury, &c., sometimes is followed by this effect; and in some cases, at least, their influence is exerted as much, if not more, upon the nerves supplying the paralysed limb, as upon any part of the nervous centres. The poisonous effects consequent upon the vegetable or acro-narcotic poisons are owing more to contingent lesions sustained by a part of these centres, whilst they and the circulation in them are under the influence of the poison, than to any effect produced by them on the nerves themselves.

166. VII. OF CERTAIN POINTS IN THE PATHOLOGY OF PALSY. — It is obvious that palsy may arise from two distinct conditions of the nervous centres, viz. 1st from the *suppression*, or *diminished evolution of the cerebro-spinal nervous power and of volition*, owing to interrupted circulation, to depressed vital influence, or to other alterations, in that part of the cerebro-spinal axis which is chiefly concerned in producing or originating that power; — and 2d, from *whatever may prevent the transmission of cerebro-spinal nervous power and volition* from the parts concerned in producing them to the limbs and organs which they actuate.

167. (*a.*) If it be conceded that the grey substance of the brain and spinal chord be chiefly

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dissipation. His mental faculties were, however, unaffected, as in most instances of paraplegia, and of general palsy caused by lesion of the spinal chord. The fascinations of his wit were unimpaired; and he became the husband of the beautiful and witty Mademoiselle d'AUBIGNÉ, afterwards the famous Madame de MAINTENON. SCARRON lived 23 years in a paralysed state.

concerned in *originating volition and the other cerebro-spinal functions,* we may readily admit that, when this substance becomes manifestly diseased throughout the convolutions of the brain, a general state of palsy, more or less complete according to the extent of change experienced by it, may be anticipated; and this is actually observed in all cases where the grey structure is extensively changed, more particularly in those cases of general palsy complicated with Insanity, as shown in that article (§ 235.). In these, the cerebro-spinal functions — the emotions, intellects, volition, &c. — are more or less impaired, and the grey matter of the brain and spinal chord is generally found atrophied, indurated, or otherwise changed, and the structure especially concerned in the manifestations of these powers is no longer in a state capable of originating or developing them.

168. (*b.*) The *transmission of cerebro-spinal nervous power and volition* may be prevented, although they are produced, by injury, disease, or pressure of the medullary substance of the brain or spinal chord, or of the nerves. Most of the lesions adduced when describing the several forms of palsy and their efficient causes, act chiefly by arresting or interrupting the transmission of volition; although, even in these or in other cases, many alterations of structure both interrupt the transmission, and prevent the evolution or the production of nervous power and volition; as when the lesion implicates both the grey and the medullary substance — both the origins and the course of certain nerves.

169. The well known fact that disease on one side of the brain causes palsy of the opposite side of the body, has been attributed to the decussation of fibres in the medulla oblongata. This decussation was supposed to be confined to the anterior columns only. But, although it might account for the crossed paralysis of motion, it could not equally explain the circumstance of paralysis of sensibility following the same law. Sir C. Bell has, however, shown that the middle columns decussate as well as the anterior, and thus accounted for the crossed effect in both cases.

170. It has moreover been objected, that lesions of the *cerebellum* also produce a crossed effect, although this organ is seated above the point of decussation; and that paralysis of the face follows the same law, and arises from disease in the opposite side of the brain, although the nerves distributed to this part also arise above the decussation. As to the first objection, it may be remarked that the dissections of Mr. Solly have demonstrated that numerous fibres run between the spinal chord below the corpus olivare and the cerebellum, which he believes to decussate with their fellows of the opposite side, forming in fact part of the apparatus of decussation. But this discovery establishes merely a direct communication between the cerebellum and spinal chord in the immediate neighbourhood of the decussation, without proving the fact of the crossing of these fibres. As to the second objection, it may be answered in the words of Dr. Bennett, that Sir C. Bell has shown that the fifth pair of nerves arise below the decussation, and Mr. Solly has traced one of the origins of the *portio dura* from the fibres he has described, which run between the spinal chord and cerebellum. Thus the sensitive and motor branches of the face ought to follow the same law as the other spinal nerves, which is consonant with what actually takes place.

171. Cases have been recorded, however, in which paralysis has occurred on the same side as the lesions in the brain. Mr. Hilton has endeavoured to explain this exception by referring it to a disposition of fibres in the decussation; but, as Dr. Bennett has justly argued, there is strong reason for doubting whether disease in the brain ever causes a direct influence; for of the many thousand cases of cerebral hæmorrhage, tumours, &c., which have been recorded, we are acquainted with twenty-one only in which paralysis is said to have resulted from disease in the same side of the brain as the palsied side of the body, and, on analysis of these, more than one half are imperfect and doubtful. As the instances, therefore, of this occurrence are so few, may we not consider that the palsy even in them was produced in the usual manner, and that the lesion which attracted attention had no reference to the complaint? Numerous instances have occurred of abscesses, softening, and other alterations of the brain having been found, but in which no paralysis had been observed during life; and a still greater number are on record, in which there was well marked paralysis, but no appreciable lesion of structure after death. It is by no means improbable, therefore, as paralysis may be induced without leaving any traces, that, in those few cases where the palsy and the lesion in the brain were in the same side, it was really caused by undetected changes in the opposite hemisphere of the brain; and, as is sometimes the case, that the disease found in the hemisphere of the paralysed side had not occasioned the loss of motion.

172. Lesions in the vertebral portion of the spinal medulla produce not a crossed, but a direct effect; and when they interrupt the functions of this part of the nervous system, all the parts furnished with nerves arising from beneath the seat of lesion are affected. Hence the paralysis is the more general, the nearer the disease of the chord is to the brain. But disorganisation has sometimes gradually proceeded to a considerable extent in the spinal chord as well as in the brain, while such fibres or portions of the former as remained unaffected appeared sufficient to perform the limited extent of function which the state or exertions of the patient required. Cases have even been recorded, in which individuals have performed voluntary movements of the lower extremities almost up to the time of death, and yet on examining the chord, it has been found entirely destroyed. Such statements should, however, be received with distrust; for, although the presence of sensibility in the lower limbs may be explained in these circumstances (see §§ 181. *et seq.*), the transmission of volition so as to act upon the extremities cannot be accounted for. It is much more probable, that the lesions observed had taken place chiefly after death, and had only commenced shortly before it; for the spinal medulla when inflamed, and even in health, often undergoes rapid changes after dissolution. We know also that, when the spinal chord is inflamed or is undergoing softening, involuntary, spastic, and automatic movements are produced in the muscles and extremities, that may be mistaken

for voluntary motion, and it will hereafter be shown that, even when extensively diseased and incapable of transmitting the usual acts of volition, various reflected movements of sympathy may be made by the paralysed limbs. Several cases have been recorded, where the spinal chord has been said to have been softened throughout, disorganised, quite diffluent, or even entirely divided, and yet sensibility, and even voluntary motion, have been preserved or but very slightly impaired. The case of DESSAULT, that recorded by M. RULLIER, and others, are of this kind; but they are related with insufficient precision for implicit confidence, and they may, moreover, be explained as just stated, and thus furnish no basis of argument.

173. (*c.*) *The physical conditions of the brain and spinal chord* ought to be taken into consideration in estimating the influence of lesions of these parts of the nervous system, or of their envelopes, in producing paralysis. These conditions are — 1st, the bony and unyielding cases enclosing them; 2d, the membranes interposing between them and these cases; and 3d, the fluid interposed between the membranes, especially between the arachnoid and pia mater.

174. *a. The unyielding cases inclosing the cerebro-spinal axis* give rise to several accidents and changes consequent upon external injury, notwithstanding the influence of the membranes, of the processes of the dura mater, and of the fluid interposed between the membranes in preventing them. The pressure, laceration, &c. caused by fractures, depressions, &c. of portions of these cases; the concussions, counter-strokes, shocks, and succussions produced by falls on the back, shoulders, feet, and extremities; the direct pressure following the extravasation of blood, or of serum, the development of tumours, or venous congestion and interrupted return of blood; the counter-pressure consequent upon these changes, and exerted chiefly on parts distant from, or opposite to, the seat of lesion or effusion; and the shock sustained by the vitality and nervous power of the frame, upon severe injury of the nervous centres, should all be taken into the account when we attempt to explain resulting phenomena; inasmuch as they complicate the effects, and render their causes or sources more obscure and doubtful.

175. *β. The physical influence of the membranes* in preserving the nervous masses they inclose from injury and disease is obvious. They support, secure, and protect their contents, whilst they interrupt or prevent the extension of injury or of disease from the external cases to the contained vital parts. Still, when they are themselves the seat of disease, particularly of tumours or of inflammation, the pressure or irritation, or the extension of the disease and its more remote consequences, affect more or less the nervous centres and interrupt or disorder their functions, although the interposed fluid tends to prevent or to lessen these effects.

176. *γ. The cerebro-spinal fluid* interposed between the arachnoid and pia mater, is not merely requisite to the healthy discharge of the functions of the brain and spinal chord, as shown by COTUGNO, MAGENDIE, and TODD, but is also most serviceable in preventing the extension of injury and disease from the bones and membranes enclosing these organs. The motions alone of the spine would be productive of serious consequences, if this fluid, which is more copiously interposed in this part of the nervous system, did not prevent them from materially affecting the chord itself and the roots of the nerves which it transmits. When we consider the effects of this fluid upon the functions of the cerebro-spinal axis, it is impossible not to infer that the quantity of it will vary with the states of the nervous masses and of vascular determination to, or congestion of, them and their membranous envelopes. It may reasonably be concluded that, when these structures and the blood supplying them do not sufficiently fill the unyielding cases of the cranium and spine, the fluid interposed between the arachnoid and pia mater will supply the defect, and prevent the existence of any vacuum, and that, on the other hand, when the states of these centres and of the circulation in them are such as give rise to much fulness, the quantity of this fluid will be diminished. Anæmia will thus be attended by an increase of the cerebro-spinal fluid, and vascular turgescence by a diminution of it, the included masses being thereby preserved from much diminution of pressure in the one case, and from much increase of it in the other. Thus also in cases of atrophy, partial or general, of the brain or spinal chord, the quantity of this fluid is increased, showing the importance of it to the functions of these parts, whilst in cases of hypertrophy it is diminished or almost wanting.

177. It is obvious that in health the presence of a considerable portion of the cerebro-spinal fluid is always necessary to protect the nervous centres with which it is in immediate contact. It is very justly remarked by Dr. R. B. TODD, that by the interposition of a liquid medium between the nervous mass and the wall of the cavity in which it is placed, provision is made against a too ready conduction of vibrations from the one to the other. Were these centres surrounded by one kind of material only, the slightest vibrations or shocks would be continually felt; but when different materials on different planes are used, the surest means are provided to favour the dispersion of such vibrations. The nervous mass floats in this fluid, being maintained *in equilibrio* in it by its uniform pressure on all sides, and the spinal chord is further secured by an additional mechanism, preventing its lateral displacement. The abundance of this fluid at the base of the brain and medulla oblongata protects these parts, the nerves, and vessels, from unequal or excessive pressure and counterpressure during disease, or from accidents; whilst a diminution of it favours or even induces most serious consequences, as shown by the experiments of M. MAGENDIE.

178. From what I have now adduced it may be inferred, that the effects often imputed to the abundance of this fluid, particularly in the spinal canal, by several pathologists, when detailing the morbid appearances after death from diseases of the nervous system, have been imputed to a wrong source; that the serous effusion in these cases, as I have elsewhere argued, is neither the cause of pressure upon, or of induration of, the nervous centres, nor the source of the palsy sometimes observed in these cases; but that it is a result of those changes of the nervous structure and of the local circulation with which it is found

associated, in connection with, or aided by, the unyielding state of the surrounding parts.

179. (*d.*) *Of the influence of the different columns of the spinal medulla and roots of the spinal nerves upon the sensitive and motor powers.* — Since the researches of Sir C. BELL and M. MAGENDIE on this subject, it has generally been supposed that, whilst the antero-lateral columns of the chord convey the motor power, the posterior transmit sensations. Several pathological facts, independently of the experiments of some physiologists, have, however, made it appear doubtful whether or not the power of motion and sensation are severally conveyed through these channels only, and in the precise manner just assigned. There can be no doubt, however, that volition is transmitted along the anterior columns of the chord, the anterior roots of the nerves and the corresponding nervous fibrils, to the muscles which are acted upon; and that sensation generally is conveyed in an opposite direction, namely, from the surface of the body along the sensory nervous fibrils, the posterior roots of the nerves, and the posterior columns of the chord, to the brain. But, although it seems satisfactorily proved, that the acts of volition cannot be fully and precisely performed, unless the channels by which volition is transmitted continue sound or not materially injured, together with the corresponding portions of the fibrous structure of the brain, still it is very doubtful whether or not the posterior columns of the chord are as exclusively devoted to the conveyance of sensation as the anterior are to the transmission of volition. Indeed the cases recorded by various writers, and especially those by STANLEY, WEBSTER, and others, prove either that the lesions observed in the posterior columns of the chord have taken place at the moment of, or immediately after, dissolution, or that sensation may be transmitted through other channels besides these columns, or even independently of the spinal chord itself. That the former of these alternatives cannot be the cause, at least to any considerable extent, is shown by the history of the cases and the nature of the changes which have been observed. It should, however, be admitted that, where softening of the chord is observed, greater doubt may be entertained; for this change, when it has commenced before death, particularly as a consequence of inflammation, will often proceed and extend very rapidly immediately afterwards, so as to be both complete and extensive at the time of inspection. Still, conceding all that may be inferred from this circumstance, pathology furnishes sufficient proofs that sensations may be conveyed to the brain by other channels in addition to the spinal chord, especially when the alterations in the chord rendering it incapable of discharging this function, take place slowly or gradually.

180. Experimental proofs of the existence of these other channels, and evidence respecting them cannot be furnished with the force of demonstration, as, however conclusive experiments performed on the higher animals with the view of furnishing such evidence may appear in the eyes of the experimenter, they will admit of other and often very different conclusions, and the phenomena observed in the lower animals, particularly those which cannot audibly express their feelings, may be ascribed to other causes, or differently explained. We can, therefore, in the present state of our knowledge, only infer from the history of diseases implicating the spinal chord, and from what we know of various inconclusive and not always truly or correctly observed experiments, that changes produced in parts or surfaces of the body may become objects of consciousness, in certain circumstances at least, without the intervention of the spinal medulla; but, as this cannot take place unless the sensation be transmitted by a different channel, it remains to inquire what that channel is, or whether or not various parts of the nervous system may, in certain circumstances, or to a certain extent, perform this function.

181. When we recollect that communicating branches run between the ganglionated or posterior roots of the nerves and the great sympathetic on each side; that ganglial nerves may be traced in their course from the sympathetic into the spinal ganglia and chord on the one hand, and from the latter into the sympathetic and ganglia on the other, we cannot but infer, not only that sensation may be transmitted, or more correctly that impressions on the surface may be conveyed, to the brain so as to excite consciousness, by a different route than that of the spinal chord, especially under circumstances of gradual change in the chord, rendering it ultimately incapable of discharging this function, and that this other route is through the sympathetic nerves and their communications with the posterior roots of the nerves and spinal medulla.

182. The indirect character of this channel may appear an argument to some against the accuracy of this inference; but we know that in cases of obstruction to the usual channels of circulation in the vascular system, very circuitous courses are developed in order to preserve an organ or limb, and the nervous system presents many points of analogy with that system, especially a transmission of sensation from the periphery of the body, and from the several organs and structures to the more central nervous masses, and a similar circulation or return of nervous agency in the form of motion and determinate muscular contraction. The analogy may be further pursued, but the several points are so obvious that they require not even enumeration at this place. Moreover it should be considered that, in respect of sensations excited in any of the abdominal or other viscera, it is very doubtful whether the spinal chord is the channel by which the impressions or changes in the viscera are transmitted to the brain, or whether the sympathetic nerves and communicating branches between the ganglia are the courses which are pursued. Indeed there appears little doubt of the latter being the actual channel of conveyance, for impressions on or changes in the viscera, especially those of digestion and assimilation, are as vividly and as rapidly conveyed to, and made objects of consciousness in, the brain, in cases of injury or even of complete division of the chord, as in sound health.

183. The above considerations may serve as reasons wherefore sensation remains unimpaired, or but little affected, in very many cases where the chord is diseased or injured so as to be incapable of transmitting the impulses of volition, particularly when the lesion is high in the chord,

and when it has advanced slowly or gradually. They may also account for the rare occurrence of entire loss of sensation in any form of palsy of motion.

184. (*e.*) *Congestion of the venous sinuses seated between the theca of chord and the bodies of the vertebræ* has been already assigned as a pathological cause of palsy, or one of the most important changes upon which the paraplegic states of palsy depends. It seldom is found unassociated or alone after death and in the most complete states of the disease, as it generally superinduces more or less extensive changes in the chord and its membranes before dissolution takes place. Several of the more remote causes of palsy act by producing, in the first place, congestion of these *sinuses*, which were even imperfectly described by anatomists until M. Breschet directed more particular attention to their structure and connections. But the pathological relations of congestion and of obstructions by fibrinous coagula or concretions in these sinuses have been entirely overlooked.

185. It will soon become obvious to those who make the early phenomena of disease objects of observation and study, that whatever depresses organic nervous power will soon be followed by venous congestion, and when this depression — whether primary or consecutive of nervous or vascular excitement — has been preceded, or is attended, by circumstances producing increased determination to, or fullness of blood in, the capillaries of the chord or its membranes, this consecutive congestion of the spinal sinuses is the more prone to occur. In its primary or uncomplicated states, it seldom produces more serious effects than pain, stiffness, or weakness of the back, loins, and lower extremities, sometimes amounting to incomplete palsy of motion of the latter; often with pain and constriction around the abdomen; and when the weakness or imperfect power of motion is associated with pain, this state is generally confounded with rheumatism or with neuralgia if the pain is severe and follows the course of a nerve, or with an attack of gout when it occurs in the gouty diathesis.

186. Congestion of these sinuses occasions first retarded circulation in the chord and its membranes, subsequently an increased serous secretion or effusion between the membranes. Unless the congestion be very great, it can hardly be expected that it should act injuriously on the chord by pressure, or counter-pressure of it against the posterior parietes of the spinal canal. Still one injurious effect may be produced in this way, particularly when the congestion has superinduced distension of the capillaries of both the chord and the membranes with increased serous effusion between the latter.

187. In these more extreme cases when ulterior changes have taken place, it is not unlikely that *the roots of the nerves* will also suffer from unaccustomed pressure, and, in those cases, the posterior or gangliated roots are the more likely to experience it, and paralysis of sensation will be present in a greater or less degree, and even be the more complete, inasmuch as the lesion implicates those parts of the roots of the nerves which communicate with the sympathetic, as insisted upon above (§ 181.). In cases also of caries and angular curvature of the spine, where not only congestion of the vertebral sinuses, but also pressure and counterpressure of both the chord and the roots of the nerves, and even of the nerves themselves as they pass through the spinal foramina, are apt to take place, palsy of sensation is then present, but only in degree proportionate to the extent of pressure on the roots of the nerves, and only in those cases where the nerves or their roots, especially the posterior, are implicated.

188. Congestion of the spinal sinuses, with more or less of the consequences now mentioned, is a frequent attendant upon *fevers*, particularly the more adynamic and congestive forms of fever, occasioning not merely pains and weakness of the back and limbs and incomplete palsy of motion of the lower extremities, but also more or less of the affection of the urinary organs already mentioned (§ 57.). Many of the cases described as spinal irritation, of hysterical neuralgia, of uterine irritation, &c., actually are instances of congestion of the spinal sinuses, occasioning remote or sympathetic phenomena in addition to those which are more strictly local. These are often removed or partially relieved for a time by the natural recurrence of the catamenia; but, when more extensive or severe, or when associated with suppression of this discharge, they sometimes lapse into paraplegia or partial palsy, especially when neglected or injudiciously treated, owing to an increase of the congestion or of its consequences.

189. (*f.*) *Various sympathetic phenomena occur in connection with paralysis*, especially with the paraplegic states of the disease, that require particular notice. Some of these admit of different explanations, and thus have been differently accounted for, both by former and by contemporary writers. Of these the *reflex motions*, which sometimes are observed upon irritating the surface of a paralysed limb, have attracted most attention, and have directed the researches of physiologists more particularly than heretofore to the structure and functions of the *spinal chord*. These researches are fully noticed in the article on the pathology of this part of the nervous centres, with my opinions respecting them; and I therefore need no further advert to them at this place, than to remark, that the phenomena which Dr. M. Hall has assigned to a reflex function of the spinal chord were fully recognised by Whytt, but not explained by him as occurring independently of sensation. He, however, believed that the power of feeling was not limited to the brain, but was extended to the spinal chord. Prochaska afterwards more correctly appreciated the true source and relations of these phenomena; and, in the articles Cholera, Chorea, Convulsions, &c., in this work, the characteristic symptoms of these maladies were explained, and ascribed to reflex actions excited in the voluntary muscles by irritations transmitted to the roots of the spinal nerves and spinal chord. Subsequently to the publication of these articles, Dr. M. Hall's researches appeared. He referred these phenomena to a special organisation of the chord; and his opinion received the support of Mr. Grainger, Mr. Newport, and others, although opposed by some eminent anatomists. The structure of the nervous system in the class *articulata* is the chief circumstance that can be adduced in favour of the existence of a spinal organisation for reflex actions in the higher ani-

mals. But reflex actions — phenomena which I denominated many years ago (1824) "*reflex sympathies*" — are performed not only by the spinal chord, but also by the *brain*, and by the *organic* or *ganglial nervous system.*

190. *α.* As respects the *brain*, no sooner are the impressions on the senses made objects of sensation or consciousness than they are reflected upon, or treasured in the memory, and, either instantly or at some future period, excite to action. The manifestations of life through the medium of an encephalon are the phenomena to which the term *mental* has been usually applied; which consist chiefly of impressions on the senses, rendered objects of consciousness and of reflection by this organ, and which subsequently are recombined, compared, &c., and thus often become causes of volition. Many of the impressions on the senses are so strong as instantly to impel to action, without any intermediate state of reflection; or, in other words, the actions or volitions are so instantaneously consequent upon the impressions and impulses, that the intermediate reflections are not made objects of consciousness, or are not remembered. This is especially the case when the impressions on the senses excite the passions, and when the individual has been habituated to act upon them without allowing, or being capable of, intermediate reflection. These reflex actions, even when not directly proceeding from impressions on, or reports of, the senses, are nevertheless the results of such impressions or reports, received, remembered, or reflected upon, at some antecedent period.

191. *β.* The reflected actions of the *spinal chord* may occur, as Dr. M. HALL has shown, independently of sensation, although sensation often attends, or is excited by the impressions which occasion them. They may even be so morbidly strong as not to be controlled by the will, when the individual is most conscious of their presence, as in tetanus. The reflected actions of the *ganglionic nervous system* are only objects of consciousness when they are excited by powerful stimulants or irritants.

192. Thus there may be said to be *three classes* of *reflected actions*, viz., 1st. that class of actions which may be denominated *psychical*, or *cerebral*, or which results either directly from impressions made upon the senses, or indirectly or reflectively from these impressions: — 2d. that class which may be termed *animal* or *spinal*, which proceeds from impressions or irritations transmitted to the spinal chord or roots of the spinal nerves, and is reflected thence by the motor nerves to voluntary muscles, and which may occur independently of the brain: — and 3d. that class which is *organic* or *vital*, which takes place in parts supplied only or chiefly by the ganglial system, and which is independent of both the brain and spinal chord.

193. *γ.* There are several circumstances connected with the *voluntary actions as involving consciousness*, to which further allusion may be made. The actions which occur during sleep when the mind is incapable of perceiving impressions made on the senses unless they be inordinately intense, to which the terms *somnambulism*, sleep-waking, sleep-walking, &c. have been applied, are merely the result of suggestions arising out of previous or recollected impressions and reflections; these suggestions and reflections giving rise to volitions which excite the voluntary organs to action without awakening the senses or permitting the perception of external objects in a distinct manner. Somnambulists may perform any of the common occupations of life, or may even execute difficult intellectual tasks with much ability,—I have seen them compose, sing, play on musical instruments, &c. according to their respective tastes or occupations, and be still unconscious of the various surrounding objects of sense. Consciousness, however, of the act which the somnambulist is performing, and of objects connected with it, undoubtedly exists for the moment, to the abstraction of every other sensation. In this state the suggestions, mental operations, and the resulting actions, are often perfectly performed, as respects the ability of the individual; but, as they commence and are continued during a state of the brain unfavourable to sensation and perception, they are faintly, or not at all recollected. The concentration also of the mind on the subject engaging it, still more completely prevents other objects from being perceived. The somnambulist, in fact, *acts* his dream, and often in such a manner as to enable him to shun the dangers attending the action, as completely as if he saw them distinctly and thus avoided them. And yet there is reason for believing that they are not seen by him, but avoided from the circumstance of his having followed an accustomed and well-remembered track, each successive part of which is suggested to him as he proceeds, just as a person passes through a room in the dark, avoiding all impediments in his way from his recollection of their positions.

194. *δ.* Many of the above remarks apply to *dreaming*, and in part also to the *motions of the body in sleep*. Dreaming may, or may not, be attended by movements of the body; but these are generally imperfect or partial, if observed at all, and have reference to the idea passing in the mind. In this case the mental suggestion either fails of exciting precise and corresponding actions and expressions, or excites them so partially or imperfectly as not to amount to somnambulism. The chief difference between dreaming and somnambulism is, that the individual during a state of sleep, or whilst the senses are closed against perception, — or rather whilst the brain is incapable of perceiving the impressions made upon the senses in their usual states of intensity, — not only dreams, but also actually executes what he dreams, without awaking from the state of which I have just defined sleep to consist.

195. But the motions of the body during sleep are often independent of dreaming, or of those sensations and suggestions which pass through the mind during sleep, and which are faintly remembered afterwards; for obscure sensations may be excited for the moment by external objects or physical causes during sleep, although they are not at all recollected. A person turns or moves whilst asleep, owing to a feeling of uneasiness, which, although not remembered by him when awakened, has nevertheless been produced so as to cause the change of position. These movements have recently been adduced as instances of reflex actions occurring independently of sensation; but, that momentary sensation has not been excited, is not established. Even in experiments showing the occurrence of motion after the removal of the cerebral hemispheres, the non-existence of sensation is not demonstrated, inasmuch as sensation

has not been proved to be limited to these hemispheres, nor even to exist in them; they having to perform other functions, of which the sentient principle, presiding most probably in some other part, as in the medulla oblongata or in its vicinity, takes due cognisance.*

196. ε. *Catalepsy* is a state altogether opposed to the foregoing, — is the most complete and general state of palsy of motion that can exist without terminating existence; but it rarely continues longer than some hours, although it may recur after short intervals, lasting on some occasions for many

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* The following observations on the *Forms and Modes of Sensibility* were published in 1824, among my Physiological Notes, already referred to in various parts of this work. They may serve to elucidate many of the phenomena which occur in several states of paralysis.

The phenomena considered by several authors as evincing the existence of *sensibility*, are referrible only to contractility, with which all classes of animals are endowed, and which, in the lowest orders and in some vegetables, assume the appearance of sensibility. In these latter, however, we have no reason to infer the presence of sensibility, merely because they contract under the influence of a stimulus; for the contraction may take place without the existence of this property, from the effect produced by the stimulus upon the organisation of the contracting part. Indeed, we cannot suppose that sensibility is present where the parts generally observed to be instrumental in its production are not found to exist: a sensation cannot be supposed to be produced where there is neither an organisation suitable to receive, nor a channel to convey, nor an organ to perceive, an impression. We should, therefore, limit this term to those phenomena which the mind perceives or is conscious of when in a state capable of exciting perception or consciousness.

With this limitation, *sensibility* may be called the function of sensation, and a property peculiar to the animal kingdom. The sensations are derived through the medium of the senses, and of the nerves which communicate with the encephalic centre. On this centre the existence of sensibility chiefly depends; the ramification of its nerves, or the subordinate portions of it, being also parts of the apparatus requisite, but not giving rise, to this property. As we ascend in the scale of creation, and as the senses and organs of volition present a more intimate connection with this nervous mass — the encephalon, — so sensibility becomes more perfect, until in man it reaches an extent greatly surpassing that of other animals.

In man, and perhaps in the more perfect animals, the *modes* of sensibility seem to vary. These modes may, however, be divided into *two conditions*, as they are more or less active; namely, *conscious* or *active sensibility*, and *inconscious* or *passive sensibility*: the former relates to those impressions, either from within or from without, which give rise to perceptions or ideas; the latter to those that are frequently produced upon the senses and upon the ramifications of the nerves, and, owing either to habit or the want of due attention to them, are not perceived by the mind. In this latter mode of sensibility, the organ receiving, and the channel conveying the impression, perform their offices; but the mind either is not, at the time when the impression is made, in a state to receive it, or receives it so imperfectly, from its weakness or its transient nature, as not to give rise to consciousness.

This mode does not necessarily imply a difference in the degree of sensibility, but the condition in which this property exists, owing either to its being more excited by other impressions, or to its being exhausted at the time when the impression is made. This condition is one to which the highest manifestations of sensibility as well as the lowest may be occasionally subject: it is, however, merely a relative mode of this property; and the relation subsists entirely between the state of the cerebral organ which perceives, and the force and duration of the impression made upon the organ of sense. Thus, when the sensibility is actively occupied with a particular object, and an impression is made at the same time upon a different organ from that through which the perception with which the mind is engaged was conveyed, the second impression may affect the senses in an evident manner, and even so as to influence volition, yet we may be unconscious of its operation, and no active perception may result from it. If, however, the second impression be stronger or more vivid than the first, or if, from various other circumstances, it should excite the cerebral functions, active sensibility or consciousness is the result.

As sensibility, according to this view of the subject, is, in its active state, a term merely expressive of consciousness; and as this faculty is evidently dependent upon the cerebro-spinal nervous system, especially on that more complex part of it which holds relation with surrounding objects; and, also, as we have no reason to attribute the possession of this part of the nervous system to the very lowest orders of animals, particularly to the class Radiata, — so we must conclude that, although sensibility is a property of animal life, its higher grades are not possessed by all animals. It may be also stated, that *active* sensibility, being thus considered as expressive of, or comprising, consciousness of sensations, and of the intellectual and moral operations, varies in its extent throughout the animal kingdom, according as those manifestations are more or less numerous and perfect. How far the *passive mode* of sensibility, or that unattended by consciousness, may be a property of the lowest orders of animals, is difficult to say. We may, however, infer, that as this latter condition of sensibility may take place without an active exertion of this property in the highest animals, so it may result from a less perfect endowment of sensibility in the lower; and as this mode may require a less complex apparatus for its production, inasmuch as its relations are more simple, so it may be possessed by animals whose organisation and manifestations do not permit us to conclude that they are capable of evincing sensibility in its more perfect and active conditions. The relations which this form or mode of sensibility holds with the numerous instincts of animals, must be evident to all who consider the subject. The relations, however, which evidently subsist between that form of sensibility, called *organic sensibility* by BICHAT, and the animal instincts, are much more numerous, more intimate, and more apparent.

Organic sensibility refers to those sensations which are produced in different degrees of intensity, owing to the existence of certain conditions of those viscera which are immediately subservient to the preservation of the individual and the species — to nutrition and reproduction, and which are not immediately subjected to the influence of volition. The conditions of the parts exciting organic sensibility are very various, and are the result of irritations arising from the presence of a stimulus, of unnatural actions supervening in particular systems or textures, and of the deficiency of that stimulus or influence to which particular viscera have been accustomed. Many of the changes preceding this class of sensations seem to interest, in the first instance, the ganglial class of nerves; but, owing to the intimate relation subsisting between this part of the nervous system and the voluntary or sentient part, the impression or change is propagated to the brain. This is the only essential difference which exists between this and the other forms of sensibility. It is the brain which perceives in them all; and although stimuli, or the defect of stimuli, may give rise to certain phenomena possessing the characters of the higher manifestations of this property in the organs appropriated to the preservation of the organic system, independently of the sensorium, — consciousness, or the more perfect form of sensibility, cannot form part of the results.

Organic sensibility may also be *active* or *passive* — it may or it may not be attended with consciousness; and even the unconscious mode of it may indirectly impel to action, or give rise to many of the manifestations or instincts which characterise the lower animals, owing to the ganglial centres, either from their organisation or connexions, or from both, performing a greater extent of function than usually falls to their share. If, therefore, the passive form of organic sensibility may propel to action without consciousness, or the sensorial sensibility being excited, in those animals, we may also account, in the same manner, for many of the instinctive functions being performed when we cannot trace them to the influence of a cerebral organ. Of all the conditions of sensibility, the active organic form is the least under the control of the mental powers. It also, in all its modes of existence, more intimately interests the existence of the individual than the other forms of sensibility, — organic sensibility involves a feeling in all its active manifestations instinctive of life or death.

From this it will be readily seen how close a connexion exists between organic sensibility and the animal instincts; it does not, however, belong to my plan to trace the connexion in all its relations.

Of sensibility generally we may observe that, in the human species, it is very variable, even in health; in some persons it is very much exalted, in others very obtuse. It is vivid in early life and in youth; after the age of manhood it gradually diminishes; as old age advances it decreases rapidly; and, in persons who have attained a greater age, it is present in the lowest grade in which we find it in the species. Its morbid conditions — in respect both of grade and kind — form or characterise many of the most important diseases of the human œconomy.

hours. In this state, the muscles of voluntary motion — even those of the face and the eyelids — will not contract upon irritating them, nor will they be influenced by the will of the patient, which is generally attempted to be exerted when consciousness is not altogether abolished. The sensibility, indeed, is generally not lost during the attack, although it is more or less obscured in most cases. In a patient who is liable to attacks of this complaint, and whom I have often seen during their continuance, the eyelids and all the voluntary muscles retain the positions in which they are placed; but not the least appearance of contraction is manifested upon the most energetic irritation. Still this lady feels, sees, and hears during the continuance of the seizure. She even wills the action of the muscles; but volition is not transmitted to them. The voluntary muscles of respiration are generally the first to act upon the return of voluntary power. In another case which I had an opportunity of observing during the attack, the sensibility was somewhat more diminished than in the foregoing; but I have not met with an instance of its entire abolition. The sphincters are always unaffected in this disease. The respiratory movements are slight, and perceived with difficulty; the impulse of the heart is weak, and the pulsations generally accelerated and soft, but sometimes slow or irregular.

197. (*g.*) *Mechanism and functions of the spinal chord.* — There are other phenomena beside those already mentioned, which occur in paralysed limbs, and which deserve a brief notice at this place: — Dr. M. Hall and Dr. Budge have shown that, in cases of paraplegia where sensibility as well as motion is lost, convulsive motions are produced in the paralysed limbs by tickling the soles of the feet, and even on defecation and micturition. But it is doubtful whether sensibility is entirely lost in these cases; the occurrence admitting of explanation in the manner stated above (§ 181. *et seq.*), and still more readily, if the minute anatomy of the spinal chord, according to the researches of Stilling, Van Deen, and Budge, be taken into the account. The chord, according to these researches, consists, first, of perpendicular fibrils, forming the white substance of it; secondly, of transverse fibrils, and of very delicate longitudinal fibrils, constituting the cineritious or grey substance of the chord; the transverse fibrils crossing at right angles, and forming a net-work with the longitudinal both of the grey and of the white substances; thirdly, of corpuscles, of an angular form, with nucleated or projecting processes, scattered in groups through the anterior grey matter only, and most numerous at the origin of the anterior roots of the nerves; fourthly, of transverse fibres passing directly from the posterior to the anterior grey substance of the chord.

198. The roots of the nerves are direct prolongations of the grey substance. Fibrils pass from the grey, through the white substance, into the roots of the nerves. Dr. Stilling traced fibrils from the posterior roots to the anterior grey masses. And fibrils, almost as soon as they enter the chord, run between bundles of fibrils of white substance to join other bundles of fibrils from adjoining nerves. Others, in fasciculi, form loops with fibrils coming from the next nerve; and others appear as continuations of the transverse ray-like fibrils of the posterior grey substance, while the connection of the anterior roots with the anterior grey substance is still more distinct. The nucleated processes or corpuscles of this substance are in immediate connection with the primitive fibrils of the roots of the nerves.

199. The afferent properties of the posterior, and the efferent properties of the anterior divisions of the chord, are rendered more manifest by the above results, at which the above-mentioned anatomists have arrived. But, according to Dr. Stilling's experiments, the longitudinal fibrils of the anterior white substance do not transmit volition to the nerves, this office being performed by the longitudinal fibres of the anterior grey substance. As the transverse fibrils are prolonged into the nerves, and as we know that the posterior nerves are necessary to sensation, so it may be inferred that the posterior transverse fibrils are excitors of the posterior longitudinal fibres of the grey substance, and that a sensation, or rather the sensative impression, is transmitted by the posterior transverse fibrils, and by the longitudinal fibres, to the sensorium; the same relations, *mutatis mutandis*, being conceded to the anterior grey fibres. As centripetal impressions pass from the sensitive nerves along the transverse and longitudinal fibres of the posterior grey substance to the brain, so centrifugal impressions may pass in a contrary direction, that is, from the brain along the longitudinal and transverse fibrils of the anterior grey substance to the roots of the motor nerves.

200. Such being the mechanism of ordinary sensation and motion, according to the recent researches of Stilling, Van Deen, Budge, and others, it can be no longer difficult to account for those involuntary movements which are produced in a paralysed limb when the surface of it is irritated, pinched, or tickled, and which have been termed by Dr. M. Hall reflex actions, depending, according to him, upon a reflex function of the spinal chord, which function he refers to a distinct mechanism in the chord. It has already been contended by the author that no such mechanism exists, and that these actions are sympathetic, and result from the conformation of this part of the nervous system, transverse fibrils passing, as shown by the anatomists just referred to, directly from the posterior to the anterior grey substance, to convey impressions from the sensitive fibrils and to excite the roots of the motor nerves. That no appropriate and peculiar structure exists in the chord for the purpose of performing these sympathetic or reflex movements, beyond what has now been noticed, is the opinion not only of the author, but also of the writers already mentioned, as well as of many others who have investigated the subject.

201. Dr. M. Hall has contended that the spinal chord is the source of muscular irritability, and that this irritability is exhausted by volition. In proof of this position he states that paralytic limbs are more readily agitated by galvanism and strychnine than sound limbs, when the cause of palsy is in the brain; the paralysed muscles being in such cases more irritable than natural, whilst they are less irritable when the palsy proceeds from the state of the chord. The irritability is thus considered to be increased in the former case, owing to its not being exhausted by volition, and

to be diminished in the latter owing to the lesion affecting its source. But experience shows the inaccuracy of this inference, for the paralysed muscles, in cases of cerebral paralysis, are not more irritable than the sound muscles, but on the contrary less so, as tested by voltaic electricity; and Dr. Pereira has come to a similar conclusion. In the article Irritability, I have adduced my views, as promulgated many years ago, respecting the source of this property — have stated that it proceeds from and depends upon the organic or ganglial nervous system; and have contended that it does not arise from the spinal chord and nerves, although it is rendered more energetic and perfect in the voluntary muscles by the supply of nerves which they receive from the chord. The truth is, that the tone, rigidity, and irritability of all paralysed muscles are more or less impaired — the less so when the lesion is in the brain and high in the chord. Still it cannot be doubted that strychnine or nux vomica affect these muscles more readily and more remarkably than the sound muscles. These facts may be explained partly by referring to the minute structure of the chord, and partly by the circumstance of this substance being rapidly absorbed and acting energetically on the structure of the chord and origins of the spinal nerves.

202. The fact that mental emotions often excite parts which are paralysed, is also explained by the mechanism of the chord, and by the circumstance so strongly insisted upon by Bichat, but since so much overlooked, that mental emotions powerfully affect the ganglial and sympathetic nerves, and, through them, the spinal chord and the nerves proceeding from it, the sympathetic nerves communicating freely with the chord and roots of the spinal nerves, and contributing numerous fibrils to the latter to be distributed with them to the parts they supply.* That volition, when continued or energetic, exhausts the irritability of voluntary muscles, is admitted; and hence the sense of fatigue, lassitude, and even of soreness or pain, which often follow such exertion.

203. (*h.*) *The relaxation of the sphincters,* occasionally observed in palsy, especially in paraplegia and general palsy, has been viewed as a phenomenon of more general occurrence than it really is. The fact is, that the sphincters are not so frequently relaxed, as they are imperfectly influenced by the will, or are not at all affected by it. They still retain much of their tonicity, but volition is not so energetically exerted on them as to counteract the actions of the hollow viscera, when these viscera are excited by an accumulation of their respective contents, or by medicine. The *tonicity* or power of the sphincters has been attributed entirely to the spinal chord, and without reference to any influence they may derive from the organic or ganglial nervous system. But, although they derive a share of their power, more especially the voluntary increase of power as circumstances may require it, from the cerebro-spinal axis, their continued state of tonicity is chiefly to be attributed to the organic system of nerves. This is shown in paraplegia and in general palsy, in both which the sphincters very often retain a natural condition of contraction; but that contraction is frequently not increased by volition so as to resist the actions of the bowels or urinary bladder. In some cases of these states of palsy, the sphincters are not much affected, especially when the palsy is incomplete, or seated high in the chord. Pathological evidence, indeed, clearly leads to the inferences,—1st. that the power of the sphincters is attributable chiefly to the organic nervous system, but that it is increased by volition exerted through the medium of the spinal nerves, especially in circumstances requiring such increase, as when the disposition to the actions of the bowels or bladder has to be resisted, and 2d. that it is chiefly this latter influence, or that which is exerted through the spinal chord, that is either lost or impaired, in cases where the voluntary contractions of the sphincters are insufficient to prevent the passage of the excretions when the patient wishes to retain them. It is not, therefore, to be inferred that where there is insufficient control over the evacuations, the sphincters are either relaxed or materially deficient in power; but that they are only insufficiently influenced by volition, relatively to the power which overcomes their natural tonicity.

204. VII. Treatment of Palsy.—There is no disease which more requires an intimate study of its nature and relations, before a determination should be formed as to its treatment, than the one now under consideration. The seat, grade, pathological condition, and constitutional peculiarities, of paralytic maladies are so diversified, that each case should be made a separate study, and such means only as are appropriate to existing pathological conditions ought to be employed. I shall endeavour — 1st, to point out the plans of treatment which are most serviceable in the principal forms, states, and complications of palsy; and 2d, to appreciate the character and value of the numerous medicines and methods of cure which have been recommended for this disease, and their applicability to the several conditions in which it comes before the physician.

205. i. Of Paralysis of Sensation. — The means to be employed in this form of the disease should be selected with strict reference to the remote causes, to the pathological conditions inferred to exist in each case, and to the particular circumstances of the individual. If this affection occur in a spare habit of body, if it be unconnected with general or local vascular plethora, and if it have been caused by cold or other depressing agents, the means about to be recommended for the more chronic states of paralysis of motion (§ 213, 214.) may be employed, especially local stimulants and irritants, internal excitants, external derivatives, galvanism, &c. In all cases, however, the strictest attention should be paid to

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* The views published by the Author in 1822, in the *London Med. Repository*, and, in 1824, in his *Physiological Notes, &c.*, respecting the independent and distinct constitution of the organic or ganglial class of nerves, as to the functions and relations of this part of the nervous system, and as to the influence exerted by this system on the vascular system on the one hand, and on the cerebral system on the other, — in short, the positions thus taken, from researches in various classes of animals, that all organs and parts which are necessary to the life of the individual animal, and to the perpetuation of its species, are supplied by ganglial or organic nerves in proportion to the importance of each organ, and to the activity of the several organic processes, — have been recently fully confirmed by the researches of Stilling, Bidder, Volkmann, Wallach, Hannover, R. Lee, and others.

he several digestive, secreting, and excreting functions.

206. If the *senses* of *sight*, *smell* or *taste*, are singly or generally affected, the same principles of treatment should be adopted as are here espoused in respect of *anæsthesia ;* the several means being selected or modified according to the peculiarities of the case, and the organ especially disordered.

207. Local congestions are concerned in producing many, probably the majority of cases of *anæsthesia.* If the loss of feeling be associated with hesitation or other affection of the speech, these conditions may be more confidently inferred; and if the anæsthesia be hemiplegic, a limited congestion, hæmorrhage, or softening of some part of the brain, probably exists. When anæsthesia occurs in plethoric and robust habits of body, in persons who have lived fully, or of sedentary habits, or consecutively of suppressed evacuations or discharges, then these pathological states most probably exist, and the affection, if not quickly removed, will often soon be followed by paralysis of motion. In these circumstances, the treatment advised for the acute states of palsy of motion, especially general and local vascular depletions, chologogue and other purgatives, and derivatives, is that which is most appropriate. Subsequently external excitants, as sinapisms, vesicants, urtications, &c., or the other means noticed for the more chronic states of palsy (§§ 213. *et seq.*), may be prescribed. When anæsthesia is associated, as it generally is, with loss of motion, the treatment is in all respects as about to be stated with reference to palsy of motion, which is then the most important phenomenon, and the one which should chiefly engage attention as respects its immediate cause.

208. ii. Treatment of Palsy of Motion, &c. — When the faculty of motion is paralysed either alone or conjointly with partial or more complete palsy of sensation, the treatment should be directed with the same intentions as have been just mentioned, viz. — 1st, with the view of removing the morbid states or the structural lesions inferred to exist in each case which may present itself; and 2dly, with the object of restoring the transmission of nervous influence to the paralysed muscles.

209. *A. When the palsy is strictly local or partial,* the treatment should necessarily depend upon the peculiar features of the case. In this state of the complaint (§ 21.) the lesion may be either in the origin or in the course of the nerve supplying the paralysed muscles; but it may also be limited to the ramifications of the nerve, as when the affection is caused by the continued influence of cold, &c. If the lesion be inferred to exist at or near the origin of the nerve, local depletions, derivatives, alteratives, especially a carefully regulated course of mercury or of the iodides, with sarsa, &c.; external irritants and drains; and a due promotion of the several secretions and excretions, comprise the most efficient means of cure.

208. If the nerve have its functions interrupted by changes in any part of its course, as by thickening of the periosteum, by abscesses, tumours, &c., alteratives, particularly the iodides with the solution of potash and sarsaparilla; various external applications, particularly the tincture of iodine, or solutions of the iodides, the plaster of ammoniacum with mercury, &c., and other means suited to the nature of the case may be resorted to — if the ramifications of the nerve be chiefly affected — and particularly if colds have been the cause of the disorder, sinapisms, blisters, or applications containing capsicum or mezereon, may be prescribed, and if these fail, the part may be stimulated by either of the means hereafter to be mentioned (§§ 249. *et seq.*).

210. *B. The Hemiplegic form of Palsy,* whether occurring *primarily* and *simply,* or *associated* with apoplexy or convulsions, or appearing *consecutively* of these, is the most common form of the disease, and requires the greatest discrimination in estimating the pathological changes and in prescribing the means of cure. — *a. In the acute or early period of the malady,* prompt and decisive measures are generally required; yet these should be varied according to the mode of accession and character of the attack, as already noticed (§§ 35—40.). If the complaint approach in the *gradual manner* above noticed (§§ 35, 36.), alteratives and derivatives are chiefly indicated with the view of removing or arresting the lesions which may be inferred to be the causes of the complaint, and of allaying the irritation they may be supposed to occasion. Local depletions, especially by cupping on the nape of the neck; sinapisms or blisters in this situation and behind the ears; purgatives and alteratives; setons in the nape, and mustard pediluvia, are severally indicated. In this form of palsy, vascular depletion, unless local and moderate, is seldom of much service. Purgatives are generally required; and mercurials, in alterative doses and combinations, especially Plummer's pill with soap, or the bichloride of mercury, in small doses, taken either soon after a meal, or with preparations of sarsaparilla, sometimes either ameliorate the symptoms, or arrest for a time the further progress of the disease. It is in this form of hemiplegia that the iodides are more particularly indicated. I have given the iodide of mercury, or Plummer's pill, nightly, and the iodide of potassium with solution of potash and compound decoction of sarsaparilla during the day, with manifest advantage, a seton being kept open in the nape of the neck.

211. When the attack of palsy seems consequent upon *inflammatory softening of a portion of the brain, &c.* (§§ 37, 38.), local vascular depletions, or even general blood-lettings, are manifestly required. Active purgatives and mercurials are also requisite; and, in the intervals between the exhibition of purgatives, the bichloride of mercury should be given in small and frequent doses, until the gums become affected, external derivation being also produced by the usual means, whilst the head is kept cool and elevated. In this form of the disease, I have not seen any advantage accrue from the iodides, especially in the *early or acute stage,* or whilst inflammatory action continues to exist. In other respects, the treatment in this variety of the disease should be conducted as advised for inflammation of the brain. (*See art.* Brain, §§ 191. *et seq.*)

212. If hemiplegia occur in a *sudden manner* (§ 39.), the treatment should be as prompt and energetic as in cases of apoplexy. In many cases, particularly in robust and plethoric persons, copious general or local blood-letting, or both

general and local, is required; and either one or the other, or even both, may be again necessary some days after the accession of the attack, owing to the vascular reaction consequent upon it and the previous depletions, or attending the inflammatory action produced by the extravasation of blood causing the seizure. In this form of palsy the pulse should be carefully watched during the first fourteen or twenty-one days after the accession of the symptoms; and as soon as it acquires fulness or hardness, blood-letting, according to the circumstances of the case, should be repeated. But, in order to prevent the necessity of recurring to depletions, purgatives, external derivatives, and refrigerants or cooling diaphoretics, should also be prescribed at the commencement of the attack. In this variety of the disease I have seen much benefit derived from the bichloride of mercury, either alone, and taken soon after a meal, or with sarsaparilla until the system became affected by it; but vascular depletions should be premised, and the secretions and excretions duly promoted. In this state of the malady, as well in that which is *associated with*, or *immediately follows, the apoplectic seizure* (§ 40.), the treatment in the early or more acute stage is in every respect similar to that which I have recommended in the article *Apoplexy*, when that malady is attended or followed by hemiplegia. (*See art.* Apoplexy, (§§ 146. *et seq.*)

213. *b. The chronic or persistent state of hemiplegia* is seldom altogether removed. The injury received by the fibrous structure of the brain in the great majority of cases, is such as admits not of the restoration of the complete power of volition over the paralysed limbs. In this state, setons or issues may be tried, but they should be kept discharging for many weeks before much advantage can be expected from them. At the same time the iodides, particularly the iodide of potash, may be exhibited either alone or with liquor potassæ, or as already recommended; and the bowels should be kept freely open by means of chologogue purgatives.

214. During this period of the disease, various internal and external stimulants and irritants have been advised with the view of accomplishing the *second indication of cure* (§ 208.); but the selection of them requires great discrimination, as regards their respective properties and the existing pathological conditions. The preparations of nux vomica, strychnine, &c., have been recommended in this state of hemiplegia, but I have rarely or never found them of service in this form of palsy; but, on the contrary, productive of more or less mischief, especially whenever increased determination or fulness of blood in the head was present. They are indicated only when an opposite state of the cerebral circulation is inferred to exist, and in some other forms of the disease. The same may be said of the use of other internal stimulants, when a disposition to increased vascular action or effusion exists in the substance and membranes of the brain; for, in such cases, the preparations of iodine, aconite, cantharides, serpentaria, phosphorus, camphor, electricity, galvanism, &c., of which more particular notice will be taken hereafter, are very rarely of use, but often injurious. The remarks which I shall have to offer respecting certain modes of cure, and various medicines more or less praised for this complaint, apply so entirely to this period of hemiplegia, that I shall add no more at this place as to the means which may be further employed in the treatment of it.

215. C. *The treatment of paraplegia* so entirely depends upon the nature of the lesion producing this form of palsy, that a continual reference to such lesions must be had in the observations which I shall have to offer on this subject. I have stated above (§ 53.) the several changes causing paraplegia; and it will be seen that these require a treatment appropriate to each individually. — *a.* It is obvious that the means required for paraplegia consequent upon *concussion* or *fracture* of the spine, or upon *laceration* of, or *pressure* on, the chord by displaced bone, are chiefly surgical, at an early period; and that the selection of these means should depend upon the peculiar features of the case and the extent of local injury. At a later period, when the palsy still continues, the treatment will necessarily hinge upon the physical condition of the parts and the presumed consequences of the lesions immediately resulting from the injury. In such cases the paraplegia sometimes persists, although the physical condition of the spine appears but little or not at all altered. In these it may be presumed, that softening, effusion, or some other consequence of inflammatory action is present in the chord or its membranes; and consequently these cases come under the same category as others about to be considered (§ 216.).

216. *b.* In cases of paraplegia which commence with severe pains or tenderness in the spine or loins, or with a sense of heat or burning, followed by spasms, numbness, and loss of power, indicating an *acute* or *inflammatory character* (§ 56.), a decided antiphlogistic treatment is requisite, especially at an early period. In these, cupping on each side of the spine near the seat of pain or tenderness, repeated according to circumstances, mercurial purgatives and terebinthinate enemata, are the most efficient remedies, especially when these symptoms have not been of long duration. If pain or spasms still remain after a due recourse to these means, calomel or other mercurials should be given with opium until the mouth is slightly affected, attention being paid to the states of the urinary bladder and bowels, and of their excretions.

217. In cases of paraplegia of a more insidious character — in those which occur gradually and slowly, or which are consequent upon exposure to cold, or are attributable to congestion of the spinal sinuses, to increased serous effusion, or to chronic lesions affecting the chord, or to scrofulous changes in this part, its envelopes, or vertebræ, the bichloride of mercury as exhibited above (§§ 211, 212.), or conjoined with the compound tincture of bark; or the iodide of potassium with liquor potassæ and the fluid extract of sarsa, or an alternation of these; stomachic purgatives; warm salt water baths followed by active friction of the trunk and limbs, and strict attention to the excreting functions and to the states of the discharges, are the measures which have proved most beneficial in my practice. The bichloride of mercury, or Plummer's pill, should be exhibited until the gums are affected, or until recovery takes place; and, when the motions are tar-like, and are procured with difficulty, calomel should be given with active cathartics, such as

the compound extract of colocynth, scammony, &c., sometimes quickened with a drop of croton oil. Blisters or rubefacient applications may be placed on the back, and be repeated according to circumstances. The *liniments* prescribed in the *Appendix* (*Form.* 308. 311.) may be applied as *embrocations* in the course of the spine, from time to time, or be rubbed assiduously in this situation.

218. Setons or issues on each side of the spine have been advised, and in some instances have proved serviceable, particularly when aided by a judicious internal and constitutional treatment, but they require discrimination in respect both of the pathological causes of the paraplegia, and the general health of the patient. When the disease appears to have proceeded from exhausting causes, as masturbation, venereal excesses, &c., or to have been aggravated by these, then setons or issues are generally injurious, especially when the constitutional powers are much exhausted. Stimulating and invigorating measures are required in all such instances. In these and similar cases I have found the tincture of the sesquichloride of iron with the tincture of cantharides; the compound galbanum pill with the sulphate or oxide of zinc; the aloes and myrrh pill with the resinous extract of nux vomica; and the valerianate of zinc lately introduced by Mr. J. Savory, of more or less service. Sir B. Brodie recommends a grain of the sulphate of zinc to be given three times a day, increasing the dose, and to be washed down by a draught containing twenty minims of the tincture of cantharides. In cases of this nature, the preparations of iodine, particularly a weak tincture, or the compound tincture of the pharmacopeia; or small doses of the bichloride of mercury in the compound tincture of cinchona and tincture of capsicum, or an alternation of these, have been of essential benefit. Sir B. Brodie makes favourable notice of the bichloride of mercury in doses of one-sixteenth of a grain, three times a day, with a moderate dose of the tincture of cantharides; I have tried this mode of exhibiting the bichloride, but the effects should be watched. The compound tincture of camphor will be conjoined with these two medicines with advantage.

219. *D. The treatment of general paralysis* in most instances is much the same as that just recommended for paraplegia; for the former generally depends upon similar lesions to the latter, or is merely an extension of it. — *a.* When the general palsy is a symptom of the more violent states of *apoplexy*, the means appropriate to these should be prescribed (*see art.* Apoplexy, § 135. *et seq.*). When it is the result of *concussion* of the brain, or of the spinal chord, or of *fracture* or other *injury* of the cervical vertebra, the treatment must depend upon the violence of the shock, on the presence of the primary symptoms, or the supervention of reaction — on the state of the heart's action and of the circulation, both locally and generally, and on various circumstances which will influence the experienced physician. The intentions of cure should therefore be not only varied but different, or even opposite in different cases and circumstances.

220. *b.* In cases of general palsy from *caries* of the cervical vertebra, after the acute symptoms have been removed by local depletions, blisters, mercurials, &c., issues, setons, or moxas, &c. should be placed at a little distance from the seat of lesion; and an embrocation, consisting chiefly of the compound camphor and turpentine liniments, placed from time to time along the spine. In the case of caries of two of the cervical vertebra referred to above (§ 68.), the treatment consisted of active mercurial and other purgatives, of an alternation of a short course of the bichloride of mercury dissolved in the compound tincture of bark, with a more prolonged course of the iodide of potassium and solution of potash, with the fluid compound extract of sarsa. A protracted discharge was procured by means of blisters and savine ointment, applied to each side of the neck just below the occiput. The recovery has been complete. The neck, however, is shorter and much stiffer, obviously owing to absorption and anchylosis of the diseased vertebræ.

221. *c.* When the general palsy is of an *acute* character, or is caused by inflammatory congestion or by any of the more immediate consequences of inflammation of the membranes or substance of the chord, then local depletions near the seat of pain, and the prompt use of mercurials, of blisters, or of the terebinthinate embrocation in the course of the spine, and of the other remedies recommended above (§ 216.) for paraplegia should not be neglected.

222. *d.* When the disease is *chronic*, or has been neglected, or has not yielded to these means, then the bichloride of mercury, the sulphate or the valerianate of zinc, the iodide of potassium, the tincture of cantharides, the tincture of capsicum, &c., may severally be employed as already advised (§ 218.). Indeed, the treatment of general palsy, in its several forms, is in every respect the same as that advised for paraplegia.

223. iii. Paralysis in Children should be treated according to the principles above developed, and with strict reference to the presumed pathological condition. If the palsy be *partial* or *hemiplegic*, and be inferred to have arisen from injury during parturition, or apparently *acute*, the application of a leech behind the ear (of the unaffected side in the hemiplegic variety), and repeated doses of calomel should be prescribed. Minute doses of the iodide of potassium may be given subsequently, and the bowels ought to be kept freely open. If the palsy be congenital and independent of injury, the iodide of potassium or the iodide of mercury, or the bichloride of mercury, may be tried in minute doses and with due caution. In the more *chronic* cases of infantile paralysis, these constitute the chief remedies, but they should be continued for a considerable period and gradually increased, a course of the one being alternated with that of the other, as already advised.

224. If the infant be able to take the breast, recovery to some extent may be expected, although it may not be complete. I have at present under my care a patient in a fit of gout, aged between forty and fifty years, who was hemiplegic from earliest infancy, but he is unable to state whether it was congenital or caused by injury during parturition. The limbs of the paralysed side are considerably smaller than those of the sound side, and their movements weak, difficult, and constrained. The imperfect growth of paralysed limbs in infancy is owing chiefly to the very imperfect use made of them during the epochs of development.

225. iv. TREATMENT OF SHAKING PALSY. — Amendment has not followed any mode of cure which I have tried, and I have tried the most energetic means for this form of palsy, when it appears *gradually* and in a *chronic form*. When, however, the tremor occurs in a more *acute form*, or consecutively of suppressed evacuations, in strong or plethoric patients, as in the case adduced from FRANK (§ 99.), or when it is attended by pain in the head or in the course of the spine, then antiphlogistic remedies, particularly local depletions, blisters, or the terebinthinate embrocation in the course of the spine, purgatives, mercurials, &c., followed by the iodides, the bichloride of mercury, or the valerianate of zinc, and a seton in the nape of the neck, may be severally employed, according to the peculiarities of the case; or other energetic means about to be noticed may be tried.

226. In all cases of *paralytic tremor*, the existence of an arthritic or rheumatic diathesis should be ascertained, and the treatment modified accordingly. In such instances, tonics, opiates, and antispasmodics, with ammonia or other alkaline substances, may be prescribed. When the disease has probably arisen from masturbation or excessive sexual indulgence — the most frequent of its causes — then the preparations of iron with the tincture of cantharides or of capsicum, or with camphor, or with the nitro-hydrochloric acids; or the extract of nux vomica, or opium conjoined with aromatics may be tried, according to the peculiarities of the case, and to the effect produced; and they may be aided by stimulating embrocations or plasters applied on the spine, as the *liniments* in the *Appendix* (F. 308. 311.), or the emplastrum thuris comp., &c. &c.

227. v. PARALYSIS CAUSED BY POISONS requires a treatment appropriate to the nature of the deleterious agent. — *a.* When the affection is caused by the preparations of *lead*, the state of the digestive organs first requires attention. (*See art.* COLIC FROM LEAD.) After the alvine secretions and excretions are more or less improved, and their discharge is rendered more regular and healthy, the preparations of *nux vomica* or *strychnia* may be exhibited, but their effects should be carefully watched. In this disease I have preferred the resinous extract of nux vomica to strychnia, and have generally prescribed it in combination with the purified extract of aloes. In aid of these, the external stimulants hereafter to be mentioned, suitable exercise of the paralysed parts as far as they may admit of it, and the application of splints extending from the elbows to the fingers in cases of palsy of the wrist or arm, should not be overlooked. In addition to friction with various stimulating substances, electricity and galvanism, warm salt-water bathing, and warm baths containing stimulating substances, may be employed. Cleanliness and the removal of the cause always should be enforced. During the treatment the regular discharge of the alvine functions ought to be promoted, and the patient should be allowed a generous diet.

228. *b.* The states of palsy caused by other poisonous substances should be treated conformably with the principles already explained — with strict reference to the states of vascular action and vital power, both general and local. The tremulous form of palsy sometimes caused by *mercury* (see ARTS AND EMPLOYMENTS, § 23. *et seq.*) requires similar means to those just recommended for palsy from lead. This observation also applies to the palsy of the extremities sometimes produced by *arsenic*. In all these, internal stimulants, tonics and restoratives; attention to the digestive and defæcating processes; external excitants, electricity, &c., and nutritious diet are requisite.

229. Palsy consequent upon *narcotic poisons* should be treated according to the states of vascular action and nervous power. After due recourse to their respective antidotes, &c., local depletions, purgatives, external derivatives, &c., in order to remove congestion of the nervous centres, should be prescribed, and, if the malady still persists, the several alterative, restorative, and stimulating remedies recommended for the *chronic states* of palsy ought to be employed according to the peculiarities of the case, and the circumstances of the patient.

230. vi. The TREATMENT OF THE COMPLICATIONS OF PALSY requires but few remarks; as the most important of these complications is duly considered in the articles on the diseases of which palsy is a part, or of which it is consecutive. Under the heads APOPLEXY, INFLAMMATION OF THE BRAIN, and INSANITY, the associations of paralysis with these are fully discussed. — *A.* I have already noticed *that palsy may either follow or precede inflammation of the nervous centres*, and have explained how this may arise (§ 125.). Hence it is requisite to watch carefully all cases, especially of hemiplegia, where it is inferred that the palsy is caused by extravasation of blood, particularly during the first three or four weeks of the disease; and, upon the first indication of inflammatory irritation to have recourse to antiphlogistic measures co-ordinately with the indications for their use. The evidence of inflammatory action in the vicinity of the lesion producing paralysis, at whatever period it may appear, as described above (§ 128.) is a sufficient reason for the having recourse to local depletion, purgatives, external derivatives, and alteratives, and for relinquishing tonics, stimulants, or excitants of any kind, should those have been resorted to.

231. *B.* The *complication of insanity with general palsy* admits of little or no hope even of partial benefit. Still the alteratives already noticed, combined with tonics and restoratives, should be prescribed, particularly the iodide of potassium with sarsa or with bitter infusions; the extract of nux vomica with aloetic or other aperients; the bichloride of mercury with the compound tincture of cinchona; the valerianate of zinc and other means already noticed (*see art.* INSANITY, § 444 —446.). In the association of palsy with *puerile imbecility*, or with *idiotcy*, the case is hopeless, for the reasons assigned above (§ 127.).

232. *C.* The treatment of *disease of the cranial bones*, or of the *vertebræ associated with palsy*, may be said to have been already noticed (§ 217.), since the same means as have been advised for the more chronic cases of paraplegia or of general palsy are also appropriate to this complication. In the more common cases of this kind, namely, in those where the vertebræ are diseased, but little can be done with rational hopes of success, beyond what has been recommended above (§§ 217. 220.). But in the course of treatment, the intercurrence of inflammation of the membranes or

even of the chord itself should be guarded against and watched for, and be promptly opposed by the means already indicated (§§ 216. 221.)

233. *D.* The *association of palsy with neuralgia or rheumatism,* or with pains resembling these affections, should always lead to the suspicion of congestion, or inflammatory action, of or near to the origins of the nerves which are the seat of pain, or which supply the pained parts; and when the palsy is moreover complicated with *spasms* or *cramps,* the same lesions should be inferred, and a treatment based upon the inference be prescribed.

234. *E.* I have already contended that the *association of palsy with disease of the kidneys and urinary organs* is most frequent and important; and that the latter morbid condition, even when it is apparently the primary one, is generally only the consequence of congestion of the vertebral or spinal sinuses, causing pressure on the chord, or increased effusion into its sheath (§§ 184. *et seq.*). In these cases, the urinary functions may be disordered to a most serious extent, or even for a long time, before symptoms of paraplegia are evinced, or the movements of the limbs are materially affected. When the spinal congestion interrupts or otherwise changes the functions of the kidneys, the consecutive excrementitious plethora may occasion either hemiplegia, or coma with general palsy. In some cases, the congestion of the spinal veins and sinuses is soon followed by acute congestion, or inflammation of the kidneys, or by suppression or retention of urine, paralytic symptoms not appearing until the renal malady is far advanced. In these circumstances the treatment is obvious. Cupping on the loins, or near the part of the spine chiefly affected, according to the severity of the attack and the habit and constitution of the patient, should always be directed, and afterwards terebinthinate embrocations ought to be applied to the loins and spine.

235. *F.* The nature of the occasional connection of *palsy, especially paraplegia, with hysteria,* has been already noticed (§§ 140. 188.). The irregularities often observed in the urinary functions of hysterical patients may often be attributed to the irritation propagated from the uterus and ovaria, either directly by the ganglial nerves to the kidneys and bladder, or indirectly to the spinal chord, and thence to the urinary organs along the nerves communicating between them and the chord. In those cases where the protracted irritation of the uterine organs, in connection with exhaustion of nervous power, disorders not only vascular action in these organs, but extends itself and its effects upon the vascular system, not only to the spinal chord, but also to the urinary organs, pain or aching in the loins, and even tenderness on pressing the spinous processes of the vertebræ, are often observed: and, if the vascular disorder consequent upon the local excitement or irritation advances far, so as to occasion certain of its most prominent effects, numbness, cramps or spasms of the lower extremities; retention or suppression of urine, sometimes alternating with an unusually large secretion or flow of it; occasional nausea, vomiting, and irregularity of the bowels; irregularity, or difficulty, or suppression of the catamenia; and, ultimately, even more or less complete paraplegia may result. Several cases of this kind have occurred to me, and have long resisted treatment until they were submitted to energetic courses of the alterative medicines above advised (217.), particularly the bichloride of mercury, or the iodide of potassium, variously combined, aided by terebinthinate enemata and embrocations, by the extract of nux vomica, and by such of the remedies already mentioned as were most appropriate to the peculiarities of the case. In the remarkably severe and prolonged instance noticed above (§ 139.), for which all the usual means had been exhausted, in addition to several of the means now noticed, a pea-issue was made in the inside of each thigh, and kept freely discharging until the amendment was complete. The recovery was rapid in this instance, and the lady is now in the enjoyment of good health.

236. *G.* I have met with several instances of *palsy, and especially of hemiplegia, associated with visceral disease.* The connection between organic disease of the heart and hemiplegia, as that between the former and apoplexy, is sufficiently obvious; and neither it, nor the treatment of the complication, requires much comment, inasmuch as our remedial measures should be directed primarily to the cardiac lesion, and subsequently or collaterally to the paralytic affection; the states of these lesions, in connection with the age, habit of body, &c., of the patient, controlling the plan of treatment and the choice of means.

237. *H.* The *complication of palsy with hepatic disease* has been observed by me on several occasions: the palsy being generally hemiplegic, and the right side being that affected in nearly all the cases I have seen. Although in some cases the liver has appeared to have been primarily affected, still it is very probable that the loss of power in the voluntary nerves and muscles of the right side may have in some degree affected the functions and circulation of the liver, and, in prolonged cases, ultimately induced disease of it. In these associations the principles of treatment and the choice of medicines will readily suggest themselves to those who have perused the foregoing remarks, and what I have adduced on the treatment of diseases of the liver.

238. Palsy may, moreover, be associated with *scorbutus,* and it not unfrequently occurs in the *gouty* or *rheumatic diathesis,* more especially after irregular, displaced, or suppressed gout. In these circumstances, the treatment should be varied according to the diathesis. In the gouty association of the malady, the usual means should be employed to develope the gout in the lower extremities.

239. vii. THE APPRECIATION AND APPROPRIATION OF REMEDIES FOR PALSY.—In discussing the treatment of the several forms of palsy, it has been, as will be seen above, a principal object to advise the use of such means as appear the best calculated to remove the morbid changes upon which these forms severally depend; and mention has been made chiefly of those remedies which seem to me most likely to produce this effect, and of which I have had more or less experience. It is necessary, however, to a full exposition of the treatment of palsy, to review the application of the more energetic means to certain states of the disease and of the constitution, and to notice other medicines which have been favourably mentioned by writers of reputation.

240. After devoting due consideration to the *seat* and *nature of the lesion* of which palsy is the

prominent and most manifest phenomenon, it next is of importance to estimate correctly the states of vascular action and of nervous and vital power — to ascertain, as nearly as may be, how far the affection may be considered, from these states, in connection with its cause and duration, to be *acute* or *chronic*, and *sthenic* or *asthenic*. These terms, it is true, are merely conventional; but they nevertheless assist us materially in our attempts at briefly indicating the conditions of the patient which powerfully influence the operation, and which should therefore guide our choice of medicinal agents for this malady.

241. *a.* Of *bloodletting*, general and local, it may be briefly stated, that they are generally required early in attack, especially in acute and sthenic cases, and more particularly in the hemiplegic or sanguineous form of the disease. In the paraplegic and partial states of the malady local bloodletting is commonly to be preferred to general; and in all cases the quantity, as well as manner and repetition of the depletion, should depend upon its effects, the state of the pulse, and habit of body of the patient, as well as upon the predisposing and exciting causes of the attack. We must not, however, inconsiderately prescribe either venesection or cupping in all cases even of hemiplegia, because we find them to have been advised by CELSUS, ZACUTUS LUSITANUS, HOME, ABERCROMBIE, and many other eminent writers. The most recent of these writers recommends it too profusely, too generally, and too exclusively, at least as regards the inhabitants of large cities and manufacturing towns, wherein the causes of the malady and the asthenic states of a very large proportion of those attacked either admit not of depletions, or require very different or even opposite means of cure. During the treatment of both hemiplegic and paraplegic palsy, intercurrent inflammatory action may appear, and require, generally, depletions by cupping or leeches; and the physician should be alive to such an occurrence when he has recourse to stimulating medicines, in doubtful circumstances, and in young persons.

242. *b.* Of *evacuants, purgatives* and *diuretics* are the most appropriate; and of the former of these, the most active should be selected, and such as influence most energetically the principal secreting viscera, as calomel, colocynth, jalap, scammony, &c. In paraplegia, and even in hemiplegia, the bowels are very torpid, and require repeated and full doses of these, and even of still more energetic cathartics, as croton oil or elaterium, in some obstinate cases. In many, recourse should also be had to purgative enemata, particularly to those in which the oleum terebinthinæ is an ingredient. It is not merely necessary regularly to evacuate fæcal matters by means of these, but to employ them so as to derive from the cerebro-spinal axis any increased flow of blood to it which may have occasioned or prolonged the attack. Indeed, with these conjoined objects, they are advised by HALLÈ, DALBERG, BRODIE, and others who have insisted on their use.

243. The ancients advised a recourse to *diuretics* in palsy, and some of the medicines prescribed by modern physicians, and considered by them to influence the disease merely as stimulants, owe no small share of their good effects to their operation on the kidneys. Of these, the most efficient are the tinctura lyttæ, the preparations of iodine, and spirits of turpentine—substances of which further notice will be taken hereafter—which require caution in their use, and which are suited chiefly to chronic and asthenic cases, and to the paraplegic states.

244. *c.* Of *alteratives*, the most beneficial and most generally appropriate are *mercurials, iodine* and the *iodides*, and *sarsaparilla.* — (*a.*) *Mercurials*, employed so as to affect the system, and chiefly by inunction, have been recommended for palsy by SCHENCK, SCHNEIDER, CAVALLINI, and J. P. FRANK; and, both internally and externally, by VALLISNERI, BURGER, and many others. I have seen them of service, when judiciously prescribed, in both hemiplegic and paraplegic palsy. J. P. FRANK prescribed them more especially for saturnine palsy, in which he has seen them of great service. In acute and sthenic cases, calomel given with antimony, after bloodletting until the pulse is sufficiently reduced, should be preferred; afterwards, the milder mercurials may be substituted; and, in chronic and asthenic cases, the bichloride may be given in the decoction of bark until the gums are slightly affected, especially in scrofulous and rheumatic constitutions. I lately attended a patient in hemiplegia (Mr. G., of Watling Street,) for whom I prescribed the bichloride of mercury, in this combination, a frequent recourse to purgatives, and a seton in the nape of the neck, with the best results. His right side was affected, and he now can walk unaided, and write letters and cheques as usual.

245. (*b.*) I have prescribed *iodine* and the *iodides* in several cases of the various forms of both partial and general palsy; but in no case of the disease have I ventured to employ them otherwise than in very small doses at first, carefully watching their effects, and cautiously increasing the doses. Dr. MANSON was the first who published cases of palsy in which iodine had been employed; and these cases show not only the good effects of this substance in certain states of palsy, but also its injurious influence in the more acute and sthenic cases, and when prescribed in too large doses. Dr. MANSON employed only the tincture of iodine; but, both before and after the publication of his cases, I had used both this and the iodide of potassium for this disease, as well as for some others, in public and private practice; and more recently the iodides—the iodide of potassium and the iodides of mercury—more frequently than the pure iodine. These preparations, especially the last, are best suited to the more chronic and asthenic cases, or after depletions and other evacuants have been pushed sufficiently far. Even then the doses should at first be small, and the effects upon the pulse be carefully watched. The occurrence of headache ought to cause an interruption in the use of these medicines. The iodide of potassium may be conjoined with liquor potassæ and sarsaparilla, commencing only with one or two grains, and gradually increasing it. I have even given only one grain in the twenty-four hours with advantage.

246. *d. Stimulants* and *tonics* were employed internally for palsy much more frequently by the older writers than by physicians of the present day, who are more conversant than they generally were with the true seat and nature of the lesion causing the paralytic attack. These substances are contra-indicated in all acute and sthenic cases

of palsy, and whenever there is reason to infer the existence of inflammatory irritation. Hæmorrhage, or vascular extravasation, or even of active congestion, whilst they may be employed with reasonable hopes of benefit in chronic and asthenic cases, and when the disease has appeared after exposure to cold or to other depressing influences, or has followed exhausting causes.

247. (*a.*) Of this class of medicines the resinous *extract of nux vomica* and *strychnine* have been more frequently employed than any other in recent times. Of the two preparations, my experience induces me to prefer the former, as more manageable than the latter and equally efficacious. I have usually prescribed it in conjunction with purgative or aperient extracts. It, as well as other internal stimulants, should never be given in palsy, especially hemiplegia, when the pulsation of the carotids, or the temperature of the scalp, is at all increased; and, if the pulse become strong or frequent, or the face flushed, during its use, it should be discontinued, and local depletions, with an antiphlogistic treatment and regimen, instantly adopted. It is most serviceable in paraplegia and in lead-palsy.

248. (*b.*) The flowers of the *Arnica montana* were much praised, and is still much used in Germany and Denmark for paralytic cases. It has received the commendations of Angeli, De Meza, Conradi, Aaskow, and others; but I am not aware of any other British physician beside Home who has given it a trial, and his evidence is not much in its favour. The *Rhus radicans* or *Toxicodendron* has been recommended in this disease by Brera, Desgranges, Van Mons, Kok, and Alderson; but Zadig considers it quite inefficacious. A decoction of the *Chenopodium ambrosioides* has been advised by Rudolphi, Baldinger, and Lentin; *serpentaria* and *capsicum* by Falconer; *guaiacum* by Fothergill and Johnston; *ammoniacum* by Bourget; *pyrethrum*, internally, by Oxley; *cajuput oil*, both internally and externally, by Pereboom and Thunberg; *naphtha* by Ramazzini; *camphor* dissolved in turpentine by Schumacher; this substance dissolved in naphtha by Reichsanzeiger; *musk* by Truener, Lœffler, and others; *castor* by Pault; the tinctura *lyttæ*, internally, by Vaughan, May, Brisbane, &c.; *phosphorus* dissolved in æther, internally and externally, by Brera and Gaultier-Claubry; and the *nitrous oxyde gas* by Beddoes, Hill, and Pinel. It is very probable that these may severally prove of service when judiciously prescribed, especially in those circumstances of the disease to which I have above (§ 246.) limited the use of stimulants and tonics. In the same category *aconite* may also be noticed; it having been recommended by Stœrck and Greding; also *opium* and *belladonna*, which have, severally, been used by Stoll, Thomann, and others, in palsy from lead.

249. The circumstances which admit of the internal use of stimuli also allow a recourse to *electromotive agencies*, in the several forms in which they have been employed; and, in no disease have they been more generally and more empirically resorted to than in this. *Electricity*, in the form of shock, bath, sparks, &c., although chiefly prescribed by persons ignorant of medicine, has received the cautious sanction of Vander Belen, Hart, and others, in the most chronic and asthenic cases. Meyer, Bang, and Percival advise it chiefly for paraplegia and lead-palsy; and they, with Stoll, De Haen, Quarin, and Falconer, doubt its efficacy in other circumstances. The *electro-galvanic* influence was first recommended by Volta in this disease; and it was soon afterwards adopted by Walther, Hallé, Marcus, and Grapengiesser for those cases in which powerful stimulants seemed to be required.

250. *e.* The numerous means, which may be strictly called *external*, and which have been so generally resorted to in this disease, operate either (1), by rousing the circulation and exciting the nervous influence in the part, as simple or medicated friction; (2), or by deriving irritation or other morbid action from the nervous centres to superficial parts, as issues, setons, &c.; (3), or by a combination of these modes of operation, as blisters, sinapisms, urtication, &c. These means are severally appropriate to most of the forms of palsy; and, when judiciously selected, they may be safely used in the various states and relations of the disease.

251. (*a.*) *Frictions* in a simple form, although advised by Stoll and Hilscher, are seldom employed; for some medicinal substance with which frictions may be used is requisite to impart confidence to the patients in their efficacy. However, they may be advantageously employed by means of the hair-glove, or of the kheesha or Indian glove. Frictions of the palsied limbs with various stimulating substances, as with phosphorus dissolved in oil or ether; with camphor, soap and turpentine; with cajuput oil, camphor, olive oil, &c., have been often advised; and may in a few instances prove of service.

252. (*b.*) *Issues and setons* are upon the whole the most efficacious modes of permanent external derivation in palsy; and the most generally adopted, especially in this country. The former may be made in the scalp itself, by incisions in or near the occiput, peas being afterwards inserted; the latter may be worn in the nape of the neck. They have been praised by Pott, Appleton, Latour, Schreger, Prichard, and Loder; and I have had several occasions of witnessing their good effects. *Moxas*, which have been for ages employed in the East as the usual mode of external derivation, have been strongly insisted upon by Larrey and others in this and other diseases, and have been much employed on the Continent of Europe; but their superior efficacy to issues or setons is very doubtful. The *actual cautery*, mentioned by Paulus Ægineta and others of the ancients, has been recommended also by Richter, Portal, and J. P. Frank. Neri Nerii, a Neapolitan physician of the sixteenth century, directed it to be applied to the occiput in hemiplegia. Amongst the usual means of derivation, *dry-cupping*, mentioned by Celsus and others in this disease, should not be overlooked.

253. (*c.*) *Blisters*, kept discharging for a considerable period, or frequently repeated, as advised by Boerhaave, Fordyce, and Dickson; or *artificial eruptions*, produced for a longer or shorter period, by means of tartarized antimonial ointment, or by croton oil, are also frequently of service both in acute and chronic cases; but in the former especially, after local depletions and

evacuations have been freely practised. The same remark is applicable to the use of *sinapisms* and to a frequent recourse to *urtication*, which has been advised by Paulus Ægineta, Muys, Home, Hufeland, and many others, or to *embrocations* containing capsicum or its tincture or pyrethrum, all which exert the double effect noticed above (§ 250.), when applied to the paralysed limb, as they should generally be applied, unless in cases where the sensibility and temperature of the paralysed limb are morbidly increased, as sometimes observed; and then they may even prove injurious, especially in asthenic cases. In these, also, blisters applied to the palsied limb may be followed by sloughing.

254. *f. Simple* and *medicated* and *mineral warm baths* have been much praised in palsy. But it is obvious from the nature and forms of the disease that, although they may be of service in some instances, they may be injurious if inappropriately or indiscriminately employed. I have seen them of service in chronic and asthenic cases, and in those states of the disease caused by exposure to cold. Medicated warm baths — with warm and aromatic substances — were most beneficial in a case of general palsy arising from this cause that came under my care. J. P. Frank notices favourably simple and sulphureous warm baths, and states that those of Baden have been of service in some obstinate cases of chronic palsy. In recent, acute, or sthenic cases he justly dreads the use of warm baths, whether simple, mineral, or medicated, as he has known apoplexy supervene where they had been injudiciously prescribed. The sulphureous thermal baths of Baden were recommended by Stoll chiefly in lead-palsy after electricity had been employed. It may be noticed further, that the warm mineral springs of Bath, Toeplitz, &c., have been frequently resorted to by paralytic patients, and sometimes with more or less advantage, when neither general nor local plethora or congestion exists, or when opposite states of the vascular system obtain; that sulphureous warm baths have been favourably noticed by Baker, Summers, Tolberg, Waitz, and Hufeland; that aromatic and spiced warm baths were recommended by Riedlin; warm salt water baths by Reil; and even warm chalybeate water-baths by Graefe, in this malady.

255. *g.* The *diet and regimen* in palsy should depend entirely upon the peculiarities of the case. In most cases of hemiplegia, in all acute and sthenic cases, or whenever general or local plethora is inferred to be present, both the diet and regimen should be strictly antiphlogistic; a farinaceous and vegetable diet, with simple diluents only, being adopted. In chronic, asthenic, and anæmic cases, light, digestible animal food may be allowed; but in every instance, the predisposing and exciting causes should be viewed in connection with the pathological conditions, and all these should be duly estimated, before either the *treatment*, or the *diet*, or the *regimen* is assigned. The chief part of the regimen in all cases is the careful avoidance of the *causes* (§ 157. *et seq.*) of the disease.

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PAROTID GLAND — Diseases of.

PAROTID GLAND — Diseases of. — This gland is often the seat of inflammation, of congestion, of scrofulous enlargement and inflammation, and of several other structural lesions. It is liable to be variously affected by the ingesta, whether alimentary or medicinal; and it is often the seat of symptomatic disease, particularly in the course of those maladies which reduce vital power or contaminate the blood. The diseases of the parotid may be divided into — 1st, the *functional*; 2d, the *inflammatory*; and 3d, the *structural*.

I. Functional Disorders of the Parotid Gland.

Classif. — I. Class, I. Order (*Author*).

1. These disorders have received but little attention from medical writers; for, unless in a few prominent cases, they seldom attract attention, and even in these they are generally *symptomatic* of some more important malady to which a primary and principal attention should be paid. The functional disorders of the parotid consist chiefly of *excessive* and *diminished* secretion. Doubtless, an alteration of the *quality* as well as of the *quantity* of the secretion often obtains, but the latter change is more obvious, whilst the former can be inferred chiefly from the deposits formed from the salivary fluid, either in the ducts or upon the teeth; or from the action of chemical re-agents, which, according to M. Donné, evince more or less of acidity in inflammatory diseases, with an increase of the animal elements. (See art. Saliva.)

2. i. Deficient Secretion of the Parotids arises from numerous circumstances and agents affecting the digestive organs or the constitutional powers. Great mental anxiety; heating articles of food, condiments, and beverages; general vascular excitement; and morbid states of the blood, may diminish or altogether arrest the action of the parotids and other salivary glands. Irritation or inflammation of the stomach, or of other digestive organs, sometimes has a similar effect; and numerous stimulating, astringent, and anodyne medicines impair the action of these glands, although in a very uncertain and capricious manner. Deficiency of the salivary secretion also generally attends most fevers and inflammatory diseases, more especially those fevers in which the blood is early contaminated; and in the more malignant maladies, when the action of the parotids is arrested, the glands themselves become swollen and tender. The secretion of these glands is generally diminished in diabetes and diseases of the kidneys. (See arts. Saliva and Salivation.)

3. ii. Increased Action of the Parotids often arises from the ingestion of various articles of food, condiments, and medicines; but when it is caused by food or condiments, it is generally transient and slight. It is often very remarkable and prolonged when caused by medicine, especially by mercurials; and it is usually more moderate and irregular when it is symptomatic of other diseases, as of affections of the pancreas, or of the stomach or duodenum, &c. Seeing, however, that the functions of the parotid are generally affected co-ordinately with those of the other salivary glands, whether quantitatively or qualitatively, they will be more particularly considered in relation to diagnosis and prognosis, under the heads Saliva and Salivation.

II. Inflammation of the Parotid Glands.

Synon. — *Παρωτις* (from *παρα*, near, and *ους*, the ear), Galen; *Parotis*, Vogel, Sauvages, Pinel; *Parotitis*, Darwin; *Cynanche Parotidœa*, Cullen, Parr; *Angina externa*, Russel; *Empresma parotitis*, Good; *Cauma parotitis*, Young; *Oreillons*, *Parotide*, *Ourles*, Fr.; *Entzundung der Ohrdrüse*, Germ.; *Parotite*, Ital.; *Mumps*, *Branks*, *Inflammation of the Parotid*.

Classif. — 1*st Class*, 2*d Order* (*Cullen*). 3*d Class*, 2*d Order* (*Good*). III. Class, I. Order (*Author*).

Defin. — *Pain, tenderness and swelling in the situation of one or both parotids, with symptomatic fever, occurring either sporadically, endemically, or epidemically.*

5. i. Causes and History. — *A.* Parotitis is most frequently observed in children, and about the period of puberty; and but rarely after twenty-five or thirty years of age, in an *acute form*, although it sometimes occurs in advanced life as a chronic disease. M. Begin thinks that it is more frequent in children of the male than of the female sex. It proceeds, *sporadically*, from cold conjoined with humidity, and from currents of cold air. It is sometimes so prevalent in cold and humid localities, especially during the colder months, as to be *endemic*; and it is occasionally *epidemic* in extensive districts. When thus prevalent, it has appeared in many instances to have been propagated by *infection*, particularly in schools and in ships, &c., where a single case has frequently been followed by very many; but in these circumstances, the propagation of the complaint may be imputed to exposure to the same physical agents and atmospherical states; although the removal of a boy from a school in which the disease prevailed to a locality where it was unknown, and the subsequent infection of other children by the one removed, militate against these agents having been the cause, and evince an infectious property. I have seen two instances of the disease appearing in nurses whilst tending on persons affected with erysipelas of the face and scalp, and in both these the adjacent cellular tissue was much implicated. One or both glands may be affected; and, when the disease is epidemic, the maxillary glands are often similarly diseased. The accumulation of morbid secretions or of fæcal matters in the *primæ via*, evidently favours or predisposes to an attack of the complaint. Epidemic parotitis very rarely attacks the same individual a second time. In scrofulous persons, simple or sporadic parotitis

often assumes a modified character, and becomes chronic or prolonged. It not infrequently follows scarlet fever and other exanthematous fevers, and then assumes a very severe and troublesome form, particularly after scarlatina, the inflammation often extending far into the adjoining cellular tissue and to the lymphatic glands of the neck.

6. *B. Symptoms.*— *a.* The *invasion* of the complaint is usually indicated by irregular chills or rigors, followed by lassitude; pain and tenderness, with stiffness in the neck; frequency of pulse; heat of skin; difficulty of mastication, owing to swelling and pain in the situation of one or both parotids; occasionally a somewhat increased flow of saliva; slight difficulty of deglutition, more or less increased when the adjoining glands are affected, and by the usual attendants on symptomatic fever, as thirst, loss of appetite, costiveness, headache, &c.

7. In some cases the symptoms are even milder than now stated. The swelling, pain, tenderness, and tension are slight; the pulse is but little affected; and the organic functions are not materially disturbed. From this state of extreme mildness every grade of severity occurs, until the disease assumes much more intense characters, both locally and generally. In these latter the swelling is great, not merely in the situation of one or both parotids, but extends to the sub-maxillary glands, sometimes also to the tonsils, and to the adjoining cellular tissue. In these cases there are generally much heat and sensibility of the parts, often with more or less redness, and always with difficult mastication and deglutition, owing to the great tumefaction. There are also acute symptomatic fever, with urgent thirst, loss of appetite, severe headache, flushed countenance, &c.

8. *b.* The *duration* of the complaint varies much in the *simple* and *sporadic form* of the disease; beginning to subside in four or five days in some cases, and continuing to increase during a longer period, or passing into suppuration in others. When it follows the eruptive fevers, especially scarlatina, or when it occurs in the scrofulous diathesis, as it frequently does, it is often of longer duration than in other circumstances, or when it appears epidemically; and it more readily passes into suppuration of a chronic kind, the matter being discharged externally, and but rarely by the external meatus auditorius. In the *epidemic* disease, perspiration usually breaks out on the fourth or fifth day, commencing and becoming more copious about the neck, breast, and head, but often extending more generally. The pain, tension, and swelling of the parotids afterwards diminish, and the affected parts return to their natural state.

9. *c. Suppuration*, which is more frequent in the *simple*, in the *consecutive*, and in the *scrofulous* states of the disease than in the epidemic, is commonly indicated by a greater intensity of the local symptoms; by marked redness of the more swollen part; by a more central and circumscribed elevation: by the pain being less acute and more throbbing; by the more elevated part of the tumour becoming softer, and ultimately betraying more or less evident fluctuation. The cellular tissue surrounding the gland or connecting its lobules is generally the seat of suppuration. BICHÂT and thers have supposed that the lymphatic glands surrounding the parotids are more affected than the parotids themselves; and this may be the case, especially in the *consecutive* (§ 11.) and *scrofulous* varieties of the disease. Probably, also, in the *epidemic form*, these parts, with the glands themselves, and the adjoining cellular tissue, are more or less implicated.

10. *d. Metastasis* of disease from the parotids to the testes, mammæ, or even to the brain or its membranes, has been often observed and noticed by writers as one of the terminations of the disease, especially when appearing epidemically. When this occurrence takes place, the swelling under the ears rapidly subsides, and either the testis or the mamma on the same side with the affected parotid becomes painful and swollen. When both parotids have been affected, the metastasis has in rare instances taken place to both testes or to both mammæ. I have not met with a case in which suppuration has occurred in these parts after metastasis from the parotids. In some instances the parotids have become again affected upon the subsidence of the engorgement of the testicle. I have observed but few instances in which the brain or its membranes have been affected consecutively upon the sudden disappearance of the disease of the parotids; and these recovered under the treatment about to be noticed.

11. *C. The nature* of inflammations of the parotids, in their several modes of manifestation, requires more consideration than has hitherto been devoted to it. That the *epidemic state* of the disease is different in many respects from the primary and simple form is shown by various circumstances, to which I will more particularly allude.— *a. Simple parotitis*, whether occurring *primarily* from cold or any other cause, or *consecutively* of eruptive fevers, or of other affections implicating the throat or mouth, is more distinctly an inflammatory disease, and is more strictly local than the *epidemic* malady. It is also more prone to assume all the characters of inflammation of glandular parts, and to pass into suppuration than the latter form.

12. *b. Epidemic parotitis* is less strictly inflammatory, at least in a large proportion of cases, and is more manifestly congestive; consisting rather in active congestion, or an engorgement of the parotids and adjoining glands, than the simple form of the disease. It is also less a local than a constitutional malady; and this, as well as its more congestive character, is shown by its originating in infection, by its disposition to metastasis, by its definite course, and by its frequently terminating by a distinct crisis. The *simple* or sporadic complaint is attended by fever, which is merely symptomatic of the local inflammatory action; whilst the *epidemic* is characterised by fever, which is less a symptomatic than a primary or idiopathic malady, and of which the swelling of the salivary glands is an attendant or local feature, consisting of congestion or engorgement of these glands rather than of actual inflammation. In the epidemic or specific form of the disease, the fever is rarely sthenically inflammatory, but generally is either mild, or partakes more of an adynamic or asthenic character, and requires a different treatment from the truly inflammatory or simple form of the complaint.

13. *c.* From this it will be seen that I consider

Parotitis, or inflammation of the parotid, to consist of the following *varieties* and *states*: — *namely*, 1st, *Simple* or *Common Inflammation*, — occurring *a. primarily*, or independently of pre-existing disease; and *b. consecutively*, or following eruptive fevers and affections of the mouth and throat, in both which states it usually presents an acute character; 2d, *Scrofulous Inflammation* of the parotids, or parotitis affecting the strumous diathesis, and usually assuming a chronic or indolent form; 3d, *Epidemic Parotitis*, or that proceeding from a *specific* cause, and presenting a *specific* or distinct and regular course. Indeed, it is doubtful whether this last should be arranged as a local inflammation, or rather as a specific form of fever caused by infection, and characterised by congestion or engorgement of the salivary glands, and a tendency to metastasis to the testicles and thence to the brain.

14. ii. TREATMENT.— The treatment of inflammations of the parotid should vary with the severity of the local symptoms, and with the character of the attendant fever. — *a.* In the *simple form* of the disease, when *primary* and *slight*, moderate warmth, sustained by the application of flannel locally, and cooling aperients and diaphoretics, are generally sufficient to promote resolution. I do not believe that cold applications are beneficial in this complaint; they may even prove injurious. In more severe cases, where inflammatory action is unequivocally manifested in the gland and its vicinity, blood should be taken away locally; and a more strict antiphlogistic treatment and regimen adopted as in other cases of inflammation. If suppuration commence, it should be promoted by the usual warm applications, and an early outlet be given to the matter which is formed.

15. *b.* In the *consecutive form* of *parotitis*, particularly that following the anginous states of eruptive fevers, even local depletion should be cautiously prescribed, and with strict reference to its effects. Diaphoretics, stomachic aperients, warm baths, and diuretics are generally required in these circumstances; and if the swelling become sub-acute or indolent, small doses of the iodide of potassium with liquor potassæ may be given in the compound decoction of sarsaparilla. If suppuration take place, the matter should be early evacuated, and the iodide and solution of potash may be given in the decoction of cinchona, &c., and change of air, especially to the sea-side, advised.

16. *c.* The *scrofulous*, sub-acute, and chronic states of parotitis, sometimes require the application of a few leeches to the parts or to their vicinity, and the means just recommended (§ 15.), firmly persisted in for a considerable period. Brandish's alkaline solution may be substituted, in many cases, for the solution of potash. When there is some degree of anæmia, or when the affection occurs in females about the period of puberty, with delayed or scanty menstruation, the iodide of iron may be taken in the syrup of sarsaparilla, and warm salt-water bathing, or warm salt-water hip-baths resorted to.

17. *d.* The *epidemic form* of the complaint is so slight in some cases as to require merely protection from cold and humidity, and attention to the state of the secretions and excretions. The affected parts ought to be kept moderately warm, and the excretions from the bowels and skin promoted. When the local affection is more decidedly inflammatory, the swelling of the neck being considerable, and the surface generally red, febrile action being also great, a number of leeches may be applied, and their operation promoted by warm fomentations. Cold applications are especially hazardous in this form of the complaint, as favouring metastasis to the testes; and this risk may even be incurred by active purgatives. Antimonial diaphoretics and gentle aperients are the safest means which can be employed in most cases of this affection. If metastasis to the testicles or to the mammæ occur, these are also the best remedies, in connection with the horizontal posture. In these secondary states of disease, the application of leeches, followed by warm fomentations and poultices, is generally necessary. Antimonial emetics are often of service in inflammation of the testes; but when this disease occurs suddenly upon the disappearance of parotitis, the subsequent metastasis of the malady to the brain should be dreaded, as it sometimes takes place; and it may be favoured by the active operation and consequent perturbation of emetics, and by the application of cold to the diseased testicles.

18. It is possible that parotitis, caused by cold and humidity, may assume an endemic form, or may affect a number of persons who are exposed to these causes, or exist in a particular locality. It has thus affected a considerable number of a ship's crew; and it has then manifestly arisen from the once general practice of daily, and even more frequently, washing the decks, now happily abandoned. The cold and humidity produced in a confined space by this practice were the sources of more maladies, especially of rheumatism, erysipelas, fevers, &c., than were recognised in those days. Mr. NOBLE, in his account of parotitis endemic in a ship of war, states, that the swelling and redness of the neck suddenly subsided on the fourth and fifth days, and were, in all the cases, rapidly followed by metastasis to the testes, the epididymis and spermatic chord not being affected. In two instances a second metastasis took place from the testes to the brain, the cerebral symptoms being well marked and severe. In no instance did the disease return to the parotids. This remarkable frequency of metastasis was probably favoured by the persistence of the cause originating the disease, and by the use of cold applications and drastic purgatives.

19. *e.* In some instances, especially in aged persons, or in females about or soon after the change of life, the complaint assumes *a chronic state*, obscure inflammation extending to the adjoining cellular tissue, and giving rise to the formation of matter and even to indolent ulceration, if a suitable treatment be not employed. In these, a few leeches should be applied and sometimes repeated, and an antimonial emetic exhibited. Subsequently, antimonial diaphoretics may be given; and if matter form, fomentations, poultices, and an early outlet to the matter are requisite. If the disease become indolent, or if swelling and hardness remain, the iodide of potassium with liquor potassæ and sarsaparilla, should be prescribed. The external application of a weak tincture of iodine, or of the iodide of potassium, in the form of ointment, may also be tried; but I have seldom seen this ointment beneficial unless

the proportion of iodide has been much smaller than that usually prescribed. Dr. Neumann (*Edin. Med.* and *Surg. Journ.* No. 93. p. 452.), applied a plaster, consisting of eight parts of mercurial ointment and one of the iodide of potassium, to the swollen gland with great success, during an epidemic parotitis which prevailed in Silesia, having premised an emetic. When parotitis, either simple or epidemic, occurs about the period of puberty, and previous to menstruation, it is apt to become obstinate and chronic, particularly in scrofulous habits. In these cases, the iodides combined according to the peculiarities of the case; local depletion, emmenagogues, horse exercise, warm salt-water bathing, stomachic aperients, &c., are most serviceable.

III. Organic Lesions of the Parotids.

Classif. — IV. Class, I. Order (*Author*).

20. Structural lesions of these glands, both the consequences of inflammation, and independent of this state of disease, are sometimes observed. The most frequent and important of these are enlargements, scrofulous disease, scirrhus, and open carcinoma. To these may be added the congestions and asthenic inflammation, sometimes terminating in sphacelation, occasionally observed in malignant fevers, and frequently in the plague.

21. *A. Chronic enlargement* of the parotid, without pain, heat, or any other indication of inflammatory action, is sometimes met with. In some cases the gland increases to three or four times its natural size. It is difficult to determine how far hypertrophy is owing to change in the lobular structure, or minuter granules composing the gland, or to deposits of lymph in, or change in the nutrition of, the interlobular and surrounding cellular tissue. Most probably both orders of structure, and even the surrounding lymphatic glands, are more or less implicated; and this seems the more likely, since the researches of Murat and others have shown the granules and minute lobules of the gland to be affected in parotitis. A very remarkable case of chronic enlargement, first, of one parotid and afterwards of the other, the first having become much reduced, after a considerable time, lately came under my care. The history of this case, as well as of others which I have seen, led me to infer that the enlargement was consequent upon obstruction or obliteration of the canal of the duct. After having had recourse to a variety of means, the enlargement was at last entirely removed by a prolonged course of the iodide of potassium in minute doses, with conium. In this instance, from half a grain to a grain only of the iodide was given in the twenty-four hours, a larger dose occasioning uneasiness and febrile excitement.

22. The symptomatic enlargements, congestions, asthenic inflammations, softenings, and even gangrene sometimes observed in malignant fevers and the plague, were imputed by Bichât and others rather to alterations in the connecting and surrounding cellular tissue and lymphatic glands, than to change in the granules of the gland itself. But the researches of Murat and others have shown that these granules are affected from the commencement of simple parotitis; whilst those of Bulard and Clot-Bey have evinced that the surrounding lymphatic glands are more especially implicated in the plague, and in other sympathetic enlargements in the region of the parotids.

23. *B.* Tumours of various kinds are sometimes seated in the parotid; and scirrhus and open cancer, commencing either superficially or in the gland itself, or in the lymphatic glands surrounding the parotids, are occasionally met with. These have been the themes of prolonged surgical disquisitions, as well as the subjects of surgical operation. But in this last resource, the dexterity or daring of the operator have been oftener displayed than the propriety and success of the undertaking. Comparatively few cases admit of this procedure — in very few ought it to be attempted when the disease is malignant; and in none, of a non-malignant nature, without having previously duly tried the means already indicated both in this article and in those on Scrofula and Tumours. (See arts. Saliva, Salivary Ducts, and Salivation.)

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PELLAGRA.

Synon. — *Dermatagria*, Titius; *Scorbutus Alpinus*, Frank; *Ichthyosis Pellagra*, Alibert; *Tuber Pellagra*, Parr; *Lepra Lombardica*, Swediaur; *Elephantiasis Italica*, Good; *Pellagre*, Fr.; *Pellarella, Pelagra, Mal di Miseria, Malattia della Miseria, Mal del Sole, Mal Roso*, Ital.

Classif. — 3*d Class*, 4*th Order* (*Good*).
IV. Class, IV. Order (*Author*).

1. Defin. — *A squamous eruption, chiefly on those parts of the body exposed to the sun or air, preceded and attended by disorder of the digestive organs and nervous system; accompanied with general cachexia; a sense of burning pains in the trunk and limbs; ennui and melancholy; intermitting at first, afterwards more continued; endemic and hereditary.*

2. The *antiquity* of Pellagra has been a subject of doubt. Moscati and others consider that the disease has not been known much before the middle of the last century, whilst Strambio, who was physician and director of the hospital established near Milan for the reception of *pellagrosi*, states, in his treatises published in 1784—7, that he had seen many *pellagrosi* in the hospital, who assured him that their fathers and grandfathers had died of the malady. Dr. Holland adds, that F. Frapoli, physician to the hospital at Milan, in his Treatise on the disease, published in 1771, also contends for its antiquity, and supposes it to be the same disorder as the one called *Pellarella*, which is casually noticed in the records of the Milan Hospital for the year 1578. It is certain, however, from the concurrent testimony of all

writers on the malady, that pellagra has been rapidly increasing itself since the middle of the last century. Dr. HOLLAND, who has investigated the disease more closely than any English writer, remarks that, at the time when STRAMBIO wrote (in 1784), the pellagrosi formed about one-twentieth part of the population in the districts principally suffering under the disorder, namely, in the Alto-Milanese, where the country rises towards the Alps. In these districts, Dr. HOLLAND believes, at the time when he wrote (1817), the pellagrosi to be one in every five or six of the population. He adds that the disease prevails in some districts much more than in others; that it appeared first in the higher parts of the Milanese territory; and that its ravages there are still greater than in any other part of Lombardy. Some time elapsed before it was said to have appeared in the Venetian provinces and near the shores of the Adriatic Sea. At the present time it is increasing in every part of Lombardy, as well on the plains as among the hills which rise on their northern border towards the Alps. It also exists in the province of Friuli, the district intervening between the foot of the Carinthian Alps and the northern shore of the Adriatic.

3. I. SYMPTOMS. — Pellagra is almost exclusively confined to the lower orders, and chiefly to peasants, and those engaged in agricultural employments.—*a*. Its first distinct appearance is that of a local cutaneous eruption, generally preceded by languor, debility, and indications of constitutional disturbance and cachexia. The local symptoms usually first appear early in spring, when the mid-day heat is increasing, and when the peasants are most actively engaged in the fields. The patient first perceives on the backs of his hands, on his feet, and more rarely on other parts of the body exposed to the sun, certain red spots or blotches, which gradually extend themselves, with a slight elevation of the cuticle, and a shining surface, not unlike that of lepra. The colour of the eruption is a more obscure and dusky red than that of erysipelas: it is attended by no other uneasy sensation than a slight pricking or itching, and some tension in the part. After a short time, small tubercles are frequently observed in the inflamed surface. The skin always becomes dry and scaly, forming rough patches, which are excoriated and divided by furrows and rhagades. Desquamation takes place gradually, and leaves behind a shining unhealthy state of the affected surface. Towards the close of the summer, or occasionally earlier, the parts have nearly resumed their natural appearances; and but that the further progress of the malady is familiar to all, the patient might suppose that the mischief had disappeared.

4. With this local affection are connected from the first, general debility, vague and irregular pains of the trunk and limbs, especially in the course of the dorsal muscles and spine; vertigo and headach; irregular appetite and depression of spirits. The bowels are usually relaxed, and continue so throughout the disease. There are no febrile symptoms, and the catamenia of females are generally continued without irregularity, but there are frequent exceptions; febrile symptoms occasionally appearing; and menstruation being more or less obstructed from the commencement; but these occur chiefly in the more advanced course of the malady.

5. The patient obtains a remission, more particularly of the external eruption, uring the autumn and winter of the first year; but he almost always experiences a recurrence of the symptoms in the following spring under a more severe form, and with much greater disorder of the constitution. The cutaneous affection spreads, yet still affecting chiefly the hands, neck, feet and legs, and other exposed parts. The skin becomes callous and deeply furrowed; large rhagades appearing, especially near the articulations of the fingers. The cutaneous affection now resembles an inveterate degree of psoriasis, or of lepra vulgaris, and, in some respects, ichthyosis, with which ALIBERT has classed it.

6. The debility is greatly increased in the second year; often rendering the patient incapable of pursuing his active labours, and rendering him susceptible of all changes of temperature. Partial sweats break out, especially on any exertion. Cramps, spasmodic affections, and pains are frequently complained of; and the mind is despondent and depressed. All the symptoms are aggravated as the heat of summer advances; especially in those most exposed to the sun. They begin again to decline, as in the preceding year, towards the middle or end of autumn; but the remission, as well of the local affection as of the general disorder, is much less complete than before; and the patient continues to suffer during the winter from debility and other constitutional symptoms.

7. The disease may continue for several years thus to remit during winter, and to present increasing or varying grades of exacerbation during the spring and summer, but generally in the third year, or in the fourth or fifth, in some instances, or even later, every symptom is renewed at an earlier period of the spring, and in an aggravated degree. The debility now becomes extreme; the patient is hardly able to support himself; and he is affected with pains in his limbs. All the constitutional phenomena indicate universal cachexia and lesion of the nervous and voluntary powers; the general symptoms now have a close analogy to those of scorbutus. The diarrhœa continues, and augments the debility; and ultimately it assumes much of a dysenteric character, particularly in the latter stages of the malady. The evacuations are offensive and morbid, and preceded by abdominal pains. Aphthæ, thirst, pains at the stomach, &c., are also frequently complained of. The odour of the breath and of the perspiration is extremely offensive. The appetite and digestion are irregular; but they are often less affected than most of the other functions. Dropsical effusions frequently appear at this stage — generally in the form of anasarca, occasionally of ascites. Vertigo, tinnitus aurium, double vision, are now usually present; and all the senses are much impaired. Spasmodic affections, irregular convulsions, involuntary movements of the head and body forwards, and even complete epileptic attacks, often occur.

8. *b*. The *nervous system* presents remarkable disturbance; and the manifestations of the mind are more or less disordered. The pellagrosi complain of a sense of heat in the head and spinal chord; of tingling or darting pains in the course of the nerves; of heat in the limbs, palms of the hands, and particularly in the soles of the feet;

of great weakness of the limbs, with trembling when attempting to stand; and sometimes of contractions of the lower limbs. Their looks become sombre and melancholy. Ennui, depression of spirits, and mental imbecility increase with the progress of the malady. Dr. HOLLAND states, that pellagrosi afford a melancholy spectacle of physical and moral suffering at this period. They seem under the influence of an invincible despondency; they seek to be alone; scarcely answer questions put to them; and often shed tears without obvious cause. Their faculties and senses are impaired: and the disease, when it does not carry them off from exhaustion of the vital powers, generally leaves them incurable idiots, or produces attacks of mania, soon passing into utter imbecility or idiotcy. The public hospitals of Lombardy are incapable of receiving vast numbers of the pellagrosi; the greater proportion perishing in their own habitations, or lingering there wretched subjects of fatuity and decay. Where extreme debility and cachexia are the causes of death, as usually the case, they are attended with colliquative diarrhœa, spasmodic affections, coma, and extreme emaciation.

9. *c. Mania* and *delirium*, consequent upon pellagra, are either *acute* or *chronic*. The acute state sometimes proves fatal in a few days; but the more chronic form seems to retard in some degree the progress of the malady; the strength of the patient declining less rapidly. In this state there is always loss of memory and of the powers of attention. Religious melancholy frequently characterises this form of delirium, with a desire to commit suicide, and usually by drowning. Hence STRAMBIO denominated this morbid disposition by the name of *hydromania*.

10. *d.* Although the disease has been described above as proceeding its course in three or four years, yet it is generally of longer duration. Several intermissions, or remissions, usually occur in its progress. It occasionally remains stationary; and certain of its phenomena sometimes predominate over the others at one time, and others at another time. Thus some relief of his sufferings is experienced by the patient from time to time, although he can entertain little hope of ultimate recovery. Occasionally the cutaneous eruption forms the principal indication of the complaint for several years; it being renewed every spring and disappearing in the autumn. The constitutional symptoms may also continue for some years comparatively slight; and, if the patient be removed to a different locality and to another mode of life, the disease may be further protracted, or altogether arrested in its progress. It is rarely, however, that these means can be adopted; and the constitutional malady is generally so firmly established in the third or fourth year, that few hopes of benefiting the patient by treatment or by change of climate and occupation can be entertained.

11. *e.* Some cases of the disease assume a more *acute* and more rapid form, particularly in respect of the constitutional symptoms. In these the disease proceeds as rapidly as above described, with all the more severe symptoms: and, although the pulse is often very slow and weak, especially in the more chronic cases, it is sometimes frequent and hard in the more acute. This, however, only occurs when fever takes place in the progress of the malady. This consecutive fever is connected either with a state of gastro-intestinal irritation, or of asthenic inflammation, or with predominant affection of the brain and spinal chord; and is generally attended, at first, by heat of skin and irregular remissions, followed by offensive perspiration. These states of febrile excitement generally hasten the fatal termination of the malady, usually with all the concomitant symptoms of the last stage of adynamic fever.

12. *f.* In *infants* and *children* the symptoms of the malady are not materially different from those characterising it in more advanced life. The cutaneous affection of the hands, arms, feet, and legs, is the first to appear; is renewed and augmented in successive years, and attended by the various symptoms indicative of a cachectic state of the body. The malady, as in other cases, has in them a fatal termination, unless a change of climate be obtained in an early period of its progress.

13. *g.* Some *anomalies* have been observed in the progress and succession of the symptoms of pellagra. During its first appearance in Italy, the disease was remarkable for the intensity of the cramps and spinal pains, and the trifling extent of the cutaneous affection. At a more recent period this affection became a prominent feature, whilst disorder of the digestive organs and mania appeared chiefly as secondary symptoms. Different phenomena have also sometimes predominated; in certain years ptyalism, and in others it has been displaced by aphthæ, desquamation of the lips, &c. Very recently the various cramps, spinal pains, and convulsions, insisted on by former writers, have been less noticed than previously, while pellagrous mania and delirium are very common, and gastro-intestinal affections are general.

14. *h.* Pellagra may be *complicated* with other diseases of the skin, such as lepra, psoriasis, erysipelas, eczema, purpura, syphilitic eruptions, &c.; and with intermittent and remittent fever, scrofulous affections, phthisis, peritonitis, white swellings of the joints, &c.

15. II. APPEARANCES ON DISSECTION.—Lesions are found chiefly in the digestive canal, nervous system, and skin. — *a.* In the five bodies examined by M. BRIERRE DE BOISMONT, the mucous membrane of the *stomach* was red, intersected by bluish or dark vessels, soft, pultacious, and easily removed. The redness was greatest at the large end of the stomach; the mucous membrane was thinner in some cases, and thicker than natural in others. The valves of the duodenum, and the mucous membrane of the small and large *intestines*, were of a lighter or deeper tint, in some approaching to brown. This membrane was generally softened and hypertrophied; it was likewise studded with irregular or round ulcers, surrounded by a reddened base. The subjacent cellular tissue and muscular coat were hypertrophied. The intestines, in all the cases, contained lumbrici. Dr. CARSWELL, in addition to the usual signs of chronic inflammation of the stomach and intestines, found perforations of the stomach from softening in two cases.

16. *b.* The membranes of the *brain*, particularly the arachnoid and pia mater, in these cases, as well as in those examined by STRAMBIO, FANTONETTI, and others, were injected, thickened, and opalescent. The pia mater adhered to the cerebral convolutions, which were slightly atro-

phied. The substance of the brain was in some cases diminished, in others increased, in consistence; the grey substance was injected and deeply coloured; the white substance dotted with vascular points. The cerebellum was slightly injected and somewhat softer than natural. The arachnoid and pia mater of the *spinal chord* were also injected. The grey substance of the chord was somewhat indurated and injected. The white substance was much softened.

17. *c.* The *skin* of the backs of the hands and feet was like leather; and, when examined with a lens, presented a number of irregular cracks, crossing at acute angles, and placed closely, and sometimes implicating the whole thickness of the corion. Small, thin, yellow crusts, and furfuraceous lamellæ of a dirty white, interposed in some of these small fissures, and adhered firmly. The epidermis was six or eight times thicker than natural, brownish, friable, and dry, and was firmly attached. The sub-epidermic layers were much thickened. The radial nerves were softened, reddish, and infiltrated with serum. The most frequent lesions to the above were the usual signs of recent or of old, general or partial *peritonitis*. Indications of *bronchitis* and *pulmonary tubercles* were also often observed. Enlargements of the *spleen* and of the *liver*, in some cases also of the mesenteric glands, and effusion of serum in the shut cavities, have been occasionally noticed.

18. III. ASTURIAN PELLAGRA — *La Rosa* — *Mal de la Rosa* — *Asturian Leprosy*, Thierry, Sauvages, &c. —*Elephantiasis Asturiensis*, Good, — is, according to the descriptions of THIERRY and others, merely a variety of pellagra, and, in its local and general characters, still more nearly approaches the *leprosy of the middle ages* than the pellagra of Lombardy. THIERRY states that this disease generally appears at the spring equinox, on different parts of the body, with redness and harshness of the skin. It afterwards degenerates into rough, dry, blackish crusts, intersected by deep cracks and fissures. These dry and fall off in summer, leaving reddish, smooth, and shining marks, devoid of hair and depressed below the level of the surrounding skin, resembling the cicatrices of burns. They remain through life. In the spring of every year they are covered anew with crusts, which become more and more painful, offensive, and disgusting to the sight. They often appear on the fore or most exposed part of the neck, extending to the clavicles and top of the sternum.

19. To these eruptions are added a constant shaking or trembling of the head and upper parts of the body, heat of the mouth, vesicles on the lips, foulness of the tongue, extreme weakness of the whole body, with a feeling of heaviness, and disorder of the digestive organs. Through the night burning heat, insomnia, groaning without obvious reason, dejection of spirits, melancholy, &c., are complained of. Several suffer slight delirium or hebetude of the senses, particularly of touch and smell. To these are sometimes added slight mania, erysipelas, ulcers, and irregular fever. This malady is often attended in its advanced stages with a tranquil state of mania or melancholia. The patient sinks into a state of dejection, in which he forsakes his home, seeks solitude, and is reduced to utter despair. This mental depression usually appears about the summer solstice, and proves fatal sooner or later. A fatal issue is often also preceded by marasmus and dropsical effusion. The local and constitutional symptoms place this malady in a position intermediate between the pellagra of Lombardy and the leprosy of the middle ages, although more closely to the former than to the latter.

20. IV. DIAGNOSIS. — Pellagra is manifestly allied, in many of its features, to the leprosy of the middle ages on the one hand, and to scurvy, with which however pellagra is sometimes complicated, on the other hand. But still there is an alliance only in certain points. The resemblance also which it bears to *erysipelas*, led TITIUS to define it as a chronic, periodic, and nervous form of that disease; from which, however, it differs widely in its whole history — in local and constitutional symptoms, in its nervous characters and terminations.

21. M. RAYER observes that certain epidemics which have occurred in the north of Europe during the last three or four centuries, and which have been generally attributed to want and to the use of unripe, spurred, and damaged grain, closely resemble pellagra. The resemblance is certainly close in many features, but the difference is great in others. There can be no doubt that local, external, and constitutional diseases, peculiar in kind or anomalous in character, yet varying in numerous modes, grades, and phases, appear in certain localities and at certain epochs, as the several circumstances and agents occasioning them are differently combined, in respect both of the number, grade, and quality of these agents; for it is only reasonable to infer that as causes, agents, and influences are variously associated in number, intensity, and quantity, so will the effects be different, and hence present indescribable forms, varieties, states, and phases, which admit not of distinct or specific limitations as to character, nor of consistent, constant, and uniform manifestations.

22. *a.* It will appear in the sequel (see *Causes*) that many of the circumstances, in which the Italian and Asturian pellagra originate, are the same which gave rise to the leprosy of the middle ages, and to certain epidemics which have appeared in several countries during the fifteenth and sixteenth centuries. Still the features of each vary, or even differ. In the true *leprosy*, the face, roots of the hair, palate bones, nose, are more affected, and the cutaneous disease is more decidedly tubercular; the affection of the skin, of the extremities and face increasing with the other symptoms, and the mind being less disordered, than in pellagra. In the *Italian pellagra* the mental, nervous, and intestinal affections predominate with the progress of the malady.

23. *b.* In the *Asturian malady* the affection of the skin is greater than that of the Italian, and approaches more nearly the severity of leprosy; the affection of the mind is less acute than that of true pellagra, but the *termination* of all these are nearly equally unfavourable, although their *duration* is very variable, not only in regard of the respective maladies, but as respects individual cases of each.

24. *c.* The history of pellagra sufficiently distinguishes it from other diseases of the skin. Chronic *erythema* is never attended by the serious nervous, mental, and digestive disorders characterising pel-

lagra; and *lepra* and *psoriasis* are removed to an equally great distance from the Italian malady, even without taking into account the different characters and forms of the eruption in each, and the ultimately fatal issue of pellagra.

25. *d.* M. RAYER attempts to establish a similarity between pellagra and the epidemic of Paris and its vicinity in 1828, to which the name *acrodynia* has been given. But, although the season of the appearance of the latter was the same as of the former, and although the eruption on the extremities, the pains in the feet and difficulty of walking, the disorders of the digestive organs, closely resembled the same phenomena at an early period of pellagra, yet the absence of the mental disorder, the non-recurrence of the malady, and the general recovery of the attacked, indicate a total difference between the two maladies; the points of resemblance being probably the results of a concurrence of certain causes contributing to the production of pellagra.

26. V. PROGNOSIS.—The circumstances which render the prognosis of pellagra particularly unfavourable, are the unequivocal operation of those causes, to which this malady is attributed; the circumstance of one or other parent of the patient having died of it; an advanced period of its course; the poverty and agricultural occupation of the affected; previous disease, and the severity of the constitutional symptoms, particularly of the disorder of the digestive organs; general cachexia, emaciation, and mental disturbance; severity of the nervous symptoms, and especially the occurrence of mania, delirium, partial or general paralysis; and, at an early stage, the impossibility of removing the subjects of the malady to a different climate, or to other occupations. Pregnancy and lactation also exert an unfavourable influence on its course and termination.

27. VI. CAUSES. — The hereditary tendency of pellagra is fully admitted by all writers who have observed the progress, or traced the origin, of the malady. There can be no doubt of the disease being continued in succession through families, even the children of pellagrosi becoming affected, when much exposed to the sun and air, or early occupied in the fields. Writers have differed as to the respective liability of sex; but there seems to be no difference in this respect, beyond what may be imputed to occupation and exposure. That these latter circumstances are chiefly productive of the disease cannot be disputed, inasmuch as those only who are subjected to them are affected by it. Doubtless, however, other causes co-operate; but *the influences to which persons thus occupied are alone exposed, should be viewed as the chief agencies in developing the malady.* Some writers have supposed the climate to be the chief cause; but if this were the case, other persons beside agricultural labourers would become affected. This disease has also been attributed to the use of maize, but we do not find that maize has any similar effect in other or similar climates, where it is extensively employed as food. It has likewise been imputed to a rice diet, but the same remark applies also to this opinion. The imperfect and sometimes unwholesome nourishment; the want of animal food, and due proportion of condiments and stimuli; the insufficient use of salt and other antiseptic substances; and the general wretchedness, privations, and filth, of the field labourers in this part of Europe, to all which the malady has been attributed, may certainly concur, in some degree, in developing it; but even these conjoined cannot reasonably be inferred to be the real exciting causes of it, inasmuch as these causes are equally influential, and concur in similar grades of activity in other localities, without pellagra being the result.

28. After considering the various causes and their combinations, to which this malady has been imputed, I infer that they may tend to aggravate its severity, or to increase the predisposition to its appearance, but that other peculiar and endemic agencies are chiefly concerned in generating it. What these agencies are have not been demonstrated, nor do they perhaps admit of precise demonstration, but they appear to me to proceed from the soil and water of the locality. The use of water filtrating through certain or peculiar geological formations, or certain alluvial deposits; the labours of the peasants in fields which are saturated with moisture, or which have been inundated during the preceding winter; and the circumstance of those parts of the body which are most exposed, or most commonly immersed in the water and soil or earth which these labourers cultivate, must readily suggest themselves to the minds of those who reflect on the subject, as the obvious exciting causes of the disease. That the influence of the sun is necessary to develope the cutaneous affection, may be admitted, and may be explained by the effects produced by its rays, or by the drying effects of the air upon the surfaces covered by the moisture of the soil in which the peasants are employed. It has been observed, particularly by STRAMBIO, that, although the sun and free exposure to the air tend to develope more completely the cutaneous affection, still the constitutional symptoms appear and proceed their course, even when no such exposure is incurred, and when the eruption is either imperfectly or not at all developed.

29. Viewing, therefore, the nature of the water of the localities in which pellagra occurs, together with the state of the soil, and the water saturating or inundating the soil, as the chief causes of the malady, it may be admitted that the other agencies to which so much influence has been imputed by various writers, may in some degree contribute to develope and to aggravate the disease, especially the use of unwholesome food, as of sour or diseased rye bread, or of unripe maize or rice; dirty and ill-ventilated apartments; hereditary predisposition; the depressing passions; privations, misery, and exhausting indulgencies. M. SPESSA attributes considerable influence to the habit of the poorer inhabitants of passing the evenings and even parts of the day during winter, in the dirty and unhealthy cow-houses and stables, by way of escaping from the cold. The effluvium also proceeding from the accumulated exuviæ of the inhabitants and cattle at the commencement of spring, and of warm weather; and when these exuviæ are exposed and spread upon the soil as manure, and to which the field labourers are more particularly exposed, may not be without its influence, and even exceed that insisted upon by M. SPESSA. But, seeing that those persons who are alone affected with pellagra, are those only who are much exposed to the agencies to which I have attributed the malady, the in-

erence that these agencies are the principal causes of it becomes inevitable.

30. It may be further added, that similar causes o those which obtain in Lombardy exist also in the *Asturias*, where a similar malady prevails. These are extreme poverty with its attendants, bad and insufficient food; filth; crowded and ill-ventilated apartments; and agricultural pursuits in the deep and swampy valleys of the country.

31. That the malady should first appear, and be aggravated during spring and summer, can be accounted for by the exposure of the subjects of it at this season to its chief exciting causes, and to the influence of labour, conjoined with increased temperature, in exciting the circulation, and in throwing out, by means of the cutaneous excretion, the morbid materials accumulated in the blood, and disordering vascular action in the digestive organs, in the nervous centres, as well as in parts of the cutaneous surface.

32. VII. Treatment. — It is obvious that the chief means of remedying, or even of checking the progress of this malady, are change of the habits and occupations of those who have become subjects of it, change of climate, and removal of the several causes and influences to which it has been imputed, and particularly of those upon which I have above insisted on. The circumstances in which those are placed who become the subjects of pellagra, very generally preclude the adoption of these measures, which, however, can be but of little avail at an advanced stage and confirmed state of the malady. When the nervous and constitutional symptoms are fully developed — when the cutaneous eruption is constant, extensive, and severe, and is attended by a peculiar offensive effluvium, or perspiration — when affections resembling or approaching to those of either chorea, convulsions, tetanus, epilepsy, palsy, mania or melancholia, appear; or when severe diarrhœa, or dysentery, or marasmus, or dropsy, or pulmonary disease occur, then removal or change of occupation, or medical treatment, is very rarely of avail; and even at an early stage, medicines can produce but little benefit, whilst the patient continues to be subjected to the several circumstances and influences originating the malady. In addition to wholesome and nutritious food, alterative, tonic, and antiseptic articles, should be prescribed, aided by warm bathing and diaphoretics. The alkaline carbonates taken in tonic infusions, or in demulcent and bitter decoctions, or with emollient and narcotic substances, are generally of service; but the treatment should vary according to the various prominent affections which complicate the advanced stages of the disease.

33. For the affections of the *digestive canal*, the decoction of Iceland moss; various emollients, with or without opiates or Dover's powder; fomentations and embrocations on the abdomen, and emollient and anodyne injections are requisite.

34. Affections of the *brain* and *nervous system* during the progress of this malady, admit not of a recourse to lowering means. In but few cases can local depletions even be prescribed with advantage; but, whilst tonics, antispasmodics, and alteratives, conjoined with anodynes, as circumstances may suggest, are administered, blisters may be applied to, or issues or setons inserted in, the nape of the neck; or even small bleedings in the more acute cases may be directed from this situation or behind the ears. In most of the nervous affections appearing in the course of pellagra, the preparations of opium taken with camphor, or ammonia and aromatics, are of essential service, but chiefly as palliatives.

35. For the cachectic habit of body and cutaneous affection, alkalies and alkaline carbonates with sarsaparilla, particularly the compound decoction, in large quantity, or with antimonials; sulphureous warm baths followed by frictions; milk diet; and attention to the several secretions and excretions, using those means which are most serviceable in improving and promoting them, are the measures which promise the greatest amount of benefit, which, however, can rarely be attained without the removal of the causes which occasion the disease. Even in an early stage of the disease, whilst these continue to operate, and at an advanced stage even when these are removed, medical treatment is generally of little or only of temporary avail, at least as far as it has been employed by the Italian physicians.

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PEMPHIGUS.—Synon. Πεμφιξ, *πεμφιγος* (a small blister or bubble), *πυρετος πεμφιγωδες*, Hippocrates, Galen; *Pemphigus*, Sauvages; *Febris Bullosa*, Vogel; *Bullæ*, *Bullosa Febris*, Morton; *Hidroa*, Piso; *Pompholyx* (Πομφολυξ), Willan and Bateman; *Typhus vesicularis*, Young; *Emphlysis Pemphigus*, Good; *Febris vesicularis, Febris Pemphigoides,* Auct.; *Fièvre Bulleuse, F. vésiculaire,* Fr.; *Wassenblasen, Blasenfieber,* Germ.; *Penfigo,* Ital.; *Vesicular fever.*

Classif.— *3d Class, 3d Order (Good). 4th Order (Willan).* IV. Class, IV. Order (*Author*).

1. Defin.—*An eruption of transparent or yellowish bullæ of considerable size appearing on circular or oval erythematous patches, nearly corresponding in diameter with their bases; terminating by effusion of the fluid they contain, and by the formation of lamellar incrustations, or by excoriations.*

2. I. Description. — The various appearances assumed by this eruption have led to various divisions and denominations of it, according to the mode of its eruption (*Pemphigus simultaneus, P. successivus*), — to the number of the bullæ (*P. solitarius, P. confluens*), — to the greater or less rapidity of their course (*P. acutus, P. chronicus*) — to the existence or absence of fever (*P. pyreticus, P. apyreticus,*) — and to the age of the patient (*P. congenitus, P. infantilis*). I agree, however, with Rayer, Cazenave, and Wilson, in the propriety of considering this eruption under the two heads of *acute* and *chronic.*

3. i. Acute Pemphigus. — *P, acutus, Febris bullosa, F. Pemphigoides, F. Synocha cum vesiculis,* Auct. — This is a rare disease. The bullæ almost always stand apart, or are distinct. They are rarely confluent, and they usually appear in succession. They may be partial or more or less general, and may occur on any part of the body, but most commonly on the lower extremities; occasionally, however, also on the arms, the trunk, and the face; most rarely on the soles of the feet, hairy scalp, and genitals.

4. *a.* The *constitutional symptoms* vary from a slight degree of languor and listlessness, sometimes of sickness and general uneasiness, followed by quick pulse and mild fever (*Pompholyx benignus* of Willan), to chilliness or rigors followed by a dry and hot skin with pruritus, by pains in the head and limbs, nausea, thirst, anorexia, tenderness at the epigastrium, very rapid pulse, sore throat, and even slight delirium. In some cases, the fever is attended by irritation of the mucous surface of the digestive, respiratory, or genito-urinary organs.

5. *b.* The *eruption* usually appears the second or third day from the commencement of the constitutional disorder, or even later, in the form of small red spots, preceded and attended by pruritus, and a parched and hot sensation. The spots increase to circular or oval erythematous patches, varying in redness from a pale to a vivid or dusky tint. In the course of a few hours a vesicle arises in the middle of each patch, and becomes rapidly distended by a limpid serum, and increases to the size of a hazel-nut, or even of a large walnut. The bullæ, or *blebs,* which thus arise, are usually circular or oval, and slightly flattened at their summits. They generally correspond with the breadth of the patches on which they appear, and thus conceal them; or they are somewhat smaller than the patches, which thus show around them as a narrow zone, more rarely as a complete areola. The bullæ usually break in a day or two, and expose an excoriated surface, secreting for a few days longer a serous fluid, which concretes into a thin, yellowish scab, and becomes gradually browner and dark; but they sometimes do not burst, and in this case the serum contained in the bullæ assumes an amber or yellowish tint, subsequently turbid and opaque, diminishing in quantity by evaporation, shrivelling and drying up, in the course of a few days, into a thin dark scab. The rupture of the bullæ, and the time when it occurs, depend upon the situation of their eruption. In about three weeks the scabs fall off, leaving the skin beneath of a dusky red hue, but sound.

6. Bullæ are occasionally imperfectly developed, and appear in the form of circular or oval patches, slightly red and prominent. On passing the finger over their surface, the cuticle is felt loosened by a slight effusion of serum between it and the dermis. The cuticle is detached after a few days, exposing a red spot covered by a thin and shining epidemic layer.

7. The *duration* of the disease depends upon the mode of eruption: if this takes place at once, it is no longer than just stated, or from seven to fourteen days; but if the bullæ appear successively, it is longer accordingly, or from three to four weeks. Mr. Wilson remarks, that in the progress of the cutaneous eruption, vesicles are not unfrequently observed on the mucous membrane of the mouth.

8. When the disease is *confluent,* two or more of the bullæ unite and form a *bleb* as large as a hen or a goose-egg. In these cases, the constitutional symptoms are more severe, and are sometimes attended by irritation of most of the mucous surfaces.

9. *c.* This disease sometimes affects *children* — *Pemphigus infantilis* — *P. gangrenosus* of some writers — and sometimes assumes a very serious or even fatal appearance. But this severe form occurs chiefly in lying-in hospitals, or in the crowded, dirty, and ill-ventilated dwellings of the poor. In the cases which I have seen in *infants* the bullæ were numerous, more frequently distinct than confluent, and, in a few instances, presenting many of the characters of *rupia escharotica,* but assuming much more acute features, and even terminating fatally in four or five days. When it occurs in lying-in hospitals, it may present a mild form in some cases, and a very acute and dangerous form in others, even in the same ward and at the same time. It then manifestly proceeds from local causes — from the states of the beds and bedclothes, and the air of the wards.

10. *d. Solitary Pemphigus* — *P. solitarius* of Willan — is very rare. I have seen only one case of it. The bulla rapidly attains the size of an orange. It is preceded by disagreeable sensations of tingling and smarting. The bulla breaks in about forty-eight hours, and is succeeded by a superficial excoriation, passing into slight ulceration. One or two days after the disappearance of the first bulla another arises in its vicinity, and pursues the same course as the preceding. In this way, two, three, or even more may appear in succession, the disease being prolonged to several days' duration. Willan says that this variety very rarely occurs, and seems only to affect women. The case I saw was in a man, and occurred on the lower extremity. Biett and Cazenave mention a chronic state of this variety.

11. *e. Acute Pemphigus* may occur as a *compli-*

ition or sequela of eruptive fevers, or be *asso-ated* with other eruptions, as with herpes, and iore rarely with prurigo. Mr. Wilson remarks iat the small bullæ of pemphigus bear consi-erable resemblance to the vesicles of herpes hlyctenodes; and the likeness to herpes is still irther increased by the occasional appearance of he smaller bullæ of pemphigus in the form of ings.

12. ii. Chronic Pemphigus. — *Pompholyx di-tinus*, Willan — *Phlyctenoide confluente*, Ali-ert — is met with much more frequently than he acute, and appears much oftener in adults nd aged males than in females. It is either imited to a small surface, or spreads more or less ver the body. It is painful and tedious in its ourse, always successive in its appearance, and ffects chiefly persons advanced in age and of de-ilitated constitutions. It often continues for many months or even years, and, in some cases, ppears at a particular season for several successive years, for instance in the autumn and winter, and declining in the spring.

13. *a.* The *constitutional symptoms* of chronic pemphigus are slight compared with those of the acute, some degree of sickness and lassitude, with pains in the head, back, or limbs, precede the eruption during several days; and these symptoms generally vary in degree with the severity or extent of the eruption. The cutaneous disease is often associated with considerable gastro-intestinal irritation; and, in aged persons, and in cachectic habits, it is sometimes attended by dysuria or hæmaturia.

14. *b.* The *eruption* appears first in the form of small red spots, attended by slight itching. The epidermis soon becomes elevated in the centre of each patch. The base of the elevation of the cuticle gradually extends; and often in a few hours an irregularly shaped bulla, the size of a filbert or even of a walnut, is thus formed. Sometimes the bullæ attain the size of an egg. At the end of three or four days some of the bullæ burst, discharge their contents, and leave an angry-looking excoriation of the dermis. In others of them, the serum becomes reddish and turbid, decreases, and dries up, forming a dark scab covered by the shrivelled epidermis. As one crop of bullæ is thus changed, another is produced near to the first; and the disorder thus may be seen in all its stages at the same time, and be prolonged, by successive eruptions, almost indefinitely. The bullæ are occasionally confluent, especially when they appear on the face; but this seldom occurs. They sometimes attain the size of the palm of the hand, the epidermis peeling off and exposing an unhealthy-looking excoriated surface, which seems difficult to heal, or which heals in two or three days, new bullæ forming and pursuing the same course as the former. In some severe cases the patient is confined to bed, but there is rarely any fever.

15. *c.* Chronic pemphigus may be *complicated* with *prurigo* — *Pompholyx prurigenosus* of Willan — and with various chronic diseases of the viscera; and in such cases may terminate fatally. It sometimes supervenes on chronic inflammation of the digestive organs, and on partial or general dropsy. When complicated with prurigo, it is often a most distressing affection, and in old persons especially, may hasten a fatal termination, particularly if visceral disease be also present, as commonly observed.

16. *d.* The contagious variety of pemphigus mentioned by Willan — *P. contagiosus* — is merely the symptomatic occurrence of bullæ in certain epidemic and endemic maladies described by authors. Its endemic occurrence has been observed by me on two occasions amongst infants in a lying-in-hospital, on each occasion nearly all the infants in the institution becoming affected; but this prevalence was attributable to local causes and not to contagion.

17. *e.* The *morbid appearances* found in fatal cases are entirely those constituting the complications, and usually causing the fatal issue of this affection. M. Biett and Cazenave have often met with fatty liver in their examinations of these cases, with effusion of serum into the chest and other shut cavities.

18. II. Diagnosis.—The bullæ which occasionally appear during the progress of *erysipelas* are accidental, and are to be distinguished from those of acute pemphigus by the latter being distinct, the surfaces between them being neither tumid, nor red, nor painful. The isolated form of the bullæ and the laminated crusts which they form generally distinguish pemphigus from other eruptions. The bullæ of *rupia simplex* are exceedingly few, and terminate in ulcerations and in thick prominent scabs. In *ecthyma* the epidermis is sometimes raised by puriform fluid to a certain extent; but the purulent nature of the contained matter, the brownish appearance of the apex of the elevations, and the presence of pustules of ecthyma at an earlier stage, will sufficiently distinguish the eruption. In *herpes* the vesicles are always formed in groups upon a red and inflamed surface; while the bullæ of pemphigus are generally isolated, and free from surrounding inflammation. Even when the bullæ of pemphigus are small and confluent, so as somewhat to resemble *herpes phlyctenodes*, they are always larger than those of herpes, and some of them present their distinctive characters.

19. III. The Prognosis of acute pemphigus when occurring in adults, and without any complication, is always favourable. When met with in infants in the circumstances above noticed (§ 9.), it is often a serious or even dangerous disease. The prognosis of chronic pemphigus should depend upon the constitution of the patient, and upon the existence of visceral disease. When it is extensive or frequently developed, and affects those debilitated by dissipation or poverty, or when it is complicated with visceral disease, an unfavourable opinion of the result should be entertained. Its severity usually corresponds with the cachectic state of the body affected by it. M. Rayer adduces a case in which chronic pemphigus of the legs following attacks of hæmoptysis, appeared to exert a salutary influence. Where there is obvious visceral disease complicated with this eruption, the cure of the latter will aggravate and increase the danger of the former. Mr. Wilson remarks that he has seen several cases which have induced him to "believe that this eruption is an effort of the system to rid itself of some morbid disposition." I may add, that I have hardly seen a case in which there was not reason to infer, what I have elsewhere so much insisted on, a more or less morbid state of the cir-

culating fluids, owing either to impaired elimination and excretion, or to imperfect assimilation.

20. IV. CAUSES. — Acute pemphigus attacks infants, children, and young persons most frequently. It has been said to be congenital and hereditary. It is most prevalent in the summer, and in those exposed to the sun's rays. I have often seen it in sailors who have exerted themselves under a tropical sun without any covering to the upper parts of the body. It is usually referred to teething; to improper or unwholesome food; to gastric and intestinal irritation; to overfeeding; to mental emotions; and to amenorrhœa and dysmenorrhœa. It has sometimes resulted from the constitutional irritation caused by vaccination. The endemic sources to which infants are sometimes exposed have been already noticed (§ 9.). The symptomatic appearance of pemphigus in connection with various fevers, has been occasionally observed.

21. Chronic pemphigus occurs chiefly in aged persons whose systems are debilitated or cachectic; and appears most frequently in autumn and winter. It is usually caused by intemperate habits, by excesses, unwholesome food, by fatigue; anxiety of mind; low, damp situations; living in cellars and ill-ventilated apartments; exposure to cold; and by chronic irritation of the digestive, mucous, and genito-urinary organs. It is more rarely a sequela of the exanthematous fevers. It may follow disease of any of the secreting and excreting viscera, and thus be complicated with it, the morbid elements not being eliminated from the circulation, but irritating and inflaming the cutaneous surface in the particular mode constituting pemphigus; and often affecting also the mucous surfaces.

22. V. TREATMENT. — *A.* In the mild cases of *acute pemphigus*, but little more is requisite than to exhibit diluents, gentle aperients, warm baths, and diaphoretics, thereby to promote the functions of the several emunctories. When the symptoms are more acute, and the patient is plethoric, a few ounces of blood may be taken away, and purgatives with the rest of the antiphlogistic regimen prescribed. In infants and in cases attended by debility or symptomatic of low fever, the infusion or decoction of bark, with muriatic acid, or with the alkaline carbonates, if the urine be very acid, is generally beneficial; and when any complication exists, especial attention should be directed to it.

23. *B. Chronic pemphigus* often withstands the use of very active means. But it is necessary, previously to determining upon the method of cure, to ascertain as nearly as possible the states of the secretions and excretions, and of the several emunctories. The urine should be carefully tested, and the alvine evacuations daily examined. When the biliary and intestinal functions are disordered, means appropriate to such disorder, as blue pill, or hydrarg. cum creta with ipecacuanha, or opium, or with Dover's powder, should be exhibited. In most cases, warm baths — either simple or alkaline — are of essential service. When the liver is torpid, after a recourse to calomel or milder mercurials, the nitric or nitro-hydrochloric acids may be given with the infusion or decoction of cinchona, or the decoctions of sarsaparilla. If the urine be acid, the liquor potassæ with the preparations of sarsa are generally beneficial; and, if the digestive mucous surface be exempt from marked irritation, small doses of the iodide of potassium may be added with great advantage. When there is marked disorder of the digestive organs, warm baths, alteratives, ipecacuanha, and anodynes are generally requisite. When the evacuations are offensive, as well as frequent, care should be taken not to confine the bowels by opiates, but rather to correct the secretions by alteratives, by the alkaline carbonates and salts, and by a spare farinaceous and milk diet. If, however, the intestinal irritation be severe, and the symptoms present a dysenteric character, ipecacuanha or Dover's powder, in frequent doses, may be exhibited, and emollient enemata administered; and, when restlessness and pain are complained of, these means, aided by warm baths, will be still more requisite.

24. When the menstrual discharge is suppressed or interrupted, these measures should be directed to its restoration: but these measures should be chosen according to the peculiarities of the case. In most cases of menstrual obstruction connected with cutaneous eruption, the iodide of potassium with liquor potassæ, and tonic infusions will prove beneficial, if the bowels be duly regulated by means of suitable aperients; and the biborate of soda conjoined with any of the preparations of aloes will often be of use in similar circumstances. M. RAYER has had recourse to the arseniate of soda in obstinate cases of pemphigus; and in these DONOVAN's solution of the iodide of arsenic and mercury may be employed with some hopes of advantage, as I have seen benefit derived from it, in one case of this kind, for which I lately prescribed it.

25. The observation made above respecting the pathological relations of pemphigus (§§ 19. 21.) should be borne in mind during the treatment of this eruption, and especially of the chronic states and complications of it; for a morbid condition of the circulating fluids arising either from insufficient elimination or excretion, or from imperfect assimilation, as fully shown in the articles BLOOD and DISEASE, generally more or less obtains not only in this, but also in most other cutaneous diseases. This position being unassailable, it should form the basis of our therapeutical operations, and all our efforts ought to be directed to the restoration of the excreting functions — to the removal of all obstructions to the discharge of these functions, and especially of the cutaneous functions.

26. *C.* The *topical treatment* of chronic pemphigus is often of much importance. As a general principle, the serum effused in the bullæ should, as soon as they are fully developed, be let out by puncturing them, for even the partial absorption of it tends to perpetuate the morbid condition of the circulating fluids on which the complaint chiefly depends; whilst the early removal of the morbid secretion prevents not only this contingency, but also the excoriations and sores which often result from leaving the bullæ uninterfered with. After puncturing the bullæ, warm baths, warm bread and water poultices, or emollient fomentations may be employed, and, subsequently, gently astringent lotions, or absorbent powders, or healing ointments, may be applied according to the circumstances of the case.

27. *D.* The *diet* in this, as in many other cutaneous affections, should consist chiefly of milk and farinaceous articles; animal food, of easy digestion, should be taken sparingly; but veal, pork, shell-fish, and dried or highly-seasoned articles, ought to be avoided. In cases requiring tonics, a more generous diet, and good wine in moderate quantity, may be allowed, particularly if due exercise in the open air be also taken.

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PERICARDIUM. See art. HEART AND PERICARDIUM.

PERIOSTEUM. — Περιοστεον — *Périoste*, Fr. — *Die Knockenhaut, Beinhaut*, Germ. — *The diseases of the periosteum* have been noticed in the articles BRAIN — *Membranes of*, CRANIUM, FIBROUS TISSUE, and OSSEOUS SYSTEM. When thus treating, in their respective relations, of certain portions of the periosteum, and when viewing them in connection with the bones which they form and support, the several alterations of structure observed in the periosteum were fully noticed. It now only remains for me to consider *inflammations of the periosteum and their consequences*.

1. INFLAMMATION OF THE PERIOSTEUM. — SYNON. — *Inflammatio periostei, periosteïtis, periostitis; Periostite*, Fr.; *Die Entzündung der Beinhaut*, Germ.

CLASSIF. — III. CLASS, I. ORDER (*Author*).

2. DEFIN. — *Pain, more or less acute, referred to the surface of one or more bones, with tenderness on pressure; deep-seated swelling, at first obscure, but afterwards more manifest, sometimes with redness in the parts covering the more superficial and prominent bones; more or less symptomatic fever.*

3. The conventional division of periostitis into *acute* and *chronic* is useful, although every grade of activity and duration obtains in this as well as in other diseases. Periostitis is also *simple* and *primary*, or *consecutive* or *constitutional*. In this latter case it generally proceeds from previous disease, and is characterised by a certain diathesis, or is the consequence of a specific cause. Thus periostitis may be *scrofulous, gouty, scorbutic*, or *rheumatic*, and present certain modifications in its course and consequences, as it occurs in constitutions thus characterised. It may, moreover, be *specific*, or be caused by certain specific causes, as by syphilis and the excessive use of mercury. Due regard to these several states of the disease is requisite in practice, inasmuch as each of them requires a modified treatment.

4. i. SYMPTOMS. — *A. Acute* and *sub-acute periostitis* often commences in an insidious manner; but it sometimes declares itself very acutely. In the former case there are generally neither chills nor rigors, and the accompanying fever may be slight; in the latter case, chills or rigors are often experienced, with intense pain, complete insomnia, and severe symptomatic fever. The progress of the disease in the one is generally slow, in the other much more rapid. It is often difficult to determine whether or not the inflammation is seated in the periosteum or in the bone itself. Most frequently, I believe, the bone is affected nearly as soon as the periosteum, more especially in the scrofulous and syphilitic states of the disease. If the bone be superficial and the inflammation severe, swelling, at first hard or resisting, subsequently more superficially soft or doughy as it increases, may be detected in the course of the bone.

5. *a.* The symptoms are much more obscure where the periosteum of deep-seated bones is affected. In these cases, the attending swelling may be obscure or hardly felt, and the existence of the disease can be only inferred from the pain being fixed in or limited to some part of the skeleton, and from the nature of the predisposing and exciting causes. It is difficult to determine whether the disease commences in the exterior or in the interior surface of the periosteum, unless under particular circumstances, as when the periostitis is caused by certain external injuries, by ulceration, or the extension of inflammation from parts covering the periosteum. In such cases, and when the inflammation extends from the periosteum to the soft parts covering or surrounding it, it may be inferred that the external surface of the periosteum is chiefly affected, and the bone underneath either slightly or not at all. And this condition may be also inferred where the disease attacks the *rheumatic* and *gouty diatheses*; and, in these cases, particularly where the periosteum in the vicinity of joints is implicated, serum or fluid lymph often accumulates in the sheaths of tendons, or even within or around the capsules; similar changes, in these situations, have also been observed by me in several cases of *syphilitic periostitis*, complete recovery taking place without any indication of disease of the bones.

6. *b.* In the more *acute cases* of periostitis, *suppuration* is not an infrequent result. If the external surface of the periosteum be chiefly affected, the swelling becomes more and more manifest, softer, and circumscribed. The tissues external to the primary swelling become somewhat œdematous or even reddened, and fluctuation, at first obscure, may be detected. In scrofulous constitutions, and when the periosteum of the long bones is affected, especially near articulations, œdema of the joints, or serous effusion under the capsules, or in the sheaths of tendons, is often observed;

but these changes may also take place independently of suppuration, as in the rheumatic diathesis, but more frequently in connection with it, in the scrofulous.

7. *c.* In the more acute cases of periostitis, when there is reason to infer the extension of inflammation to the bone itself, *suppuration* may likewise occur, and may detach the periosteum from the bone; but, in the more intense cases, and in cachectic or scorbutic habits, the morbid action in the periosteum may give rise to the effusion of a turbid serum between the periosteum and the bone, detaching the one from the other to a considerable extent, even before suppuration takes place, and to *gangrene* of the periosteum and *necrosis* of the bone. This result may take place in acute periostitis of any of the more superficial bones, and not infrequently in periostitis of the bones of the cranium and face; but suppuration is a more frequent occurrence. (See articles Cranium (§ 4.), and Osseous System — *Osteitis.*)

8. *B. Chronic periostitis* usually commences slowly and insidiously, and presents similar constitutional and specific relations to those above alluded to (§ 3.). It is more frequently observed than the acute, and is sometimes connected with ulceration, tumours, or other organic changes of the parts external to the periosteum; and is attended by slight pain only, which is often aggravated during the night by more or less tenderness, especially in superficial situations; and by varying or slight symptomatic fever and constitutional symptoms. Chronic inflammation, when limited to a very small extent of the periosteum, may produce various local changes, according to the grade of morbid action, and to the character of the secretion infiltrating the inflamed part and contiguous tissues; it may occasion simple thickening and induration, or even thickening with softening; it may give rise to the accumulation of a glairy, soft, or gelatinous or semifluid matter, chiefly external to the periosteum; or to a greyish homogeneous matter resembling soft cheese; or to a fibrous, cartilaginous, or osseous substance. These even may form apparently between the periosteum and the bone, or in the fibrous structure of the former.

9. In the *rheumatic form* of chronic periostitis, thickening, or fibrous, cartilaginous, or even osseous transformation of parts of the periosteum sometimes takes place, particularly in the vicinity of articulations; occasioning stiffness or even complete immobility of the joint or joints. In the *gouty state* of the disease, a calcareous or chalky deposit, similar to that which forms around the articular ligaments, and consisting chiefly of the urate of soda, sometimes takes place in the structure of the periosteum, or between it and the bone. In addition to these changes, various others are met with in the bones and in the periosteum, consecutively of chronic periostitis; but I must refer the reader to the notice taken of them in the articles mentioned above (§ 7.).

10. The *terminations* and *consequences* of periostitis are in every respect the same as those shown to follow *osteitis*, and are attended by the same symptoms as accompany them. (See Osseous System, §§ 12—22.)

11. ii. Associations of Periostitis. — The periosteum is very rarely inflamed without an extension of the morbid action, in a greater or less degree, to the bone itself. Hence it is difficult to determine how far the bone is affected until the disease in it has made considerable progress. Much depends upon the diathesis and age of the patient, and the nature of the exciting causes; but when the pain referred to the bone whose periosteum is affected is increased, as in the case of any of the long bones, by sustaining a weight or standing on it, inflammation of the bone itself may be inferred. The association of osteitis with periostitis is most frequent in young persons, children, and the scrofulous diathesis; and the least so in the gouty and rheumatic.

12. When periostitis is seated in any of the vertebræ, or in the sacrum, or indeed in any of the bones either encasing parts of the nervous masses or furnishing outlets to the nerves, the consequent swelling of the periosteum and effusion of lymph may so affect the parts of the nervous system contiguous to it, or the nerves as they pass through their respective foramina or outlets, as to interrupt their functions, and to occasion *paralysis* more or less complete. I have seen several cases of paraplegia thus produced; and very recently attended one with Dr. Johnson and Mr. Liston where this complication existed. In these cases the bladder is often affected — indeed always when paraplegia is present. Periostitis may be also associated with *neuralgia*, and in this case the former is usually the cause of the latter, which not infrequently, in these circumstances, passes into palsy.

13. When periostitis affects the head, as the *pericranium*, of which I have seen two or three cases, one of them that of a physician in this city, the symptoms are often distressing. The disease may be either acute or chronic, and proceed simply and favourably, as in the case just alluded to; but it also, owing to the extension of the inflammation to the inner table of the skull, or to the effect produced upon the nerves in the vicinity, may be complicated with *epilepsy*, as in a case recorded by Dr. Graves. Indeed, epilepsy is not infrequently caused by inflammatory and other changes in the dura mater; and we know that inflammation may be propagated from the pericranium, through the tables of the skull to this membrane, especially after injuries.

14. The complication of periostitis with gout or rheumatism need hardly be mentioned, since the latter are more commonly causes than complications of this malady; and this remark is still more applicable to syphilitic periostitis. Still they should be viewed also as complications requiring a modified and even peculiar mode of treatment.

15. iii. *The changes found in the periosteum* during the several periods of periostitis are briefly these: — In the simple and early state of the disease, the membrane is red and injected, without any remarkable thickening or softening. The adjoining cellular tissue is also injected. At a somewhat more advanced period the injection increases and extends to the bone, the adhesion between which and the periosteum is now somewhat impaired. At a still later stage this membrane is redder, thicker, and somewhat softer, owing to some infiltration of lymph or serum; and it is much more easily detached from the bone; and the bone itself is often more discoloured. In the

more chronic states of the disease, the membrane is less red, but it is more thickened, is more dense, and more closely adherent to the bone. In scrofulous persons, small abscesses or scrofulous suppuration may take place in the periosteum, and extend outwardly, with or without a more or less serious lesion of the bone.

16. When the disease goes on to suppuration, which may occur in either the acute, the sub-acute, or chronic state, particularly the latter in scrofulous persons, the periosteum is still more thickened, softened, villous at its surface or even fungous. Suppuration most frequently occurs in the outer surface of the membrane, and proceeds externally; but sometimes it takes place from the internal surface, particularly when the bone is much affected. In this latter case it detaches the periosteum from the bone, causing considerable changes in both, often with perforation of the former, with extension of the abscess externally through the soft parts, and with the death of the bone underneath. In cases of injury of the pericranium, purulent matter is not infrequently collected between this part and the bone, and the inflammation having extended through both tables, advances to the dura mater, between which and the inner table matter often also collects, so that, before the abscess breaks externally, fatal lesions may be produced underneath the bone. In some cases, abscess forms externally to the periosteum, and this membrane is thickened, opposing for a time a barrier between the abscess and the bone; but this is at last overcome, and the bone is more or less destroyed. In this case, periostitis and osteitis are consequent upon the inflammation of the adjoining parts. The other changes observed after periostitis are the same as those found after osteitis, and are described in the article on the OSSEOUS SYSTEM (§§ 12—22.).

17. iv. THE DIAGNOSIS of periostitis is generally easy when the periosteum of superficial bones is affected; but, in other circumstances, it is extremely difficult. The history of the case, and the relation which the symptoms have with the causes which seem to have produced them, will generally aid in the formation of a correct opinion. When an acute or aching pain is felt in the situation of a bone, and is increased on firm pressure, and during the night; and more particularly when there is a fixed and deep-seated swelling which is continuous with the surface of the bone, it may safely be inferred that either periostitis or osteitis is present, or both; and, although it may be impossible to determine which of the two structures may be chiefly affected, the circumstance is the less important, inasmuch as the treatment is the same, or very nearly the same, for both. It is often much more important to ascertain the existence of certain of the consequences of the disease, particularly of *suppuration*, or of *caries*, or the death of the bone. When the former occurs, redness is often observed at the surface, unless the periosteum be deep-seated, and there is also some degree of œdema of the adjoining parts, followed by more or less distinct fluctuation, particularly when suppuration commences in the external surface of the periosteum. The existence of *caries* is to be inferred from what has been stated on the subject under the head OSSEOUS SYSTEM (§§ 16—20.).

18. v. THE CAUSES of periostitis are altogether the same as those which produce osteitis. They are *constitutional* or *intrinsic*, or *external* or *extrinsic*. *a.* Many of the former are chiefly *predisposing* causes, as the scrofulous, gouty, and rheumatic diathesis; but syphilis is not only a predisposing, but also an energetic *exciting* cause; and when it affects the scrofulous diathesis, not only periostitis, but osteitis also, often supervenes. Periostitis may also follow fevers, especially exanthematous fevers of a malignant character. It is not infrequently caused by scurvy, and by various chronic cutaneous affections, when neglected, or allowed to proceed to ulceration, particularly in the extremities. All debilitating agents, unwholesome food, exhausting excesses, and the abuse of mercury, also predispose to periostitis.

19. *b.* The *exciting causes* are chiefly contusions and local injuries of all kinds; chronic ulcers near or over superficial bones; the irritation of abscesses, of tumours, or of tubercles in the vicinity of the periosteum; excessive muscular exertion, sprains, &c.; exposure to excessive cold or heat; and a prolonged or unsuitable exhibition of mercury, especially for syphilis affecting the scrofulous diathesis. Many of the cases of periostitis, osteitis, and consequent *caries* of the bones of the skull and face, which were formerly so frequent, and which are still occasionally met with, are more attributable to the excessive use of mercurials than to the disease for which they were prescribed.

20. vi. TREATMENT. — *A.* In the *acute* or *early state* of this malady, the antiphlogistic treatment and regimen are requisite, particularly in young, robust, or plethoric persons. Even when we have cause of suspecting the periosteum only to be affected, the intimate connection between it and the bone should induce us to employ decided and prompt means. *Local depletions* are always requisite, particularly in the simple form of the disease, occurring in a previously healthy person, and they ought to be large or repeated, or be preceded by general blood-letting, especially in robust or plethoric habits. After depletion, *calomel* should be freely exhibited with *antimonials* until the gums be affected, and I agree with Dr. GRAVES in thinking that the calomel is especially required when the pericranium and bones of the head are implicated; taking care, however, not to prescribe calomel so as to risk an injurious effect from it. When the periosteum of the more superficial bones is affected, as those of the head, face, or extremities, the practice of making *incisions* down to the inflamed structure, even before suppuration has commenced, and with the view of preventing this consequence of the inflammation, seems judicious, and is advocated by CRAMPTON, VELPEAU, BERARD, and others. These incisions not only unload the vessels of the inflamed and adjoining tissues, but tend to determine the suppurative process, if this should occur, externally in the direction of the excisions, and thereby to protect the bone. When the inflamed periosteum is, however, deep-seated, such early incisions can hardly be practised, or only may be ventured on when suppuration has advanced. After local depletions, or even when they cannot be prescribed, as in those sub-acute attacks which sometimes occur in debilitated, exhausted, or broken-down constitutions, *blisters*, other *issues*, or

the tartarised antimonial ointment, or other means which will produce vesication or irritation, with a *copious or prolonged discharge* from the cutaneous surface over the inflamed periosteum, will often prove extremely beneficial; but, as soon as vesication or a discharge is obtained, it should be favoured by warm poultices, and such other means as the peculiarities of the case will suggest, and perpetuated for a considerable period, so as to fully determine its effects. After these antiphlogistic means have been employed, the treatment about to be advised for the *chronic states*, if the disease still continues, should be employed.

21. *B.* In the *chronic states* of periostitis, the treatment should be nearly the same as that recommended for osteitis; for in this state the bone generally partakes more or less in the morbid action. Such, however, may not be the case to any extent in the *rheumatic* or *gouty states* of the disease, even when assuming more of an acute than of a chronic character; but, in the *scrofulous form* of the malady, the probable extension of the morbid action to the bones requires more especially the treatment advised for osteitis; namely, recourse to the *iodide of potassium*, with *liquor potassæ*, or Brandish's alkaline solution, in either of the preparations of *sarsaparilla*, or in bitter infusions. In the rheumatic and gouty states these means are equally beneficial; and occasionally the *mistura guaiaci* may be advantageously made the vehicle of the other medicines. In these states also, some one of the preparations of *colchicum* may be added to those just named; and a small quantity of *sulphur* with magnesia may be taken at bed-time for a considerable period, or until convalescence is far advanced.

22. *C.* If *suppuration*, either externally to the periosteum, or between it and the bone, should take place, an early exit ought to be given to the matter; and the local treatment proceeded with according to the circumstances of the case. The *iodide of potassium* and *liquor potassæ*, with *sarsa* and *tonics*, should, however, be persisted in, if no urgent reason exist to contra-indicate them; as they generally enable the system to repair whatever local mischief may have been done. In many of these cases, a full dose of some one of the preparations of *opium* will be conjoined with the above, or given at bed-time with benefit.

23. *D.* In the *other states of organic lesion* occurring in the periosteum, the means now mentioned are generally most efficacious, even when associated with *caries* of the bone. I state this from experience; but I should also add, that I have likewise seen the *bichloride of mercury*, prescribed in the *compound tincture of bark*, with tincture of *capsicum*, almost equally beneficial with the iodide, both in the simple and in the advanced and complicated states of periostitis. In cases of *syphilitic periostitis* this salt, either in simple solution or prescribed with sarsa, is the chief remedy upon which we should confide, particularly if it be taken according to Van Swieten's method, and soon after a meal. In cases where mercury has not previously been given, or in those where it has been given in inadequate quantity or inefficient form, this mode of treating syphilitic periostitis should not be overlooked. Where, however, mercury has been resorted to in this complicated state of the disease, without marked benefit, the *preparations of iodine* should be preferred and sufficiently tried. As far back as 1824 I employed these preparations with decided success in both syphilitic and scrofulous periostitis; and about this period I prescribed them for a gentleman whose case presented this complication, and had become remarkable for the persistence and consequences of this disease, and the number of medical means and measures he had had recourse to. They proved efficacious in his case, as well as in others, and he is now alive and well. (See Osseous System, §§ 23—25.)

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PERIPNEUMONIA.—See Lungs—Inflammation of.

PERITONEUM — Diseases of. — The *peritoneum* (περιτόνειον from περιτείνω, to extend around) was not recognised, until a comparatively recent period of medical history, as being often the seat of disease, independently of the parts which it envelopes; and, as will be shown in the sequel, the most serious changes to which it is liable were, until modern times, often confounded with other maladies. The greater precision imparted to pathological research since the appearance of the writings of Morgagni, and more recently of those of C. Smith, Bichât, Baron, and others, and the more accurate connection of lesions of this membrane with the phenomena or symptoms by which they are indicated, furnished by numerous modern writers, more especially by those referred to at the conclusion of this article, have combined to place our knowledge of the nature, symptoms, and treatment of diseases of the peritoneum greatly in advance of the progress it presented at the close of the last century, or even at the commencement of the present. In this article I shall, *first*, consider the several states of *inflammation of the peritoneum, and their consequences*; and, *secondly*, the *structural changes found* in this membrane independently of inflammation.

1. Inflammation of the Peritoneum. — Synon. — *Peritonitis*, Vogel, Cullen, &c.; — *Phlegmone Peritonei, Phlegmone Mesenterii*, Prosper Alpinus; — *Epiploitis*, Sagar, Sauvages; — *Omentitis*, Vogel; — *Inflammatio Omenti*, Boerhaave; — *Mesenteritis*, *Enteritis Mesenterica*, Sauvages; — *Inflammatio Mesenterii*, Hoffmann; — *Febris Mesenterica*, Darwin; — *Enteritis epiploitis*, Parr; — *Cauma Peritonitis*, Young; — *Empresma peritonitis*, Good; *Inflammatio Peritonei*; — *Péritonite, Inflammation du péritoine*, Fr.; —*Darmfellentzündung, Bauchfellentzündung*, Germ.

Classif. — 1*st Class.* 2*d Order* (Cullen); 3*d Class.* 2*d Order* (Good); III. Class. I. Order (Author).

2. DEFIN. — NOSOLOG. DEFIN. — *Tenderness, pain, heat, and tumefaction of the abdomen, with symptomatic fever; the patient always preserving a supine posture, with the knees drawn up; and the pain being aggravated by pressure, or by actions of the abdominal and respiratory muscles.*

3. PATHOLOG. DEFIN. — *Increased vascularity, softening, or thickening of the peritoneal membrane, with effusion of coagulable lymph, or of a sero-albuminous, or sero-puriform, or sero-sanguineous fluid; sometimes with organised adhesions, &c.*

4. Inflammation of the peritoneum may affect persons of any age, of any temperament, and of any habit of body; it may attack suddenly and acutely, or slowly, insidiously, and chronically; it may be general or limited, or at first partial, and afterwards more or less extended; and it may be primary or idiopathic, and consecutive or symptomatic. It may, moreover, be characterised by either of those states of vital diathesis which I endeavoured to establish as important pathological distinctions, when treating of *inflammation*, and which I ascribed to the nature of the exciting causes, and to the states of vital or constitutional power, and of the circulating fluids. Hence *peritonitis* may also be either *sthenic* or *asthenic*, as regards the local action and the accompanying fever.

5. I. ACUTE PERITONITIS. — *Acute peritonitis* in a *sthenic form*, often *commences* in a part only of the peritoneum, but extends more or less to other portions of it. It is comparatively rare, in this state of the malady, that the peritoneal surface is at first extensively affected; but I have seen many cases of the puerperal and erysipelatous states of the disease — of the *asthenic form* — in which this membrane was more or less extensively implicated at an early period, and more particularly in the puerperal states of peritonitis associated with, or even arising from, *contamination of the circulating fluids.*

6. *True* or *primary peritonitis* commences in, and is chiefly confined to, the peritoneum; and, when thus originating, the inflammation more rarely extends to the organs which are enveloped by this membrane. As I have shown on several occasions, the inflammation does not so rapidly spread over the surface of the peritoneum as was generally supposed, unless in the asthenic forms of the disease, although the lymph thrown out from the surface of the part first affected rapidly irritates and inflames the opposite surface, or that coming in contact with it; so that it may be confidently asserted, that sthenic acute peritonitis extends rapidly and chiefly by contiguity of situation, and, but slowly and less remarkably, by continuity of surface. I have often observed the opposite surfaces, or those in more immediate contact, intensely inflamed, whilst large portions of the surface continuously interposed between the inflamed parts were unaffected.

7. This limitation of the inflammation to opposite surfaces is equally remarkable when the *peritonitis is consecutive* of inflammation of a subjacent tissue or organ; unless indeed the circulating fluids have become contaminated and constitutional power much depressed — circumstances tending remarkably and rapidly to spread the morbid action continuously over the surface. In this latter case coagulable lymph is not formed, but a turbid and irritating serum is abundantly thrown out, as will be more fully noticed when I consider certain asthenic and complicated states of the disease.

8. i. SYMPTOMS OF ACUTE STHENIC PERITONITIS. — The symptoms of acute peritonitis vary with the causes which produce it and with the portion of the membrane primarily and chiefly affected. As this form of the disease often originates in, and is limited to, a part only of the peritoneum, although often extending more or less rapidly and generally, I shall first describe the symptoms of the more *partial states* of peritonitis, and next those of *general* peritonitis.

9. *A.* PARTIAL PERITONITIS is most frequently observed after *surgical operations*, in connection with incarcerated or strangulated *hernia*, and consecutively of inflammation of the *appendix cæci*, as shown in the article CÆCUM, and of *metritis, ovaritis*, and *cystitis*. It is often also consequent upon, or associated with *splenitis, hepatitis, enteritis*, and *dysentery*; and upon *chronic ulceration and perforation* of the *stomach* or of an *intestine*. Indeed, partial peritonitis is often consecutive of inflammation of parts enveloped by this membrane, the disease proceeding no further, when occurring in a previously healthy state of the frame, than in the production of coagulable lymph, and the affection and agglutination thereby of the opposite surface, terminating in adhesions which, as will be shown hereafter, time will modify or alter.

10. *a. Partial peritonitis*, consequent upon *local injury, surgical operation*, or occurring without any very obvious cause — *Peritonitis partiaria traumatica et spontanea* — generally commences with pain confined to a particular part of the abdomen; often with rigors or chills, but sometimes without either; with tenderness on pressure, and with slight fulness. To these soon succeed the usual attendants of symptomatic fever; increased or more constant pain and tenderness; a somewhat swollen, hard, and hot state of the most painful part; nausea, vomitings, and an anxious expression of the countenance, in the most severe cases. The bowels are confined, but stools are usually procured by active purgatives and enemata. The pulse is frequent, small, hard or constricted. In some instances the complaint proceeds no further, and either gradually subsides or is followed by indications of circumscribed effusion, or more rarely of purulent collection. In other cases the disease extends, and assumes, with greater or less rapidity, all the characters of general peritonitis (§ 19.).

11. *b.* Peritonitis connected with *incarcerated or strangulated hernia* — *P. Hernialis* — *P. ex strangulatione* — presents similar features to the above, being only more intense and rapid in its course. The symptoms of partial peritonitis may exist, in cases of hernia, without any appearance of hernial tumours, and without the bowels being obstructed. In these cases, most probably only a small portion of one side of the bowel is strangulated, the canal not being thereby obstructed. A very interesting case of this kind occurred many years ago in a cook in my family, who had been subject to femoral hernia. She was removed to Guy's hospital, where she remained for a very considerable period under the care of Sir A. COOPER and [Mr. CALLOWAY, who agreed with the author in considering the case to be one of partial peritonitis from the strangulation of a

small portion of one side of the sigmoid flexure of the colon. No tumour could be detected in the seat of the hernia. She ultimately recovered without an operation. Partial peritonitis, arising from internal strangulation, or even from the strangulation caused by the adhesions or bridles formed by an old partial peritonitis or omentitis, or from the operation of hernia or other local causes, presents the same symptoms as have been already noticed, and usually pursues a most unfavourable course, the inflammation extending with greater or less rapidity, with obstruction of the bowels and its consequences.

12. *c.* Inflammation not infrequently commences in that portion of the *peritoneum covering the appendix vermiformis and cæcum* — *Peritonitis partiaria cæci* — and is either more or less limited to it, or extended much farther. In most of these cases the disease arises, as I have shown in the article Cæcum, from inflammation of the appendix caused by the passage into it of hard substances, as the stones of fruit, gall-stones, &c. The symptoms are chiefly acute pain in the cæcal region, with distension, great tenderness, fulness or swelling, tormina, costiveness, nausea, and occasionally vomiting, with symptomatic fever. The inflammation may continue limited to this portion of the peritoneum and the more immediate vicinity, terminating either in suppuration or in gangrene of the appendix, or it may extend much further over the peritoneum, and ultimately become general. Several cases illustrative of these states and terminations of this form of partial peritonitis have come before me, and some of them are fully noticed in the article Cæcum.

13. *d. Inflammation of the peritoneum reflected over the abdominal muscles* — *Peritonitis superficiaria* — *P. antica* — *P. externa* — was first noticed by J. P. Frank, and afterwards by Hildenbrand. They considered that this variety might be distinguished from inflammation of the visceral peritoneum. They remark, that it is attended by extreme tenderness of the abdomen, particularly at the umbilical region; by an extension of the inflammatory action to the cellular tissue connecting this membrane with the muscles; and often by the effusion of lymph into the sheaths of these muscles, causing extreme tension, hardness and swelling. This variety usually commences with rigors, chills, and irregular heats, preceded and attended by a fixed, acute and burning pain, remarkably increased by coughing, and by motions of the trunk. There are marked heat of the abdomen; swelling and hardness, particularly in the course of the recti muscles; occasionally distinct and circumscribed tumours; intolerance of the touch of the bed-clothes, and of the slightest contractions of the abdominal muscles; and symptomatic inflammatory fever, with its usual attendants. The vomiting and obstinate costiveness accompanying some other states of peritonitis are not usually remarkable in this. These symptoms may, however, be present, and be attended by anxiety, nausea, and dyspnœa, as the inflammation becomes more extended, and by singultus, laboured respiration, &c., when it mounts to the diaphragm, as it usually does in the most severe and unfavourable cases.

14. *e.* If the inflammation be seated in the *peritoneum covering the psoæ and iliac muscles* — *Peritonitis psoitica* — *P. partiaria postica* — many of the symptoms already mentioned, with others which are proper to this seat, are complained of. Some of these occasionally resemble those attending hepatitis. Pain is felt in the back, sometimes obtuse, more frequently very acute. It is often referred to either flank, or to some part above the bladder on one side. An obtuse pain, occasionally with numbness, passes through the groin to the thigh, which the patient cannot stretch out without an increase of suffering. The urinary functions are not disturbed, and the bowels are not obstructed. There is more or less tenderness on pressure, according to the situation and severity of the inflammation.

15. *f. Dorsal Peritonitis* and *Mesenteritis* — *Peritonitis dorsualis* — *P. mesenterica* — are the most obscure of the several varieties of peritonitis; but it is very rare to observe inflammation of the peritoneum covering the dorsal and lumbar spine without the mesentery and intestines being more or less implicated. When the disease originates in this situation, acute pain is felt along the spine, which is much increased upon extending or straightening the trunk, or upon drawing it upwards or backwards, upon extending the limbs, and upon firm pressure of the abdomen. The febrile symptoms are most severe, with marked affection of the stomach and bowels. (See art. Mesentery — *Inflammation of.*)

16. *g.* The *omentum* may be the principal seat of the inflammation — *Peritonitis omentalis* — *Epiploitis* — *Epiploïte*, Fr. — but it is extremely difficult to distinguish this state of the disease from that which is more or less extended. Indeed general peritonitis commonly implicates the omentum; and this is more particularly the case in the asthenic and puerperal states of the disease. Or, if peritonitis commences in this situation, it rapidly extends in the way already indicated, to all the parts coming in contact with the inflamed omentum. J. P. Frank states that, in true epiploitis, the epiploon is generally greatly thickened, and that he has seen it in several instances upwards of an inch in thickness. Omentitis is usually attended by acute burning pain of the anterior part of the abdomen, above and below the umbilicus, but chiefly between the epigastrium and umbilicus, with extreme tenderness, a sense of tension, slight hardness, and marked swelling; and by acute symptomatic fever; but, these symptoms are also present in most cases of general peritonitis, of which, however, omentitis is often a more or less considerable part.

17. Omentitis may be *associated* with inflammation of one or more of the contiguous viscera, as of the liver, stomach, colon, or small intestines, and by the symptoms more especially belonging to such complication. Indeed simple omentitis rarely occurs, unless in connection with some cases of hernia; it being usually associated with inflammation of contiguous portions of the peritoneum. It should also be recollected, that the most severe cases only of omentitis present the acute symptoms just mentioned; and that slighter or *sub-acute* cases sometimes occur, in which the symptoms are milder, but more insidious and equivocal. I have even met with omentitis in a *chronic state*, and nearly limited to the omentum, with the exception of some adhesions to contiguous parts of the peritoneum, covering portions of the bowels and abdominal parietes. These

cases have been generally in females somewhat advanced in life, and chiefly in those who have been subject to *umbilical hernia*. The *adhesions* consequent upon omentitis and the extension of the inflammation to contiguous portions of the peritoneum, may become, even at a remote period after the recovery of the patient, the cause of internal strangulation of a portion of intestine. Many instances of this occurrence might be adduced if it were necessary.

18. Omentitis, in a very acute form, often extending to contiguous parts of the peritoneum, is frequently observed in the course, or as a consequence, of *hernia;* and when the hernia consists of a portion of omentum and becomes strangulated, the inflammation thus induced often terminates in gangrene, which is either limited to a part of the omentum, or is extended to parts of the peritoneum and intestines. Omentitis may likewise, in either an acute or sub-acute state, terminate in *suppuration*. In this case the matter may find its way, by perforation, into the bowels, or externally through the parietes of the abdomen. J. P. FRANK states, that he has met with instances of this kind, but they are very rare.

19. *B.* GENERAL PERITONITIS.—The more general states of peritonitis, occurring in a person of good constitution, or in a sthenic form, usually commence with rigors or chills, more or less severe and prolonged, with acute pain, soreness and tenderness in the abdomen, and aching in the back or limbs. The abdominal pain soon becomes the chief symptom; and is sharp, burning, pungent, or cutting, and is attended by a sense of tension, or of heat and distressing distension. It is aggravated by pressure, by efforts to vomit, or to pass a stool, or to pass the urine, or even by the slightest movement in bed. The patient cannot endure the weight of the bed-clothes, or of a fomentation. He lies on his back with his knees drawn upwards, thereby favouring relaxation of the abdominal muscles, and removing a part of the pressure of the bed-clothes from the abdomen. In some cases the pain is less acute, or remits somewhat for a short time, and returns with much severity. In others it is felt chiefly on pressure, or upon any effort; and more acutely after intervals, or when flatus is passing through or distending portions of the intestines. The pain is usually most severe about the umbilicus, or between this place and the hypogastrium; but it continues most acute at the part where it commenced, even when it extends most rapidly over the abdomen, which is hot, distended, and flatulent.

20. As the disease advances and is extended, the pain is increased by respiration, which soon becomes short and superficial. There are also nausea, frequent retchings, and vomiting of the fluids taken, with mucous matters, and sometimes with bile, more or less thirst, and generally constipation. The tension of the abdomen is at first attended by a marked contraction of the abdominal muscles, under the hand of the physician, owing to the increased sensibility being attended by augmented susceptibility, and disposition of the muscles to contract energetically, when the sensibility is excited. Subsequently, or after a day or two — seldom later, but often after a few hours only — the feeling of tension is attended by much distension, which varies in amount, and in the rapidity of appearance, with the intensity, and the general diffusion of the inflammation. The circumstances proper to the patient, however, modify the distension considerably; it is greatest in females of a relaxed habit of body, and soon after parturition; and least in males, of a spare habit of body, with strong or rigid muscles. In this state or form of peritonitis the abdominal distension is equal throughout; any irregularity which may be felt arising chiefly from muscular contractions under the hand of the examiner.

21. *Percussion* can hardly be endured; but at an early period, the clear sound which is emitted evinces that the distension is owing to the accumulation of flatus; but this sound becomes more dull as the disease advances, particularly in more depending parts of the abdomen, owing to the collection of serum, whilst it still continues clear, or even more so, around or above the umbilicus. The ear or stethoscope applied in different parts of the abdomen sometimes detects a rubbing or friction-sound similar to that often heard in pericarditis or pleuritis; and this sound is caused by the motions of the opposite inflamed surfaces during respiration.

22. The countenance is pale, expressive of anxiety and suffering, and the features are sharpened and sunk. The patient continues motionless on his back, the least inclination to either side increasing his suffering; and he is afraid of quenching his thirst, lest vomiting should ensue and augment his distress. Respiration becomes more short, frequent, interrupted, and shallow, the action of the diaphragm increasing the pain. The pulse is frequent, small, constricted, or hard. The skin is hot and dry; the urine scanty, high-coloured, and often turbid.

23. The *course* of general sthenic peritonitis is usually rapid, and characterised by a progressive aggravation of the symptoms; especially of the tenderness, tension, and swelling of the abdomen; and of the sickness and vomitings. The pain and tenderness become more general, and diffused through the abdomen, extending to the back and loins; the face paler and more sunk; the anxiety and distress greater; and the pulse and respiration smaller and quicker. Having reached its acmé, the disease may continue for one, two, or three days, or even longer, nearly stationary, but with irregular exacerbations and remissions. Having, however, become general and thus far advanced, it most frequently is not the less fatal, even when prolonged, as it sometimes is, to seven or eight days. General peritonitis, however, often runs its course in a much shorter period — in three or four days, or even in less time; but this rapid termination occurs most frequently in the *asthenic* and *puerperal* states of the malady.

24. II. ACUTE PERITONITIS presents certain VARIETIES OR MODIFICATIONS requiring particular notice. The most remarkable of these occur in the *puerperal states*, — *Puerperal Peritonitis*, — but, as they present so many peculiarities, and are so often complicated with other affections connected with these states, I shall treat of the puerperal forms of peritonitis in connection with those maladies with which they are so often associated, under the general head of PUERPERAL DISEASES.

25. Some authors have noticed what they have denominated *bilious* and *nervous forms* of perito-

nitis; but these require merely a passing notice. The *former* of these is merely peritonitis occurring in connection with an accumulation of bile in the biliary organs, and its discharge, chiefly by vomiting, during the course of the disease. The *latter* is characterised by a more than usual predominance of nervous symptoms — of acute pain, of low delirium or of convulsions, of restlessness, and lastly of coma with subsultus of the tendons. It is obvious that these modifications are dependent upon previous disorder and temperament, and may appear in either the sthenic or asthenic forms of the malady.

26. i. ASTHENIC GENERAL PERITONITIS — *Erythematic or Erysipelatous peritonitis* — most frequently occurs in the puerperal states, and will receive due attention in connection with these states.—*a.* But it sometimes occurs independently of these, in debilitated and broken-down constitutions; in cachectic habits; in connection with erysipelas, or with morbid states of the circulating fluids; in the course of exanthematous, adynamic or other fevers; after spontaneous perforation of the stomach or intestines, or even of any portion of the peritoneum; and after the operation of *paracentesis abdominis.* Under these diverse circumstances asthenic peritonitis presents varied phenomena, as respects both the local and the constitutional symptoms. Still it exhibits many, and these the most characteristic, that are common to all circumstances; and chiefly the appearance of symptoms diagnostic of it after previous disorder, or during a state of ill health; its often sudden accession and rapid progress, and frequently without previous or concomitant rigors or chills; the greater softness, rapidity, smallness, and weakness of the pulse; the cachectic or even livid hue of the countenance and general surface, as when it occurs in the progress of fever; the almost sudden distension of the abdomen, and indication of serous effusion into the peritoneal cavity; the more profound prostration; and the rapid supervention of singultus, with frequent regurgitation of the contents of the stomach, coldness and dampness of the extremities, and other fatal symptoms.

27. *b.* When the peritonitis results from *spontaneous perforation* of any portion of the *digestive canal* (see DIGESTIVE CANAL, § 42.), or from perforation of this membrane covering any of the abdominal viscera, by tubercular softening, disease, or rupture of vessels, or other lesions affecting the organs over which it is reflected, it is usually excited by the escape of fæcal, morbid, or other matters into the peritoneal cavity; and although these matters may not extend much beyond the place through which they passed, yet they excite a spreading or asthenic inflammation, attended by a copious, turbid, serous, or sero-albuminous effusion, the constitutional powers being incapable of forming coagulable lymph, or such as can agglutinate the opposing surfaces, and thereby limit the extension of the inflammation or prevent the diffusion of the matters passed through the perforation over the peritoneum. In all these cases, the pain and tenderness are first referred to the seat of perforation, which is most frequently in or near the right iliac region; but they rapidly extend, and are followed by all the symptoms just mentioned, which always terminate fatally, sometimes within twenty-four hours, and seldom later than two or three days.

28. *c.* Peritonitis from *paracentesis abdominis* usually presents similar characters, and pursues the same course as that just noticed. It is one of the most frequent varieties of asthenic peritonitis, and is almost uniformly fatal. It is very closely allied in its symptoms and progress to that state of the disease which has been denominated *erysipelatous peritonitis* by some pathologists, from the connection sometimes subsisting between erysipelas and asthenic peritonitis. Indeed the connection is sometimes obvious, as when erysipelas attacks the parts punctured in paracentesis, as it sometimes does, particularly when it is prevalent in a hospital, or is epidemic in the locality. In rare cases, also, asthenic peritonitis occurs on the subsidence of erysipelas from external parts of the body. I have met with an instance of it consequent upon the disappearance of erysipelas from one of the lower extremities; and Dr. ABERCROMBIE mentions another. In these, the patients complained of acute pain through the abdomen, with tenderness on pressure, great anxiety, and restlessness; death taking place within thirty-six hours. On *dissection*, the appearances were nearly the same in both instances; the intestines were all distended by flatus; the peritoneal surface was of a dark red, passing to a dull leaden colour, and the cavity contained much turbid serum, somewhat reddened, or of a sanious hue.

29. ii. *Hæmorrhagic peritonitis* has been noticed by BROUSSAIS and others; but it is extremely rare. It is not, however, to peritonitis consequent upon rupture of a blood-vessel, or of a viscus, as of the spleen or liver, that this term has been applied; but to asthenic peritonitis occurring in the hæmorrhagic diathesis, and attended by an exudation of blood from the capillaries of the peritoneum, without rupture. I have never met with a case of this form of peritonitis; but BROUSSAIS states that the symptoms are inflammatory at the commencement, and rapidly pass into those indicating great depression of the powers of life; the pulse soon becoming rapid, small, and soft; and death quickly supervening, with convulsions, cold and damp extremities and surface, and the other symptoms attending the fatal sinking of the asthenic and other states of the malady. The effused blood remains fluid, is mixed with serum, and the peritoneum appears generally affected.

30. iii. *Latent peritonitis* occurs sufficiently often to deserve notice at this place, although less frequently than is supposed by some writers. Indeed it is very rarely that the disease remains latent when it occurs primarily, and perhaps never, when it affects a robust or previously healthy person. It is chiefly when peritonitis attacks persons who are exhausted, cachectic, or otherwise diseased; or who are labouring under some other malady which attracts the chief attention, or who are maniacally or otherwise insane, that the characteristic symptoms are either imperfectly developed, or overlooked from their slight or mild form, and from the more prominent affection of a distant part. It is chiefly from the absence of pain, tenderness, and pyrexia, and from the insidious progress of the disease, that the nature of it is unsuspected. The appearance and expression of the features; an attentive examination of the abdomen by pressure, percussion, &c.; and the position of the patient in bed, will gene-

ally disclose, without much doubt, the nature of the malady.

31. iv. The Terminations *of acute general peritonitis* are much influenced by the predisposing and the exciting causes; by the state of the patient at the time of attack; by the particular form the disease may assume; and by the several circumstances and influences to which the patient has been or is subjected. — *a. Resolution* of the inflammatory action sometimes occurs, and chiefly when the disease is of the sthenic form, is of a mild character, or less intense than that described above (§ 19.); or, although equally severe with it, if the symptoms become ameliorated by treatment. A diminution of pain, tension, and tenderness; less frequent retchings; an improved state of the pulse and of respiration, and a more natural expression of countenance, are favourable indications, especially if they are accompanied by perspiration, a more copious secretion of urine, and freer alvine evacuations.

32. *b.* In many instances of resolution of sthenic peritonitis, evidence of *adhesions* having formed between parts of the contiguous surfaces, is furnished in the continued tenderness or pain, increased by pressure, or accidental shocks, or quick motion, or by turning in bed, that is felt in one or even more parts of the abdomen; although the patient may apparently have nearly, or even altogether recovered. That these symptoms result from adhesions has been proved by the subsequent history of some cases of this kind; these adhesions becoming the cause of internal strangulation of a portion of intestine, of partial peritonitis, and of the patient's death. In other instances the inflammation, instead of being completely resolved, is only abated, the symptoms gradually subsiding in severity, without recovery taking place. In these the acute passes into the *chronic disease* (§ 36.).

33. *c. Effusion* of serum, or of sero-albuminous, or even of sero-sanguineous or sero-puriform matter, more rarely the latter, into the peritoneal cavity, is rather a consequence than termination of the disease. At an early stage the *effusion* is slight, but at an advanced period, and as the powers sink, it becomes more and more copious. The abdominal pain and tension then subside or altogether cease; the abdomen being soft, relaxed but tumid, and dull on percussion, excepting at its most elevated part, where the sound emitted indicates flatulent distension of the intestines. Fluctuation is sometimes remarked, but occasionally it is obscure, or not evident, owing to the effusion being either traversed by adhesions, or existing between the folds of the mesentery and convolutions of the intestines, or gravitating to the iliac and pelvic regions.

34. *d. Gangrene* very rarely occurs in general peritonitis, even when it is most asthenic in its nature. It appears chiefly when the disease commences partially, as in the appendix of the cæcum, or from strangulation or local injury. Its occurrence is indicated by sudden cessation of the pain and tension of the abdomen; by hiccup, and by coldness and clamminess of the extremities and general surface; by rapid, weak, small, thready, and intermittent pulse; and sunk, dark, and Hippocratic countenance.

35. *e. A fatal issue* may be the consequence of effusion and its effect upon the system, in connection with the extent of lesion, and, in rare cases, of incipient gangrene. But it most probably chiefly results from the shock or influence produced upon the vitality of the frame, by the great extent of the inflammation and consequent lesions; and this is especially the case when the disease is intense, and the peritoneal surface extensively affected at its commencement, for in these cases the powers of life most rapidly sink, especially when the malady presents an asthenic character. Where effusion is not extensive, and consists chiefly of serum, or of a sero-albuminous fluid, it does not necessarily occasion death, the patient sometimes recovering; the fluid being absorbed and partial adhesions still remaining, or the disease passing into the *chronic form.*

36. A fatal issue occurs chiefly when the more intense cases of the sthenic form of the disease have been neglected at their commencement, and the more unfavourable consequences of inflammation have supervened before the treatment has commenced. In these, this issue usually takes place at periods varying from two or three to eight or nine days. In the several varieties of asthenic peritonitis noticed above, this issue generally occurs, unless in a few instances, where the disease is judiciously treated at its commencement, in from one to two or three days. This *termination* is preceded and indicated by increased alteration of the countenance; by greater rapidity, weakness and smallness, or irregularity of the pulse; by coldness and dampness of the extremities; and by more frequent vomitings, the contents of the stomach being rejected without retchings or effort, and by mere regurgitation. On the accession of these unfavourable symptoms, the state of the respiration and the occurrence of singultus indicate the extension of the disease to the diaphragmatic peritoneum. The patient is now sometimes restless or oppressed, and the breathing is laboured or thoracic; but he still lies on the back, and makes no effort to move, even when fluids are regurgitated from the stomach, these being thrown over his person and the bed-clothes. The matters thus ejected are fluid, with some mucus and green bile. He soon afterwards either sinks into a state of coma, quickly terminating in dissolution, or he is attacked by convulsive movements, with difficult or laboured respiration, spasms of the diaphragm, and asphyxia; or he sinks with all the indications of vital exhaustion.

37. III. Chronic Peritonitis. — This form of the disease was not duly recognised and investigated until the commencement of the present century. Bichât was the first who distinctly and correctly noticed it, and Dr. Pemberton subsequently described one of its forms. Soon afterwards, Dr. Baron fully illustrated the tubercular variety of chronic peritonitis; and about the same time Broussais, Montfalcon, Gasc, and the Author, further investigated the disease. Although overlooked as an idiopathic and distinct malady, by writers of the seventeenth and eighteenth centuries, still cases illustrative of its nature are to be found in the works of many of them, as shown in a memoir published by me many years ago, containing the history of some cases of it which had occurred in my practice. The writings of Columbus, Fantonius, Fernelius, Ballonius, Tulpius, Lomius, Bonetus, Tissot, Hoffmann,

BURSERIUS, and MORGAGNI, at the places mentioned in the *Bibliography*, furnish some interesting cases and remarks, illustrating the history of chronic peritonitis, and showing how frequently this malady was confounded with colic and mesenteric disease.

38. i. The HISTORY *of our pathological knowledge of chronic peritonitis* must nevertheless be considered as very limited. Although the medical writers of the two last centuries furnish no accurate description of this highly dangerous disease, yet their writings are not altogether deficient in proofs of a partial acquaintance with its nature; but they failed in recognising the lesions found on dissection of fatal cases as the results of chronic inflammation. COLUMBUS (*De Re Anatom.*, lib. xv.) describes "Conglomerationem intestinorum, natam videlicet ex ultimis ilei partibus una complicatis, tumoremque in hypogastrio exhibentibus." And MORGAGNI adduces several cases (*Epist. Anatom. Med.* 39. sect. 24—32.) in which he found the intestines agglutinated into one mass, and their coats possessed of an almost cartilaginous firmness. One of these cases occurred after ascites, and sufficiently marks the acute nature of the dropsical affection. TULPIUS (*Observationes*, lib. iv. p. 348.) mentions a similar instance in a female who had been affected from an early age with ascites: upon dissection, the peritoneal coverings were every where thickened to such a degree as to equal that of the ring finger.

39. MORGAGNI, when adducing the cases just referred to, mentions others from preceding writers, which are, as well as those seen by himself, illustrations of chronic peritonitis occurring without tubercular formations. He describes these cases as unfavourable results of prolonged or repeated attacks of colic and of ascites; and he describes others as forming varieties of abdominal tumours, owing to the thickening and induration of the peritoneal coat, and the agglutination of the intestines to each other and to one or more of the other abdominal viscera.

40. It is singular, however, that MORGAGNI, with all his pathological knowledge, did not attribute the changes in the peritoneum which he has so fully and even frequently described, and with which he occupies nearly the whole of his thirty-ninth epistle, to inflammation. He is very much puzzled to account for the changes, now universally ascribed to chronic inflammatory action, and enters upon a somewhat lengthy disquisition (sect. 31.) in explanation of it. He ascribes the pain to flatulent distension of the bowels; and the agglutination of the opposite surfaces to the pain and distension, which he considers to have caused an exudation of a glutinous matter from these surfaces. The thickened and indurated state of the peritoneum, often found in connection with more or less serous effusion, he imputes to the effect produced upon this membrane by its prolonged maceration in an acrid or morbid serum. When adverting to the symptoms, he remarks, "Pulsus humilis et debilis potius, et qui, si bene attendas, sibi obscure, dissimilis sit: abdomen autem tensum, et durum, et cum dolore quodam; facies denique insoliti aliquid, sed in aliis aliud, ostendens," &c.

41. HOFFMANN, after describing the more acute affections of the intestinal tube which terminate either fatally or in health, in a very short time, mentions those of a chronic character, which he denominates "dolores chronici, vel colicæ diuturnæ." He describes them as continuing during many weeks, and even for the space of a twelvemonth, with various intermissions and exacerbations. On dissection, "the intestines are found constricted, their coats thickened, callous, and scirrhous," &c. (*De Intestinorum Doloribus*, sect. ii. cap. v. p. 180.)

42. Other instances could be also adduced, from BONETUS (sect. xxi. *Observat.* 3—8.), from FANTONIUS (*Observationes, Epist.* 4.), and from the Acta Academ. Nat. Cur. (tom. i. Observat. 87., et tom. vi. Observat. 124.), in all of which the intestines, omentum, and mesentery, were accreted into one mass. BURSERIUS mentions similar cases, which he considered as arising from an "arthritica, rheumatica, herpetica, scorbutica, vel scabiosa materies, retropulsa." Speaking of these diseases, which he denominates "intestinorum conglomerationes," he remarks, "Similem (conglomerationem) vidi in muliere colica chronica jamdiu afflicta, et demum marasmo confecta." (*Institutiones Medicinæ*, vol. iv. p. 362, *et seq.*)

43. JODOCUS LOMIUS furnishes some remarks which may be referred to this disease. "I find it observed," he says, "by some learned men, that the peritoneum, or at least those membranes which cover the abdomen and parts of the belly, are likewise afflicted with very grievous pains. These pains, although they in nowise belong to the colic, yet they are equally violent. And these, as they are very severe, so likewise are they very long, and yield to none of those remedies which are proper in the colic, whether medicines, fomentations, and clysters; but generally succeed long fevers, and those kinds of bilious diseases which are not easily solved, and have been often observed to terminate, as it were critically, continued fevers, as well as tertians and quartans. The mesentery may also be seized with an inflammation; at this time there is an inward weight, but no manifest pain; a fever arises, but this is moderate," &c. (*Observat.* p. 316, *et seq.*)

44. It is not, however, to the scanty details furnished by the earlier writers in modern medicine, that we are to attribute the progress made in our knowledge of the pathology of chronic peritonitis; but to the researches of BICHÂT, PEMBERTON, BARON, BROUSSAIS, MONTFALCON, GENDRIN, GASC, SCOUTTETTEN, and HODGKIN, that we are chiefly indebted. Up to the time of the earliest of those writers, this disease was confounded, as I have now shown, with colic, mesenteric affections, or tumours of the omentum. And it is very probable that the varieties of colic, particularised by many of the older writers under the appellations arthritica, rheumatica, scorbutica, metastica, inflammatoria, symptomatica, diuturna, chronica, endemica, &c., were actually chronic inflammations of this membrane, the disease occurring in the manner indicated by those specific names. In addition to this catalogue of names, others from the same and different authors may be mentioned, as constituting varieties of colic, as colica herpetica, C. ex scabiosa materie retropulsa; C. ex perspiratione retenta, atque ad intestina translata; C. mesenterica, &c., which, most likely, were truly affections of a slow inflammatory nature, attacking this membrane, and either simple or

rimary, or associated with tubercles. FERELIUS appears to have been of this opinion ; he ays,—"Ab acri vero erodentique humore, aut tiam ab inflammatione quisquis ortus fuerit, dolor olicus fixus etiam est, sed cum febricula, arore, siti et vigiliis ; irritatur esculentis potuentisque calidioribus, a quibus etiam sumpsit riginem." And again "Alii insuper cruciatus uadam similitudine et vehementia colici nuncuantur, quibus tamen non in colo intestino sedes st; sed vel in peritonæum vel in membranis quæ bdomini ventrisque partibus obtenduntur. Hi ane gravissimi sunt, et admodum diuturni, ac eque clysteribus, neque medicamentis, neque fonentis, neque iis remediis quibus qui vere sunt colici lolores, deliniri solet." (FERNEL. *Pathol.* lib. vi. ap. vi. p. 159.) Although WILLIS did not consider olic to be an inflammatory disease, he believed the part primarily affected by it to be the mesentery, " which is highly sensible," he adds, "and through which a morbific matter is conveyed, not by means of the arteries, but by the nerves, and its seat is not he proper coats of the intestines." (*Pathol.* p. 11. c. xv.) Many a case of chronic peritoneal inflammation probably is, even in the present day, aken for colic, but more especially for diseased mesenteric glands ; the size of the abdomen, its irregular hardness, with the hectic, emaciated limbs and dry foul surface, being symptoms, which may readily be mistaken, if not carefully inquired into, for those of the latter affection. Indeed, disease of the mesenteric glands may be induced by continued irritation, existing primarily in the serous membrane ; and, in the tubercular form of chronic peritonitis, I have shown that tubercular disease of these glands is often also present. It may be also granted, that disease sometimes takes place in these glands, coetaneously with morbid action in either of the mucous or serous membranes, in consequence of, and depending upon, the nervous influence supplying the capillary vessels distributed to those textures, and upon the state of the circulating fluids ; chronic inflammation with tubercular productions resulting therefrom in scrofulous constitutions.

45. Chronic peritonitis not unusually supervenes on continued exanthematous and remittent fevers. I have met with several instances of this connection. TISSOT (in his dissertation *De febribus biliosis*, p. 143.), mentions an affection following fever which continued for many months. He gives the following characteristic symptoms: —"Accessit diarrhœa sæpe recurrens, tumet frequenter tympanitice abdomen, et fere semper dolet, ita ut minimam vestium constrictionem fere nequeat; deletur prorsus appetitus ; urget sæpe sitis; parvus est somnus; urinæ paucæ, turbidæ." This case evidently puzzled TISSOT ; for he asks "Quænam causa morbi ? He adds, " Tabes succedat, tympanitis, ascitis, icterus, mors." He makes no mention of any dissection. Chronic peritonitis may follow acute dysentery ; and even during the continuance of the chronic form of that disease, from an extension of the inflammatory action to the serous membrane. I have met with several instances of this occurrence in the course of practice ; and they are often seen in climates where dysentery is endemic ; and many cases are recorded by writers in the last century that illustrate this succession.

46. Although chronic peritonitis sometimes occurs as a secondary affection, and is complicated in the manner just alluded to, it appears also as a primary disease. This independence of inflammation of the peritoneum of disease of the contiguous structures did not escape the penetrating mind of JOHN HUNTER. "If the peritoneum," he says "which lines the cavity of the abdomen, inflames, its inflammation does not affect the parietes of the abdomen ; or if the peritoneum covering any of the viscera is inflamed, it does not affect the viscera. Thus the peritoneum shall be universally inflamed, as in the puerperal fever, yet the parietes of the abdomen, and the proper coats of the intestines, shall not be affected. On the other hand, if the parietes of the abdomen, or the proper coats of the intestines are inflamed, the peritoneum shall not be affected." (*On the Blood and Inflammation*, p. 244). BICHÂT remarks— " L'affection d'un organe n'est point une conséquence nécessaire de celle de sa membrane séreuse, et reciproquement, souvent l'organe s'affecte sans que la membrane devienne malade," &c. (*Anat. Générale*, vol. i. p. 551). And SPRENGEL observes—" Neque facile ad reliquas intestinorum tunicas transit adfectus hujus externi velamenti, unde peritonæi inflammationes sæpius observamus sine ullâ inflammatione tunicarum musculosarum et nervearum." (*Institut. Physiol.* t. i. p. 343.)

47. ii. DESCRIPTION.— *Chronic peritonitis* appears in *two distinct forms:* 1st. It occurs *primarily*, and then generally gradually and insidiously, and most frequently in connection with tubercular formations ; 2d. It appears *consecutively*, or succeeds to the acute form of the disease, or to inflammation of some viscus that has extended to the peritoneal covering. As in the acute form, so in this, the inflammation may be either *partial* or *general*. It is most frequently the former when it proceeds from local injury, or from inflammation of a subjacent viscus ; and it is often general when it is granular or tubercular, or is associated with serous or dropsical effusion : but the general, as well as the partial state of the malady, may be consequent upon some other disease, particularly dysentery, enteritis, hepatitis, inflammation of the uterus and its appendages, &c. Dr. BARON and M. LOUIS concluded that chronic peritonitis, occurring primarily, is always associated with tubercles. As early as 1821, I combated this opinion, and adduced two cases which were exceptions to the law which these pathologists believed to exist. More recently Dr. HODGKIN has stated that the form of peritonitis which is accompanied with copious effusion, occurs without any tubercles ; and the same may be said of other cases, in which the concrete product of inflammation had been more considerable. However, it must be admitted that chronic peritonitis appearing independently of injury, of rheumatism, of visceral disease, or of cutaneous eruptions, is generally tubercular, and is observed chiefly in scrofulous constitutions ; and that when it is consecutive of these maladies, or appears from the suppression of external affections, it is rarely associated with tubercular formations.

48. *A. The symptoms* vary at the commencement of chronic peritonitis, with the exact nature, seat, and associations of the disease. — *a.* When it is *tubercular*, it is always insidious, slow, and often latent, until it is considerably advanced ;

and soon after it is recognised, it often rapidly terminates fatally. At first there is often very little pain, and in some cases none at all. In others, griping or colicky pains are occasionally felt, and frequently after long intervals. A sense of broiling or burning heat is complained of in the epigastric and umbilical regions. The bowels are irregular, more frequently relaxed than confined, the excretions being offensive, deficient in bile, and otherwise morbid. Nausea is is often complained of, but vomiting is not frequent unless at an advanced stage of the disease. The matters thrown up are fluid, with mucus and a little green bile, and are more or less acid. The urine is scanty, high-coloured, and deposits a reddish sediment. The tongue is usually red, glazed, and chapped; its surface being often slightly fissured and uneven. The surface of the body is foul, lurid, and dry, but perspires freely during the night. The pulse is quick, small, and weak. The body is always more or less emaciated; the countenance and eyes are sunk; and the extremities cold, attenuated, and slightly livid or dark. A livid or dark circle surrounds the eyes; and the face and whole body appear as if faded or blighted.

49. The *abdomen* is always large or tumid, relatively to the rest of the body, particularly at an advanced period of the malady. If the peritoneal cavity contains any fluid secretion, slight or obscure fluctuation will be detected, and there will be dulness on percussion, particularly in more depending situations. When pressing or kneading the abdomen, a doughy state is remarked; and the inclosed viscera and the abdominal parietes feel as if they constituted one mass. Tenderness is often not considerable; but it varies and is more remarkable in one part than in others, and the seat of it varies in different cases, and even in the same patient at different periods. The abdomen often presents irregularities, which are sometimes mistaken for enlarged mesenteric glands. These irregularities are generally owing to the development of larger tubercular masses, accreting the intestines, and occasionally by scybalæ in the cells of the colon. These masses of tubercular accretion are often more manifest on examination, when a fluid effusion has been removed by absorption.

50. Tubercular peritonitis is often insidious and slow in its early stages, and may thus be almost *latent* until shortly before death. In these cases, however, there have been generally an irregular state of the bowels, sometimes nausea, morbid evacuations, and more or less emaciation. But these have proceeded without creating alarm, as they were attended by little, or only occasional pain. At last the emaciation, the blighted appearance of the system, and the relaxed state of the bowels, attract attention; or acute symptoms are suddenly complained of, especially acute abdominal pain, increased disorder of the bowels, vomiting, and rapid sinking of the vital powers. As soon as these symptoms supervene, the disease proceeds with variable rapidity to a fatal issue.

51. In a few cases the abdomen seems more flat than usual; but is then always duller on percussion than natural. The surface of the belly is generally warm, dry, and of a livid or dark hue; and in many instances it is traversed by large blue, or distended veins, indicating impeded abdominal circulation. [In addition to the inequalities just alluded to, the inguinal glands are generally enlarged, and painful on pressure. The diarrhœa, which was at first slight, occasional and interrupted at times, or even alternated with slight costiveness, becomes more continued, and less under the control of treatment, for it then, a will appear in the sequel, is the result of ulceration. The stools are always unnatural, and contain undigested matters. Life is soon afterward terminated by gradual exhaustion of its powers.

52. *b.* When chronic peritonitis is *consecutive* of the acute state, or when it appears from the metastasis of disease, or after visceral inflammations, or after suppressed eruptions, or when it i non-tubercular, although *primary*, it usually presents somewhat different phenomena. In these circumstances, the abdomen is the seat of a deep seated but not very acute pain, which often intermits, and is either increased, or not much complained of unless upon pressure, or when the abdominal muscles are contracted, or when the trunk experiences a shock, as when taking a false step. Nausea and even vomiting are occasionally experienced, and digestion is always difficult food oppressing the stomach, and producing pains in the abdomen as it passes through the intestines In some cases, these pains are felt in a particular part, in others their seats vary. Constipation is often present at an early stage; it is subsequently alternated with diarrhœa; but, at an advanced stage, the bowels are much relaxed, and the stools morbid, sometimes containing undigested substances. Emaciation is considerable, and always greater as the disease advances. The countenance is sunk, anxious, pale, and sallow. The skin is dry, and unhealthy in appearance; the respiration is laboured, short, or quick; and the pulse is frequent, particularly towards evening and night When the chronic disease follows the acute, the severe symptoms of the latter gradually subside and lapse into those attending the former, varying, however, with the exciting causes, and the circumstances developing the primary attack.

53. The state of the abdomen varies with the presence or absence of fluid effusion in the peritoneal cavity. When fluid is present, the abdomen is enlarged, often so as to contrast remarkably with the emaciated limbs; and it is tense, distended, dull on percussion, unless at the more elevated parts. Fluctuation is seldom very manifest, more frequently it is obscure. Occasionally œdema of the lower extremities, and of the more depending parts of the abdominal parietes, is remarked. When there is no fluid in the cavity, the abdomen often appears diminished rather than increased in size. In some it is quite flat; in others it presents a slight or an irregular swelling about the umbilicus, owing to the agglutination of the small intestines. It is generally somewhat dull on percussion; but not more so in the more depending situations. On careful palpation of the abdomen, the experienced examiner will readily feel that the suppleness of health is wanting, and is replaced by an internal resistance or tension, indicating the adhesion of internal parts, whilst the integuments are loose, and move readily over the more tense parts underneath.

54. *c.* Chronic peritonitis may be *partial* or *general*. The former occurs chiefly after inflammation of some abdominal viscus, that has ex-

nded to the peritoneal surface. In this case, e lymph thrown out upon that portion of this rface excites inflammation in a part opposite to, coming in contact with that first affected; and ius adhesions, or thickening of the opposite parts, r both, may be produced, and the disease proeed no further; the patient dying at some subseuent period of some complication of this state of artial peritonitis, or of some disease developed t a more or less remote period.

55. *Partial chronic peritonitis* is sometimes bserved after enteritis, after inflammation of the olon and dysentery, after chronic ulceration and erforation of the stomach or intestines, after heatitis, and after inflammations of the urinary and exual organs. When these maladies induce perionitis in persons not remarkably debilitated, or therwise of good constitutions and habits of body, he disease may not only proceed no further, but t may be so limited, or so latent, as not to give ise to distinctive phenomena indicating its existnce; although slight uneasiness and pains, inreased on sudden motions, jerks, or muscular ctions affecting the abdominal viscera, or on ressure in certain directions, are often present.

56. When, however, peritonitis supervenes ıpon any of the above maladies affecting scroulous, cachectic, or broken-down constitutions; or in persons whose excreting organs are torpid or diseased, and whose circulating fluids are contaminated or insufficiently depurated, it usually spreads more or less, and becomes even *general;* and, in these cases, is attended by more or less of fluid effusion, unless in children, young persons, and the scrofulous diathesis, where it is more frequently accompanied with tubercular formations.

57. *d. The terminations or consequences* of chronic peritonitis are those organic lesions which will be particularly described in the sequel, and which, although most extensive, cannot be individually distinguished by symptoms, as they are variously associated or grouped in most cases; and when either far advanced in their separate states, or associated, give rise to nearly the same phenomena, which are those characterising the advanced stage of the malady.

58. IV. PERITONITIS IN CHILDREN. — Peritonitis may occur even in the *fœtus,* and hence may be *intra-uterine,* and even *congenital*; but it much more frequently appears after birth, particularly between the second and eleventh years of age, and is one of the most important diseases of childhood. It may be either *acute, sub-acute,* or *chronic*; and it may be *simple* and *primary, tubercular* and *consecutive* or *complicated.* It may also be *partial* and *general:* — in other words, in either its acute or chronic states, it may be partial or general, and each of these may be primary and simple, or consecutive and complicated; and, further, any of these states may exist either with or without tubercular formations, although the chronic form is comparatively rarely seen unassociated with tubercles. Moreover, instances have occurred of simple or non-tuberculated peritonitis having been developed in the course of tubercular disease in other organs, as when simple acute peritonitis proceeds from perforation of the intestines or stomach, occurring in the course of tubercular consumption, or of intestinal diseases, associated with tubercles in various organs.

59. *A. Acute and sub-acute peritonitis* is more frequently a *consecutive* than a *primary* disease in children. It rarely occurs primarily and simply in the previously healthy: but most frequently in the course of, or during convalescence from, fevers, particularly eruptive fevers; and especially of those cases which have presented predominant disorder of the abdominal organs or diarrhœa. It may even occur in the advanced progress of the chronic form, and prove fatal in a short time.

60. *a. Pain* is generally the earliest symptom; and is often at first local or limited; but it soon extends over the abdomen, is increased by pressure and motion, and continues to the termination of the malady. *Vomitings,* which are frequent in the peritonitis of adults, are much less so in that of children, and often do not occur until an advanced period. The *bowels* are seldom much confined, particularly as the disease advances. They are more generally relaxed, and the stools become more frequent and morbid as a fatal issue is approached. *Respiration* is accelerated, but short and shallow. The *tongue* is generally moist, and covered by a whitish or yellowish coating. The *appetite* is lost, and there is always great *thirst.* The *countenance* is expressive of pain, anxiety, and distress. It is pale, collapsed, or sunk. *Nervous symptoms* are rarely observed, unless in very young children, and in these convulsions are the chief form they assume. The *position* of the patient is always on the back, with the knees drawn up.

61. *b.* The *abdomen* becomes tumified very soon after pain is first felt, is always tense, and then sonorous throughout upon percussion. When the peritonitis is *partial,* the swelling and tension are often confined to the situation affected; and this partial state of the disease is most frequently observed in the right flank, or in or near to the right iliac region. As the disease advances, the abdomen, particularly in the situation of any manifest tumours, becomes more dull than natural on percussion; but the tenderness often prevents this mode of examination from being practised. When the disease is general, flatulent distension increases and is more manifest. Fluid effusion is seldom clearly evinced by fluctuation. The surface of the abdomen is usually warmer than natural.

62. *c.* There is always more or less *symptomatic fever,* which is seldom ushered in by distinct rigors. The *pulse* is very quick, and commonly the quicker, smaller, and weaker, the more intense and the more general the disease. The urine is scanty and high-coloured, and voided frequently; the skin is hot, dry, harsh, and of a dull unhealthy appearance.

63. *d.* The *duration* of acute peritonitis varies from twenty-four hours to thirty-eight or forty days. When the disease proceeds from perforation of any part of the digestive canal, its duration is usually the shortest, as in adults. When it continues longer than thirteen or fourteen days, it is either partial, or presents a less severe or sub-acute character. When peritonitis *terminates* in *resolution,* the general or constitutional symptoms are ameliorated; the pain subsides or altogether ceases, and the abdomen gradually resumes its natural condition. The bowels become more regular, and the pulse slower and fuller. If much fluid effusion have attended

the inflammation, the abdomen is longer in resuming its former state. If the disease continue to advance to a *fatal issue*, the swelling and tension of the abdomen increase; the countenance becomes more sunk; the bowels more relaxed; the pain more severe and more general, and the pulse more rapid, smaller, and at last inappreciable.

64. *e.* Acute peritonitis is rarely associated with *tubercles* in children; but the chronic form is very often thus complicated. It sometimes, however, supervenes in the course of tubercular formations in other or even distant organs, especially of ulceration of the intestines, in connection with tubercular disease of the mesenteric glands, and of tubercular consumption; and it occasionally appears in the progress of the chronic disease, either simple or tubercular. In this latter case, acute symptoms are suddenly developed; the abdominal pains become more severe; the fever, the distension, and the heat of the abdomen are augmented; the pulse is more rapid, and smaller; and the countenance is more anxious and sunk. The disorder of the bowels increases, and, with the progress of the organic lesions, soon terminates life.

65. *B. Chronic peritonitis* in children is generally associated with tubercular formations, and is often then more or less general. It may, however, occur without this association, especially when it is partial, and consecutive of inflammation of one or more of the abdominal viscera. It may also follow the acute form of the disease, either from the natural decline in the severity of the attack, or from the treatment resorted to.

66. *a. Simple or non-tuberculated chronic peritonitis* can rarely be distinguished from the tubercular during life, unless the history and circumstances of the case be duly considered. When it seems to follow inflammation of some viscus, or the acute disease, in children of a previously healthy frame, and free from constitutional vice, then it may be presumed to exist independently of tubercles. As respects the symptoms, there appears hardly any difference between this variety and the tubercular, about to be noticed. In the former, however, distinct tumour, or inequalities in the abdomen, are more rarely or never observed; and there is often less dulness on percussion. In other respects, the phenomena and progress of both varieties are the same.

67. *b. Chronic tubercular peritonitis* in children is generally attended by *pain* from the commencement, often before the abdomen presents any swelling, although often also contemporaneously with swelling and tension. The pain is in some cases local, in others general, or erratic, but it is not when local or fixed always an indication of the chief seat of tubercular productions. The *tongue* is moist, white, or coated with a yellowish matter at its base; less frequently red and glossy. The *appetite* is frequently but little, or even not at all impaired; it is more generally irregular and capricious. It is sometimes not materially diminished throughout. *Thirst* is generally felt, and it increases with the progress and severity of the symptoms and associated affections. *Vomitings* rarely occur in this state of peritonitis, although they are not infrequent in the acute. *Diarrhœa* is commonly observed, and it increases as the disease advances, especially when ulceration of the intestines present, and this is rarely wanting in the la stage.

68. The *abdomen* presents the most characte istic appearances. At an early period, its for presents little or no change beyond being som what more full and sonorous on percussion. A the disease advances, but at no definite perio the belly becomes distended, and is either son rous throughout, or is dull in some parts an sonorous in others. When the dulness is foun always in the same situation, and is attended b some hardness or doughiness, suspicion of th existence of the disease is generally well founde In some cases an obscure fluctuation is felt in th more dull parts of the abdomen, owing to a pa tial fluid effusion attending the tubercular lesio of the peritoneum. With increased distensio and tympanitic sound there is often more or les tension; which is sometimes greater in one sid or part than in another; and when it is grea the part is elastic rather than hard. As th disease advances, particularly in older childre the abdomen presents many of the chang already noticed. When the tension is ver great, the surface becomes smooth and shinin and afterwards harsh or scurfy, owing to de squamation of the cuticle. The veins in th surface of the belly are then often large and dis tended.

69. *c.* The *progress* and *duration* of this form c peritonitis vary remarkably in different cases The disease is often far advanced before it excite alarm; and is mistaken for simple disordere function of the bowels, and the pains for those o colic. The flatulent state of the digestive organ generally attending, as well as preceding, th complaint, is frequently considered as the sourc of all the disorder until serious organic lesions ar developed; and then *emaciation, febrile exacerba tions, diarrhœa*, partial or general *night-perspira tions*, and the symptoms just mentioned, disclos the nature of the malady. The *duration* of th disease can rarely be precisely determined, as th exact period of its commencement cannot ofte be ascertained. The patient has been frequentl out of health for a considerable period before th symptoms were fully evolved; and it is mos probable that the tubercular formations connecte with the peritoneum commenced about the perio of the earliest indication of impaired health. The continuance therefore of the malady may, according to my experience, vary from two or three to eight or nine months. Instances of a shorter or even longer duration may occur, but they can be very rare.

70. *d.* The *termination* of this form of peritonitis is always fatal. But this issue is not owing to the extent of the tubercular disease solely, but partly also to associated disease in other organs, to tubercular formations in other viscera, particularly in the lungs, in other serous membranes, in the mesenteric glands; to ulceration of the intestines, &c.

71. V. Complications of Peritonitis. — The several forms of peritonitis may be variously complicated. Peritonitis in the puerperal state, as will be shown in the article on Puerperal Diseases, is most frequently complicated with disease in other organs and parts; but those states of peritonitis already considered are often also compli-

ited, although not so frequently and so extensively s those occurring after parturition. The *symptomtic fever* attending peritonitis can hardly be viewed s a complication, as it depends upon the preious health of the patient, the state of nervous or ital power, and the condition of the circulating uids — depression of power and contamination r imperfect depuration of these fluids giving rise o an adynamic state of fever, and favouring the xtension of the malady and fluid effusion. The *omplications* of peritonitis are of two kinds: — st, those in which the peritonitis is a conseuence of the disease with which it is associated; — and 2d, those which consist of extensions of he peritonitic malady. The former are the most umerous, frequent, and important.

72. *A.* When peritonitis supervenes on other isceral disease, and is thereby associated with , the inflammation may be *limited* to a portion f the peritoneum, or *extended* more or less geneally; the limitation or extension depending upon he states of vital power, and of the circulating uids, as already specified (§ 4.).

73. *a.* The complication of *hepatitis* with perionitis is generally with the *partial form* of the tter, the former being the primary malady. n this association, as will appear by referring to IVER — *Inflammation of*, the diaphragmatic, or he parietal peritoneum, or other contiguous ortions, may be affected; and recovery from it frequent, adhesions between the opposite suraces only remaining, and these ultimately beome more cellular and less extensive. The ssociation of *splenitis* with partial peritonitis, in slight and chronic form, giving rise to adhesions, c., is not infrequent, especially in marshy situaons.

74. *b.* The complication of *gastritis* with perionitis is much less common than that of hepatitis, ut, like it, is much more frequent in warm than temperate climates. It is, however, a much ore severe and dangerous malady. The sympoms are violent; the vomiting is almost constant; he vital depression extreme; and the progress to fatal issue generally rapid. In the few cases of his complication that I have observed in this ountry, the peritonitis has been partial.

75. *c.* The association of peritonitis with *eneritis*, or with *inflammations of the cæcum* or *olon*, is not infrequent, particularly in warm limates; and, in persons who have migrated om Europe, it is more commonly observed than natives. In all such cases the disease generally ommences in the mucous surface of some portion f the intestinal canal, and extends through the ther tunics to the peritoneal coat, agglutinating e opposite surfaces of the bowels with each ther, or with those of other organs or parts. In ases of inflammation of either the small intesnes, the cæcum, or colon, the resulting peritonitis s most frequently partial, the disease sometimes erminating rapidly in gangrene, especially when he *appendix cæci* is affected, or when strangulaion exists. When, however, there is perforation f a portion of bowel, or when this complication ccurs in the course of exanthematous or coninued fevers, or of dysentery, the disease of the eritoneum is more or less general, and is rapidly atal, as described above (§ 27. *et seq.*).

76. *d.* The association of peritonitis with *disases of the sexual and urinary organs*, or with inflammation of any of these organs after surgical operations, often occurs, particularly in persons of a bad state of health or constitution. The peritoneal inflammation may be partial or general, sthenic or asthenic; but, when general, it is usually also asthenic; and it may be associated either with hysteritis, cystitis, nephritis, or with inflammation of the ovaria or fallopian tubes, or with any two or more of them. These complications are almost always present in puerperal peritonitis, and are also sometimes observed in other circumstances. Partial peritonitis not infrequently follows inflammatory and organic diseases of the uterus and ovaria; and when thus associated, or when complicated with inflammation of either the sexual or urinary organs, sometimes terminates favourably, adhesions of contiguous surfaces, however, generally remaining in these, whilst serous effusions take place in the more unfavourable cases.

77. *B.* Complications seldom arise from *the extension of peritonitis to the organs which the peritoneum invests;* for when the peritonitis is general and acute, death commonly takes place before inflammation in a distinct form, or other organic change, is developed, in any of these organs; and when the peritonitis is partial or chronic, the affection of contiguous or inclosed viscera is more functional than structural. In children, however, and even in adults, both partial and chronic peritonitis may be associated with mesenteric disease, or with tubercles in the mesenteric glands and in the lungs. In these cases, also, there may be a further complication with ulceration of the intestines; the ulceration sometimes perforating the coats of contiguous convolutions of intestines, and forming fistulous communications between them. It is doubtful, however, whether the peritoneal inflammation or the tubercular formation be primary; it is even not improbable that the former is the consequence of the latter in some instances, although the existence of tubercles in the false membranes, or within the peritoneum, shows that the inflammation has preceded the tubercular productions. In many cases of chronic tubercular peritonitis, the ulcerations and other lesions of the intestines are manifestly consequences of the peritonitis, whilst in others the ulceration seems to be primary, or the sequence of organic lesion cannot be readily established.

78. *a.* When peritonitis commences about the liver and extends to the diaphragmatic peritoneum, the *pleura* of the same side not infrequently also becomes inflamed, partial peritonitis thus becoming complicated with *pleuritis*, and ultimately even with *pleuro-pneumonia.* I have met with several instances of these complications in the course of my practice, and in most of them complete recovery has taken place. The association of general peritonitis with pleuritis of one or even of both sides, is frequent in puerperal peritonitis, particularly as occurring in lying-in hospitals, especially if the disease be not arrested at an early stage. (See Puerperal Diseases.)

79. *b.* Tubercular peritonitis in children is sometimes complicated with *tubercles in the membranes of the brain*, with softening of the central parts of the brain, and with serous effusion into the ventricles, or *acute hydrocephalus.* In these cases, of which I have seen several, the lesions of

the peritoneum and of the brain and its membranes, were consequences of inflammation in connection with tubercular productions, in scrofulous constitutions.

80. VI. Appearances on Dissection. — i. After Acute Peritonitis. — The changes produced by acute inflammation of the peritoneum vary with the severity or activity of the disease; with the habit of body and constitution of the patient; and with the predisposing and exciting causes; they differ most essentially according as the disease presents *sthenic* or *asthenic* characters (§§ 8. 26.), as it occurs *primarily* or *consecutively*, and as it has been preceded by, or is associated with, depression of vital power, or contamination of the circulating fluids. I shall therefore describe, 1st, those changes which are observed in the more *sthenic forms* of the malady — or those affecting persons whose vital powers are not exhausted, and whose circulating fluids are uncontaminated; and 2d, those alterations observed in *asthenic states* of the disease; reserving, however, a more detailed account of these latter, until they come under consideration in the article on Puerperal Diseases.

81. *A. After acute sthenic peritonitis.*— *a. The earliest change* in acute peritonitis is a loss of the polish of the free surface of the membrane, which assumes a dull, opaque, and occasionally a dry-like appearance. Red vessels are seen, either grouped in spots, forming a number of puncta, or in streaks. The surface, appearing dull or even dry, is upon a closer examination found to be covered by a most delicate, unctuous, and slightly viscid exudation. The dense cellular tissue connecting the peritoneum to the parts underneath, or at least the attached part of the membrane, is the situation in which the increased vascularity seems to commence. Even at this stage, the former is somewhat infiltrated with an albuminous serum, giving the subserous tissue a thickened aspect, in which the membrane itself appears to participate. The peritoneum may be detached from the parts it covers with greater facility than in the healthy state, owing to diminished cohesion, and infiltration of the inflamed subserous tissue. As yet the minute capillaries, forming puncta, or streaks, or assuming a reticulated appearance, interspersed with red points or spots, consist of the colourless vessels of the membrane enlarged so as to admit the red globules; but, as the disease advances, the vessels appear more and more superficially. The small spots become more extended, approach each other, and at last coalesce, so as to form patches of various dimensions. The membrane itself is not, as yet, materially thickened, beyond the slight degree just noticed, produced chiefly by the change in the subjacent cellular tissue and its adhering surface. The redness now becomes more intense, deep, and extended. This may be considered as the *first stage* of the changes caused by acute inflammation, and is attended by intense pain, tenderness on pressure of adjoining parts, a quick hard pulse, and symptomatic fever. It seldom exceeds three days, and sometimes does not endure twenty-four hours until further lesions supervene.

82. *b.* The most remarkable of these lesions is the *exudation of lymph* on the inner or unattached surface of the membrane. This is effused in a fluid state, and at first is an increased exudation of the viscid matter already noticed as giving dull and an opaque appearance to the membrane This exudation becomes more copious, especiall as the surface is more crowded by capillaries injected with red blood. It is generally of a straw colour, homogeneous, gelatinous, semitransparen and coagulable, gluing together as it were, in slight degree, those free surfaces of the inflame membrane which come in contact. Sometimes th reddened colour of the surface is heightened by th exudation being red and sanguineous, and adherin closely to it, giving it a villous appearance. Sometimes the exudation is of whitish or whitish-gre colour. With the exudation of lymph, the redness becomes more extended; in some it is nearl limited to the parts covered by, and to thos slightly adherent to the opposite surface throug the medium of, this exudation. In other cases th redness extends, in a somewhat less degree, i bands or stripes, along the surfaces between th parts covered by this exudation; these intermediate surfaces being either nearly dry or apparently so, and as yet not advanced to the stage effusion. As the exudation proceeds in the mor acute cases, it becomes more abundant, and varie in quantity and density, according to the activit and duration of the disease, and constitutiona energy of the patient. It constitutes the *coagulable lymph* of Hunter and other British pathologists, and the *albuminous exudation* of Cont nental authors, from the large proportion albumen which enters into its composition.

83. When this substance is minutely examine about the fifth or sixth day of the disease, or abou the third from the commencement of its formatior it is generally of a pulpy consistence, partiall translucent, of a straw yellow or greyish colou and, when torn asunder, presents a cellular c cellulo-filamentous structure in its denser part from which more or less serous fluid escape Seperated from the membrane on which it ha been formed, its adherent surface is rough, irregular, minutely honey-combed, and marked b more or less numerous minute dots of bloo arising from the disruption of the recently forme capillaries passing from the inflamed serous surface into the new product. Here we have th most complete example of the formative proce being one of the characters of inflammation occurring in persons of a previously healthy state system.

84. *c.* This exudation, which is fluid when fir poured out, and has rapidly assumed the state no described, experiences further changes during th continuance of life. These, however, vary wit the different states of the disease and circumstances of the case. One of the most constant, the agglutination of the opposing surfaces of th inflamed membrane. To occasion this, it is n necessary that both the opposing surfaces sha have been previouly inflamed; for, the lymp effused from the primarily inflamed surface, coming in contact with a circumscribed portion of th opposite surface, irritates and inflames it onl and thus increases the quantity of the effuse lymph, which becomes a connecting medium between the inflamed surfaces; capillaries, carryin red blood, passing from both surfaces into th effused lymph, so as to change and organise th substance still further. In cases of this kind, th portions of the peritoneum intermediate betwee

the parts, whose accretion has been thus effected, have frequently presented little or no appearance of inflammation; or have been moistened only by a small quantity of a sero-albuminous fluid, or have contained a larger quantity of a similar effusion.

85. *d*. The *connection* or *adhesion* thus formed between the opposite points or surfaces of the peritoneum, varies much in its characters with the period which has elapsed since the effusion of the lymph which produced it, and with the surfaces which it exists between. At first the exudation is fluid; but it soon coagulates into a gelatinous, pulpy substance, of various density, exhibiting a weak cellulo-filamentous structure, enclosing in its meshes the serous parts of it, and easily separated from the surfaces it either covers or connects. After a time its cellulo-filamentous structure becomes more firm, and is penetrated by minute capillary vessels, shooting into it from the inflamed membrane, to which it is now more strongly attached by means of the vessels passing into it. The process of organisation of the plasma or effused lymph has now commenced; and it proceeds more or less rapidly. The vessels penetrating the newly-formed substance are now more numerous, so as to admit of injection in fatal cases; its cellulo-filamentous structure becomes firmer, more opaque, and somewhat whiter; it is firmly attached to the serous surfaces, which it connects more or less closely, and the serous portions of the exuded lymph contained between the meshes or cellules of the cellulo-filamentous structure, are absorbed. This substance is now nearly altogether albuminous; and, as the inflammation which produced it declines, the vessels penetrating it contract, so as ultimately to convey only the colourless portion of the blood. This contraction of the vessels, after the decline of the inflammation which formed them, is also accompanied by a great reduction of the bulk of the newly-formed substance; if not to its entire removal, especially when the inflammation and the albuminous exudation are limited, recovery from the attack taking place.

86. *e*. In less acute, or rather sub-acute or partial forms of peritonitis, or when the more acute symptoms have been subdued, and where inflammation has existed from fifteen to thirty-five days or even longer, before producing death, the albuminous exudation forms false membranes of a greyish, whitish, or even reddish colour, establishing adhesions between contiguous parts, and varying in thickness from half a line to three lines, generally in proportion to the duration of the disease. When detached from the serous surfaces which produced them, and to which they adhere firmly, these surfaces are found much inflamed, and sometimes dotted with minute specks of blood, owing to the rupture of the connecting capillaries. The false membrane itself is here found firm and elastic, and not pulpy and friable, as in the most acute cases, or in those which have more rapidly terminated in death. In these cases, little or no effused fluid is observed, that which may have been poured out with the albuminous formation during the earlier period of the inflammation having been absorbed.

87. According to the violence of the inflammation, to the duration of it, and to the constitution of the patient, sthenic acute peritonitis may give rise to *false membranes, membranous adhesions, cellular adhesions*, or *cellular bands*; and these may be the chief, or only changes produced, beyond the increased vascularity of the membrane underneath. But, in many cases, other changes supervene. The chief of these concern the morbid productions themselves, the nature and character of the fluids effused, in connection with these productions; and the state of the membrane itself and of the subjacent cellular tissue.

88. *f*. Where the *false formations* are considerable, and have assumed an *organised and cellular structure*, the vessels proceeding to them are very minutely divided when they have reached the peritoneal surface, and are about to pass into the morbid production; but, having passed into it, they again unite and form larger vessels, which ramify in different directions through this production. This distribution has led some pathologists to suppose that these vessels are first formed in the morbid productions, as in the envelope of the vitellus of the incubated egg; but this is not the case, as is shown by the manner in which the capillaries shoot from the inflamed membrane into the lymph thrown out upon its surface (§§ 83, 84.).

89. The morbid formations become firmer and less vascular, after they have been organised, as the period from their production is prolonged (§ 85.). They also become thinner as they grow older, and their surface assumes the appearance of a serous membrane, whilst their internal structure is more strictly cellular. When bands of adhesion stretch from one surface to the other, or when laminated productions extend over a large superficies, or connect opposite parts, they are cellular in the centres and serous on their unattached surfaces; and, at all the points of adhesion with the peritoneum, this membrane has lost its serous characters, the sub-serous cellular tissue being continuous with that which forms the centre of these bands, false membranes, or adhesions.

90. The progressive diminution of the volume of those productions with the subsidence of the inflammatory action which produced them, and with the lapse of time, as well as the history of cases, in which there has been sufficient reason to believe that those productions had been actually formed, have led several pathologists to infer that they may be removed altogether. M. Villermé was the first to contend, that the adhesions formed between the surfaces of different organs sometimes separate after a time at their centres, and disappear, and the observations of Dupuytren, Béclard, and Gendrin, confirm this inference. I have had reason in the course of practice to concur with this opinion, the justness of which is of practical importance, and should not be forgotten in our management of diseases in which the serous surfaces are implicated; and I further believe, that the diminution and ultimate disappearance of these productions are remarkably favoured by whatever promotes the vital powers, and favours the healthy performance of the several functions.

91. *g*. In acute and sub-acute peritonitis, a *fluid effusion* is either a concomitant or a consequence of the albuminous formation, or both. In cases of partial peritonitis it is most frequently the consequence, particularly of adhesions. In slight and more chronic cases, however, the effusion

of a serous or sero-albuminous fluid is often the principal phenomenon. In the more acute cases, the liquid effusion is whitish-grey, or of a whey or milky appearance. In some it is unctuous, thick, or abounding in albuminous flocculi, of a whitish, yellowish, or lemon colour. In others, it is turbid, greenish, or brownish-red, containing lighter-coloured flakes; but this effusion occurs more frequently in acute asthenic peritonitis; the colour proceeding from a slight admixture of the colouring matter of the blood. In the most acute cases of the sthenic disease, the effusion of much fluid seldom occurs until the powers of life are much exhausted, or until the extreme capillaries and pores have lost their tone; congestion of the venous capillaries either supervening or having already taken place.

92. In many cases, particularly in partial peritonitis, the adhesions, in their advanced or old states, are causes of irritation to the surfaces they connect, either exciting an increased exhalation from the adjoining unattached portions, or being themselves the seat of exhalation; the spaces between the adhesions becoming filled with fluid, either of a serous, a sero-albuminous or sero-purulent character, according to the degree of morbid action in the part and the state of the system. This accumulation of fluid in the spaces between the adhesions, or in cavities the parietes of which are lined with an albuminous exudation in the form of a false membrane, is often owing either to a slight return or exacerbation of the inflammatory action after it had subsided to some extent, or to its continuance in a less severe or chronic form, after the more acute stage had been mitigated. But, in either case, congestion of the venous capillaries, and impaired tone of the affected vessels and tissues, are more or less concerned in the production of the fluid effusion. When the accumulation is large, it constitutes a species of *acute dropsy*, and is dependent upon the same pathological states of the containing membrane and surrounding parts as have been explained when treating of the origin and nature of dropsical effusions.

93. The effusions of congulable lymph, and the consequent adhesions, are remarkable chiefly between the various convolutions of intestines, between the prominent points of these and the omentum, in the pelvic and iliac regions, and between the serous surface of the bowels or of the other abdominal viscera and the peritoneum lining the parietes of the abdomen. In some, the greater number of the folds of the intestines are agglutinated together, and these partially cemented to the omentum, or to adjoining viscera or surfaces, by means of an opaque lymph, of a lemon-yellow colour and pulpy consistence. In others, the agglutination is more partial, and the omentum is shrunk or contracted, and drawn up to the arch of the colon. In some of the most acute and violent cases, the surface assumes a purplish-red or violet colour; and in these the intestines are often united to each other, or to the opposite surfaces, without the intervention of a false membrane, beyond a very thin film of a whitish or greyish albumen.

94. In cases of partial peritonitis, when the disease has been of longer duration, or when the patient has recovered, adhesions more or less extensive, or bands of various dimensions, are often formed between various parts of the opposite surfaces, or between the omentum and one or more of the convolutions of the intestines, between the margin of the omentum and fundus of the uterus, or between other parts, according to the particular seat and circumstances of the partial peritonitis of which these adhesions were the consequences. These albuminous exudations and adhesions present other forms, especially in sub-acute and chronic cases, and are often attended by more or less fluid effusion of a similar description to that now noticed.

95. The *peritoneum itself* is often variously changed, besides being injected in the manner already noticed; and generally the change implicates more or less the subserous tissue: indeed this latter seems often more particularly altered, being ædematous, or infiltrated by coagulable lymph in some cases, and softened in others. In these, the peritoneum is frequently also more or less softened, or more readily torn, and somewhat thickened. In the most acute cases, this membrane becomes in places of a deep brownish red or purple colour, or even almost black; but it very rarely advances to *gangrene*, unless in partial peritonitis caused by strangulated hernia, or by inflammation of the appendix of the cæcum, and then this lesion is limited to the part thus circumstanced, and the peritoneum only participates with the other tissues in the change. M. Scoutetten remarks, that he has met with black gangrenous eschars of a small size, and never exceeding one or two inches in extent. These, however, occur chiefly in the asthenic form of peritonitis, and even rarely in it, as death generally takes place before gangrene can supervene; and in those cases where it is observed on dissection, it is most probably a *post-mortem* change, or at least very shortly antecedent to or concomitant with dissolution.

96. The changes just described, particularly as respects the membrane itself and its false productions and adhesions, are often *partial* or limited; and when this obtains, they are observed more frequently in the peritoneum lining the pelvic viscera, the cæcum, and appendix; and next most frequently in parts of that reflected over the large and small intestines, the liver, diaphragm, and either surface of the omentum; and less frequently in the transverse meso-colon and mesentery; that covering the stomach being most exempt from them.

97. *B. The lesions consequent upon asthenic peritonitis* differ materially from those caused by the sthenic form of the disease. Whilst, in the latter, they are more frequently partial or limited, in the former, they are more general or at least extended; whilst, also, in the sthenic disease, albuminous lymph, false membranes, and adhesions are frequently the chief or only changes, in the asthenic these are very rarely observed, or in a very imperfect and unorganised and unorganisable form. In some cases, a thin muco-albuminous or soft and dark-coloured film is found extending over the surface of the inflamed membrane; and a large quantity of a turbid serum, of every shade of colour, from a whitish or greyish hue to a brownish dark sanguineous or sanious appearance, is effused in the peritoneal cavity. This fluid varies in quantity from a few ounces to several pounds; but it is very rarely above this amount in the acute form

of the disease. It seldom contains the large flocculi or masses of coagulated lymph or albumen sometimes met with in the more sthenic form of the malady, unless in those cases which approach more or less to that character.

98. The peritoneum often presents a softened or sodden and somewhat thickened appearance, in which the subjacent cellular tissue participates. It is generally more readily torn; and, in some cases, I have found this greater lacerability very remarkable, particularly when there was much dark discolouration of the surface, which is more or less altered in colour, being commonly of a dark, brownish, greyish brown, or purplish tint, he shades varying in different situations. Various other appearances are often observed in this membrane, in the viscera over which it is reflected, and in the fluids effused into its cavity; but, as hese most frequently occur in the puerperal states of peritonitis, they are described in the article PUERPERAL DISEASES.

99. ii. LESIONS CAUSED BY CHRONIC PERITONITIS. — When the peritoneum has been chronically inflamed, the lesions which present themelves are very various, according to the constitution of the patient, and the duration of the disease. But they differ also most remarkably according as they proceed from an inflammation which has become chronic, consecutively upon an acute form of the disease, and as they result rom a slow, insidious, almost latent, and primary state of inflammatory irritation or action, — according as they are *consecutive* or *primary*. They differ, moreover, as the peritonitis is simple or associated — as it is *non-tubercular* or *tubercular*.

100. *A. The changes which follow chronic perionitis consequent upon the acute* vary with the duration and circumstances of the case. — *a.* In ome, after the duration of fifty or sixty days, the peritoneal cavity is filled with a considerable quantity of a whitish serum, occasionally resembling partially curdled milk. Numerous bands of adhesion and portions of false membrane presenting he same appearances, and formed as above (§§ 81. *et seq.*) described, unite the greater part of he intestines to each other, or line the intestinal peritoneum and omentum. These false membranes often form partial sacs, containing a fluid, he characters of which are various. When the alse membrane is detached, the portion of the peritoneum underneath has not so red or so vasular an appearance as in the acute disease; ometimes, indeed, it is hardly coloured. In many of these cases, the quantity of fluid effusion s inconsiderable, and the false membranes are ess extensive and thinner; opposite surfaces being united by adhesions or bands, and not by ontinuous albuminous layers.

101. *b.* In some subjects, a considerable quantity f a yellowish limpid serum, without clots or floculi, is found in the peritoneal cavity, about this period of the disease, but without any trace of alse membrane or adhesion; the peritoneum being, however, reddened, thickened, and inected. The omentum, in these, is very much hickened, red, and fleshy; and sometimes conains small vesicles or cysts.

102. *c.* In other cases, and particularly at a later period of the disease, the abdomen is distended by the accumulation of serum. The intestines are pushed towards the vertebral column, and sometimes adhere slightly, or more or less extensively, to each other. The peritoneum is generally thickened and papillous, having a greyish lardaceous appearance, occasionally with bloody striæ and red spots, seemingly formed by slight extravasations of blood. In some of these cases, furrows or broad superficial erosions are formed in the thickened peritoneum. The fluid collected is occasionally clear and yellowish; in some it is turbid, greyish, brownish, or even sanguineous, particularly where the bloody striæ or spots are observed in the thickened membrane. In rare instances *hæmorrhage* has occurred, owing to the destruction of small vessels by the superficial erosions just mentioned. These erosions in rare instances become more and more deep, and are converted into *ulcers*, which destroy the membrane and advance to the subjacent tissues, forming the primary peritonitic ulcers of SCOUTETTEN.

103. *d. Gangrene* very rarely is observed in chronic peritonitis; and only when a recurrence of the acute disease takes place, or when acute inflammation attacks the subjacent structures; and then only limited portions of the membrane are implicated. In these, eschars of a greyish slate or dark colour are formed, their surfaces being covered by a dirty, greyish matter. The eschars in these instances generally extend to the subjacent tissues.

104. *B. The lesions consequent upon primary non-tubercular peritonitis* are, in some instances, not very different from the foregoing, in others, they differ materially. — *a.* Very slight *redness* of the peritoneum is often observed, and as frequently this is entirely wanting. When it occurs, it is usually of a brownish shade. If more remarkable, or of a brighter tint, it is then owing to an acute state of inflammation, which had supervened upon the chronic, and terminated life; but in these cases other marks of acute action are often found united to the characteristic alterations of the chronic.

105. *b. Thickening* with increase of density is one of the chief changes observed in the primary form of chronic peritonitis. The thickening is owing not only to increase of the membrane itself, that being seldom very great, but also to infiltration and tumefaction of the subjacent cellular tissue, identifying it completely with the serous coat in such a manner, that it is impossible to distinguish the exact limits of this membrane, particularly in very chronic cases. The difficulty is also much increased by the organised false membranes, often formed upon the peritoneum, and which become ultimately identified with it, in such a manner as themselves to become inflamed and to give rise to similar productions.

106. *c.* The increase of *density* of the chronically inflamed peritoneum is usually considerable, so that it is generally torn with greater difficulty than in the healthy state, or especially after acute inflammation. It is detached also with much more difficulty from the subjacent parts, owing to the increased density of the connecting cellular tissue; and is much less friable than in the acutely inflamed state.

107. *d.* The surface of the membrane is rugose, dull, and presents a number of small elevations, which are perceptible to the touch as well as to the sight, are whitish, somewhat flattened, and irregularly intermixed with brownish

specks: these specks resemble those which are observed in acute inflammations, and occasion no elevation of the surface. These small elevations, although generally observed on the surfaces of the thickened membrane, are not confined to these surfaces, being frequently also found on false membranes; they are usually called *granulations*. Some have confounded them with the tubercles which sometimes are developed, either under the inflamed peritoneum, or in its substance, or in the false membranes. They may, however, be distinguished from these latter, by the following marks: the small whitish, flattened granulations arise upon an exhaling surface, and seem to elevate an epidermis whiter and more opaque than the serous texture itself, indicating that they exist in the substance of this membrane. Around them there is always observed a slight vascular injection, very evident under the microscope, and sometimes apparent to the unassisted eye. Upon dividing the membrane, a minute infiltration of whitish serum is observed at the points where the granulations have been divided, with a slight increase of thickness of the parts of the membrane where they are developed. They are not enclosed in any cyst, but are mere infiltrations into the structure of the part in which they are formed, as first shown and contended for by me in a memoir on chronic peritonitis, published in 1821 (see *Lond. Med. Repos.* vol. xvi.), and since confirmed by M. GENDRIN and others.

108. *e.* The false membranes found in this state of peritonitis are completely organised and dense. Occasionally they are indurated, of a fibrous or lardaceous structure: in other cases they are entirely wanting, and it is in these latter that the thickening of the peritoneum has taken place, chiefly in the direction or at the expense of the subjacent cellular tissue; the free surface of the membrane appearing as a rugose epidermis of a dull greyish-white colour, elevated by numerous granulations, and spread over a thickened and indurated coat of the connecting cellular tissue. In other, but rarer cases, the peritoneal cavity is nearly obliterated by dense false membrane, indurated or cellular in parts, or united to the opposite surfaces by large bands; or then by one mass of indurated cellular tissue, having its areolæ filled with a gelatinous substance. In some instances, the false productions consist of several layers, of different degrees of thickness and density. They are not always, as M. GENDRIN has shown, closely adherent to the subjacent peritoneum, being sometimes separated from it either by an effused fluid, or then by more recently effused lymph, owing probably to an acute action having taken place shortly before death.

109. *f.* In a few cases, the peritoneum presents a brownish, or very dark colour, is less dense and coherent than usual, and is infiltrated, particularly in parts, by a dark-coloured blood. At first sight the membrane seems to be gangrenous, but, on examination, it is not disorganised, its surface being rugose, granulated, and sometimes elevated by small ecchymoses or clots of dark blood, effused under its surface or in its substance. This change is observed only in persons of a cachectic, scorbutic, or broken-down constitution. M. GENDRIN views this alteration as a complication of hæmorrhagic congestion with chronic inflammation. Occasionally it is accompanied with an exhalation of bloody serum into the cavity; and very rarely with a puriform exudation on the surface. In this latter case, it may be presumed that a subacute state of inflammatory action had taken place shortly before death.

110. *g.* If acute inflammation have supervened upon the chronic, and continued for some days, it may produce not only albuminous formations, but also vascular injection of the part of the peritoneum thus affected. This injection may be either punctated, striated, or even general; and in this last case, the surface of the membrane is sometimes lined with a puriform or perfectly purulent matter.

111. *C. Tubercular chronic peritonitis,* although generally assuming a chronic character, does not always commence as such; and, even when it is primarily chronic, as it is most frequently, it may pass into the acute, at least in a partial or limited manner.—*a.* At an early stage of the disease, coagulated lymph, in the form of a soft false membrane of a greyish yellow colour, and amorphous, is thrown out upon the inflamed surface. The organisation of this substance soon commences, but in a morbid state; small whitish grains soon appear in this hitherto amorphous production, which presents a few rudimental vessels. These grains are diaphanous, more dense than the coagulated lymph containing or surrounding them, and from which they are readily separable. When viewed by the microscope, they are seen surrounded by a vascular net. The false membrane forms adhesions to the peritoneal surface, that are more intimate where these small grains or concretions, the commencing tubercles, are most numerous. These adhesions soon become very intimate, the false membrane more vascular and more organised; and the inflammation, if of an acute character, passes into the chronic state; and the serous surface, and the false membrane covering it, are still more intimately united, so as to form apparently but one very thick coat, in the substance of which the tubercles are developed and adherent. This membrane is often very vascular, the capillary vessels passing into it being often very large; the tubercles acquiring considerable size, and being much larger than the granulations above described (§ 107.). The tubercles do not exist, as is the case with the latter, in the substance of the peritoneum, but are formed within the false productions and at the same time with them; whilst the granulations are found only after these productions are fully formed, when seen on the surface of them, and in consequence of their inflammation.

112. *b.* Although tubercles cannot be said to exist in the peritoneum itself, yet they are often found in the sub-peritoneal cellular tissue, and are to be distinguished in this situation, as well as in false productions or membranes, by their being always encysted; the tunic or cyst arising from the condensation of the cellular tissue in which the tubercular matter is effused. When these tubercles form in the mesenteric or omental subserous tissue, they often reach a larger size than when they occur in the subserous tissue of the intestines, and are much more numerous. Dr HODGKIN remarks, that in the latter situation they appear as if the part were sprinkled with particles of rice. They are often surrounded by a vascular areola, the tint of which varies with the

colour of the blood injecting the capillaries forming the areola, and are readily distinguished from the miliary granulations found in the peritoneum itself, in the manner above noticed (§ 107.)

113. *c.* Chronic tubercular peritonitis is often associated with *ulceration* and *perforation* of the intestines, sometimes so extensive, as I have occasionally observed, particularly in children, as to form direct fistulous communications between distinct but contiguous convolutions. These communications may arise from primary ulceration of the mucous coat, advancing to the peritoneal, and producing consecutive partial or more general peritonitis, of a sub-acute or chronic form, independently of tubercular formations; but they are more frequently attended by these formations, and then it is doubtful, at least in some cases, whether the ulceration has commenced and proceeded in this way, or has originated in the situation of the tubercles, which, being softened, are followed by ulceration and perforation of the bowel, from without inwards. Dr. Hodgkin remarks that puriform collections, varying from the size of a pea to that of an orange, sometimes form in those situations in which the exudation of concrete lymph is greatest, as in the angular and lateral parts of the abdomen, — and that these collections are often attended by ulcerative absorption of those points of the peritoneum in contact with them, the ulceration extending to the subjacent coats, until a communication between these collections and the canal of the bowels is effected. The ulcerations thus consequent — 1st, upon softened tubercles, formed either in the plastic lymph, or beneath the peritoneum; and 2d, upon the purulent collections just mentioned, may, severally, give rise to communications not only between different parts of the bowels, but even between the intestine and the external surface, thereby producing artificial anus.

114. *D.* After this, as well as after the preceding form of chronic peritonitis, the peritoneal cavity frequently contains more or less *fluid*, which is usually opaque, of a whitish yellow colour, sometimes milky, and occasionally of an unpleasant or even foetid odour, particularly when this membrane has been long inflamed. — *a.* In a few cases, the fluid partly consists of a muco-puriform matter, whitish, of the appearance of a semi-concrete albumen, mixed with pus; in others it is nearly puriform, but much more frequently it is limpid, or it resembles clear whey. In very rare instances it is gelatinous, with a thicker gelatinous or slimy coating over all the inflamed surface. The quantity of fluid effused is variable: sometimes it is so great as to distend the abdomen; when in smaller quantity, the cavity is partly filled with false membranous productions of a cellular texture, occasionally infiltrated with pus. In a few of these cases the inflamed cavity has its capacity somewhat diminished by a sinking inwards of its parietes, an alteration observed after the disease had appeared to tend towards recovery.

115. *b.* In those cases attended by liquid effusion into the peritoneal cavity, the *omentum* is contracted or corrugated under the greater curvature of the stomach, and often reduced to a small size. If, however, an old adhesion have taken place between some part of it and an adjoining surface, the omentum is usually found extended in the form of a chord between the stomach and the part at which the adhesion exists.

116. *E.* Dr. Hodgkin remarks, that in chronic peritonitis the *mesentery* is found more or less shortened, by which the intestines are drawn up to the spine; and if a hernia had existed, it will sometimes be found completely reduced. The *intestines* are reduced more frequently in their length than in their calibre. " In extreme cases," he adds, " they probably lose nearly or quite half their dimensions, and the valvulæ conniventes are consequently placed close to each other. This contraction of the omentum, mesentery, and intestinal canal seems to depend on the contractions which newly-formed parts undergo after they have become organised or permanent, as in the large cicatrices of extensive burns." This shrinking evidently depends upon the false membranes covering the peritoneum, and partly upon the deposit on the attached surface. The original structures also are probably themselves reduced by absorption; partly under the influence of the contraction of the adventitious deposit, and partly under the pressure of the fluid effusion. These contractions were first noticed and explained by Dr. Hodgkin, in his work on " *the Pathology of Serous Membranes*," (p. 152.)

117. *F. Cartilaginous or semi-cartilaginous induration and thickening* are sometimes met with in parts of the peritoneum in consequence of chronic inflammation. This change is much more rarely seen in this membrane than in the pleura; but it has been remarked by Sandifort, Portal, Cruveilhier, and others. I have met with this change, twice in that portion of the peritoneum investing the spleen, and once in that covering one of the ovaries, — the situations, I believe, where this change is most frequently observed.

118. *G. Ossification of, and ossific deposits in,* the peritoneum, have been noticed by authors, particularly in the omentum, sometimes in connection with osseous, calcareous, or cartilaginous tumours. Most of these instances are not strictly referable to the peritoneum, this membrane being only consecutively implicated. Others are probably only cases of calcareous deposits under the peritoneum resulting from ultimate changes in tubercular matter in that situation.

119. *H. Gaseous fluids* are sometimes found in the peritoneum, generally in connection with the effusion of serum, and with one or more of the other lesions already described. The question as to their source has been often agitated; but I agree with Baillie, Hodgkin, and others, that although the peritoneum may in a state of disease secrete a gaseous fluid, yet that most generally this fluid is the result of cadaveric change, when found in this situation. But there still remains another question, May not the gaseous fluid be evolved during the life of the patient from the changes in, or partial decomposition of, the products of inflammation lodged in the peritoneal cavity? This result is by no means improbable, when the quantity, the nature, and the physical condition of the effused fluids are considered; and when the inefficiency of the vital influence in this disease to prevent those changes, to which these fluids are prone, is taken into the account. My experience of this disease, particularly in its asthenic forms, and in the puerperal state, leads me to infer that the effused fluids actually undergo, in the peritoneal cavity,

during the life of the patient, and at an advanced stage of the malady, such changes, or such partial decomposition, as produce gaseous fluids, which aggravate the symptoms, and which, by their partial absorption, contaminate the blood. Many years ago I contended that this is the principal source of the gaseous fluids sometimes found in the peritoneum and pleura in connection with the products of inflammation; and the opinion is now entertained by several pathologists.

120. VII. DIAGNOSIS. The *diagnosis* of peritonitis is often extremely difficult, particularly the partial and chronic states of it. Partial peritonitis, whether acute or chronic, is so frequently consequent upon, and associated with, inflammation of the organ or organs which the inflamed peritoneum invests, that it is often difficult to form a correct idea as to the part affected, either solely or principally. Still the history of the case, in connection with its causes and the early symptoms; and the grouping of the existing symptoms especially characteristic of peritonitis, particularly the abdominal pain, tenderness, swelling, and tension; the position and aspect of the patient; and the states of the pulse, stomach, and bowels, when duly weighed, will generally guide the physician to a correct conclusion. Even in those cases which are consecutive of inflammation of the enclosed viscus, and which are strictly partial, the characteristic phenomena of peritonitis are usually present, although more or less limited to the situation affected. These are the acute, burning, or sharp pain, swelling, tenderness, and tension; the position best calculated to take off pressure from the seat of disease; the sharp and anxious countenance; the quick, sharp, hard, constricted or small pulse; the short, small, frequent and thoracic respiration; the dread of coughing, sneezing, or of a full respiration; the retchings, vomitings, or flatulent eructations; and the symptomatic fever, in various grades of severity, according to the intensity and extent of the inflammation, whether partial or general; the chief difference being in the limitation or extension of the local symptoms.

121. When inflammation of one or more of the abdominal viscera is followed or attended by these symptoms, the inference, that the peritoneum investing them is implicated, or has become chiefly affected, will generally be correct; and, if these symptoms appear primarily, without any marked functional lesion having preceded them of the organs invested by the peritoneum, to which the symptoms are limited, it may safely be inferred that the peritoneum of that region is primarily and principally attacked; and the treatment should be directed conformably with this conclusion. — The diseases for which peritonitis is most liable to be mistaken are, enteritis, gastritis, colic, rheumatism of the abdominal muscles, neuralgic and hysterical pains in the abdomen, &c. Of all these the diagnosis between enteritis and peritonitis is the most difficult.

122. *A. Enteritis* is with great difficulty distinguished from peritonitis; and, in many cases, the diagnosis can hardly be made, especially in that state of enteritis where the peritoneal covering of the small intestines is chiefly affected. (See art. INTESTINES, §§ 31. 69. 74.). CULLEN, WILSON PHILIP, and others, have insisted upon the difficulty of the diagnosis in these cases; and when the peritonitis is limited to the serous covering of the intestines, or has commenced in this situation, it is certainly and necessarily very great; for the disease is in truth a partial peritonitis becoming more and more extensive. Many of the diagnostic symptoms so strongly insisted upon by authors, who have copied their descriptions of disease from those who have written before them, instead of writing from their own observation, either are fallacious or occur only in certain circumstances. Thus the greater sensibility or tenderness of the abdomen, and the more acute pain, said to distinguish peritonitis from enteritis, cannot be depended upon, for these will depend, in either case, upon the susceptibility and sensibility of the patient and the intensity of the disease. Neither can the states of the bowels be always viewed as offering any indication of importance. The confidence, indeed, with which diagnostic symptoms has been advanced by some recent writers tends more to mislead than to instruct the inexperienced. After long experience and tolerably close observation, I may remark, that all diagnostic symptoms, particularly between these diseases, should be cautiously estimated; and although it may not be of much importance as respects the treatment, whether or not the one malady be distinguished from the other, still something may be gained, in this regard, as well as respects the prognosis, by a greater precision of information.

123. In the more general states of peritonitis the diagnosis is often not so difficult as in those just adverted to, or when the intestinal peritoneum is inflamed. Here there are often observed, although not always, greater and more general, and more superficial pain of a burning or acute kind; greater sensibility to pressure; more remarkable swelling and tension of the abdomen; less tolerance of motion of the body and of the abdominal muscles; a greater dread of coughing, sneezing, and of a full respiration; and less motion of the diaphragm, than in enteritis. Vomitings or retchings are generally not so early nor so frequent in peritonitis as in enteritis; although often equally so in an advanced stage of the former; but in many instances they are not very urgent until the disease is verging towards a fatal termination. The bowels are usually constipated in both maladies unless in the more asthenic states of peritonitis, when they are sometimes even relaxed, especially in the low infectious form of puerperal peritonitis.

124. *B.* The other diseases which are said sometimes to simulate peritonitis can hardly be confounded with it, if due attention be paid to the symptoms. — *a. Gastritis* will not be mistaken for it, if the abdomen be carefully examined; for the seat of pain, the desire of cold fluids, the thirst, and early vomitings, always following the ingestion of fluids, will generally indicate the affection of the stomach. If the peritoneal coat of this viscus is inflamed, the disease may be considered either as a form of gastritis, or as partial peritonitis, according to the views of the physician; but this portion of the peritoneum is the most rarely affected, at least alone, and in this climate. Some aid may occasionally be afforded in this case, as well as in others, by *auscultation;* for, although the motions of the diaphragm are generally slight, yet sometimes an imperfect or obscure rubbing

sound is heard, with the respiratory movements, in the sthenic forms of peritonitis; and when much affusion takes place, and *percussion* is tolerated, a dull sound is emitted where the affusion is considerable. These modes of examination may assist in distinguishing peritonitis from the diseases just noticed as well as from colic, and some other maladies.

125. *b.* Certain states of *colic* sometimes resemble peritonitis, especially when the former is attended by much abdominal distension and pain; for I have seen in some instances the tenderness on pressure so great, owing to the stretching of the peritoneal covering of the bowels by the flatus distending them, as to resemble peritonitis. In these, the absence of fever, the state of the pulse, the cool or natural temperature of the abdomen, and other concomitant symptoms, will guide the physician. Still the occasional supervention of peritonitis or enteritis in these cases should be kept in recollection. In the more common states of colic, when pressure is tolerated, or even gives ease, there can be no mistake as to the nature of the disorder. (See art. Colic.)

126. *c.* An *hysterical form of colic*, and a *hysterical state of neuralgia*, may somewhat resemble peritonitis, chiefly owing to the apparent tenderness of the abdomen, which, however, is tolerant of firm pressure unexpectedly made on it. In these cases, the presence of other hysterical symptoms, the borborygmi, and the flatulent state of the digestive canal; the situation of the pain, and its connection with uterine irritation, and occasionally with tenderness in some portion of the dorsal or lumbar spine; the absence of fever and of several other inflammatory symptoms; the states of the urine and of the catamenia, &c., will generally indicate the nature of the disorder. I have, however, met with cases of hysterical colic, in connection with dysmenorrhœa, where the extreme tenderness, the acute pain and tension, in the lower regions of the abdomen, the retchings and vomiting, and the disturbance of the circulation, induced a dread of inflammation of the portion of the peritoneum reflected over the uterine organs; and most probably the congestion of these organs had so affected the peritoneal covering, either by stretching or injecting it, as to develope its sensibility, the removal of the congestion by the supervention of the discharge, removing also the suffering with the cause.

127. In all cases, when the abdominal tenderness of *hysteria* most closely simulates peritonitis, a remarkable incongruity of symptoms is observed. The states of the countenance, of the pulse, of the tongue, of the evacuations, and of respiration, are inconsistent with peritoneal inflammation. The breathing is hurried and laborious, and not suppressed, short, and shallow as in peritonitis; the pain and tenderness shift, or suddenly appear and as suddenly depart; the catamenia are usually more or less disordered; and leucorrhœa is often present. In the hysterical affection the state of the temper and of the moral feelings, and the frequent occurrence of other hysterical symptoms, often of themselves sufficiently characterise the disorder.

128. *d. Rheumatism* rarely affects the abdominal muscles, but, when it does, it may be mistaken for peritonitis, owing to the intense pain felt on pressure and motion. Dr. Parr states that the pain in rheumatism of these muscles is felt chiefly at their origins and insertions, shooting to the false ribs and spine of the ilium. This, however, does not agree with my observation; for I have considered the sheaths and aponeurosis of the abdominal muscles to be the chief seat of the rheumatic affection in those cases which I have seen. A careful examination of the abdomen, the state of the countenance, and the absence of retchings, and of the chief symptoms characteristic of peritonitis, will readily indicate the nature of the disease. It should, however, be kept in recollection, that acute rheumatism of these muscles may be followed by peritoneal inflammation. Such instances are rare, but I have met with two or three. The pains and girding sensation, or feeling of tension around the abdomen, often attending irritation and inflammatory action in the spinal chord or its membranes can hardly be mistaken for peritonitis, if the least attention be paid to the history and symptoms of the case.

129. VIII. Prognosis.—*A.* At an early period of *acute sthenic peritonitis*, much confidence may be entertained in a favourable result, although considerable danger should be apprehended until the good effects of active and prompt treatment become apparent. If, however, those effects are not manifested soon after the measures have been resorted to, that I am about to advise at an early stage of the malady; if the disease have advanced far before suitable treatment was adopted; if indications of any of the unfavourable terminations mentioned above (§§ 32. *et seq.*) have appeared; and if the case presents the *asthenic* form or a complicated state, an *unfavourable prognosis* should be given; but hopes of recovery should not be entirely relinquished. The prognosis of peritonitis occurring in the *puerperal state* depends upon various circumstances peculiar to this state, and must be considered in connection with puerperal diseases.

130. The most *favourable indications* are furnished by the symptoms already enumerated of resolution of the inflammatory action (§ 31.) by a subsidence of all the painful and urgent symptoms. On the other hand, if the symptoms increase in severity, especially after judicious means have been administered; if the heat of the abdomen augment or is more harsh; if the vomiting become more urgent; the pulse more frequent, smaller, irregular, or intermittent; the countenance more anxious and collapsed, or the extremities cold or clammy; if the breathing be very short, interrupted, painful, and attended by distress and restlessness; if singultus supervene with or without meteorismus, or a pumping-up of the contents of the stomach or eructations of fluid matters, and if constipation be obstinate, no hopes of the recovery of the patient should be entertained.

131. The causes of the disease, and the various circumstances and complications attending and characterising particular cases, should be duly estimated before we form or give an opinion as to the result. Thus peritonitis caused by perforation of the stomach or intestines, or that appearing in the advanced course of continued and exanthematous fevers, or following abscess in, or the rupture of, any viscus, rarely or never admits of complete recovery. Peritonitis also following surgical operations involving the peritoneum, and

that caused by or consequent upon, or connected with, erysipelas, is attended by very great danger, particularly in the crowded wards of an hospital, or in an impure atmosphere. Various other circumstances of only casual occurrence will also weigh with the intelligent physician when he forms his prognosis in any case.

132. *B.* The *chronic forms* of peritonitis very rarely admit of recovery in any case which is distinctly characterised. The slighter or even partial states, following the acute, may, however, be removed more or less completely by careful treatment and regimen, especially when affecting persons not far advanced in life and of an otherwise good constitution; but the more general form of primary chronic peritonitis, and still more particularly the tubercular complication of it, should be considered as entirely hopeless, although life may be prolonged for some months.

133. IX. Causes.—The causes of peritonitis are many of those which most frequently occasion inflammation of other internal viscera and external parts (see Inflammation, §§ 91—121.); but there are some causes which determine more especially the development of this disease, and which may be more particularly adverted to.—*a.* Many of these *act directly* upon the seat of inflammation, as wounds, operations, bruises, lacerations, ruptures, displacements, strangulations of parts, &c., implicating the peritoneum more or less; great or unusual stretching or distension of this membrane; the passage into its cavity of matters foreign to it, as blood, chyle, bile, fæces, pus, tubercular matter or other morbid secretions, &c.; invaginations of portions of the bowels, or stricture or undue pressure of parts of them or of the omentum by tumours, bands of old adhesion; inordinate and continued pressure by or on surrounding or adjoining parts, and prolonged and unusual exertion of the abdominal muscles, &c.

134. *b.* Other causes *act from contiguity*, as pre-existent disease of some viscus covered by the peritoneum, especially dysentery, diarrhœa, and ulceration of the stomach or bowels; enlargements or tumours of subjacent parts; inflammation of any of the viscera or structures enveloped by this membrane, particularly of the intestines, urinary bladder, uterus, ovaria, liver and spleen; and malignant or other structural lesions of adjoining parts. This class of causes generally occasion partial or limited peritonitis.

135. *c.* Certain causes occasion peritonitis through *the organic* and *vital actions*, and *the circulating fluids*, there being, however, a predisposition in the peritoneum or some part of it to become affected, or pre-existing circumstances determining the inflammatory action to this membrane. Many of the causes just enumerated may be merely determining influences in developing the morbid action in this situation, other causes affecting primarily the vital and circulating functions, and producing the inflammatory diathesis or constitution. Of these latter, the most frequent and influential are, exposure to cold, humidity, or both conjoined, and to currents of cold air; sleeping on the ground or in the open air, or in damp beds or bed-clothes; sitting in wet clothes; the contaminating or infecting influence of foul air, or of animal miasms upon injuries, wounds, &c., communicating either directly or indirectly with the peritoneum; the suppression of accustomed discharges or evacuations, and of determinations of blood from more external parts; the retropulsion of cutaneous eruptions, of rheumatism, erysipelas, &c.; repeated attacks of ague, occasioning vascular determinations to the liver and spleen, and unusual stretching of the investing peritoneum, favouring the supervention of inflammation of it; changes in the state of the blood, as respects both quantity and quality; and the puerperal states, and the various circumstances attending them. (See Puerperal Diseases.)

136. X. Treatment.—Having described the several states of local and general morbid action characterising this malady, their varying consequences, and their complications, each of which requires a different or modified plan of treatment, it becomes necessary that the means appropriate to each of them should be fully stated. In every case, however, the treatment ought to be conducted according to its individual features and circumstances; but in all, the measures should not only be efficient, but they should also be promptly employed, and with due reference to the stage and progress of the disease, and the other peculiarities of the case.

137. i. Treatment of Acute Peritonitis.—*A. Acute sthenic peritonitis*, whether partial or general, requires a prompt recourse to measures calculated—1st, to arrest the inflammatory action locally, and the general febrile commotion; 2d, To prevent the most injurious consequences of inflammatory action from supervening; and to remove them, as much as may be possible, if already they have more or less taken place. These objects comprise all the indications, which have been paraded by some writers, and which can rarely be individually followed or even mentally recognised in the course of practice; the intention being to take the shortest and most efficient method of accomplishing these ends. It should always be recollected, when treating this form of the disease, that, although most frequently commencing in a partial or limited form, it may rapidly become more and more extended, sometimes unexpectedly; and that the surest means of preventing this extension are active and prompt measures, relatively to the constitutional powers of the patient.

138. *a. First, To arrest the morbid action*, whether more or less extensive, or of longer or shorter duration, the most antiphlogistic measures are required, and should be energetically employed, particularly in the more violent cases, and during an early stage of the disease, or before indications of much effusion into the peritoneal cavity, or of a very general extension of the disease, present themselves. In these latter circumstances, the powers of life are often too far depressed by the extent and severity of the morbid action,—the constitutional energy has sustained too severe a shock, at least in many instances,—to admit of very active antiphlogistic means, or too copious depletions, especially at such an advanced stage of the disease as these changes characterise. During the earlier periods of this form of the malady, and particularly in young and robust or plethoric persons, *venesection* should be resorted to, in the manner so frequently recommended in this work (see article Blood, §§ 64. *et seq.*), and blood taken until a marked impression is made upon the

pulse, but short of fainting, for the reasons elsewhere assigned. Immediately after the depletion, full or even very large doses of *calomel* and *opium*, — from five to fifteen, or even twenty grains of the former, and from one and a half to three or even four of the latter — ought to be given. These will generally have the effect of allaying irritability of the stomach, of equalising the circulation, of procuring perspiration or a relaxation of the skin, and of keeping down the vascular action to the point to which it was brought by the bloodletting.

139. If these effects are not produced in the course of a few hours, and more especially if the pulse still continue hard or constricted, and the abdomen tense and tender, or if the pulse should begin to rise, and the pain to increase or to return, *bloodletting* should be again practised, generally in smaller quantity, and be followed, as before, by a repetition of the calomel and opium, in the same, or in somewhat reduced doses, according to the effects produced by the former. In this disease, and more especially at an early period of it, the physician should not be deterred from bloodletting by the smallness of the pulse; for the pulse will become fuller and softer, and often less frequent, as the depletion proceeds. It may be necessary in some cases to repeat the bloodletting a third time in the manner already recommended, and to follow it by the calomel and opium as before; but in most instances of this form of the malady, this will not be requisite, and in many, where a doubt may exist as to its propriety, leeches may be placed on the abdomen, in numbers according to the severity and other circumstances of the case; and be followed by fomentations, &c., and by calomel and opium, in doses suggested by the quantity and effects of those already taken, and by the period which has elapsed between the exhibition of them.

140. Having carried vascular depletion as far as may prudently be attempted, and having employed calomel and opium as now advised, the disease will be either entirely or partially subdued. If, however, pain, distension, and tenderness of the abdomen still remain, — if the stomach be irritable, and the bowels constipated, the gums or tongue indicating no incipient mercurial action, — the calomel and opium may be again exhibited in quantities suggested by circumstances, and several folds of flannel should be wrung as dry as possible out of very hot water, and freely sprinkled with spirits of turpentine, and placed over the abdomen, and covered by oiled silk or by napkins, so as to confine the terebinthinate fumes as much as possible to the part. This *fomentation* ought to be applied as long as it can be endured; and even be repeated in many cases. The admirable effects of it have been proved to me on many occasions at this stage of the malady, both before and since I wrote in favour of it in 1821. (*See a Memoir on Terebinthinate Remedies in Disease,* in Lond. Med. and Physical Journ., vol. xlvi. pp. 107. 185.)

141. The usual effects of this application, after the measures advised to precede it have been duly employed, are a diminution of the abdominal pain, distension and tenderness, and of the irritability of the stomach; a reduction of the frequency of the pulse, which becomes fuller and softer; and a general diffusion of heat, usually with perspiration over the surface and extremities.

142. *b.* It is possible still that the above energetic means may fail, both in arresting the progress of the malady, and in affecting the gums and tongue in the way which is desired. It should, however, be recollected that many cases will proceed favourably, and to complete resolution, without any mercurial effect upon these parts; but when such effect begins to appear, it should be viewed as a favourable indication, and the calomel should either be relinquished or much reduced in quantity, as this effect may rapidly increase. If, however, neither of these beneficial influences appears to follow, depletions being no longer admissible, and the terebinthinate embrocation having also failed, a *blister*, or the vesicating fluids recently introduced, may be applied over the abdomen, and vesication be promoted by a warm bread-and-water poultice. Afterwards, the cuticle should be removed, if the symptoms persist, and mercurial ointment be applied, either on the surface of a poultice, or in the usual way. The object in thus persisting in the use of *mercurials*, as now proposed, is not only to aid in arresting the inflammatory action, but also to prevent the more serious of those consequences, namely, albuminous exudations and serous effusions, which frequently result. They should be exhibited from the commencement of treatment, in full, or in frequently repeated doses, conjoined with opium, so as to aid the bloodletting in making an early and energetic impression on the disease, and not be delayed until an advanced period.

143. I have been called to cases where bloodletting has been pushed too far, with the mistaken idea that the frequency of the pulse is to be reduced by it. But, although this effect is often observed when bloodletting has an immediate influence on the disease, and in healthy or robust persons, yet in other circumstances, particularly in weak, or nervous, or irritable constitutions, the pulse will more frequently become quicker, and even sharper from the repetition of it.

144. *B.* There are *three symptoms* which often increase the difficulty of treating peritonitis, and augment the severity of the disease, and which are often aggravated by the mode of treating them. These are the irritability of the stomach, the constipation, and the flatulent distension of the bowels. To each of these I advert. — *a.* The *sickness* and *retchings* at an early stage of the malady are best encountered by calomel and opium as above advised, and by turpentine fomentations, after bleeding has been duly resorted to, aided in some cases by *creasote* conjoined with the calomel and opium, or by *hydrocyanic acid*. The attempts to allay this symptom by effervescing draughts are generally futile, for the stomach readily reacts upon the distension caused by these draughts and throws off the ingesta. Neither ought much fluid or cold fluids to be given; the mouth and throat should be merely rinsed with tepid fluids, or small quantities of them only be sipped. The retchings or pumping up of the contents of the stomach, characterising a fatal issue, in extreme cases, and often associated with singultus, will not be removed, and seldom even alleviated by any means whatever.

145. *b. Constipation* is frequently removed, even when most obstinate, by the treatment I have advised, without having recourse to purgatives. I have often seen much mischief result from the

officious interference of the practitioner in these cases; the irritability of the stomach, and the severity of the disease being heightened by repeated endeavours to operate on the bowels by drastic purgatives given by the mouth. It is best, at an early stage of the disease, to wait the effects of the treatment advised above, for a reasonable period, and then to have recourse to *enemata* containing spirits of turpentine, with castor or olive oil, or with both, in a thick decoction of barley. These may be repeated from time to time, until the bowels are sufficiently evacuated, without any dread of the complaint being aggravated either by their frequency, or the amount of the ingredients. At a somewhat advanced period of the disease, particularly when the irritability of the stomach has been removed by the calomel and opium, and much flatulent distension of the bowels still continues, from two or three drachms, or half an ounce, to six drachms each of spirits of turpentine and castor oil may be taken on the surface of milk or peppermint water, and repeated according to circumstances. I have often seen this medicine productive of great advantage; and, at a still more advanced stage of the malady, it has remained on the stomach, although vomitings unattended by effort or by retchings were present, and every thing beside was instantly rejected.

146. *c. Flatulent distension* of the abdomen may continue, and perpetuate pain and tenderness, after inflammatory action has been removed or much reduced. In these cases, the flatulence is the result chiefly of the lost tone or contractility of the coats of the bowels; and the distension by gaseous fluids of the tender and inflamed peritoneum, or of the peritoneum independently of inflammation, developes the sensibility of this tissue, and indicates a greater amount, or a longer persistence, of inflammation than actually obtains. A recurrence to bloodletting in any form, in such circumstances, which, as I have had reason to know, is not an infrequent practice, and was formerly much more so, is generally most injurious. The good effects of *terebinthinate enemata* and *embrocations* in these circumstances are almost always remarkable, and are still more when the spirits of turpentine are taken internally, either as just advised, or in other forms, in which I have so often prescribed this medicine and recommended it in the course of this work.

147. *d.* It was advised by the late Dr. Sutton of Greenwich, and by some German physicians, by whom I have seen many years ago the practice adopted, to apply *cold*, or *evaporating lotions*, or *ice* to the abdomen in peritonitis. If the practice is admissible at all, it is in this form of the disease, and at an early stage of it, that it should be employed. My recollections of it are not, however, such as would induce me to recommend it, whilst my experience of the practice I have prescribed above has been so long and extensive as to fully warrant my commendations. Dr. Symonds, however, remarks that, in some cases, cold evaporating lotions have seemed preferable to other applications, the evaporation being accelerated by blowing the surface by a common bellows; and that he has placed the patient in a warm bath, sufficiently long and shallow for him to lie extended, and for the tumid abdomen to rise above the level, so that a jet of cold water could be poured upon the latter. "The relief," he adds, "has been most striking, even when the disease was too far advanced for a cure." (*Op. Cit.*, p. 145.)

148. *e.* When the disease yields, as it usually does, to the above means, when early employed, and the indications of resolution appear, little more is requisite than attention to the state of the secretions and excretions, which should be promoted by gentle alteratives and aperients, aided by an occasional recourse to oleaginous or emollient enemata. As the pulse usually continues frequent for some time after the other symptoms subside, owing to loss of blood and debility, this circumstance should neither create alarm, nor lead to an officious or unnecessary interference. A premature recourse to tonics or stimulants, or to an exciting diet or heating regimen, would be injurious, and lowering measures on the other hand would only protract convalescence. In this state mild diaphoretics and diuretics, as the camphor mixture, with the liquor ammoniæ acetatis and spiritus ætheris nitrici, will generally prove both safe and beneficial; whilst the functions of the skin should be promoted by warm baths, by warm clothing, by flannel worn next the skin, and by avoiding the exciting causes. The lower extremities should always be kept warm; and the bowels and urinary functions ought to receive the strictest attention long after the patient has recovered.

149. *C. The second object*, namely, *to prevent the injurious consequences of peritonitis, and to remove such as may have been already produced*, is best accomplished by a prompt and judicious recourse to the measures already recommended. But the physician may have been called too late to prevent these consequences, — the disease may have advanced to that stage at which one or other of the more unfavourable results described above (§§ 33. *et seq.*) has either supervened, or is in progress. If *effusion* have taken place, or is even proceeding, *bloodletting* in any form may be of little use, or even injurious. Still it may be practised with due caution, whilst the pulse retains some power and is not very frequent, and when the patient is young, and his vital powers not remarkably depressed. In similar circumstances also, *calomel* and *opium* may be prescribed and repeated from time to time; although, at this late period of the malady, the mercurial effect on the system may not be readily, or even at all, produced. A few grains of *camphor*, added to the calomel and opium, will often be of service in these cases. The *terebinthinate fomentation* over the abdomen, and terebinthinate *enemata*, a terebinthinate draught also being occasionally given, are most important measures in these circumstances, whatever may be the amount or the exact nature of the lesions produced by the inflammation. *Vesicatories*, followed by poultices, with or without mercurial ointment, as circumstances indicate, may be applied to the abdomen, as above advised (§ 142.); but they require discrimination, especially as to the period of their application. In most instances they should be large and efficient. In some cases, a prolonged discharge from them may be procured in the usual way; and, when the gums have not been affected by the mercurials previously given, the application of mercurial ointment to their surfaces, the cuticle being removed, will often produce a local and constitutional effect. In other

cases, a repetition of blisters may be requisite, whilst *mercurial alteratives* and *aperients*, as Plummer's pill with soap; the bi-borate of soda with the watery extract of aloes, &c., and *oleaginous* or *emollient enemata*, are being employed. In some instances, especially when much liquid effusion has taken place in the peritoneal cavity, I have directed the following embrocation, sprinkled on two or three folds of flannel, to be applied over the abdomen, and kept there for a considerable time, or even worn for some days, when the amount of irritation produced by it admits of its continued application. In other circumstances a repeated recourse to it should be insisted on:—

No. 307. ℞ Linimenti Camphoræ comp.:—Linimenti Terebinth.; Olei Olivæ, āā, ℥jss. Olei Cajuputi, ʒjss. *m.* Fiat Embrocatio vel Linimentum.

When the physician is called late in the disease to a case of acute peritonitis it is prone to pass into the chronic state; and this may be the most favourable result which can be anticipated from the extent of lesion already produced. In these instances the treatment about to be mentioned as appropriate to the chronic disease, is in many respects the same as that now advised, and should be resorted to, taking care, however, not to reduce the powers of life so low as to render them unable to resist the extension of the morbid changes.

150. *D.* The *treatment of acute asthenic peritonitis* (§ 26.), is rarely entered upon with any hopes of advantage, unless at the commencement, or at an early stage of the malady; and then the most energetic means are required to arrest its progress, and even they will frequently fail, if they be not employed with discrimination; the extension and course of the disease being extremely rapid, and effusion quickly supervening. This form of peritonitis occurs most frequently in the puerperal state, both sporadically and epidemically, and especially in lying-in hospitals, where it often spreads throughout the wards (see PUERPERAL DISEASES). Instances, however, of this form of peritonitis are observed in other circumstances, especially in connection with erysipelas, and with other maladies already alluded to (§ 26.). In these the chief object is to arrest the extension of the morbid action by those remedies which will make the most powerful impression, and in the shortest period, upon the organic nervous, and vascular systems—an impression which shall enable these systems at the same time to resist the extension of the local mischief, and to remove the changes which have already taken place. After having made trial of various remedies and methods of cure in this form of the disease, the means which I have had reason chiefly to confide in are, a combination of *camphor*, *calomel*, and *opium*, in large doses, repeated every four, five, or six hours, according to the features of the case; in some instances *sulphate of quinine*, camphor and opium, in frequent doses; *epithems* or *fomentations of warm spirits of turpentine* over the abdomen, renewed or repeated according to circumstances; *terebinthinate enemata;* and occasional doses of *spirits of turpentine* by the mouth, with or without *castor oil*, or other medicines. I have employed this treatment since 1823, modifying it with the peculiarities of individual cases; but it is more fully described in the article on the several forms of *fever* and of *peritonitis in the puerperal state.* (See PUERPERAL DISEASES.)

151. *E. Peritonitis from perforation of the stomach or intestines* may assume various forms, according to the circumstances under which the perforation occurs.—*a.* As I have shown above (§ 27.), if it result from chronic ulceration of any portion of the digestive canal, it may be limited to that portion of the membrane more immediately surrounding the perforation; and, coagulable lymph having been effused, that part becomes agglutinated to the opposite surface, and effusion of the contents of the canal into the peritoneal cavity is thereby prevented. In this case, the symptoms only of *partial peritonitis* are manifested, and the disease may assume an acute, sub-acute, or chronic character. An instance occurred in my practice of a female who lived between two and three years after peritoneal symptoms caused by ulceration and perforation of the stomach appeared: she was treated chiefly by *opiates;* and upon dissection, the peritoneum for a considerable space around the large perforation was thickened, adherent to the opposite surface, and almost cartilaginous. (See art. STOMACH.)

152. *b.* In many cases, however, especially when the perforation takes place in the course of continued or exanthematous fevers, and of phthisis, the constitutional powers and the state of the circulating fluids are such as generally admit not of the production of coagulable lymph, and the formation of adhesions between the opposite peritoneal surfaces. In these circumstances, a portion of the contents of the digestive canal escapes into the peritoneal cavity, occasioning a rapid form of *general asthenic peritonitis.* Sometimes, however, the disease continues for a time more or less limited, acute pain and tenderness being confined chiefly to the region in which they were first experienced. In this case, some hopes may be anticipated from treatment. Dr. GRAVES and Dr. STOKES first suggested the most rational principle and means of cure in this state, namely, to enable the constitution to produce coagulable lymph, by which the opposite surfaces of the peritoneum may become adherent, and to keep the bowels quiescent until this end be attained. The most efficient means to accomplish these intentions are, frequent and full doses of *opium*; and the remedial, dietetic, and regimenal measures usually employed to promote the strength of the patient, accommodated variously, so as to suit the peculiarities of particular cases.

153. *E. Peritonitis consequent upon paracentesis abdominis*, or other operations, especially if there be any connection between it and erysipelas (§ 28.), generally assumes the asthenic form, and should be treated upon the principle of enabling the constitution to form coagulable lymph, and of assisting the powers of life to resist the extension of the malady. With these views, *opium*, in full and frequent doses, should be given, and the usual remedial and dietetic means of supporting the vital powers ought to be employed. In short, the treatment advised above (§ 150.) should be adopted, and modified so as to meet the exigencies of each case.

154. ii. TREATMENT OF CHRONIC PERITONITIS. —*A.* In a few cases only of the *general* and *tubercular forms* of the disease can it be hoped, that very great advantage will be procured from treatment. Much, however, may be done in alleviating the more unpleasant symptoms, especially the at-

tendant diarrhœa, and even in prolonging the life of the patient. In some cases, particularly where the powers of the patient are not much reduced, *local depletions*, by means of leeches, repeated as circumstances will suggest, will be of considerable service; but venesection can rarely be attempted. I have found most benefit to be derived from the *turpentine liniment* or *embrocation* recommended above (§ 140.), with the addition of a little of the *iodide of potassium* and *vinum opii.* It should be perseveringly used, and be aided, particularly when there is much liquid effusion, by the *iodide of potassium* given internally with *opium*, or with the *compound tincture of camphor* and *sarsaparilla*. *Opiates* are indispensable in most instances, and more especially when the bowels are much relaxed. They may be given as just recommended, or alone, or with absorbents, mucilages, and emollients. I have employed the iodide of potassium in this disease since 1824, but it is most beneficial when taken in very small doses, and when long persevered in. Even in moderate doses it is prone to develope an acute state of peritonitis; and, in this case the application of leeches, of turpentine fomentations with opium, &c. to the abdomen, is indispensable, in order to subdue the acute or sub-acute action thus produced, the iodide being relinquished.

155. *B. Partial chronic peritonitis*, existing either simply, or associated with chronic visceral disease, is often either permanently removed, or reduced to a state which is not inconsistent with the performance of the functions, even of that organ, the peritoneal surface of which has been more or less implicated. The disease may degenerate into adhesions of a loose or cellular kind, which may not interrupt materially the offices of the connected organs. Still these adhesions may excite further change, may occasion inflammation, or may themselves be the seat of it. It is not infrequently observed, that inflammation of a viscus covered by the peritoneum extends to this membrane, or the inflammation may commence in and be limited to a portion of the peritoneum, in an acute or sub-acute form, and, being either neglected or only partially removed, continues for an indefinite time afterwards in a chronic state. In this case, attention to the functions of the organ primarily affected or consecutively implicated, the occasional application of a few *leeches* when pain or tenderness are felt, followed by warm *fomentations* or the *terebinthinate embrocation*, by *opiates* with *alteratives*, cooling *diaphoretics* and *diuretics*, and such other means as the seat, severity, and associations of the disease will suggest, are the means upon which the chief dependence should be placed. In some instances of this partial state of chronic peritonitis, the *iodide of potassium*, or the *iodide of mercury*, in small doses, may be tried subsequently to a due recourse to the means just mentioned, with the view of reducing adhesions; but the effect should be carefully observed. Partial chronic peritonitis is most frequently observed in the peritoneal coverings of the spleen, liver, and female sexual organs, as a consequence of inflammation of the subjacent viscera, and is there more readily removed by treatment than in other situations; or at least is more easily reduced to a state of comparative innocuousness.

156. iii. The Complications of Peritonitis require attention, in both the *acute* and *chronic states* of this disease. It is chiefly, however, in the partial forms of peritonitis, or early in the more general malady, that these complications become objects of the greatest importance. In every case it is necessary to ascertain, as far as may be, the organ or part primarily affected, and the extent of the super-induced disease; for in many the primary malady will perpetuate the consecutive affection of the peritoneum.—*a*. When *hepatitis* extends to the peritoneum covering the convex or the concave surface of the liver, the portions of this membrane reflected over the diaphragm in the one case, and over the stomach, colon, duodenum, &c., in the other, are often implicated (§§ 71—74.). The disease may even extend further, not merely as regards the peritoneum, but as respects other parts. Thus I have seen diaphragmatitis, pleuritis, and ultimately pleura-pneumonia follow hepatitis, on the one hand, and partial or even general peritonitis supervene on the other. In these circumstances, and especially before the disease has thus extended, every effort should be made to bring the system under the influence of mercury as soon as possible, whilst at the same time the constitutional powers should be aided in resisting the further extension of the malady. In addition, therefore, to judicious vascular depletions, calomel, camphor, and opium should be exhibited as above advised (§§ 139. *et seq.*), and be aided by terebinthinate fomentations and enemata.

157. *b. The association of peritonitis with inflammation of the cæcum*, or of the *appendix cæci* (§ 74.), is one of the most frequent and important which comes before the physician. In many instances, as I have shown in the article Cæcum, the impaction of a hard body into the *appendix* perpetuates the inflammation of it, as well as of the peritoneum, and prevents a favourable result, however judicious the treatment may be. When the partial peritonitis caused by the disease of the Cæcum (see that art. §§ 18—20) is acute, the treatment already recommended (§§ 138. *et seq.*) for simple sthenic peritonitis, or that advised above for the complication with hepatitis, should be adopted. I may refer the reader also to the treatment recommended by me for inflammation extending to the peritoneum in the article Cæcum (§ 32.). In the more *chronic state* of this association, the means already prescribed for partial chronic peritonitis (§ 155.) may be adopted, due attention being paid to the secreting and excreting functions of the liver and bowels.

158. *c.* The *associations of enteritis and of acute or chronic dysentery with partial peritonitis* are very common (§ 74.); and, even in general peritonitis, both the small and large intestines are often more or less affected. These complications are generally the most difficult to manage; for, if the bowels be obstinately constipated, attempts to move them by drastic purgatives frequently aggravate the disease. The treatment in this case should be directed almost entirely to the inflammation, and consist of those means which I have advised for the sthenic form of it (§§ 140. *et seq.*), aided by suitable enemata. When the inflammation has been allayed, and the bowels still remain confined, such mild laxatives as may solicit, rather than force, the action of the bowels, only ought

to be employed. On the other hand, if the bowels are much relaxed, or if diarrhœa or a dysenteric state be present, the arrest of the increased discharge from the mucous surface of the bowels may increase the morbid action in the peritoneum, whilst the persistence of the diarrhœa may arise from ulceration, which has either already caused, or will aggravate, the peritonitis. The early history of cases of this kind is the chief guide of the physician, aided by the extent and severity of the peritoneal symptoms. If the diarrhœa be merely an attendant on the peritonitis, as it sometimes is in the asthenic form of the disease, attempts ought not to be made to arrest, or even to moderate it, unless it be excessive, and exhaust the patient; whereas, if the peritonitis, in any form, supervene on diarrhœa or upon dysentery, the persistence of the latter, whether ulceration or perforation exist or not, will aggravate the peritonitis; and, therefore, whilst the chief attention ought to be directed to it, strenuous efforts should also be made to moderate or remove the disorder of the bowels. In the first case, the bowel affection depends upon the peritonitis, and the treatment, as I have advised, should be directed with promptitude and activity to this latter — to the primary and chief disease. In the second case, the disorder of the bowels has not merely caused, but still continues to perpetuate and to aggravate, the peritonitis, and ought therefore to be moderated or controlled even where it might not be prudent at once to arrest it, supposing this to be in our power. In this complication, whatever may be the sequence of morbid action, an extensive experience has proved to me that the terebinthinate remedies, used both internally and externally, are most to be depended upon when judiciously prescribed. That the right use may not be made of them, in respect both of the circumstances and period of the disease in which they should be used, and the modes of exhibiting and combining them; and hence that they will sometimes disappoint many who may have recourse to them, I can fully believe. But in these contingencies they participate with all our other most efficacious remedies. Opium, with grey powder, and with ipecacuanha in large doses, when the bowels are much disordered; appropriate enemata, and other means already noticed, adapted or combined so as to meet the exigencies of particular cases, are also important adjuvants in the treatment of these complications.

159. *d. The association of peritonitis with inflammation, or with organic lesions of the urinary and sexual organs* (§ 75.), is not infrequent, especially among females, and in the puerperal state. In ordinary circumstances, the associated peritonitis is generally consequent upon the visceral disease, and is commonly partial, unless in puerperal or cachectic states, or in the course of fevers, where it often rapidly becomes more or less general. It sometimes also passes into a chronic form, especially when it is consecutive of organic lesions, or is independent of the puerperal condition. In these several associations, the treatment should partly depend upon the extent of the peritoneal affection, and upon the degree of vital power characterising the disease. When the asthenic and diffusive form is present, the treatment advised above is most appropriate (§ 150.); but when the more sthenic and partial or limited state of morbid action exists, then the means already recommended (§ 140.), is that which is most beneficial for this state of complication. In either case, the peritonitic disease claims the more immediate and the chief attention, as upon the limitation or extension of it depends the recovery or the loss of the patient. It being arrested, or more or less subdued, the treatment should be more strictly directed to the primary lesion of the sexual organs; and the functions of these organs ought to be promoted, especially as respects the menstrual discharge. Even after the disease is apparently subdued by the vascular depletions, &c. prescribed above, still pain or tenderness often recurs, especially about the expected catamenial period, and is sometimes attended by scanty or difficult discharge. In such cases, leeches should be applied below each groin, and be followed by fomentations, as already advised (§ 140.), by small doses of the biborate of soda in camphor and orange-flower water; and by such other means as the peculiarities of individual cases will suggest.

160. iv. TREATMENT OF PERITONITIS IN CHILDREN. — *A.* The principles of treatment which I have advocated for adults are also applicable to children. In the latter class of subjects, however, *acute peritonitis* generally assumes a *sthenic* or phlogistic character, unless when it follows eruptive fevers or mesenteric disease, when a subacute and diffusive state is often assumed, not infrequently lapsing into the chronic form, particularly in the scrofulous diathesis. In the more sthenic of these states of disease, local depletions, calomel, terebinthinate fomentations and injections, emollient warm baths, with the other means already advised, according to the circumstances of the case, are the measures upon which our dependence ought to be chiefly placed. When peritonitis follows the maladies just mentioned — when it presents, either locally or as regards the constitutional symptoms, the asthenic, diffusive, or subacute state, calomel with camphor, and with opium in small doses when the age of the patient will admit of this last, and terebinthinate remedies in the several forms already prescribed, and duly repeated or continued, are the principal means of cure.

161. *B.* If the disease pass into the *chronic state*, or assume this form primarily, — if it be *tubercular*, as it most frequently is, or *simple* and attended by fluid effusion into the peritoneal cavity — a cautious recourse to *iodine*, especially to the proto-iodide of mercury, to the iodide of potassium, with liquor potassæ and sarsaparilla, and a frequent or continued use of the terebinthinate embrocation over the abdomen, as above advised (§§ 140, 141.), either with or without the iodides externally, should in no case be neglected. But they should be perseveringly employed, and the iodides ought to be given only in very small doses, especially at first; and be aided by change of air, and exposure to light and sunshine. When chronic peritonitis is attended in children by diarrhœa, when it is far advanced, and its tubercular nature manifest, then ulceration, or at least a state of lesion almost precluding hope, may be inferred. Our treatment should then be directed to the alleviation of urgent symptoms, — to the moderation of the attendant diarrhœa and pain by means of absorbents and opiates, by hydrarg. cum creta

with compound ipecacuanha powder, and warm baths, or fomentations over the abdomen.

162. v. Convalescence *from any of the forms of peritonitis* requires the utmost care and caution, especially in respect of *diet* and *regimen.* During the continuance of the disease, particularly in the acute form, bland or emollient fluids only should be allowed. The compound decoction of barley may be taken in small quantities; and when a relaxing effect upon the bowels is desired, then about a drachm of oleum olivæ may be given on its surface, three or four times in the day, or oftener. In the acute state of the disease, this, or simple barley, rice, gum-water, rendered agreeable with liquorice powder, is all that is required, both as drink and as aliment. In the chronic states, however, or during the early stage of convalescence from the acute, the same watery decoctions, with small quantities of ass's or other milk, or weak arrow-root or other farinaceous substances, may be allowed; and subsequently, according to the progress of the case or the amount of debility, mutton or veal or chicken broths, or beef tea, in small quantity, with dry toast, or with boiled rice or stale bread, may be cautiously permitted. The greatest caution should be used in returning to animal food; and that which is the mildest, least stimulating, and most digestible only should be allowed, in small quantity, once in the day. All heating or stimulating beverages, and flatulent or ascescent vegetables, ought to be avoided. Chocolate or cocoa-nibs should be substituted for tea and coffee; and, in the case of infants or children, ass-milk warm from the animal, either pure or diluted, is one of the best articles of food as well of drink that can be administered.

163. During the course of, as well as convalescence from, this disease, a perspirable state of the surface ought to be preserved by flannel worn constantly next to the skin, by warm baths rendered emollient by an alkali, by decoction of marsh-mallows or infusion of linseed, &c. If the bowels after recovery continue irregular or constipated, the emollient decoctions or infusions may be employed as enemata, to which oleum ricini or oleum olivæ may be added; and small doses of these, particularly of the latter, may be taken frequently, on the surface of any suitable diluent or demulcent until a regular action shall be established.

XI. Organic Lesions of the Peritoneum, independent of Inflammation.

Classif. — IV. Class. I. Order (*Author.*)

164. i. Description. — The lesions of the peritoneum which have already been noticed have chiefly been those which are consequent upon inflammation, in some one or other of its several forms or types. Tubercular formations are, however, an exception; and these have been noticed only incidentally, and in as far as they are associated with chronic peritonitis, particularly in scrofulous constitutions. A brief notice only will be taken of those changes which are not essentially caused by inflammation, as they are generally, especially in the circumstances in which they usually present themselves, but little influenced by medical treatment. Certain of these changes affect rather the attached surface, or the sub-peritoneal tissue, than the peritoneum itself; whilst others consist in the presence of fluids altogether foreign to the peritoneal cavity.

165. *A. Various changes of colour* are occasionally presented by the peritoneum, which are independent of inflammation. — *a. Yellowish* or even *greenish tints* are sometimes observed in those parts of the membrane in the more immediate vicinity of the gall-bladder, and are owing to the exudation of bile. The extent and the intensity of the colour generally depend upon the colour and quantity of bile contained in the gall-bladder and ducts, and upon the duration of the period from the death of the patient. Various shades of colour are often observed in the peritoneal surfaces of the liver and spleen, and are generally owing, when they are very deep or dark, bluish or brownish, to venous congestion of these organs, or to accumulations of black viscid bile in the hepatic ducts. These deep shades of colour are most remarkable in warm climates, after hepatic, periodic, and other fevers. — *b.* The peritoneum may also present a *reddish hue,* without having been inflamed. This always is owing to the escape of blood, from accident or rupture of vessels, into the peritoneal cavity; and hence its nature is apparent. It is always a *post-mortem* change.

166. *B. The sub-peritoneal cellular tissue* is not infrequently the seat of various changes which, although sometimes connected with, is oftener independent of, inflammatory action. — *a. Œdema* of this tissue is occasionally observed in consequence of chronic disease of the heart, liver, lungs, or kidneys; and is most conspicuous in those situations where the cellular tissue is most abundant and loose; as in the vicinity of the pancreas, kidneys, and sexual organs.

167. *b.* Minute transparent *vesicles,* varying from the size of a millet-seed to that of a pea, or even of a marble. They occur most frequently about the Fallopian tubes, ovaries, and broad ligaments. *Serous cysts* are not infrequently found between the folds of the broad ligaments, and sometimes attain the size of a large orange, simulating ovarian disease, and constituting one of the forms of encysted dropsy. (See art. Dropsy, §§ 206. 212.)

168. *c. Tubercles* and *scrofulous tumours* are the most frequent and important organic lesions primarily occurring in the sub-peritoneal cellular tissue independently of inflammation, although, with all other morbid formations in the same situation, generally inducing chronic inflammatory action in their progress. Scrofulous tubercles in this situation, and when well defined, seem to be encysted, owing to the condensation of the cellular tissue directly investing them. Dr. Hodgkin states that these scrofulous tubercles or tumours are most frequently seen, and are the largest, between the folds of the mesentery; but they obviously implicate the glands in that situation. They also attain a considerable size in the omentum. Under the peritoneal coat of the intestines they are generally small, but numerous. Dr. Hodgkin considers the small miliary granulations which I have described above (§ 107.) as consequences of inflammatory action, and which are found both below and in the peritoneum, to be incipient tubercles. I have already endeavoured to distinguish between those granulations which seem to result from chronic inflammation and scrofulous tubercles.

169. *C.* — *a. Malignant deposits or formations* of a *scirrhous* or *fungoid character* occur occasionally

n the attached surface of the peritoneum, and ometimes they extend from the subjacent structures, and invade this membrane. Dr. Hodgkin emarks, that in the former case the tumours hich result are often remarkable for their size, umber, and diffusion; but that, even in these, ome portions of the peritoneum more frequently scape than others. Thus, these morbid growths re not so often met with on the parietes as in the mentum, or in the intestines; and when formed n the parietes they are generally of a smaller ze. Neither the mesenteric glands nor the other rgans invested by the peritoneum are apt to become affected by the extension of the disease. hese growths are sometimes, although not necessarily, attended by serous effusion into the eritoneal cavity, causing distension, which is occasionally very considerable. When the disease s propagated from the primarily affected organ, is generally to the vicinity only; thus, in scirhus of the pylorus, a sprinkling of minute scirhous tubercles is often seen under the peritoneum n the neighbourhood; and in malignant disease f the uterus, the convolutions of the intestines vhich happen to come in contact with it often xhibit growths of a corresponding character beeath their peritoneal coat.

170. *b.* The *free* or *internal surface* of the eritoneum is very rarely the seat of malignant rowths. Dr. Hodgkin, however, met with two nstances, in which it was the seat of these growths; ut in these, malignant formations also were ound in organs invested by this membrane, and vere manifestly developed primarily in these organs. In one case, in addition to fungoid disease f the kidney, there were small malignant tuberles situated in and beneath the peritoneum, and thers seated on the free surface of it; and in the ther case these tubercles were scattered beneath he peritoneal coat of the intestines, and on its ree surface, the chief and primary fungoid tumour eing in one of the ovaries.

171. *c. Melanosis* also is sometimes met with, nvading, rather than primarily affecting, the perioneum; and it is chiefly observed on the attached urface of the membrane, to which it has extended rom the subjacent structures and cellular tissue; vhere, however, it presents the usual characters ssigned it when treating of it elsewhere. (See art. Melanosis.)

172. Although scrofulous tubercles and scirhous and fungoid productions affect the peritoneum ndependently of inflammation, and appear in hose circumstances, and from causes, which are ully developed in the articles devoted to those everal subjects, still they not infrequently are ound accompanied with more or less abundant effusion of serum, and with bridles or films of adhesion, indicating, the latter especially, that a chronic form of inflammatory action had been excited by their presence, and in their vicinity.

173. *D. True hydatids* or *acephalocysts* are sometimes produced beneath the peritoneum, and occasionally they attain a very large size, so as to resemble encysted dropsy, from which they are with difficulty distinguished during the life of the patient, especially when they form between the folds of the broad ligaments of the uterus. They are met with chiefly under the peritoneal covering of the liver, beneath that of the spleen, in the broad ligaments, and in the mesentery; but the first is their most frequent seat. They may burst into the peritoneal cavity without producing any signs of inflammatory action; but a chronic and limited state of inflammation may be occasioned by them. In either of these situations they may pass through those changes which have been described when treating of them. (See art. Hydatids, §§ 15—25.)

174. *E. Ecchymoses* and small *bloody points* are occasionally found in the peritoneum, owing to minute extravasations of blood, caused by diminution of the tone of the capillaries and of the vital cohesion of the sub-peritoneal tissue, and probably also of the peritoneum itself. They are most frequently observed under and in the peritoneal coat of the small intestines, but are also sometimes met with in other situations. They occur chiefly in purpura hæmorrhagica, in adynamic fevers, and in scurvy, in which last I have observed the ecchymoses assume the form of vibices or patches as large as half-crown pieces. Dr. Hodgkin remarks that he has seen the peritoneum sprinkled with small bloody points, not only in purpura, but also in jaundice.

175. *F. Various substances foreign to this situation are sometimes found within the peritoneal cavity.*—*a.* The most common is an accumulation of *serous fluid.* This fluid may result from increased exhalation of serum, arising from congestion, or impeded return of blood from the abdominal viscera, consequent upon disease of the liver, heart, lungs, kidneys, &c. In these circumstances, the effused fluid contains comparatively but little albumen; and when this is the case, and the more watery and limpid the effusion, the less prone the peritoneum is to be irritated or inflamed by it. Still, a state of chronic inflammatory action is sometimes induced by the state and quantity of the effused fluid, affecting chiefly the omentum and mesentery, and occasioning more or less shrinking of these parts. The disposition also to chronic, or even to acute asthenic peritonitis, occasioned by serous effusion into the peritoneal cavity, is further evinced by the frequency of its supervention upon *paracentesis abdominis.* It has been stated above (§§ 101, 102.), that the effusion of fluid into this cavity consequent upon inflammatory action is often very great; but, in this case, whatever may be the form of inflammatory action producing it, the fluid contains more or less albumen, occasionally also blood-globules or colouring matter, and even pure or dissolved blood, although much more rarely; and the peritoneum is altered in structure, or it presents other morbid products.

176. *b. Blood,* fluid or coagulated, recent or partially altered, pure or mixed with serum, &c., is in rare cases found in this cavity; but generally in consequence of rupture of some one or other of the invested organs, or of an aneurism. Broussais contended that it is sometimes effused in considerable quantity, owing to a hæmorrhagic peritonitis, or to a state of action partaking of both an inflammatory and a hæmorrhagic character. This may be probably the case, but on rare occasions. Hæmorrhage may also occur into this cavity to a considerable extent, owing to the ulceration attending some states of chronic peritonitis, of which I have met with a remarkable instance. When blood is effused into the cavity owing to wounds, injuries, &c., it always rapidly produces inflammatory action, which is followed by the

effusion of coagulable lymph, if the powers of the constitution are not remarkably depressed; and this lymph may limit or surround the blood effused, and thus in some respects isolate or encyst it, and thereby even confine and ultimately repair the mischief. The effused lymph, by subsequently becoming organised in the manner described (§§ 82—84.) may even give rise to various changes in the blood surrounded by it, similar to those remarked in coagula found some time after extravasation into the parenchyma of organs.

177. A partially decomposed blood, mixed with more or less serum, or a sanious fluid, is in rare instances found in the peritoneal cavity unconnected with inflammation, and chiefly in the same circumstances and in the same cases as have presented ecchymoses of the peritoneum. This state of the effused fluid I have seen only in scurvy, purpura, adynamic fevers, malignant puerperal fever, and malignant small pox; and in these circumstances the sanious or bloody state of the effusion, as well as the ecchymoses, is owing as much to alteration of the blood as to the impaired vital cohesion of the peritoneal surface and capillaries.

178. *c. Chyle, bile, urine*, and even the *amniotic fluid* have been found in the peritoneal cavity, but only in consequence of wounds and injuries of the peritoneum and parts involving the vessels concerned in transmitting, or the organs containing, these fluids. Rupture of the fundus of the urinary bladder, or of the uterus, is necessarily followed by the escape of the contents of these organs into the peritoneal cavity. *Purulent matter* is sometimes found in this cavity independently of inflammation of the membrane, owing to the bursting of an abscess, especially of that of the liver. *Tubercular matter* is in rare instances found in this situation, owing to perforation of the peritoneum, particularly after scrofulous or tuberculous disease of the mesenteric glands, and in chronic tubercular peritonitis. The *alimentary, fæcal*, or *gaseous* contents of the *stomach* or the *intestines* occasionally escape into the peritoneal cavity, and even *intestinal worms* are also in rare cases found there, owing to perforation of these viscera, either no adhesions, or partial adhesions only, having existed between the opposite peritoneal surfaces adjoining the perforation. In all cases of the passage of these foreign substances into the peritoneal cavity peritonitis is quickly induced, and extends with a rapidity coordinate with the acridity, quantity, and diffusion of the foreign substance and the susceptibility of the patient.

179. *d.* It has been shown above (§ 119.) that *gases* are sometimes found in the peritoneal cavity, causing more or less true peritoneal *tympanitis* or *meteorismus*, owing to the partial decomposition of a portion of the products of inflammation, especially when these products are long retained. This source of the gases sometimes found in this cavity is now generally admitted by pathologists. But it has been supposed — been contended for by some and denied by others — that air may be secreted on the free surface of the peritoneum, independently of inflammatory action. Portal, Combalusier, Frank, and others have adduced instances of the accumulation in this cavity of air, independently of either disease of the membrane or perforation of the digestive canal. There is no doubt of the secretion of air from the digestive mucous membrane, independently of any obvious structural disease of it; and whilst the possibility of a similar phenomenon occurring in respect of the peritoneal coat of the digestive tube may be admitted, the rarity of its appearance cannot be questioned. Scoutetten believes that he has found air in the peritoneal cavity without any lesion of the membrane; but was it secreted there before death, or produced afterwards? M. Ribes considers that an elastic fluid exists in the serous cavities, arising from the vaporisation of a portion of the secreted serosity with which they are provided.

180. *e.* Perfectly *detached bodies or concretions*, generally of a rounded farm, are sometimes found in the peritoneal cavity. They are of a semicartilaginous, cartilaginous, or even bony character. They vary in size from that of a pea to that of a cherry. Dr. Hodgkin remarks, respecting their formation, that "they commence as an isolated clot of coagulated lymph; the smooth convex surface of which has contracted no adhesion, either to the serous or to any other portion of false membrane. In process of time the surface acquires a sufficiently membranous and firm consistence; and the detached body, instead of forming a clot of cheesy matter, contracts, losing its serous or watery part. If this take place rapidly, and materially reduce the size of the detached body, the surface exhibits an uneven and corrugated appearance. When of small size, they more often retain their smooth surface, an increasingly firm structure, which becomes loaded with earthy matter, as I apprehend, by a process of endosmosis. These detached bodies may be seen in the most recent state, wholly consisting of coagulable lymph, having a cellular character, infiltrated with serum, and presenting the figure and size of an egg-plum, somewhat flattened; but I have never seen them, in the firm and advanced stage which I have described, larger than a pea or a marble." (*Op. Cit.* p. 53.)

181. Now without questioning that some of the bodies, in their recent or soft state, or in that of lymph, are produced in the manner for which Dr. Hodgkin has argued, or consists of portions of lymph thrown out with, or isolated by, a liquid effusion produced at the same time, still the subsequent changes, whether cartilaginous or earthy or bony, cannot be explained conformably with this opinion, even although the process of *endosmosis* be called in aid of it. I believe that the lymph, formed in a greater or less clot, or mass, and with more or less serous effusion, continues connected with the peritoneum by a narrow neck or pedicle, through the medium of which successive changes take place in it; and that, with the condensation and contraction of this mass, the pedicle also shrinks, becomes thinner, and is at last destroyed or broken off, the body ultimately being altogether detached. That it should undergo the successive changes of cartilaginous, osseous, or earthy degeneration, after its complete separation from the living structures, as Dr. Hodgkin supposes, is countenanced neither by analogy, nor by observation, nor by what is known of the process of endosmosis.

182. ii. The Symptoms of those organic lesions of the peritoneum which have now been described are extremely equivocal and obscure. Many of these lesions are detected only after death, and are

ssociated with alterations of other or connected or-ans or parts, which assume a more prominent place n that state of more or less general disturbance, r of cachexia, which is usually present. Where here is effusion of fluid into the peritoneal cavity, his may be readily detected, but it may be com-licated with one or other, or even with more, of hose changes of the membrane which have just een noticed, and which the effusion may mark, r which may not be evinced by any characteristic henomenon. When the alteration is of a ma-gnant kind, it will generally be attended, at least t an advanced stage, by a cachectic, anæmial, nd languid or debilitated state of the frame. ven when a distinct tumour is present, its exact eat will frequently be undeterminable, and it vill be equally impossible to ascertain the extent o which the peritoneum is implicated by it. The natter can at best be one of inference, to which he physician will be led by a number of varying ircumstances, many of them peculiar to indi-idual cases.

183. Of all these lesions, probably hydatids eated beneath the peritoneal covering of the liver s that which is ascertained with the greatest cer-ainty during the life of the patient. Yet this is ot always the case, for much depends upon the articular part to which these parasites are at-ached, upon the size of the tumour they produce, nd upon various attendant circumstances. But he symptoms are stated in the article Liver (§ 232.). Some of the lesions, whilst they only artially, or even to a small extent, invade the eritoneum, are seated chiefly in organs or parts nveloped by this membrane; their precise seat eing indicated chiefly by the way in which par-icular functions are disturbed, and the amount of he disturbance. If the lesion consist of a deposit f morbid or heterologue matter, occasioning more r less tumour, the seat and relations of it, viewed n connection with the kind and extent of dis-rdered function, and with the evidence of con-titutional disturbance manifested in both the ervous, vascular, and cutaneous systems, will generally furnish some indication of the nature of he malady, particularly when aided by the state f sensibility evinced during a careful examination f the different regions of the abdomen and pelves, nd by percussion. Still the amount, as well as he exact nature, of the peritoneal lesion may not be made apparent; and it may not even be easy to ascertain, whether or not the alteration be one proceeding from chronic inflammation, or one or other of those which I have now considered as being independent both of inflammatory action and of its usual results. It is chiefly by comprising within our mental vision all the circumstances and phenomena characterising the causes, origin, progress, and full development of the case, that an approach can be made to a just view of the nature of the distemper.

184. iii. The Causes of the organic lesions which I have viewed as altogether independent of inflammatory action, although sometimes associated with, or productive of, a state of asthenic or chronic inflammation, vary according to the nature of the existing lesion; each of these lesions proceeding from predisposing and exciting causes, which are more or less peculiar to it. Thus the *tubercular*, the *scirrhous*, or the *fungoid deposits* formed beneath or invading the peritoneum, proceed from causes which are enumerated in the articles devoted to these diseases. The same remark applies to *hæmorrhagic, hydatidic*, and other changes implicating this membrane; these appearing from the same causes and in the same circumstances, as give rise to them in other situations. Of all the alterations of structure, however, which have now been briefly noticed, it may be stated, in general terms, that they commonly proceed from, and are characterised by, both at their commencement and during their course, a condition of the vital powers and of the circulating fluids that have been fully described in the articles Debility and Disease. *Debility*, appearing either primarily or consecutively, as shown when treating of this subject, or in other words, depression or exhaustion of vital energy, by occasioning those changes in the assimilating, the circulating, and depurating organs and functions, which I have fully developed in the articles Blood and Disease, gives rise to the several alterations of structure just described; one or other of them appearing, according as the predisposition resulting from original conformation, temperament, age, and modes of living, and as the influences exerted by air, climate, mental emotion, previous or concomitant disease, &c., determine its character or relations.

185. iv. The Treatment of organic lesions of the peritoneum, like the consideration of the causes producing them, should have strict reference to the nature of the alterations inferred to be present in each case. Still the same principles are applicable to nearly all of them — whether of prevention, of alleviation, or of cure. It has just been stated, that all these lesions generally originate in depression or exhaustion of vital power, and in its more immediate consequences in the assimilating, circulating, and depurating functions and organs; and a reference to those articles where these distempers are fully discussed, and with due reference to their causes, will fully confirm the general statement now made. It must, therefore, be manifest, that a continuance of the primary morbid condition will necessarily aggravate or increase the consecutive changes, and thereby favour the developement of the specific organic lesion, and its inroads upon the constitution. On the other hand, it must be equally evident, that whatever has the influence to remove the primary morbid condition — to rally or promote the depressed or exhausted powers of life — to aid the assimilating, circulating, and depurating functions, will most efficiently resist the progress of the organic mischief, and even overcome it ultimately, (although we should seldom be so sanguine in our expectations), when it has not advanced so far as to impede the functions of life, or when it is not of a nature which precludes hope of ultimate success. By enabling the constitutional energies to resist the advancing evil, we may succeed in prolonging the contest, — we may very considerably prolong life, even when we cannot hope to avert an ultimately fatal result.

186. Having determined the principle of treatment, the means which range themselves under it are readily suggested; the selection of them depending upon the inference drawn from previous and existing phenomena as to the nature of the particular case. The number and varying characters of the alterations just described, the dif-

ferent and even changing circumstances in which they appear, and the numerous visceral maladies with which they are generally complicated,— these maladies often being the original evils from which the peritoneal lesion springs, or by which the membrane is invaded,—preclude the possibility of noticing the several methods of treatment, the numerous means of cure or of palliation, and the interminable modes of combining these means, that may be employed in these pathological conditions. I can only indicate the general character of the means which experience has shown to be most beneficial, and notice a very few from among these means which deserve to be employed.

187. I have just now contended that the only remedies which should be resorted to in the organic lesions of the peritoneum are those which support or rally the depressed powers of life. Unfortunately, many of these lesions invade the peritoneum consecutively of a protracted existence in some one of the viscera enveloped by this membrane, and not until vital depression and constitutional contamination have made considerable progress,—or they may not come before the competent adviser until reasonable expectations of cure are precluded, either by their nature at their commencement, or by the amount of disorganisation. Still, in either case, the chief *indication* is nearly the same for all, namely, *to enable the powers of life to resist as long as possible the further progress of disorganisation; and, when the case admits of the attempt, to aid them in removing whatever alteration of structure may have already taken place*. It is very obvious that this object can be attained only by those means which support, or rally without exhausting, vital energy; and which at the same time aid the due performance of the several digestive, assimilating, and depurating functions. Care should be taken always to keep the stomach in good humour, by the aid not merely of *medicine*, but also of suitable *diet* and *beverages*. The *medicines* most appropriate to the peculiar features and complications of the case should be selected, and their influence upon the functions of digestion and excretion carefully observed. Although tonic or restorative medicines are requisite, yet those which are the best suited to the circumstances of the case, and the temperament or idiosyncrasy of the patient, ought to be studied. Where there is increased irritability of the system, with a frequent or excitable pulse, the milder vegetable tonics or bitters only will be tolerated; and these may be prescribed with calmants, as the hydrocyanic acid, Hoffmann's anodyne, or with henbane, conium, morphia, or other preparations of opium. If more or less anæmia be present, chalybeate medicines, selected and combined according as the peculiarities of the case suggest, are the most appropriate. It will be often beneficial to combine alteratives with tonics or restoratives; and the choice of those is generally difficult, as those which depress vital power, or irritate the stomach, are generally prejudicial. The preparations of sarsaparilla and of iodine are the most efficacious when judiciously administered; but the latter should be prescribed in very small doses, especially at first, and the iodide of potassium be preferred. This medicine may be given with the liquor potassæ or with sarsaparilla, or in tonic infusions or decoctions; or with the liquor potassæ in Hodgson and Abbott's[*] pale ale, a beverage which I have for many years recommended in several disorders characterised by more or less debility. When the iodide of potassium is found to agree with the patient, the iodides of mercury may also be given in small doses at bed-time, with an anodyne or opiate. If anæmia exist, the iodide of iron should be prescribed in the syrup of sarsa, and the advantages of light and sun-shine enjoyed as far as may be prudent. The several emunctories ought to be duly aided in their functions; the regular action of the bowels and of the kidneys promoted; and the insensible perspiration increased by wearing flannel next the skin, and by keeping the extremities always warm.

188. If the stomach be irritable, creasote may be given, with or without opium or acetate of morphia; or hydrocyanic acid may be prescribed in demulcents or emollients; and such *beverages* be selected as will support the strength, and agree best with the digestive organs. In some cases, the pale ale just mentioned may be made the vehicle of various medicines, according to the exigencies of the case; but, in every instance, and particularly when the stomach is weak and irritable, tea ought to be avoided. Chocolate or cocoa-nibs are preferable; or a little milk, with seltzer, soda, potass, or magnesia water. The choice of these or of mineral waters should depend upon the nature of the case, and especially of the visceral disease characterising it. The *diet* and *regimen* must be regulated by the same circumstances.

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[*] I recommend this beverage in preference to the various imitations of it which have more recently appeared, because I know that it is pure, well fermented, and prepared from the best materials. The utmost precautions are also taken against adulteration. For many years it was the only article of the kind, and it is still the most wholesome.

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PESTILENCE.—Under the head *pestilence*, comprise certain maladies which have appeared s wide-spreading and devastating epidemics, but hich have surpassed all other epidemics in their apid extension, in their fatality, and in the dura-on of their prevalence. Nor have they appeared nly as most fatal epidemics, for they have con-nued, in countries favourable to their perpetua-on, to appear from time to time in a much less larming and obtrusive manner; occurring for a me only in few or widely scattered instances, nd at more distant intervals, until certain fa-ourable circumstances, arising out of predis-osition, atmospheric constitution, or some un-nown, but more generally diffused influence, have risen and rendered what had been either unsus-ected, or but little feared, suddenly most manifest, iffused, fatal, and appalling. To these irruptions, o their rapid extension, and to their great fatality, he generic term *pestilence* may be justly applied: nd the history of medicine, in recent times, fur-ishes *three maladies*, to which this term is especially pplicable, namely, the recent distemper, which as generally but injudiciously been called *cholera*, *ellow fever*, and the *plague* or *pest*. To these night be added, perhaps, small-pox, scarlet fever, neasles, and some other infectious fevers; but these liseases only occasionally, or even very rarely, and then only in peculiar circumstances and n certain races, assume forms which, as respects either malignancy, prevalence, or fatality, can entitle them to be placed in the same category with those now about to be considered.

1. If the *history of pestilences*, or of *pestilential epidemics*, be studied in Grecian, Roman, and Arabian writers, and in the writings of the fourteenth and fifteenth centuries, it will be manifest, that the *causes* to which these pestilences were imputed are nearly the same as have been assigned in modern times. Hippocrates ascribed epidemics generally to the food, drink and air; and Galen, with Lucretius, Avicenna, and others who copied him, considered atmospheric heat, and the miasms exhaled from the soil and from the putrid bodies of animals, as the chief causes of all pestilences. Avenzoar enumerates, as their sources, a warm and humid air, unwholesome food, and emanations from stagnant water and from dead bodies. Haly Abbas assigns the same causes as Avenzoar, but attributes a share of the influence to the nature of the seasons. From Homer to the present time, considerable influence in the production of pestilences has been imputed to great heat of the sun and to very hot seasons. Diodorus Siculus ascribed the plague of Athens and the disease which attacked the Carthaginian army in Sicily, to the excessive heat of the sun, to exhalations from the soil, and emanations from the bodies of the dead. Ammianus Marcellinus considered extremes of heat or of cold, of drought or of moisture, exhalations from the earth, and the effluvia from the dead and from putrid animals, as the chief causes of pestilential epidemics. But, although these were assigned as the chief causes of pestilences by nearly all the ancient writers, still others, and particularly infection and contagion, were also viewed, as I have shown in the articles Epidemic Influence and Infection, as contributing to their propagation. Thucydides, as Mr. Adams, the learned translator of Paulus Ægineta, remarks, evidently considered the plague of Athens infectious, for he mentions, that physicians were more attacked by it than others, as having most intercourse with the sick; and he describes the terror which the citizens felt to approach the affected, and intimates that it was often contracted by such intercourse. Many historians, poets, and physicians among the ancients, since Thucydidês, have considered pestilential epidemics to be infectious—not always, however, by contact, but more generally by emanations from the sick, which contaminate the surrounding air, as shown in the article Infection (§ 11. *et seq.*). Marx, Omodei, Adams, and others have referred to the opinions of the ancients on this subject, in order to disprove what had been falsely alleged by a few writers of small reputation, that the doctrine of infection or contagion was altogether modern. That the ancients, however, entertained correct views of the matter is evident from a reference to the writings of Aristotle, Livy, Pliny, Dionysius of Halicarnassus; Diodorus Siculus, Appian, Plutarch, Quintus Curtius, Dio Cassius, Eusebius, Marcus Antoninus, Chrysostom, Seneca, and Isidorus Hispalensis. The last of these remarks that—"Pestilentia est contagium quod quum unum apprehenderit celeriter ad plures transit." "Pestilentia est morbus latè vagans et contagio suo quæ contigerit interimens."

2. A belief in the infectious or contagious nature of pestilential fevers and some other diseases was entertained by Aretæus, Cælius Aurelia-

nus, Galen, Aëtius, Paulus Ægineta, and by several of the Arabian medical writers. Mr. Adams remarks, that the result of his examination into the opinions of the ancients on this subject leads him to the conclusion that all, or at least the most intelligent of the medical authorities, held that pestilential epidemics are communicated, not by any specific virus, but by the contamination of the surrounding air by effluvia from the sick. As to this, as well as to other sources of pestilential diseases, the ancients did not differ materially from the best informed of the moderns. Indeed, faithful observers in all ages must have arrived at nearly similar conclusions; for, although various subordinate circumstances may have changed with the progress of time, and some causes may have assumed more intense, and others less prominent forms, still the chief and efficient sources and influences must have been reproduced in the succession of ages after indefinite intervals in those states and combinations which develope and propagate either pestilence or less malignant epidemics. If we consider the changes continually taking place near the embouchures of rivers with the progress of time, the deep and exuberant soil that is there accumulating, and the frequency of inundations,—if we reflect upon the circumstances affecting the physical conditions of large cities, and upon the contaminations of the air, water, and soil, arising from these and other crowded and ill-ventilated places of human resort,—we shall find causes sufficient to explain a portion of the morbid phenomena, but not the whole, which present themselves to the physician, especially during warm and humid states of the atmosphere, and under the influence of certain electrical conditions, or of unusual stillness of the air. Yet even these are not of themselves sufficient to account for all the phenomena which occur during the prevalence of destructive epidemics. Conceding all that can be contended for as to the baneful influence on the human constitution of exhalations from rich, deep, and humid soils, into a warm, stagnant, and moist atmosphere; of effluvia from the exuviæ of living human beings and other animals congregated in masses in camps, cities, and towns; of emanations from dead and putrefying bodies, insufficiently covered by the soil, and diffusing their elements through the soil, and transmitting them to the atmosphere within or around these localities; and of the water of these places impregnated with putrid animal matter—granting, in their full force of pestilential generation, the infecting influence of these causes, still an additional cause is required to explain many of the phenomena falling under the cognisance of the physician; and that cause often presents itself in a manner that cannot be mistaken, and, in many instances, in such a way as admits not of dispute. That other and most influential cause, often superadded to, or generated by, the foregoing, is *infection*, or, as I have shown in the article on this subject, the effluvium or miasm which emanates from the sick, contaminates the surrounding air, and the patient's day or night clothing, and thereby propagates to the healthy a disease similar to that from which itself proceeded, and often in circumstances and in situations where the other sources of the disease cannot have existed.

3. If the circumstances, physical and moral, characterising congregations of our species, whether in camps or in cities, in ancient times, be considered as far as we possess the information, and be compared with those which exist in respect of similar congregations and localities at the present day, we shall find that, although a few causes of malignant disease are no longer in operation, others have sprung up, and have become excessively injurious, notwithstanding that numerous influences aid in counteracting or limiting the mischief. Many of the rites, even of religion and of superstition, during early ages and in pagan countries, tended remarkably to diminish the sources of infection and of pestilence. The embalming of the dead by the Egyptians and other ancient nations, the laws rigidly enacted by Moses and enforced by Jewish rulers, the burning of the dead by several nations, and the modes of sepulture adopted by the Chinese from the earliest ages, were all more or less calculated to prevent the bodies of the dead from proving sources of destruction to the living. But with Christianity and with the superstitions which were successively engrafted upon the purest and most sublime doctrines, sprang up practices of the most injurious tendency to public health, and these have now, particularly in large towns, advanced so far as to become matters of traffic with some of those who profess the greatest anxiety for the souls, if not for the health of their species. The desire of depositing the dead within the consecrated sphere of spiritual instruction, or of boasted inspiration, became general, and the places of such deposit also became, especially in recent times, a source of emolument. Thus religion was made, even by the sanctimonious, the handmaid of Mammon; and often, in no lengthened process of time, the accumulated bodies of the dead furnished pestilential emanations, diffusing sickness and death amongst those who congregated in their vicinity. Thus also sleek hypocrisy, in the garb of sanctity, lured its victims within the sphere of infection, thereby increasing the rate of mortality, and at the same time augmenting its revenues, by swelling the general mass of animal corruption, and multiplying the sources of infection. I have shown elsewhere (see articles Endemic and Epidemic Influences and Infection) that the accumulation of human exuviæ, and the interment of the dead amongst the living, and in places of frequent public resort, occasion, in the course of ages, a state of the soil which is most productive of noxious emanations, especially under the influence of a hot sun, and a warm, stagnant, and humid atmosphere, and which, moreover, contaminates the water in the vicinity. Thus ancient cities have generated the sources of their own decay, which circumstances have retarded or accelerated, according as these sources have been counteracted, or augmented, by legislative measures either of a beneficial or of an injurious tendency.

PESTILENCE, CHOLERIC. — Synon. — *Pestilential Cholera*, *Pestilential Asphyxy*, *Asphyxia Pestilenta*, Author; — *Epidemic Cholera*, Auct. Var.; — *Spasmodic Cholera*, *Cholera spasmodica*, Auct. Var.; — *Epidemic Spasmodic Cholera*, Hawkins; — *Cholera asphyxia*, *Asiatic Cholera*, *Indian Cholera*, *Malignant Cholera*, various Authors; — *Convulsive Nervous Cholera*, Gray; — *Hyperanthraxis*, Clanny; —

Cholera Morbus, Cholera Epidemique, Cholera Asiatique, Fr.; — *Die Epidemische Cholera, Asiatische Cholera,* Germ.

CLASSIF. — II. CLASS, III. ORDER (*Author in Preface*).

4. DEFIN. — i. NOSOLOGICAL. — *Anxiety and op-ression in the chest, epigastrium and præcordia; isturbance of the bowels, with nausea, faintness, iddiness, and depression of vital power; frequent jections of an offensive fluid, resembling rice-water, rom the bowels and stomach, followed by spasms, emors, distress; a cold, clammy, purplish, and rivelled state of the surface; coldness and rawness f the expired air; a sense of painful or burning eat at the epigastrium, with urgent thirst, and apid disappearance of the pulse; — the distemper eing often preceded by indigestion and diarrhœa, nd frequently followed by febrile reaction, affect-g chiefly the brain and abdominal organs.*

5. ii. PATHOLOGICAL. — *A discharge from the owels and stomach of the watery portion of the lood; more or less complete paralysis of the lungs, nd arrest of the changes effected by respiration on e blood, and of the hepatic and renal secretions; epression of the heart's action; the circulation of thick, dark, or venous blood through the arteries, ith congestion in the large veins, and imperfect rculation through the capillaries, owing to the ick glutinous state of the blood; the congestion of e viscera in many cases being followed by an ob-ure or asthenic reaction, affecting chiefly the en-phalon and abdominal viscera.*

6. I. INTRODUCTORY REMARKS. — Circum-ances had induced the author to pay more than rdinary attention to the nature and progress of e pestilential cholera, from its irruption in Ben-al to the present time. He had perused, with e utmost care, much of what has been published specting it; and an opportunity had been af-rded him of examining the reports and documents lating to it sent, from 1817 till 1827, by the edical boards and superintending surgeons of e three Indian Presidencies, to the Board of Di-ectors of the East India Company. He had fre-uent opportunities of observing and treating cases the malady in this country; and of examining e bodies of the dead. During these inquiries, e was particularly struck by some important cts, respecting which he conceived that much isapprehension and error were entertained and idely disseminated, and which required refuta-on. The *first* of these is connected with the rigin and nature of the distemper. Many sup-osed it to be the common spasmodic cholera of arm climates, in an epidemic form merely, an pinion entertained by able writers, both in this ountry and on the continent, until they had op-ortunities of witnessing it. This opinion was, owever, opposed to the author's experience of e forms of cholera met with in warm and insa-brious countries, between which and the recent estilence there is a very marked distinction; and was contrary to the belief of the oldest Euro-ean residents in India, and of the natives them-elves, who might have been supposed to know omething of the usual manifestations of cholera mongst them, unbiassed by preconceived notions, r by medical system and authority. Instead of ooking upon it as an aggravated form of cholera, hey regarded it, wherever it broke out, as an nheard-of pestilence and scourge; and at its appearance whole villages and towns were deserted in consternation, to escape its infection; whilst the greater part of the English practitioners, having been taught to consider cholera to consist of purging, vomiting, and spasms of the lower extremities, and finding these symptoms present in the distemper they were called to treat, believed it to be that disease merely, in an aggravated form, without taking into consideration much more important phenomena uniformly presented by it, and without sufficiently adverting to the fact that these symptoms are often slight, or nearly altogether wanting in the most severe cases.

7. So strongly was the author struck by this misapprehension, that in the beginning of 1822, when editor of the Medical Repository, after noticing various facts connected with the disease, he observed: — "A careful review of the symptoms of this disease convinces us that the deranged actions which take place in the system during its continuance, are no more those to which the term cholera morbus ought to be applied, than they are those belonging to fever. It appears that this malady is the result of a peculiar cause which impresses the vital energies of the system in such a manner as to subvert the power of reaction in many cases, and to render it imperfect and unavailing in others, without the assistance of art. The cause of the disease seems to act as a poison on the extensive surface of the bronchiæ and air-cells, when the system is most liable to its attack; and, in many instances, it appears to destroy its victim in a few hours." (*Lond. Med. Reposit.*, vol. xvii. p. 407.)

8. That the author's opinion was neither prematurely advanced, nor inaccurate, has been shown by the subsequent researches of the most eminent observers. He had treated many cases of spasmodic cholera in a warm and most insalubrious climate, and had experienced the disease most severely in his own person; and while he recognised in these cases the accurate description of PAISLEY, CURTIS, GIRDLESTONE, and Dr. JAMES JOHNSON, he never met with, in any of them, the pathognomonic symptoms of the late pestilence. In this opinion he is borne out by the experience of every well-informed and candid observer, who has seen the disease in this country; and who will readily concede that it is altogether distinct from the severe forms of common cholera. (See art. CHOLERA.)

9. The *second* error, which has been extensively propagated both in this country and abroad, is, that the malady never exhibited any proofs of infection in the East. Knowing, however, from the best sources of information, that this statement is erroneous, the author has gone fully into the refutation of it, and has shown that much mischief has resulted from this opinion, and from the fact that, although evidence of its infection was everywhere furnished in India, no means of limiting the extension of the pestilence, — no sanitary measures were adopted in our Indian empire. That the distemper should extend less rapidly there, and exhibit its infectious property in a less remarkable manner than in Europe, was to be expected from free ventilation, and other circumstances tending to diminish the chances of infection, particularly amongst Europeans in warm climates.

10. A *third* error very generally entertained, both on the appearance of the distemper, and in

the present day, is, that it is caused by some unknown constitution of the air. But we have no instance on record of an epidemic of nearly thirty years' duration, without any interruption, unconnected with infection. Although the author admits that the pestilence is greatly aggravated by certain states of the air, to which the term epidemic is strictly applicable, notwithstanding our ignorance of the precise nature of these states, yet there seems no doubt that it is propagated, and prevails to a certain extent, independently of an epidemic concurrent influence. We know that some diseases are simply infectious without being epidemic, that others are both infectious and epidemic, and others are epidemic, and only contingently infectious. But the author believes that, like eruptive and typhoid fevers, this distemper is infectious, is not essentially epidemic, although it will, during favourable states of the atmosphere, &c., assume epidemic characters, and be modified accordingly. An attentive review of the various manifestations of the malady in India, throughout Asia, in Europe, and in America, seems to justify this view, and to confirm the conclusion as to its being a specific disease, arising from a specific cause, but promoted and disseminated more widely by the aid of various concurrent causes, amongst which epidemic, or unhealthy constitutions of the air; dirty, crowded, and close apartments; and crowding of the sick, are the most prominent.

11. II. PROGRESS AND MORTALITY.— i. *Progress.* Pestilential cholera first made its appearance in Jessore, a populous town in the centre of the Delta of the Ganges, and cut off the majority of those whom it attacked. It spread from the town in all directions, and reached Jaulnah, on the Madras side of the Indian peninsula, in June, 1818, and Bombay in August of the same year. It continued to spread and to prevail throughout all parts of India and the adjoining countries, and still prevails in many districts, although in various degrees of severity, and with intervals of complete immunity from its presence. Indeed, it may be said to have become naturalised in India, forming one of the diseases of the country.

12. During 1818, it visited, in an easterly direction, the Burmese empire, the kingdom of Arracan, and the peninsula of Malacca. In 1819, it appeared in the isle of Penang, in Sumatra, Singapore, the kingdom of Siam, Ceylon, and the isles of France and Bourbon. During 1820, it reached Tonquin, Cambogia, Cochin-China, Southern China, Canton, the Philippines, &c. In 1821, it visited Java, Bantam, Madura, Borneo, and numerous other places in the Indian Archipelago. In the years 1822, 1823, and 1824, it appeared at Tonquin, Pekin, Central and Northern China, the Moluccas, Amboyna, Macassar, Assam, and various other Eastern countries and islands. During 1827, it prevailed in Chinese Tartary. In all these countries and places its prevalence and fatality were unprecedented in medical history.

13. In July, 1821, it reached, in its western course, Muscat in Arabia, and, during the remainder of the year, visited various places in the Persian Gulf. In the following month it appeared in Persia, and during 1822 and 1823, 1829 and 1830, it prevailed in several of the principal cities of that empire. It broke out in Bussorah and Bagdad in July, 1821, and in 1822 and 1823 ravaged most of the populous cities of Mesopotamia, Syria, and Judea.

14. In 1822, it reached to within 150 miles of the Georgian frontiers of Russia, and in 1823 appeared at Orenburg and Astrachan, beyond which it seems not to have extended until August, 1828 and 1829, when it reappeared at Orenburg, the capital of the province of that name, situated on the Tartar frontier, about 400 miles north of the Caspian, and about 1000 miles north of the places where it prevailed extensively in 1822. Its prevalence and fatality in this province were great, upwards of a tenth of the inhabitants having been seized, and about a fourth part of those attacked having died of it. At the same time that the disease appeared in Orenburg, it was raging in several Persian provinces and Tartar tribes in Central Asia, from which it was supposed to have been introduced into Orenburg. At the commencement of 1830, the disease had entirely ceased in the Russian dominions; but, towards the beginning of autumn, it broke out with increased violence on the Georgian frontier of Persia, having appeared, in June, in the Persian province of Ghilan, on the southern shore of the Caspian, from the various southern ports of which it extended northwards along the westward Caspian shore until it reached Baku, Tiflis, Astrachan, and numerous other towns in its progress into the heart of the Russian empire. After attacking a number of places it has continued to spread westward and northward through Russia, Poland, Moldavia, and Austria; visiting Moscow, Warsaw, and other places in Poland, and extending, in May, 1831, to Riga and Dantzic, and in June and July to St. Petersburgh and Cronstadt; early in October to Berlin and Vienna, and subsequently to Hamburg, &c.

15. The distemper appeared for the second time in Astrachan near the end of July, 1830; and before the end of August, upwards of 4000 persons died of it in the city, and 21,270 in the province. After ascending the Volga it reached Moscow, became prevalent there at the end of September, and continued till February, 1831. It attacked about 9000 persons in this city, of which number more than one-half died. It reached Riga in the middle of May, and St. Petersburgh on the 26th of June. From Astrachan it extended to the northern coast of the Black Sea, and in the course of the rivers into the central parts of Russia. It reached Poland in January, 1831, followed the Russian army, in the subjugation of that country, and proved destructive in Warsaw and many other places, during April and May. At the end of the latter month it appeared in Dantzig. In June it prevailed in Lemberg, Cracow, and other adjoining parts, extending through Gallicia and Hungary, and reaching Berlin and Hamburg in August and September, and Vienna in the same months. It appeared at Smyrna in September, and soon afterwards in Constantinople. The pestilence was conveyed by a caravan from Mecca to Cairo in August, 1831, some thousands having died on the road, and by the middle of September, 10,400 Mahommedans, besides Jews and Christians, had died of it in this latter city.

16. Pestilential cholera appeared in England on the 26th of October, 1831, at Sunderland, a month afterwards at Newcastle-upon-Tyne, and in De-

ember at Hetton, Houghton-le-Spring, North hields, Tynemouth, South Shields, Gateshead, nd other places. The first cases reported in ondon occurred on the 13th or 14th of Fe-ruary, in the immediate vicinity of the shipping. n Scotland the pestilence first appeared at Had-ington about Christmas, 1831, and in Leith and dinburgh about the 22d of January following. lthough instances were adduced of sailors be-onging to ships which had arrived from Riga, ronstadt, Hamburg, and Dantzig, and on board hich individuals had died of the malady on the assage, being those first affected at the sea-ports the north of England, still there is every reason believe, from the information given me by everal captains of ships who had left these oreign ports during the period when the distemper as prevailing there, that the infection was con-eyed to many places in both England and cotland in the clothes and bedding belonging to ailors who had died either in these foreign ports, r on the passage of the ships back to this ountry, the clothes and bedding of the sick and ead having been preserved without any puri-cation, and given up to the relatives.

17. From this country the pestilence was con-eyed in an emigrant ship, across the Atlantic o Quebec, many of the emigrants having died of on the passage. It appeared at Quebec on the th of June, 1832, and on the 10th at Montreal; nd thence it extended to Kingston on Lake On-ario and all the surrounding parts. New York was attacked by it on the 24th of June, and Al-any on the 3d of July. About the middle and nd of July it spread to Newcastle on the De-aware, to Philadelphia and several other cities, nd thence to nearly all North and South America. t appeared at the Havannah in February, 1833.

18. The pestilence appeared at Calais on the 2th of March, and was believed to have been rought from England. On the 26th it broke out n Paris, where it carried off about 20,000 persons y the end of September, no precautions having een taken to prevent its extension, a general elief of its non-infectious nature having been rroneously entertained. During 1833 and the arly part of 1834 it raged throughout Spain, and was very destructive in Madrid. It visited several parts bordering on the Mediterranean in 1834; and reappeared in London and in some ther places in this country, as well as in North America, in the same year. It was most destructive in Rome in 1837, the number of deaths varying, for many days, from 200 to 300 daily. It spread to various other countries not mentioned in this brief sketch, between the years 1831 and 1837; and few places were entirely exempted from it, excepting those which were placed under strict quarantine. It still prevails (1845) in several parts of the East Indies.

19. ii. *The prevalence* of this pestilence and the *mortality* amongst those attacked, varied remarkably in different localities, and in different races of the species: and were variously estimated by different writers. The mortality, as well as liability to attack, was certainly greatest among the poor and ill-fed; and among the dark races and those presenting the lower grades of constitutional power, and of vital resistance to depressing agencies. The proportion of attacks to the population, and fatal cases in the whole number of attacked, were differently estimated, according as those cases which consisted chiefly of diarrhœa, or of the incipient stage, were comprised in, or entirely left out of, the account. Owing to these circumstances, nothing can be stated with any precision as to this point. In Arabia, one-third of the inhabitants of the towns which this pestilence visited was said to have died of it. In Siam, Java, and the Mauritius, the number seized was extremely great, as well as the mortality. In China, its fatality was still greater, especially in the more densely inhabited places, owing chiefly to the neglect of precautionary measures. In Persia, one sixth of the population of the principal cities and towns was cut off by it; and from one-fourth to one-third of the population of Mesopotamia was said to have perished. In Bassorah and Bagdad, situate in unhealthy localities, and in a humid atmosphere, a third of the inhabitants was carried off by it in little more than a month. At Erivan and Tauris it destroyed about one-fifth of the population. But in more elevated and healthy situations it was much less fatal. In Syria its ravages were extremely varied: in some places one-half of the inhabitants were swept away, whilst in others, as in Tripoli, only one perished out of every 200. During the prevalence of the pestilence in the southern and eastern provinces of Russia in 1830, the mortality was also various. At Tiflis three fourths of the sick, at Astrachan two-thirds, were carried off. Out of 16,000 attacked in the province of the Caucasus, 10,000 died; at Moscow one-half, and at Orenberg one-fifth only perished. According to the author last quoted, out of 54,000 and upwards attacked in the provinces of Russia, in 1830, more than 31,000 died. In Hungary alone, about 400,000 persons were said to have been seized, and more than half the number to have died.

20. In Astrachan one-third of the cases were said to have been fatal; among the Don Cossacks two-thirds. At Moscow the mortality varied greatly; being at first so high as nine-tenths of the cases, and afterwards sunk gradually to a third. When the disease first appeared in India, the mortality was also extremely high; but its prevalence, as well as its fatality, gradually abated after 1821. Exceptions, however, to this amelioration presented themselves in various places; and at the same period, when the rate of mortality did not rise above 8 or 10 per cent. in some parts, from one-fourth to two-thirds of the persons seized by it died in other places.

21. Of the prevalence and mortality of the distemper in this country, Dr. W. MERRIMAN has furnished the following table from the Reports sent to the Privy Council Office. It must have been evident, however, to all who paid attention to the matter at the time, that the reports were not even approximations to correct statements; for, to my own knowledge, several deaths from the disease in my own neighbourhood occurred without having been reported as such, and very numerous cases were treated successfully during the early or premonitory stage, which were either not viewed as cases of the malady, or not returned as such. The *prevalence* and *rate of mortality*, as far as my own observation enabled me to judge, were remarkably increased by previous ill health, by debility, and by advanced age. The number of cases which occurred before puberty was very small; and

from that age to thirty, the proportion of recoveries was greatest. From forty to fifty the proportion of deaths increased remarkably, and after fifty years of age but few recovered. But much appeared to depend upon the violence of the attack at the beginning.

	Cases.	Deaths.	Recoveries.	Population of Places affected.
England	49,594	14,807	33,790	2,753,958
London	11,020	5,273	5,745	1,424,896
Wales	1,436	498	938	101,603
Ireland up to March, 1833.	54,552	21,171	33,381	

22. III. Description of Pestilential Cholera.— The nature of this pestilence is best inferred from a faithful history of the phenomena manifested by it during its progress, and of the changes it produces in the organisation, and from the means found successful in limiting its extension, and in restoring the frame to its healthy state when subjected to its attack. In conducting an inquiry into the phenomena and nature of this pestilence, I shall confine myself to the more important topics of the subject, and endeavour to arrive at inferences founded on careful observation and extensive experience.

23. Since the first irruption of the malady in the Delta of the Ganges, during its various manifestations in India and other parts of Asia, and in its different visitations of northern and western countries,— whether observed in British India, in Siam, Java, and the adjoining islands,— in China, in Tartary, in Arabia, Persia, Syria, or in Russia, England and other countries of Europe, or in America, — whether attacking the Hindoo, the Mussulman, the Malay, the Mongul, the Asiatic, Caucasian, or the European branches of this race, the characteristic features of the disease have been uniformly the same,— modifications as respects grade, or intensity of attack, and as regards the severity and the occurrence of the consecutive fever, being the chief sources of distinction. Age, constitution, and varying degrees of predisposition, frequently occasion different manifestations of certain functions, or peculiar forms of disturbance, yet still the principal phenomena continue but little modified excepting in degree; and it is not until consecutive changes are induced in the system by the morbid actions characterising the disease, that any marked difference manifests itself,— such difference evidently proceeding from pre-existing states of the internal viscera, innate vigour of constitution, and the remedial means employed to remove the attack. This uniform character of the malady indicates a specific cause, with which, however, several others may combine, favouring its action, by disposing the frame to its invasion, by reinforcing its activity, or calling it into operation after the body has been exposed to its influence.

24. The specific cause producing the disease may be supposed not only to be thus reinforced by other causes, some of them of no mean influence, but itself may vary considerably in intensity, producing, *cæteris paribus*, effects of coordinate severity, yet still acting with a certain relation to the predisposition of the individuals exposed to it. This may be more clearly illustrated by taking for granted the operation of a certain infectious product or poison, the existence of which will be shown in the sequel. This product or effluvium emanating from the bodies of those attacked with the disease, often in a form rendered manifest to the senses of the observer, necessarily varies as respects concentration and quantity, dilution in the air, and rapidity of dissipation by means of ventilation; its effects, therefore, may reasonably be supposed to vary equally in grade, the state of predisposition to become affected by it being the same. Where, however, the predisposition is great, as after great fatigue, during mental depression, &c., a less concentrated and abundant effluvium proceeding from the affected, will produce a more intense effect than this principle in its most active and concentrated form, acting upon a person but slightly predisposed: whilst this intensity of cause will altogether fail of producing any marked effect in the strong, the unpredisposed, or the person whose moral confidence and equanimity generally repel the invasion of any form of infection.

25. Thus, therefore, the manifestations of the malady will be modified chiefly in grade, and scarcely at all as respects its form. In these respects, the efficient cause of the disease is perfectly similar in its operation to the causes of other infectious diseases familiarly known, and frequently observed in an epidemic form; — when the poisonous emanation is concentrated and intense, the subject being also predisposed to its invasion, its effects are rapidly produced, remarkably severe, and speedily arrive at a termination. On the other hand, when weak or much diluted, or when the predisposition of the subject is slight, its operation is slow, and the train of morbid actions of longer duration and diminished severity. Thus I have seen a person struck down nearly inanimate, by the infectious effluvium proceeding from the bodies of the sick, and concentrated in a close apartment, and death following in a few hours, without the energies of life being rallied; and similar results have been often observed by others. Owing, therefore, to the intensity of the efficient cause of the disease, to the number of concomitant causes which may reinforce its action, and to the state of predisposition of those exposed to them, the modified results which I am now about to detail will present themselves.

26. i. *A. Symptoms.*—The *invading* or *preliminary symptoms* of the disease generally consist of pallor, and collapse of the countenance, with an expression of anxiety; slight pain of the forehead, noise in the ears, and vertigo; sickness, heat, and pain at the epigastrium; oppression at the chest, with frequent sighing; nervous agitation, remarkable loss of muscular power, general uneasiness; colicky pains in the abdomen, with slight diarrhœa, at first feculent, but afterwards watery or serous; sickness at stomach; slight cramps of the legs; oppressed, weak, small, slow or creeping, and sometimes intermitting pulse, and coldness, clamminess, or humidity of the surface. These symptoms are of varied duration — of one, two or even three days, sometimes of several hours only,

d at other times not of as many minutes. In me cases, they have been scarcely remarked, e patient having been struck down almost eless, with a dark or livid state of the surface, d all the symptoms characterising the fully-rmed state of the disease.

27. Dr. Smith observes, that several of those bout to be attacked, may be seen with a pecuarly dark ring round their eyes; and others ate that the features evidently collapse, and the xpression becomes anxious for a day or two, or least for hours, before they sicken. At Orenurg, dyspeptic symptoms are stated to have preeded its attack, and a similar observation has een made in other places. Various authors ave said, that stomach and bowel complaints, of less serious nature, often preceded a fully deeloped seizure for a day or two; and that these omplaints have likewise occurred in the place here this pestilence has prevailed, and been reoved by treatment, or disappeared spontaneously, ithout being followed by the fully developed istemper. This, indeed, agrees with my own xperience, during the prevalence of the malady London. For, although but comparatively w were carried off by the pestilence, yet very any experienced severe indigestion, flatulence, nd diarrhœa, with marked vital depression, ometimes with slight spasms, these ailments being ther removed by restorative and astringent meicines, or successfully resisted by the powers of e constitution. And I may add, that there were ery few medical men who did not experience ese symptoms in their own persons,—at least e dyspeptic symptoms, if not the diarrhœa,—uring the period of their attendance on cases of e distemper.

28. *B.* The *fully-developed state* of the malady onsists of great vertigo, nervous agitation, opression at the chest and præcordia, with comlete loss of muscular energy; cramps, commencg at the fingers and toes, and rapidly extending the trunk; slow, thready, and weak pulse; reat collapse of the countenance, the eyes being unk deep in their sockets, and surrounded by a ark circle; vomiting and purging of a fluid reembling whey, or rice-water, containing whitish occuli; a peculiar sharp and contracted state of he features, and wild and terrified expression of ountenance, arising from a feeling of rapidly aproaching dissolution. The whole surface, parcularly the hands, face, and extremities, assumes leaden, blue, or purplish tint, varying in shade vith the intensity of the attack and complexion of he person; the extremities are shrunk, shrivelled, odden, and the skin is deadly cold, damp, and aw to the touch; the nails assume a bluish-white ue; the pulse is either reduced to a minute hread, or is entirely lost at the wrist, and often an with difficulty be felt in the neck; the course f the large superficial veins is marked by flat ines of a darker tint than the adjoining surface; burning heat and inexpressible anxiety is comlained of at the epigastrium; the patient tosses bout incessantly, from a feeling of intolerable veight and anguish round his heart; he struggles or breath, and often lays his hand on the stomach nd chest, referring his agony chiefly to those ituations; his voice is nearly gone, and his repiration is quick, irregular, most laborious, and mperfect; the inspiratory act being effected by an immense effort, and expiration being quick and convulsive. The patient calls frequently for cold water, speaks in a plaintive whisper, and utters only a word at a time, the lungs not containing air enough for a sentence. The tongue is always moist, often white and loaded, and generally flabby and cold. A thermometer introduced below the tongue indicates an animal temperature frequently of ten or twelve degrees below the standard of health. The sense of touch is generally greatly obscured, and deafness is often present. If blood be obtained in this state, it is black, flows by drops, is thick, and feels colder than natural; and the air which is expired is cold and raw. Vomiting and purging, which are far from being the most dangerous symptoms, and are often the most remarkable in the least urgent cases, are generally slight, or at least not profuse, in those attacks where the sinking of the vital energies is the most rapid and the greatest, or are readily allayed by medicine. The integuments of the abdomen are often raised into irregular folds, whilst the epigastrium and hypochondria, with the whole abdomen, are commonly, especially in the intensely severe cases, drawn inwards and upwards upon the chest. The spasms are generally of a more or less passive kind, but they sometimes, particularly in the loins, legs, and thighs, present a tetanic rigidity. They are often slight, or nearly absent, in some of the most rapidly fatal cases, or replaced by a constant tremor. There is occasionally a low whine of suffering expressed. The secretion of urine is totally suspended, as well as the biliary, the salivary, and lachrymal fluids; and a peculiar earthy odour issues from the body, with a singular fetor of the perspiration and evacuations.

29. These are the symptoms in the more severe attacks, varying, however, somewhat in degree, and with the occurrence or non-occurrence of previous diarrhœa. When the intense attack takes place without previous diarrhœa, then the vomiting and purging of watery or rice-coloured fluid,—from the escape of the watery portion of the blood from the digestive mucous surface,—are most marked; the quantity of this fluid thrown out, both upwards and downwards, in a few minutes, being often extremely great. If the remedial means succeed, the animal heat is slowly restored, the pulse becomes fuller, and the colour of the surface more natural; but if these means fail, rapid extinction of the functions takes place. Frictions even then may reduce the lividity of the part to which they are applied, but that of the face and hands increases. The lips and cheeks sometimes puff out in expiration as in apoplexy; and towards the close of the scene, the respiration often becomes slow, with a quivering of the tendons of the extremities. The mind is generally undisturbed, the patient feeling merely a certain degree of apathy towards the close, and a desire to be left to his fate. At last he is unable to swallow, he then becomes insensible, and he dies after one or two long convulsive sobs. In some cases, when the patient has been thus rapidly cut off, without any rallying of the energies of life, convulsive motions of the muscles have been remarked an hour or two, or even longer, after expiration had ceased.

30. Such is the history of the disease when it terminates life without any reaction of the nervous and muscular systems, the patient generally dying

in from six to twenty-four hours. But, both in the East and in Europe, particularly the latter, or amongst Europeans resident in India, a consecutive state of disease, attended with efforts at reaction of an imperfect or malignant character, was not unfrequently observed. It was rarely evinced in the weak Hindoo, or in the previously debilitated, of whatever race, but sometimes in the stronger or less predisposed in India, and often in Europe, and in England, especially in the robust and young.

31. From the aggravated state which has been now described but very few recover, particularly if that state have existed as long as three or four hours before active treatment has been resorted to. A thread of pulse, however small, is almost always felt at the wrist, where recovery from this state is to be expected. Hiccough coming on in the intermediate moments between the threatening of death and the beginning of re-action, is a favourable sign, and generally announces the return of circulation.

32. In less severe cases, the pulse is not wholly extinguished, though much reduced in volume: the respiration is less embarrassed; the oppression and anguish at the chest are not so overwhelming, although vomiting and purging and the cramps may have been more intense. The coldness and change of colour of the surface, the peculiar alteration of the voice, a greater or less degree of coldness of the tongue, the character of the liquids evacuated, are invariably well marked in all the degrees of violence of attack of this pestilence. In no case or stage of this disease have I observed shivering; nor have I heard, after inquiry, of more than one or two cases in which this febrile symptom took place.

33. *C.* The *consecutive phenomena* of this malady vary considerably. In the East, when recovery took place from the previous state, it was often rapid, and without much subsequent disease having been experienced. The numerous writers, however, in the Reports from the Medical Boards of the three Indian presidencies, make particular mention of a consecutive fever, characterised by nervous and malignant symptoms, such as I am about to enumerate, and which was very commonly observed to follow the attack in Europe. They also state that the malady often passed into visceral disease and dysentery; and that the danger was not over, although they succeeded in rallying the powers of life. According to Drs. Barry and Russell, after the blue or cold period has lasted from twelve to twenty-four, seldom to forty-eight hours or upwards, the pulse and external heat begin gradually to return; headache is complained of, with noise in the ears; the tongue becomes more loaded, redder at the tip and edges, and also drier. High-coloured urine is passed with pain, and in small quantities; occasionally is nearly or altogether suppressed; the pupil is often dilated; soreness is felt on pressure over the liver, stomach, and belly; and an offensive odour is exhaled from the surface; in short, the patient is now labouring under a continued malignant fever.

34. A profuse critical perspiration occasionally comes on from the second or third day, and leaves the patient convalescent; but more frequently the quickness of pulse and heat of skin continue; the tongue becomes brown and parched; the eyes suffused and drowsy, with a dull flush, stupor, and heaviness of the countenance, resembling typhus. Dark sordes collect about the teeth and lips; and sometimes the patient is pale, squalid, and low, with the pulse and heat below natural, but with the typhous stupor. The urine is suppressed. Delirium generally supervenes, and death takes place from the fourth to the eighth day, or even later, in the very person, too, whom the most assiduous exertions had barely saved in the cold stage. Dr. Reimer states, that of twenty cases treated under his own eye, who fell victims to the disease, seven died in the cold stage, and thirteen in the consecutive fever. This proportion nearly agrees with that observed in my own practice, or amongst the cases to which I was called. In two cases which I attended, most extensive erysipelas complicated the consecutive fever. I agree with the observation of Drs. Barry and Russell, that persons employed about cases in this typhoid stage, are never attacked with ordinary fever, but with a genuine cold, blue cholera.

35. In another class of cases, serious disorders of the secreting organs of the abdomen, particularly of the liver and of the digestive tube, supervene, instead of the low nervous fever now described. The evacuations from the bowels become of a dark, blackish, offensive, and highly irritating kind, and attended frequently with discharges of a bloody fluid, with mucus, and extremely urgent irritation of the rectum, the consecutive symptoms assuming nearly the character of dysentery. Sometimes an inflammatory, or sub-inflammatory state of the stomach and bowels takes place, either alone, or accompanied with great tenderness in the region of the liver, and disorder of the biliary secretion. In other cases these symptoms assume very nearly the form of bilious or gastric fever; and in a few this state of disease is associated with inflammatory congestion of the lungs. When these states of consecutive disease are severe, they not seldom carry off the patient; and where recovery takes place, are frequently accompanied with tedious convalescence.

36. *D.* The *points of difference* between the manifestations of this pestilence in India and in Europe, appear to be chiefly the following: — 1st. The precursory dyspepsia and diarrhœa appear not to have been so frequent in India, especially in dark races, as in Europe. 2d. The evacuations seem to have been more profuse and ungovernable in the violent attack, in the former than in the latter, although the characters of the evacuations were entirely the same. 3d. Restoration to health from the cold state, without passing through consecutive fever, was by far more frequent in India than in Europe, nor did the consecutive fever there so generally assume a typhoid type. 4th. The proportion of deaths in the cold, compared with those in the consecutive stage, was far greater in the former than in the latter country; and 5th. The proportion of medical men and hospital attendants attacked seemed greater in Europe than in the East. Relapses, also, in the hospital attendants were not unfrequent; whilst convalescence was generally perfect and rapid elsewhere. Mr. Jameson states, in the Calcutta Reports, that, although relapses were not uncommon, there seemed to exist an

nmunity from second attacks, but this is not ully ascertained.

37. It may, perhaps, be difficult to explain the requency, and the modified state, of the consecuive disease now described, as it was observed in his country and throughout Europe. Much, erhaps, may be owing to the state of predispoition, the intensity of the cause, and the constiution of the affected: something also may be ttributed to the effect of treatment in the early tage of the malady, particularly the more general mployment of bloodletting and large doses of alomel,—means evidently calculated to remove he oppressive congestion of the vital organs, and e-animate the functions of the secreting organs nd emunctories of the frame, but which seemed ot to have been so generally, nor so decidedly, esorted to in Europe as in India. Something lso may be imputed to the greater vital resistance nade to the noxious influence exerted by the oisonous miasm causing the distemper upon the rame, by the European constitution, than by the nore delicate constitution of the dark races.

38. ii. *The Prognostic Symptoms.*—*A.* Those ymptoms which indicate a *favourable* termination of the disease are, increase of the firmness and ulness of the pulse; returning animal heat to the urface; a tonic character of the spasms, or acive retchings; not very urgent feelings of heat nd anxiety at the epigastrium and præcordia, or a diminution of these symptoms, and of the pressing desire for drink; the occurrence of hiccough; a more natural and a livelier state of the countenance and surface of the body; greater freedom of respiration, and a diminution of the rawness and coldness of the respired air; a free evacuation of the bowels, with the appearance of a return of the biliary secretion, and especially the evacuation of urine, and amelioration of the tremors, restlessness, and general distress. These generally indicate a decrease of danger in the early stage of the disease, and returning vascular reaction; but this state may proceed to a fatal issue with all the symptoms of congestive and adynamic continued fever.

39. Typhoid symptoms, such as low delirium, black sordes on the teeth and lips, dry, parched skin, &c., may, however, come on, and the patient sink. The non-accession of these symptoms; the occurrence of a copious, warm perspiration; the return of the natural secretions and evacuations,—as of the salivary, bilious, and urinary secretions; the absence of serious affections of any of the viscera contained in the abdomen, particularly of the liver, stomach, and bowels; and a return of the functions of the nervous, assimilating, circulating, and respiratory organs to their natural state, are the chief guides of the physician in forming a favourable prognosis.

40. *B.* On the other hand, an *unfavourable* issue must be looked for when the prostration of strength; the coldness and blueness of the surface; the sinking and irregularity of the heart's action; the collapse of the countenance; the coldness and rawness of the expired air; the oppression and difficulty of respiration; the anxiety and restlessness, &c., are great or, individually, extreme; and especially if, with great intensity of these phenomena, the retchings and spasms are slight; or the latter consist chiefly of tremors, or irregular clonic contractions. An oozing from the mouth of the fluids from the stomach, unconscious evacuations or relaxation of the sphincters, the breathing consisting of convulsive sobs or being stertorous, with puffing of the cheeks or lips, and inability to swallow, indicate approaching dissolution in the cold or early period of the disease.

41. The occurrence of low delirium, or of coma, with collapse of the countenance, and all the symptoms of malignant continued fever, consecutive of the cold stage, are extremely unfavourable, especially when attended by suppression of urine, by great stupor, dark sordes about the teeth or lips, by convulsive tremors of the tendons, and restlessness. These symptoms show that the congestion of the nervous centres, which occurred in the preceding periods of the disease, together with the thick and otherwise morbid state of the blood itself, has been followed by serious disturbance of the capillary circulation in the substance of the brain and of its membranes, probably conjoined either with effusion beneath or between the arachnoid membrane, or with continued congestion of the veins and sinuses of the encephalon. The continued suppression of urine is manifestly owing as much to the change produced in the blood, by the evacuation of the watery part of it by the bowels, as to a paralysed state of the kidneys.

42. The supervention also of tenderness, pain, &c. in the region of the liver, or in that of the stomach; a very morbid and irritating state of the alvine evacuations, with blackish, bloody, and mucous discharges, attended with tremors, &c., all indicate, respectively, the consecutive appearance of inflammation, or inflammatory congestion of the liver, of the stomach, and bowels (§ 46.), and evince a marked tendency to disorganisation, and call upon the practitioner for the employment of the most decided means of cure. Although these consecutive phenomena show a most serious state of disease, yet recovery will sometimes take place from it by the assistance of well-directed means.

43. iii. *Morbid appearances observed after death.* — The morbid changes observed after death from this pestilence are in every respect the same, both in Eastern and in European countries. When the cold stage proves fatal, or death takes place within four-and-twenty hours from the seizure, but little change of organisation can be detected, although the viscera are much altered in *appearance* from the healthy state. The surface of the body usually presents the same aspect as mentioned when describing the fully formed stage of the malady, being livid, corrugated, constricted, and humid. The lungs are commonly found collapsed, condensed, sometimes remarkably shrunk, and always loaded with black blood, of an oily or ropy consistence, and very closely resembling tar or treacle. The cavities of the heart are filled with a black blood, and they frequently contain polypous concretions. Blood of a similar appearance is generally found in the arch of the aorta and other large arteries. The blood-vessels of the brain and its membranes are more or less gorged with dark blood, particularly towards its base. The arachnoid membrane is frequently deprived of its transparency. A serous fluid of various quantity is often found effused between the convolutions of the brain, and in the lateral ventricles. Similar appearances to those detected in the cranium are also found in the vertebral column.

44. The abdomen, upon being opened, generally emits a peculiar offensive odour. The stomach and different parts of the bowels are frequently partially, but considerably contracted; at other places greatly distended with flatus: the internal surface of the stomach sometimes seems but little affected. A whitish or yellow fluid matter, resembling the evacuations, is often observed in different parts of the alimentary canal, which occasionally contain much air, but neither bile nor fæces. The internal surface of the intestines is commonly lined by a tenacious muco-albuminous matter. The colon is frequently much contracted, generally throughout. The mucous membrane and sub-mucous cellular tissue of the digestive canal present evident marks of congestion, in some cases approaching to a sub-inflammatory state, but generally in spots or patches of various sizes, the colour of these varying from a very dark venous congestion to a more roseate hue. Decided signs of inflammation are always wanting, even in the most remarkable of those congested states. The glands of BRUNNER and PEYER, as well as the solitary glands, are greatly enlarged. Both stomach and bowels are frequently of a paler colour than natural, both in their inner and outer surfaces. The liver is generally pretty full of dark-coloured blood; the gall-bladder often much distended with tenacious ropy bile, of a dark yellow or green colour. The gall-ducts are sometimes contracted, at other times not. The appearance of the pancreas, spleen, and kidneys is various, frequently differing but little from their natural state, in other cases somewhat gorged with blood. The urinary bladder is always contracted and empty. The vena porta and all the large abdominal veins are loaded with black blood, resembling tar.

45. The chief change observed in cases terminating fatally in the blue stage of the distemper, is in the *blood*, which has lost the greater part of its serum, which, as it has exuded from the digestive mucous surface, has left an albuminous coating over the mucous membrane, and that remaining congested, thick and treacle-like, in the large veins.

46. In cases the duration of which extends from one to three days, the same leading appearances as now described are observed, but often with considerable additions. The vessels of the stomach in these are found loaded with blood, presenting a surface sometimes of a pale pink hue, sometimes of a deep blue, at others of so dark a tint as to resemble sphacelus of the membrane, from which, however, it was readily distinguished by the firmness of the texture. Similar changes are found in the small intestines, and but very rarely in the larger. In many, evidence of congestive pneumonia is found, which is usually latent before death. In those cases in which coma occurs, serum is sometimes effused in larger quantities than already alluded to, but occasionally congestion only of a very black fluid or semi-fluid blood is found. Those who die of the consecutive disease show few appearances that are different from such as are usually observed in other cases, attended with corresponding symptoms. Those cases, which have evinced, during the secondary fever, marked disturbance of the brain, generally present after death greater vascularity of the substance of this organ and of the membranes than natural, with the congestion of blood in the veins and sinuses, and effusion into the ventricles and between the membranes, particularly between the pia mater and the arachnoid reflected over it. In some cases the brain seems dusky or mottled, and the veins turgid with dark semi-fluid blood. In those terminating fatally, with hepatic disturbances, the liver is generally of a dark brownish or sodden appearance. In some cases it is of a purplish black, somewhat enlarged, its veins filled with dark semi-fluid blood, and the ramifications of the hepatic duct loaded with a dark green or greenish yellow bile. The stomach and bowels, particularly the latter, are contracted and thickened, the inner surface softened, of a dark red or purplish colour, in patches or streaks; sometimes excoriated, partially detached from the muscular coat, and covered with a muco-sanguineous fluid, in those who have died with consecutive gastro-enteric or dysenteric symptoms.

47. IV. DIAGNOSTIC CHARACTERS. — Much misapprehension of its nature and origin has arisen from viewing the pestilential cholera merely as a modification of, if not identical with, the form of cholera not unfrequently met with in India and other warm climates, and occasionally in this country, to which the terms *spasmodic cholera* and *mort de chien* have been applied. Many writers, particularly those who argue against its infectious nature, have considered this pestilence merely an epidemical occurrence of that form of cholera. It is true that, in the spasmodic cholera, the secretion of bile is either altogether or nearly interrupted; or, if it be at all discharged into the bowels, that it is so vitiated as to prove extremely irritating to their internal surface, the spasms, retchings, alvine evacuations chiefly arising from intense irritation of the organic nerves supplying the digestive tubes and the abdominal viscera, together with accompanying congestion of these vessels. In that disease, there is every reason to suppose that the absence of bile is to be imputed to spasm of the common bile duct, rather than to a suppression of the secreting and excreting functions, — whilst, in pestilential cholera, these functions are altogether arrested, and the discharge of bile is interrupted, independently even of any spasm of the excreting ducts, — the biliary secretion being suspended as well as the urinary, owing not only to a paralysed state of the liver and kidneys, but also to the state of the blood being such as not to admit of circulation through the extreme capillaries, and to the loss of its serum.

48. In the spasmodic, or severe form of sporadic cholera, the discharges from the stomach and bowels are certainly either not coloured by bile, or but little, excepting at the commencement, and when the disease begins to yield; but they are accompanied with a different train of symptoms. The spasms are more tonic, and confined more to the muscles of the abdomen and of the thighs and legs, than in the pestilential disease; and, in the former, the vertigo, deafness, headache, marked affection of the respiratory function and of the circulation, characterising the latter, are entirely wanting.

49. In sporadic or bilious cholera, the very dark, thick, and ropy appearance of the blood; the cold, wet, and shrivelled state of the surface, and its leaden, dark, or purplish colour; the almost total absence of pulse at the wrist; the very marked and

rapidly increasing collapse of the powers of life; the disagreeable and earthy odour of the body, even during the life of the patient; the burning sensation between the scrobiculus cordis and umbilicus; the complete arrest of the glandular secretions; the cold tongue and mouth; and the coldness of the respired air, which characterise the pestilential disease, are entirely absent.

50. In one, the powers of life are certainly very much deranged, and the circulation and functions of the internal organs greatly disturbed; but in the other, all the derangements and their attendant symptoms are of a much more alarming and malignant nature; the balance of the circulation is much more completely overturned, the circulating fluid itself much more sensibly and seriously diseased; the respiratory functions infinitely more disturbed; the spasms of the voluntary muscles more general, and more clonic as respects their nature; the purging and vomiting slighter and of shorter duration, and forming a less prominent feature of disease; the surface of the body more deprived of its vitality, of a much darker colour, and more collapsed and shrunk; and the powers of life are more completely overwhelmed, and sooner sink altogether, than in the severest forms of cholera observed to occur occasionally in warm climates, or in temperate countries, under circumstances favourable to their appearance.

51. In this pestilential malady, the powers of life are insufficient of themselves, even although assisted by the administration of stimulants, to overcome the congestion of the internal organs, and restore the circulation in the surface of the body and in the extremities; and while the large secreting viscera in the abdomen remain engorged by the thick and viscid blood thrown in upon them from the external surface, and their vital powers overwhelmed, their functions of secretion must necessarily be arrested; and thus they are unable to remove the load oppressing them, by one of the modes in which congestion of secreting organs is usually overcome.

52. In the severer forms of cholera, occurring sporadically, the derangements, being less malignant than in the present malady, are more readily removed by an energetic and appropriate treatment. Here the exhibition of large doses of calomel, opium, and stimulants, is generally sufficient to allay the inordinate action of the stomach and bowels, to restore the balance of the circulation, to remove spasm, and to excite the secreting function of the liver. But in this pestilence, the lungs are completely paralysed, the changes produced by respiration entirely suppressed, the blood is thick and vitiated, the large vessels, particularly the large venous trunks, and the cavities of the heart, are so engorged with blood as to be unable, particularly in their state of deficient vital energy, to react upon the distending fluid, and to throw it, particularly in its state of morbid density and tenacity, into the extreme vessels of the secreting organs and external surface, unless internal and external stimulants of the most powerful kind be employed; and even these are very often inadequate, of themselves, to fulfil the intention with which they are employed, and occasionally are productive of mischief, unless the engorgement of the internal viscera be early removed by vascular depletion and external medication, which, while they relieve the heart and empty the large vessels, enable them to react upon their contents, and recall the flow of blood from the centre to the circumference of the frame. Hence it is generally indispensable, in this very formidable disease, to exhibit stimulants and antispasmodics internally, with artificial heat and stimulating frictions, in order to rouse the vital energy of the system, whilst we remove the vascular load by means of emetics and evacuations of blood, and afterwards endeavour to excite the functions of the liver, and restore the secretions generally.

53. Amongst the other characteristics intimately connected with the nature of this pestilence, and calculated to distinguish it from all those states of disease to which the term cholera has been usually applied, may be particularly noticed the prevalence of the pestilence in all seasons, countries, and climates; the affection of the head, nervous system, and respiratory organs, characterising the commencement of its attack; the uncommon and sudden diminution of the animal temperature, which often sinks below the heat of the surrounding air, both on the surface of the body and in more internal parts; the remarkably sudden and rapid depression of the powers of life; the continued restlessness and distress referred to the præcordia and epigastrium; the mental apathy and indifference to the result; the vertigo, stupor, and deafness; the blue colour and shrunk appearance of the surface of the body; the state of the respiratory actions, and peculiar groan or whine of the affected; the unquenchable thirst, and burning at the epigastrium; the sodden, raw, wet, and shrunk state of the surface; the rapid exudation of a watery fluid from the skin, and digestive mucous surface; the states of disease by which it is very frequently followed; the unprecedented mortality, notwithstanding the most energetic and judicious treatment, and the use of those means by the aid of which nearly all the cases, even of the most severe forms of intertropical cholera, generally recover; and, lastly, the appearances observed after death, particularly the collapsed state of the lungs, the blackness of the blood, the fibrinous concretions in the cavities of the heart, the morbid secretion lining the internal surface of the intestines, the flaccidity of all the soft solids and of the substance of the heart itself, and the congestion of black blood on the large nervous centres. (See § 43, *et seq.*)

54. The *secondary fever and consecutive phenomena* (33.), which follow upon the cold and blue stage of the malady, also furnish remarkable proofs of dissimilarity between this pestilence and the severe forms of cholera observed in hot countries, or in temperate climates after very hot and moist seasons. After these latter the patient recovers without any consecutive disease, and frequently the tumult of the frame leaves it benefited by the changes it induces; but, in the present pestilence, the consecutive states of disease are as dangerous as the blue stage; and, even when assuming a typhoid or febrile character, they do not communicate a febrile disease, but the distinct and specific pestilence now treated of. This important feature was happily insisted upon in the Reports of Drs. BARRY and RUSSELL; and is one of itself sufficient to distinguish this pestilence from every form of cholera.

55. Various attempts have been made to trace a resemblance between this disease and some of those which have occurred in former ages, and of which very imperfect accounts have been furnished by writers; but, upon referring to the meagre details which have been given of them, I am unable to trace any close resemblance between them — far less identity. Mr. ORTON has endeavoured to find out a very close similarity between this pestilence and that which ravaged England and some parts of Europe at various periods, between the years 1483 and 1551, and which obtained the name *Sudor Anglicanus*, *Ephemera maligna sudatoria*, and *Sweating sickness*. In certain phenomena the similarity is close, but in others altogether wanting; but as it cannot lead to any practical results, I will not further pursue the subject.

56. It may be important, however, to be aware, that poisoning from acrid and narcotic substances, and particularly tobacco, or those belonging to the class of animal poisons, occasions symptoms which, in many respects, closely resemble those characterising this pestilence. But the difference will be apparent upon inquiry into the history and premonitory symptoms of the attack, and by observing the collapsed, shrunk, dark, and wet state of the surface of the body; the sodden, shrivelled, damp, and raw state of the extremities; the spasms, the oppressed respiration, the sunk appearance of the epigastrium, and of the hypochondria; the peculiar character of the matters ejected; the cold, raw state of the expired air, and the black, viscous condition of the blood, all of which characterise this pestilence, and are either altogether absent from every other kind of attack, or never similarly associated.

57. After attentively considering its phenomena and nature, I would conclude, — 1st, that this malady, as respects the causes which occasion it, and as regards the pathological states which constitute its various grades or stages of intensity, is quite distinct from all the forms of cholera, whether the common *bilious* variety, or the more severe form, usually denominated *spasmodic*, the *mort de chien*, &c.; and that, therefore, the name cholera should be discarded from all scientific descriptions of it.

58. 2nd, that the accounts which we possess of the epidemics and pestilences which have ravaged various countries in former times, do not furnish us with the history of any disease which may be considered as identical in its nature with this pestilence; and that it must, owing to this circumstance, and to the uniformity of its characteristic phenomena, be viewed as being of modern origin, and *sui generis*.

59. As it is important that the name of a disease should not be such as may risk its being confounded with another, different from it in its nature, symptoms, and termination, so I consider that some other name than that at present applied to it should be given it. As to the particular appellation which may be employed, I conceive that one pointing to its chief pathological states, and its prominent tendencies, ought to be preferred. The intense influence of its exciting cause upon all the respiratory actions and functions, as well as upon the actions of the heart and state of the pulse, and its marked tendency to propagate itself, and to terminate fatally, have induced me to apply to it the name of *Asphyxia pestilenta*, or *pestilential asphyxy*.

60. V. CAUSES AND NATURE OF PESTILENTIAL CHOLERA. — There are few subjects which have given rise to greater diversity of opinion, or to more discussion, than the causes of this disease. Suppositions have been adduced, and reasoned from, as established and admitted facts; and repeatedly observed occurrences and corroborated evidence have been explained away or denied, even by those who have given us merely vague hypotheses and chimerical speculations in their place. It must be evident that but little truly important can be stated in respect of the causes and nature of this malady, without previously inquiring into, and coming to some conclusion as to its infectious or non-infectious nature. I shall, therefore, inquire, in the *first* place, into the evidence which has been adduced as to its possessing an infectious property from its commencement in Jessore, and as to the extent and character of this property. Its predisposing and concomitant causes will *next* come under consideration; and, *lastly*, various topics connected with its nature will be discussed.

61. i. *The infectious nature of pestilential cholera demonstrated.* The infectious or non-infectious nature of this disease is one of the most important topics to which public attention can be directed; and one which, owing to the manner of viewing it, adopted both in this country and on the continent, requires the serious consideration of the informed part of the community. Knowing that much important information had been furnished by the medical observers of the disease in India, which was entirely overlooked, I carefully examined the reports to the Medical Boards of the three Indian Presidencies. I had also an opportunity of referring to the medical reports at the India House. From those sources, therefore, and from others within my reach, I can state that much misapprehension of this terrible disease had gone abroad, and been propagated by authorities that should have been more accurately informed on the subject. I can truly state that, although my attention has been much engaged by this disease, since the time of its eruption in the Delta of the Ganges, I approached this topic with my mind entirely unbiassed, and desirous of adopting that view of it, which well-ascertained facts should most fully support. When, therefore, professional authorities have stated opinions which have misled, and will still further mislead, those who have it not in their power to detect their unsoundness, it becomes the duty of those who have detected the true character of these opinions to place the particulars within the reach of the misinformed. One able writer remarks as an acknowledged and proved fact, " that by an overwhelming majority of the British medical officers, who have witnessed epidemic cholera in the East Indies, this disease is not considered to be of a contagious or infectious nature. A few incidents occurred which excited suspicions in the observers, that it might really, after all, possess this property. But scarcely a single person has advocated the doctrine of contagion with any earnestness." The same writer afterwards stated, that " the almost unanimous and earnest recommendation of British practitioners was not to consider the cholera contagious." In

another country an eminent physician, in an elaborate memoir on the disease, read very recently before the "Académie Royale de Médecine" of Paris, states, as a well-ascertained matter, "that in India the medical men and attendants on the sick were not more frequently seized by the disease than others of the community." Other instances of gross misstatement, made both by foreign and British writers, may be adduced, but these will suffice. Now, when we turn to the great authorities on the subject — to the official depositories of the origin and rise of this pestilence, we find that all the reports — the Bombay, the Madras, and the Calcutta, favour the infectious nature of the disease more or less. It is true that a majority of the surgeons and assistant-surgeons in India, who sent reports to their respective medical boards, state that they do not believe the disease infectious; but a large number of them give a very different opinion, whilst the reasons assigned by many for believing the disease to result from other causes than infection, are actually favourable to the existence of an infectious property. Even where they have argued against its infectious nature, they have often adduced the strongest evidence, although unconsciously, of its possessing this property.

62. When I entered upon the present inquiry, and commenced with the reports from the three Presidencies, in the order of their appearance, and before I had seen the disease in this country, I had not completely made up my mind on the subject of its infectious nature. But in order to come to a just conclusion, I had recourse to the earliest and the best information, and read and noted every individual report which these bulky publications contained: and so far are the remarks just quoted wide of the truth — so far are the medical men of India nearly unanimously against the belief in cholera possessing an infectious property, that the members of the Medical Board of Bombay, in the preface to the reports sent to them, and published at Bombay in 1819, state, that the disease had extended from Poonah to Panwell, a considerable village in the main line of communication between Poonah and Bombay; that a man who had left Panwell and arrived at Bombay, a distance of about fifteen miles, was soon afterwards attacked by the disease, and communicated it to those attending him; that it was traced in parts adjoining Bombay, and on the Island, from village to village, by the arrival of persons affected with it from places where it was known to prevail; and that there were places which, from want of this sort of communication, had, up to the time of the report, entirely escaped. From the foregoing and other data, the members of the Bombay Board — the first to furnish information respecting the disease — conclude that — "It appears to them incontrovertible, that this disease is capable of being transported from one place to another, as in cases of ordinary contagion or infection, and also to possess the power of propagating itself by the same means that acknowledged contagions do, that is, by the acquisition of fresh materials with which to assimilate." (*Bombay Reports, &c.*, pp. 10, 11.) In the same reports we find Captain Sykes stating that he ascertained that the disease did not break out in any village "until that village had communication with a neighbouring place in which the disease existed;" and he furnishes several instances proving this fact. Besides, he states that the attendants on those first seized in his company were attacked, and that it spread from one of his servants to five, whilst the gentlemen in the next tent had not one affected; and he remarks that he could add similar instances to those now adduced. (*Op. Cit.* p. 118.) Mr. Coats, surgeon, in a letter to the president of the Bombay Medical Board, states, that the idea most prevalent was, that the disease was brought from Jaulna to Aurungabad, and hat its progress could be traced distinctly through the villages on the chief road from Nagpore to those places, (p. 145.). He afterwards states, that the information as to the extension of the disease by infection was not only furnished by Europeans, but that some Brahmins had given similar information, without any particular inquiry on the subject having been made of them. From these and other facts, he concludes by considering the disease infectious; and that, "If it was occasioned merely by a distempered state of the air, it would have spread over the country with some regularity, but the epidemic seems generally to have travelled in lines along the post roads, and always to have required a succession of subjects for its propagation. In Candeish, where there is not sufficient population and but little intercourse between the villages, its progress was slow. At Pundergoor it made its appearance at the time of the great Jatra, and was spread at once in all directions by the pilgrims returning to their homes." (*Op. Cit.* pp. 150, 151.)

63. Dr. Jukes states, that the disease travelled along the high road from the Deckan to Panwell, and that he has not heard of any village in the Conkan that has had the disease, but by intercourse with places in which it had been already prevalent. "If it be something general in the atmosphere," he remarks, "why has it not hitherto made its appearance in some two distant places of the province at the same time? Nothing of this kind has, I believe, been observed: it still seems to be creeping from village to village, rages for a few days, and then begins to decline." (p. 173.)

64. Dr. Taylor reports that "whenever the disorder appeared in any particular spot or family, a considerable proportion of the family or neighbours were attacked within a very short period of each other: on many occasions I have seen three or four of a family lying sick at once." (p. 195.) Dr. Burrell informs us that in the short space of six days every attendant, in his hospital, on the patients affected with cholera had the disease. — (*Bombay Report*, p. 9.) And Mr. Craw states, that every one of the attendants, thirty in number, in the hospital of the 65th regiment, were attacked.

65. The next report which issued from India was edited by Mr. Jameson, and was published at Calcutta in 1820. This gentleman, whilst he reasoned in an extremely loose manner against the existence of an infectious property having been evinced by the disease, and without furnishing proofs of its absence, actually adduces evidence of that property which he is endeavouring to disprove. Thus, where he is stating in general terms, and without any reference to reports from the different medical officers in the establishment, that the disease did not seem to be more preva-

lent in the tents or hospitals of the divisions of the army, in which the sick were treated, he communicates the following important fact in a note. "A Sepoy died of the pestilence. Five of the corps, who had shown no signs of illness, were employed to carry the body to the grave. They were all seized with the disorder during the ensuing night, and all died." (*Calcutta Rep.* p. 130.) Mr. JAMESON, instead of appearing as the editor, or publishing reporter, of the opinions sent to the Calcutta Board, states his own views, endeavours to explain away those which are different from them; and thus the publication, which in the title-page professes to be a report, conveys not a single line of information from any one on the Bengal establishment, excepting this writer himself. The work, therefore, cannot be looked upon as furnishing the opinions of the majority of medical men in this part of India, inasmuch as we find no authorities or opinions contained in it but those of Mr. JAMESON himself; and these are evidently so perfectly at variance with one another, and with the ascertained laws by which those diseases, which are familiarly recognised as infectious, are governed, that we cannot, even although we receive some of the facts which he adduces, consider him as an authority on this subject. In all his remarks he seems to suppose that contact is requisite to the propagation of contagious diseases, and that because some persons in contact with the sick so frequently escape, the cholera is not contagious. He overlooks the influence of predisposition, which is so remarkably influential in all maladies which perpetuate themselves; and he entirely forgets the operation of those causes which often come in aid of the poison or effluvium exhaled from the bodies of the diseased, even after the exposure of a healthy person to it, and which frequently determine its action or call it into operation, when, without such reinforcement, it may have failed in producing its specific and deleterious effects. Could this gentleman ever had any experience of diseases admitted by all to be infectious — had he ever seen small-pox, measles, or scarlet fever? Notwithstanding those misapprehensions, and the evident bias which he betrays in favour of pestilential cholera being non-infectious, numerous facts escape him, eminently calculated to support the opposite doctrine. Thus he informs us that the medical staff present with the Hansi force was "*persuaded*" that the infection extended to it from the Meerut detachment, which caught the disease on passing through Delhi, where it prevailed. And at another place he informs us, that the centre division of the Bengal army were infected by a detachment which joined it whilst subjected to cholera. He endeavours, however, to explain away this occurrence; but it is evidently shown, and even admitted by himself, that the pestilence was introduced into this division, either by this detachment, or by some of the Rajah of Sumpter's troops, which were affected, and mixed with some regiments of the division.

66. After proceeding through a number of pages, in which Mr. JAMESON reasons against the infectious nature of the disease, what was my surprise when I found him, towards the conclusion of his observations on the subject, express himself in the following manner: — "This much, however, may be affirmed, from a review of the whole progress of the epidemic in this quarter, that the infectious medium, in whatever it consisted, was confined within a very circumscribed circle, and was very slowly extended to healthy parts of the atmosphere. If, setting aside the circumstances militating against it, we take it for granted that the infection was truly received by the centre and Hansi divisions from the detachments above mentioned, we must believe that the disorder, although not communicable by contact from person to person, was so from one large body to another large body; and that whenever the poison got head amongst a number of men, it assumed some new quality, so as, when mixed with the atmosphere, to become infectious. What constituted this additional quality, we cannot pretend to determine; but in support of its existence, we may quote the predilection of the epidemic for cities and camps; the infection of the left division, and the Nagpore and Meerut troops, immediately after entering into the diseased medium at Jubbulpore, Nagpore, and Delhi; and the similar case of the troops and followers in attendance upon the governor-general being attacked shortly after communicating with an infected village in the Gorruckpore district. To the same account may be placed the progressive march of the disorder from one part of an infected place to another, as in the centre and Hansi divisions, and more particularly the Rajpootana force, in which the virus seemed to be regularly propagated from corps to corps. In some instances the suffering body would appear to have sickened immediately upon coming into the poisonous medium, as was the case with the Nagpore troops, who were affected on the very day in which they encamped at the infected village of Gaongong; but more frequently one or two days would seem to have been requisite to bring the virus into action. Thus the Meerut detachment entered Delhi on the 29th, and was not affected till the 31st; thus, too, the Hansi troops had not the disease till the 6th, the day after the junction of that detachment. Again, by those abetting the opinion of the disorder being communicated to the centre division by the Shergur detachment, it is stated that the first cases occurred on the 11th, two days after its junction. Lastly, the followers of the troops in personal attendance on the governor-general in April first suffered on the 23d, three days after encamping near the infected village." (pp. 144—146.) This surgeon afterwards adds, that the disease recently appeared in a detachment of the Rajpootana force under such circumstances as at first seemed to warrant a suspicion of the existence of contagion. Now it appears somewhat surprising that the secretary of the Medical Board of Calcutta, sitting under the eyes of the governor-general, should have been allowed to issue his ipse dixit as to the non-infectious nature of a most devastating pestilence, then in its full strength, when these facts were in his possession, and when many others of a still more convincing character of the infectious nature of the distemper had passed through this very board in their way to the India House, in Leadenhall Street, where I had an opportunity of consulting them in 1827.

67. The foregoing quotation will be found to differ but little from the conclusions which an attentive consideration of the subject has led me to entertain. I have thought it right to be thus particular in the investigation of this subject, because, upon the adoption of correct ideas respecting it,

will mainly depend the employment of successful measures to circumscribe, entirely to prevent, or counteract the disease. And I hesitate not to maintain, that, owing to the very loose manner in which this subject has been considered, and to the neglect of means which the due interpretation of the information furnished even by the most sceptical as to the existence of infection, amongst the reporters to the India medical boards, ought to have led, are to be imputed, in no small degree, the propagation of the disease not only throughout India, but also to other parts of Asia, to Europe, and to America. I have thought it most advisable to go to the original sources for information as to this and various other topics, because the opinions of the Indian reporters were generally derived from an extensive and varied experience of the disease during a number of years, and they were not certainly previously biassed in favour of contagion, that being a property which the diseases of India seldom present. Whilst also the information which they furnish is of a superior description to that which has appeared elsewhere, the impossibility of obtaining it in this country — particularly the reports, the most valuable part of it — has induced me to refer to them in preference to other authorities. Having shown the identity of the Indian with the European pestilence, the arguments derived from facts observed in the one are equally applicable to both; and therefore I pursue the present topic, and further demonstrate, from the valuable and voluminous reports published by the Madras government, the inaccuracy of the opinions which have gone abroad respecting the disease in India, and which have vitiated the doctrines and paralysed many of the measures, both preventive and curative, which have been adopted in Europe.

68. Mr. Scott, the editor of the reports which were transmitted to the Madras medical board, and were published at length at that presidency, has given an able summary of the evidence which was furnished to him, in conjunction with the results of his own observation. The value of the information here conveyed, its accordance with the most accurately observed facts connected with the manifestation of the disease in Europe, and the difficulty of access to the original, will be a sufficient apology for the length of the following quotations: — "Bodies of troops in motion have been attacked, and have retained the disease, while it was unknown to the fixed inhabitants of the country through which they passed. One of two corps in a camp has been attacked, and the other has escaped the disease. Ships arriving from other parts of the world have never suffered under the assumed epidemic constitution of the atmosphere before reaching the shore." "Diseases avowedly infectious, such as small-pox, measles, &c., have not at all times the power of spreading epidemically: for while it is certain that their exciting causes are never wholly extinct, it is only at particular periods that these diseases become epidemic; but we are unacquainted with the circumstances under which this power of epidemic propagation arises. The same may be the case with cholera. All the atmospheric phenomena, and other circumstances brought under the head of occasional causes, have, with little or no interruption, existed from the beginning of time until now, without producing cholera — consequently the super-addition of a new cause must be inferred. An European, proceeding on his journey to Trichinopoly, on the 15th October, was taken ill about a mile from the Mount, brought back to the house where he had passed the day, and there died. On the 17th the wife of that person, on the 19th the owner of the house, and on the 21st his wife, all experienced attacks of cholera, but recovered. Several of the native servants also suffered. The instances of the disease appearing at places immediately after the arrival of corps and detachments which were suffering from it are very numerous. For example, it appeared at Jaulnah immediately after the junction of a party from Nagpore, amongst whom it prevailed. It appeared at Aurungabad, and at Malligaum in Kandeish, after the arrival of parties who had left Jaulnah at the time the disease was prevalent there, and amongst whom it had broken out on the march to these places. It appeared a second time at Malligaum, after the junction of the 1st battalion of the 5th regiment, in which cholera prevailed. It appeared at Secundrabad after the arrival of a detachment suffering from it, and it appeared afterwards in the villages through which the detachment had moved. It appeared at Gooty, where no case had been observed for six months before, immediately after the arrival of the 1st battalion of the 16th regiment of foot, in which it prevailed with great mortality. It is remarkable that the same formidable type of the disease which prevailed in the marching corps was communicated to the corps at Gooty. It also spread on that occasion to the adjacent villages. It also appeared in a detachment of artillery, previously perfectly healthy, upon their encamping on the ground which had been immediately before vacated by the 1st battalion of the 8th regiment, in which corps the disease prevailed. The bodies of several persons who had died of cholera remained exposed on the ground when it was taken up by the artillery. The prisoners in a gaol, enclosed by a high wall, have escaped cholera, while it prevailed all around them; and the inhabitants of certain hilly ranges have also escaped the disease. These have been said to have interdicted all intercourse with the people below. When cholera is once established in a marching regiment, it continues its course in spite of change of position, food, or other circumstances. Its approach to a town has been traced from village to village, and its first appearance in a town has been in that quarter which was nearest the track of its progress. The sudden appearance and disappearance of cholera, however unlike the progress of known infectious diseases, is not admitted as being irreconcileable with the doctrine of infection, especially if the disease be of sudden invasion after the application of the exciting cause. The relations who have attended on people ill of cholera, as well as the nurses appointed in military corps for that duty, and in general those whose employment has led them to be much with the sick, have been observed, in very many instances, to be attacked with cholera during, or shortly after, their attendance. The sick in hospitals labouring under other diseases have likewise been observed to be attacked with cholera, especially those who lay near the patients ill with that disease. Sometimes whole families have been swept off successively. Servants have often been

observed to sicken after attending their masters." —(*Madras Reports*, p. xlviii. *et seq.*)

69. This, however, is only a portion of the facts and circumstances advanced by Mr. Scott in proof of the infectious nature of this pestilence. In addition to the foregoing, I may add the opinion of several able and experienced surgeons and physicians, contained in their reports to the Madras Government: — Superintending Surgeon Duncan states, that "the 34th regiment carried the pestilence with them from Bellary to Nundydroog, and there was no trace of the disease in any village on the road. Since the regiment passed, every village on the road has been attacked by cholera." — (*Madras Rep.* p. 111.) Mr. Train adds, that "the attacks have shown a great disposition to run in families, and even among the attendants on the sick; and have in such cases been much more severe than usual." (p. 131.) Mr. England observes, that "the disease has been greatly felt amongst the attendants on the epidemic patients at various places." (*Op. Cit.* p. 170.) He also notices the extension of the disease from troops and travellers to places on the roads through which they had passed, and other facts similar to those already recorded in proof of its infectious nature.

70. Mr. Chapman, after stating facts perfectly in accordance with those furnished by the reporters already quoted, adds, that he feels most confident of having experienced the attack of the disease, under which he had with difficulty recovered, from infection. Being anxious about a patient, he remained with him for several hours, watching the progress of the disease. He felt nausea on quitting him, but attributed it to the peculiar fœtor evolved from the evacuations. On the following morning he was attacked with cholera, which nearly proved fatal. He proceeds — In the same detachment, a woman, anxious about the safety of her child, slept in the hospital tent, in which several choleric cases were present; in the morning she was attacked with the disease, and died. Three orderlies, also, slept in the hospital, and in the morning one of them was attacked, but recovered. "Thus it will be seen, four persons sleep in an hospital containing the infection of cholera, and that two are on the following morning attacked with the disease — whereas from the whole camp, consisting of 1500 or 1600, not five cases had occurred." "That the disease is contagious appears to have been observed by the natives themselves, and it thus commonly happens that the sick are avoided by those whose duty does not call on them to attend. A village in which cholera is prevailing is usually evacuated for a short period, until the disease is annihilated; these, and many others, are the proofs of their opinion of its contagious nature." (p. 189.)

71. Mr. Stokes, in his comprehensive report, states several well-ascertained facts, showing the infectious nature of the disease. The case of Mr. Rumbold, assistant-surgeon, is almost demonstrative of this property. He had been visiting some very bad cases, when he was seized with sickness at his stomach, and giddiness; and coming out of the tent, he fell down faint, and from that period he believed himself infected with the malady. He soon became one of its victims. The sickness and faintness with which Mr. Rumbold, in a state of high predisposition "from fatigue of mind and body," was affected, may be easily accounted for by the information which Mr. Stokes gives in the following page. He states, that in the worst cases — "a peculiar and offensive fœtor was observed to issue from the body, particularly when it was covered with much sweat; it was very disagreeable when first perceived, and seemed to hang about the nostrils, exciting, long after, an unpleasant sensation." (p. 211.) In another place, he remarks — "It was found amongst many who came to the hospital, that some time previous to their being attacked, the disease had existed in the family to a greater or less extent, or some one branch had been ill or died of it. In others, it had spread progressively through the whole, or nearly; and among those who officiated as orderlies or attendants at the hospital, several were attacked, and some died." (p. 217.)

72. Mr. Patterson observes as follows: — "I feel convinced that a corps on its march, catching the exciting cause, will carry it along with the corps for weeks, and to a very considerable distance. Let this corps be halted on the finest spot of ground possible, let healthy corps join this, at short and regular intervals, and I feel convinced the disease would attack those healthy corps in a few days, and according to their respective arrivals. If this be not contagion, I do not know what name to give it." (p. 224.)

73. Dr. Daun, whilst he refrains from giving any opinion as to the contagious nature of the disease, states the following facts in proof of it: — "On the 10th, when in attendance on O'Brien, I became indisposed in such a way as to lead me to apprehend an attack of the epidemic. On the 12th, Mr. Gray was attacked, after having been up part of the night with Thomas Flannigan. Mr. Gray was, during his illness, constantly attended by Lieutenants S. and M'D., who have since had both of them attacks of the epidemic, and no other officers except them at this station have been attacked. (*Op. Cit.* p. 273.) And lastly, as respects the official reports, Mr. Kellie furnishes both facts and arguments, many of them similar to those already adduced in support of the infectious character of the pestilence. (pp. 68—77.)

74. The above evidence, I consider amply sufficient to prove that the disease, even from the commencement of its ravages, evinced, unequivocally, infectious properties. If my limits would permit, I could also demonstrate from the same sources that the eyes of many were shut, by previously entertained dogmas on the subject of contagion, against this property; and that several, even where they were arguing against its existence, were actually adducing important facts in support of what I have been cautiously led to believe, namely, that the disease manifested a tendency to propagate itself by means of a morbid effluvium exhaled from the bodies of the affected, similar to what is evinced by measles, and fevers whose infectious properties have been well ascertained and generally admitted.

75. It appears extremely singular, that, notwithstanding the evidence which has been now quoted, in the very words of the reporters to the different Medical Boards, no means of preventing the propagation of the malady were resorted to during the number of years it has existed in the East. Surely the doubts even of the sceptical ought to have led to a careful inquiry; and most

certainly the natives of the country, and the European population under the British dominion, had even a *right* to expect that those placed to watch over their health, and to devise measures for its preservation, would have attended to the unequivocal opinions expressed by a number of the best informed medical officers in the service; and that, although a great difference of opinion existed among them, this very circumstance should have led to more intimate inquiry and a careful sifting of the truth. At all events, the error — if error it could be called — should have been on the safe side; and the Medical Boards, superintending surgeons, or others, to whom the duty appertained, should have pointed out the importance of preservative measures to the government, and to civil or military officers placed over districts and corps, and have adopted the suggestion of one of their most able medical officers, who has stated the following in one of his reports to the Madras Board: — "Whether or not the disease in question be contagious is a subject of infinite importance; but where the slightest gleam of doubt obtains, it is surely better to adopt the means usual for the purpose of preventing its propagation, by appropriate *quarantine* of troops on the line of march, by preventing their immediate entrance into stations when under the influence of cholera. By these precautionary measures, I conceive it possible to preserve the lives even of thousands of individuals." (p. 189.) That no precautions of any description were taken in India to prevent the propagation of the disease, may be stated without any reservation; and hence most probably the reason of its extension over so very large a portion of the whole globe.

76. Before leaving this part of the subject, it may be as well to take a hasty glance at the opinions expressed by some other authors who, having observed the disease in India, have written respecting it. Mr. Orton, who published at an early period of the epidemic an able work on it, referred it to electro-aërial influence. He now states his belief in its infectious nature. Mr. Annesley expressed himself in his publication against the doctrine of infection, and imputed the disease to a similar state of the air to that assigned by Mr. Orton, without being able to point out in what this state consisted. But "de non-apparentibus et non-existentibus eadem est ratio." Mr. Annesley, however, appears not to have directed that attention to the subject of infection in relation to the disease, which would impart much importance to his disbelief in its existence. In proof of this, I may merely refer to the circumstance of his quoting the letter of a correspondent, containing the following remarkable proof of infection, without adding any explanation or remark: — "We have, however, been particularly fortunate till our arrival at this station, not having lost a man, or having one seriously ill, though we had been under canvass above five weeks. We fell in with a battalion of native infantry who were suffering from cholera; the next day six Europeans were attacked, the number increased daily, and most of the first cases proved fatal." Dr. Kennedy, from extensive experience of the malady amongst both native Indians and Europeans, states facts and arguments, in proof of its infectious nature, and he justly places particular stress upon the peculiar odour exhaled from the bodies of the affected, as indicating the generation of a principle calculated to propagate the malady.

77. I have now shown, from the chief sources, that the disbelief of infection, in respect of the pestilential cholera, was not general in India — that the productions which issued from the three Medical Boards very strongly favoured, and indeed proved, the existence of this property, — that two out of the three actually insisted upon the activity of its influence, — and that, therefore, the dangerous opinion, so very generally propagated, and even acted upon, both in this and foreign countries, that the authorities in India did not consider the disease infectious, is entirely without foundation in truth.

78. The identity of this pestilence with that which has ravaged the East has been proved, and, indeed, is scarcely anywhere called in question. Some authors have supposed that it has acquired new properties and characters, since its first appearance and early prevalence in India, and that its infectious property is one of these. But I am entirely convinced that this is not the case. Even varieties of the disease cannot be admitted; for it is essentially the same, presenting merely gradations of intensity, and modified effects according to these gradations.

79. Several writers have supposed that the disease has originated in a number of distinct and far distant places, from those causes, to which the disbelievers in infection altogether impute it, and to which I shall direct a brief attention (§ 97, *et seq.*); and that it has, owing to the combination of those circumstances and causes which are generally admitted to be productive of infection, assumed this character, — or, in other words, that the malady was not originally infectious, but that it has had this property superadded to it, from the circumstances of imperfect ventilation, neglect of cleanliness, and crowding together of the sick. There cannot be the least doubt of those being fertile sources of an infectious principle, and that they tend greatly to aggravate all diseases, whether infectious or non-infectious; but I have remarked, in the course of my inquiries, and of my personal observations, and in the accounts of various observers, that the propagation of the malady from the affected to the unaffected frequently took place, although not to the same extent, or with the same malignity, in open, and airy, and thinly inhabited situations; and during opposite states of the atmosphere as respects both humidity and temperature.

80. I shall next adduce proofs of the infectious nature of this pestilence in other parts of Asia, in Europe and elsewhere. But I shall be very brief, because, the identity of the malady in both hemispheres having been fully and generally admitted, and its infectious nature in India having been completely proved, it must necessarily possess the same character in Europe, unless counteracted by powerful means; and, therefore, a minute detail of facts is not required. Several authors have insisted on the proofs which have been furnished of the introduction of the disease into the Isle of France by the Topaze frigate, and the circumstance of about 20,000 of the inhabitants having been seized with it, above two-thirds of whom died, no precautionary measure having been resorted to; but that when the malady had been propagated to the adjoining island of Bourbon,

a sanitary cordon was established, and only 256 persons were attacked. When the disease appeared in Aleppo, in 1822, the French consul, M. De Lesseps, convinced of its infectious nature, placed himself, his family, and all those who wished to join him, in strict quarantine, in a place adjoining the town. This colony, consisting of about 200 persons, remained perfectly secure from the disease, although 4000 persons died of it in the city. If it proceeded from some unknown state of the air, as supposed by the anti-infectionists, to what cause can we impute the escape of those who had so secluded themselves, for they surely must have breathed the same air as those who were affected? M. Hubenthal states, that a peasant having arrived from Arkatal, on the borders of Persia, at the village of Neskutshne, to visit an uncle, was seized, the night of his arrival, with the disease. The persons engaged in restoring the heat of the body by frictions, &c., four in number, were attacked on the following day, and three of them died. Precautions were taken by the police to arrest the progress of the pestilence in the village, and it spread no further. If the causes of the seizure had existed in the air, or state of the locality, how came all the inhabitants, excepting those who had been exposed to the inhalation of the effluvium from the affected person, to escape?

81. According to the reports of the Medical Board of Ceylon, the disease made its appearance in 1819, in Jaffnah, in Ceylon, imported from Palamcottah, with which Jaffnah holds constant intercourse, and thence it was propagated over the island. In August, 1820, the Leander is stated to have called at Trinquamalee from Pondicherry, and to have landed several of her crew affected with cholera. Trinquamalee soon afterwards was infected, and the pestilence was again propagated over the island. The island of Sumatra was believed to have been infected in 1819, from the intercourse carried on between Achem and Malacca across the intervening strait; and it seems to have reached Penang and Singapore towards the end of the same year, in the same manner. Dr. Labrosse states that the prisoners in the gaol of St. Denis, in the Isle of Bourbon, who were employed in the removal of the dead bodies, all died of it;—that, at the lazaretto, two servants alone escaped;—and that in the hospital it was communicated to the attendants and other patients. M. Moreau de Jonnes states that it was imported into Muscat, in Arabia, by the English East India ships; and Dr. Salinas says that it was carried into the port of Bassorah, in 1821, by a vessel from India; and that it spread from this port, extending from town to town, even as far as the coast of Syria. When the pestilence reached Manilla in 1820, where it was believed to have been imported by ships whose crews had been, or were, infected, those vessels in the harbour which abstained from intercourse with the shore entirely escaped. At Bankok, the capital of Siam, it was said to have been introduced by the ships trading there from British India. It was supposed that 40,000 persons were attacked in this city and vicinity. Its appearance in Java, in 1821, was likewise considered to have been owing to the unrestricted intercourse of infected vessels, particularly the junks trading to Samarang, whence the pestilence spread over the island, carrying off upwards of 100,000 of its inhabitants. Its irruption in Canton, in 1820,—in Macao, in 1823,—in the Moluccas in the same year,—and in various places in the Persian Gulf, and on the coast of the Arabian peninsula, was generally attributed to vessels which had arrived from infected places.

82. Dr. Meunier states that, at Bagdad, where a third of the inhabitants was attacked, none were affected but those who approached the sick. Dr. Reimann says that there was not a single instance of a town or village in Russia which contracted the malady without previous communication with houses or persons affected. Drs. Russell and Barry, who were sent by the British Government to St. Petersburg, in order to investigate the nature of the disease, state that the number of medical men and hospital attendants attacked with cholera in that city was extremely great, particularly in ill-ventilated hospitals; and they, as well as Dr. Walker, who was sent to Moscow, express their belief in its infectious property. The report from these gentlemen to the Privy Council, dated the 20th of September, at St. Petersburg, has been kindly allowed me for perusal by Sir William Pym, and it abounds in proofs, remarkably in accordance with the quotation from Mr. Scott's report (§ 68.), demonstrating the infectious nature of the disease.

83. The director of sanitary police at Petersburg, Dr. Reimann, after expressing his conviction that the Russian pestilence is entirely the same as that which has been so fatal in India, states that most decisive proofs have been furnished him that it has not been of indigenous production, but has been introduced by persons who have arrived from infected places on the borders of the empire. He further states that he is convinced of its being less active, and less fatal according as the place in which it is introduced is more airy, elevated, clean, and free from the usual cause of insalubrity; whilst its increased fatality in low, moist, thickly inhabited, and dirty places, has been demonstrated on numerous occasions. The personal and domestic cleanliness of the inhabitants has also a most remarkable effect upon the infectious property of the malady and its fatality. In proof of this, Dr. Reimann states that in a village almost entirely peopled by Jews, 700 deaths occurred from amongst few more than 800 who were attacked. These conclusions are perfectly in accordance with the laws of all infectious diseases, and are entirely such a *à priori* reasoning would lead us to adopt.

84. In September, 1823, the disease first appeared at Astracan, and the Russian governmen resorted to preventive measures in order to arres its progress. Whether or not those measure were the cause of its disappearance may be difficult to determine; but it did disappear, and i was not until 1830 that it showed itself again i that city. In 1828, the pestilence broke out i Orenburg, and was supposed to have been introduced either by the caravans which arrive ther from Upper Asia, or by the Kirghis Cossacks, wh are adjoining this town, and amongst whom it wa said to have prevailed at this time. During th winter the number seized was not great; but i the spring of 1829 it raged severely, and extende to the villages in the province. During its prevalence in this part of the Russian empire, man

of the physicians, who at first did not believe in its infectious properties, were induced to change their minds, chiefly owing to the circumstance of its appearing in places very soon after the arrival of persons affected with it. Several instances of this description have been recorded by Dr. LICHTENSTADT amongst the official documents published by him. Another circumstance evincing the infectious nature of this pestilence was the peculiar irregularity of its course; and to this may be added, its extension in the lines of the principal roads and channels of traffic.

85. The introduction of pestilential cholera into Astracan, in 1830, was traced to a vessel which arrived from Baku, a town on the shore of the Caspian, and at that time affected with cholera. This vessel lost eight of her crew on the voyage, and the sick were brought to the lazaretto; a day or two after which the pestilence first appeared in this populous town. According to Dr. SOLOMOV, it attacked the suburbs on the 27th of July, and gradually extended to the nearest villages, and thence over the whole government. It proceeded through the Cossack stations and towns on the highway to Moscow, and up the streams of the Volga, at the mouth of which Astracan is situated. Its extension was attributed to the fugitives from the places successively attacked. After visiting the principal towns, and committing unheard-of ravages on the high roads to Moscow, the pestilence reached that city at the end of September. Towards the end of 1830, or soon afterwards, a body of troops from Koursk, a province at that time affected with the pestilence, was marched against the Poles. These troops carried this scourge along with them, affecting the places in their line of march through Podolia and Volhynia. In this way the towns of Astrog, Zaslaf, and Luck became infected; and from the last of these places the disease passed the Bug into Poland. Here it appeared with the invading Russian army, and was communicated to Lublin, Siedlec, Praga, the Polish army, and Warsaw.

86. The following is an extract from a letter written by a clergyman, who witnessed the disease in Saratoff, and published in the *Quarterly Review* for November 1831.—"Scarcely had we heard of the breaking out of cholera in Astracan, than the news came to us like lightning, that it was coursing the Volga, and that it was severe, and had already reached Zaretzin. Without a dread of the presence of the angel of death, the vice-governor, the medical inspector, and the government as well as the hospital surgeon, at once went into the infected places of this province. On the evening of the 6th of August we heard that three persons had been seized with cholera who had left Astracan, and were carried to our hospital. On the 7th, others were reported to have been carried off by this malady with such frightful rapidity, as to have impressed all minds with deep consternation, especially those who dwelt in the second division of the town. The disease soon appeared in the third division, and seized so many, that the hospital could no longer contain the sick, and killed so rapidly, that they scarcely survived six hours. The evil came so suddenly on us, that we had no time for taking precautions; our governor and our surgeons were gone to meet it afar off, in order to preserve our city, but it was already among us before any regulations could be made, or any means of opposing it could be devised. It could scarcely be reckoned an epidemic, depending on some change in the atmosphere, for many places were left untouched in our neighbourhood, while in Saratoff there was scarcely a family who had not to lament the loss of some of its members.

87. "In the very commencement of the epidemic, all our four surgeons were seized with it; two died on their journey to Zaretzin, and one here. From this moment fear and anguish took possession of the public mind. They who could flee from the city, fled; and, as the malady was not considered contagious, servants, labourers, Tartars, and Russians, were permitted to rush into the country. My congregation, which consisted of 550 individuals, was reduced to 150. Many of the fugitives died on the road, and spread the malady whithersoever they went. From the 10th of August the malady increased in virulence; the daily mortality of 4 rose to 5, 12, 20, 80, 120, 200; and one day to 260, and decreased in the same gradual mode. Up to the 30th of August, 2170 persons died. While all around was infected, Sarepta, in which the quarantine regulations were most strict, escaped, and yet this disease is not called contagious."

88. From amongst other evidence—indeed, I may say a mass of evidence—that furnished by Dr. REIMANN of St. Petersburg, as to the extension of the disease through Russia, may be adduced:—"The cholera was brought to Astracan by ships, and it has spread itself over Russia from Astracan by the emigration of the inhabitants, principally those of the lower orders. This is the chief cause of its propagation in Russia; it has never shown itself in any place except where it has been brought by travellers who came from infected places. *We have not a single instance* of a town or of a village, which, without communication with houses or persons affected, has contracted the disorder. Several places surrounded by the disease have preserved themselves from it by a rigid insulation."

89. The introduction of the pestilence into St. Petersburg is referred by Drs. BARRY and RUSSELL to the arrival of vessels from places on the Wolga where it prevailed. In that capital the infectious nature of the disease was shown, not only by the mode in which it was propagated in various quarters, and by its introduction into, and extension through, the prisons and hospitals of the city, but also by its exclusion from some places by a rigid insulation. Amongst numerous other instances the following may be mentioned:—Up to the 13th of July fifteen hospital physicians were attacked by the disease; and "the proportionate number of attendants of all descriptions on the sick, who have been taken ill with cholera, is fully greater than that of the medical men." "There were 150 pupils on the officers' side, (Military Academy at Cronstadt,) which is kept perfectly distinct from the school for petty officers and sailors. The gates were shut on the 19th of June, and as strict a quarantine as possible maintained to the 6th of August (O. S.). No case occurred amongst the pupils, who are from nine to twenty years of age."

90. In a letter from Dr. RUSSELL (*Medical Gazette* for November 11th, 1831), the following

remarkable fact is communicated:—"The son of a villager in the government of Pensa, who was coachman to a nobleman at fifty versts distance, died of cholera; the father went to the place to collect the effects of the son, and brought home with him his clothes, which he put on and wore a day or two after his arrival at his native village. He was shortly thereafter seized with cholera, and died of it: three women, who had watched him in sickness, and washed his body after death, were also seized, and died of the disease. The doctor arrived in time to see the fourth case; and, finding that the disease spread on that side of the village, he had the street barricaded on the side where it had not reached, and interdicted all communication to the two sides of the village. In that side in which the disease first broke out, upwards of 100 cases of cholera occurred, of whom forty-five died, but it did not appear on the other side of the barricade." And Drs. Barry and Russell report, that "the Navarino corvette, Captain Nachinoff, 200 men, had been placed two miles to the eastward of Cronstadt during the epidemic, to question and examine all craft from St. Petersburg. She had eleven severe cases of cholera, of whom eight died. Her first and second cases occurred on the 26th of June, O. S. These two men belonged to the boat that examined the vessels coming from St. Petersburg, on board many of which they had been. The next men who fell ill were of those who carried the two first cases to the hospital in town." These are but a very few from the many facts of the same description now before me.

91. With regard to the appearance of the disease in Berlin, the following extract of a letter from Dr. Becker of that city, dated the 29th of September, 1831, furnishes information:—"I am a most decided contagionist, and it is the force of facts which has made me so; for on the authority of your Indian practitioners I formerly believed the cholera not to be contagious. The appearance of the disease in Berlin, and the manner in which it has spread, is also very remarkable, and affords supplementary evidence in favour of contagion. The conclusion at which I have arrived is, that the *efficient* cause of the Asiatic or malignant cholera is always a virus, the production of *human effluvia*, and which, according to common medical language, undoubtedly deserves the name of a *contagious principle;* but that this virus, in order to produce the disease, requires, first, like the contagion of the small-pox, measles, typhus fever, and even the plague, a disposition of the atmosphere favourable to its developement; and secondly, a peculiar disposition of the animal economy in every person who is exposed to it. This disposition appears to be brought on by previous disease, particularly bowel complaints, by excessive fatigue, cold, errors in diet, drunkenness, fear, &c. One young physician has been one of the first victims of the cholera, a decided anti-contagionist; he carelessly exposed himself, died, and, as if his case was to be a warning proof of the fallacy of his opinions, his death was immediately followed by that of his landlord and two children, and the illness of the servant-maid in the house, the only instances of the disease in that street." In a report subsequently given by Dr. Becker (*Medical Gazette*, 12th of November, 1831), it is stated distinctly that the disease was introduced by the vessels navigating the river Spree, which runs through the city.

92. The introduction of the disease into this country was certainly owing to the clothes and bedding of sailors, who died of it at Riga, and other northern continental ports, or during the voyage from these ports, having been too generally preserved and delivered up to their friends, upon the return of infected vessels to British ports. Of this fact, already adverted to (§ 16.), several proofs of a most incontrovertible nature were furnished me by two masters of vessels, on board of which several cases of cholera occurred during the voyage from infected ports. These masters were at the time, conformably with the then prevailing opinion, persuaded that the distemper could not be propagated by the clothes of those who had died of it; but facts soon afterwards occurred which demonstrated to them the propagation of the malady in this manner as well as by direct communication with the affected. Soon after the opening of the first Cholera Hospital in the vicinity of London, near Bermondsey, I passed a considerable time with the patients first admitted, and was present during the inspection of two fatal cases. I drove thence in an open carriage and saw two relatives, residing in an airy situation in Pentonville, a distance of from three to four miles; and yet the persons whom I visited, after so long a drive in the open air, complained to me instantly upon my entering their apartment of the offensive odour which proceeded from my clothes. I was cautious in not mentioning the source of this odour, and no suspicion was entertained by them of the cause. But the following day I was called to them, and found them both in an early stage of the distemper, from which they ultimately recovered with difficulty. Precautions were taken against the further extension of the malady in this house, and no case occurred in the vicinity until some months afterwards. Other proofs of infection occurred to my observation; but it is unnecessary to advert to them at this place. I shall hereafter state briefly the conclusions at which I have arrived after the closest attention I could devote to the subject.

93. ii. *The infection of pestilential cholera, assisted by predisposing, concomitant, and determining causes.*—It may be briefly premised, that this disease is never produced without the presence of a certain leaven, or morbific matter, which, emanating from the bodies of the affected, and floating in the air, is respired by those about to be attacked. This is the clear and only inference connected with its transmission that can be deduced from the body of evidence now placed before the reader. Those who argue against its transmissible nature cannot show, since the irruption of the pestilence in India, down to its arrival in this country, and transmission thence to America, a single instance of its appearance in any place without the previous communication with an infected place or persons, of a nature to propagate the malady. The non-infectionists place great reliance upon the circumstance of the disease having, in several places, spared a large number of those who have come within the sphere of its influence. But they must be aware that a similar circumstance is uniformly met with during the prevalence of all diseases acknowledged infectious. All who are exposed to them are not equally, and many are

not at all, liable to be affected by them; and the person who may not have been susceptible of the infection to-day may be susceptible to-morrow, owing, very frequently, to the causes about to be noticed. This pathological fact is familiar to every observer in respect of small-pox, measles, scarlet fever, and the true typhus — diseases whose infectious nature is very generally admitted; and wherefore should it be otherwise in respect of the present pestilence? The same fact, moreover, has been remarked of all pestilences of which we have any accurate information in medical annals. In illustration of this, I may notice what has fallen under my own observation. During the dry easterly winds which occasionally prevail on the west coast of Africa, it is frequently impossible, and always difficult, to infect the system with small-pox, even by inoculation; and when the operation succeeds, the disease is usually mild, and the eruption distinct; whereas, during the moist, close, and sultry weather following the rainy season, it spreads with the utmost rapidity; the effluvium from the bodies of the affected appears to be carried to considerable distances, and transmitted readily by means of various media, the disease being generally confluent, and most fatal.

94. The circumstance of so many persons escaping, besides being referable to this non-predisposition, may likewise be explained by the circumstance of free ventilation, the perflation of currents of pure air, by modes of living calculated to oppose the invasion of the infectious effluvium, and by being habituated to the influence of this principle. We frequently observe that persons constantly present in places contaminated by an infectious effluvium are less liable to be attacked than those who are suddenly introduced from a purer air, but at the time predisposed to infection. This has often been demonstrated by the experience of others as well as of myself. Thus, on the first occasion of my visiting the cholera hospitals and cases of the disease, a sensible effect was produced upon my respiration, pulse, and digestive functions, that was less and less manifested on each successive exposure to the concentrated emanations from several of the sick placed in one apartment. A similar fact was observed by others; and, although it was very remarkable in this distemper, it has also been noticed in respect of other infectious maladies. Thus, a person confined in a close apartment with the true typhus fever was visited by a friend: the visitor, upon entering the apartment, felt a peculiar disagreeable odour, which occasioned a slight faintness and nausea, followed by headache, indisposition to action, &c. This slight indisposition continued for several days, when, about eight or nine days afterwards, typhus fever was fully developed. The person thus infected was kept in an airy apartment, and directions given as to ventilation, &c., with the view of preventing its extension; and the means employed succeeded as far as regarded the members of the family; but, when convalescent, a friend was admitted, and this person caught the disease. What the ultimate progress of the malady was in respect of this third person I had no means of knowing; but I have no doubt that the disease was communicated, in these two instances, if not in the one first referred to, whilst none of the constant inmates of the families were infected.

95. Another circumstance showing the operation of a specific cause in producing the pestilence, is its uniform and specific character in all climates, seasons, and localities (§ 112.). If the efficient causes of the disease were diversified, or consisted of the contingent combination of several, we should naturally expect a similar diversity of effects, and a constantly varying malady, both at its commencement and during its advanced progress; but such has been shown not to be the case (§ 53, *et seq.*) The efficient cause is specific, the disease itself is specific, and only modified as respects severity or grade, and the manifestation of certain subordinate phenomena, by the intensity of this cause, by certain predisposing, concomitant, and determining influences, and by the habit and temperament of the affected (§ 97—101, *et seq.*).

96. Having stated that the pestilence is not communicable to any excepting to those who are circumstanced or disposed so as to allow the invasion of its exciting or specific cause, it will now be necessary to notice those circumstances which co-operate in this manner; and this is the more necessary, as those who deny the infectious nature of the disease refer it altogether to certain influences which *predispose* the frame to the action of the specific cause, which reinforce or *accompany* it, or which, owing to their presence *after* exposure to it, determine its operation, or bring it more rapidly or more efficiently into action, when it might otherwise have failed of its effect.

97. Many of the earliest reporters and writers on this pestilence, who disbelieved in its infectious nature, had recourse to the state of the seasons in India to account for its occurrence. Some referred it to the prevalence of easterly winds, with long-continued or heavy falls of rain, by which the air was rendered moist and vitiated,—others, to sudden or extreme variations of the electrical conditions of the atmosphere, which variations were mere suppositions, and not matters of corroborated observation, — not a few, to the extrication of some peculiar terrestrial miasm, projected in distinct or remote places from one another, and proceeding in singular currents, so as to involve a part of a village, or a detachment, or even company of a regiment, whilst the vicinity was intact, — and several could detect no other cause for it, but exhalations proceeding from low, moist, and swampy situations, and other sources of malaria, rendered peculiar by some unknown cause, or productive of this peculiar disease from errors in diet or incautious exposure. Now it should be kept in recollection, that the existence of all, or any of these, was merely suppositious; that proofs were never adduced, and that the commonest meteorological observations were generally wanting. There was no uniform relation observed, either in this country, or in the eastern and western hemispheres, between the appearance of the malady and marked variations in the barometer, thermometer, or hygrometer, even in the few places where these were registered; but the irruption of the pestilence was often observed in states of season, weather, and atmosphere, opposite to those to which it has been confidently imputed. Even admitting that all the above-mentioned causes were actually in existence, (and I believe they were frequently present,) particularly during the severer irruptions of the disease, they merely show the truth of a part of my doctrine, viz., that the infectious nature of the disease was more strikingly evinced during

conditions of the situation, season, and atmosphere, of acknowledged insalubrity, — that whatever tended to lower the energies of the frame, as such causes indisputably do, favoured the operation of the infectious effluvium issuing from those affected by this pestilence, and rendered it more prevalent, when they were concentrated or uncommonly active; and that, in this respect, as well as in many others, the infection of pestilential cholera observes the same laws as other infectious maladies, as scarlatina, measles, &c., manifesting itself in isolated cases only during healthy states of season and atmosphere, and spreading to a greater or less extent during seasons of marked insalubrity, and during peculiar constitutions and vicissitudes of the air.

98. So far, therefore, from disputing the influence of many of those causes to which some highly respectable authors have imputed this malady, I fully admit their operation, even although their existence is more a matter of inference than of observation. I deny, however, that they are sufficient for the production of the destructive effects characterising this pestilence; and contend that as no such effects have, in the history of our species, been known to result from them, so we cannot, with justice, admit that they are alone capable of producing them, so as to generate this pestilence: I view them merely in the light of predisposing and concomitant causes coming in aid of a more powerful agent, which, emanating from the bodies of the affected, contaminates the predisposed in such a manner as to give rise to the same morbid actions as those which generated it; — that these imputed causes favour the operation of this infecting agent, 1st, by predisposing the frame to its influence; 2d, by reinforcing or assisting its action; and 3d, by determining or calling into operation the infecting principle. The predisposing and reinforcing influence of the different causes already referred to cannot be denied. We know, or at least observe, too much of their influence in respect both of contagious and infectious diseases which are familiar to us, to doubt their operation as regards this distemper: indeed, their action would be a matter of undoubted inference to the well-informed physician, independently of the results of observation.

99. But, besides the *Predisposing and Concurring Causes* noticed above (§ 97.), there are others not yet enumerated, of equal influence, not only in favouring the operation of the efficient agent of the malady, but also in calling it into action after the frame has been exposed to its invasion. The chief of these are, anxiety and depression of the mind; fear of the disease; physical and moral debility; low living and unwholesome diet; constitutional debility or laxity of the bowels; previous disorder of the digestive organs; neglect of personal and domestic cleanliness; deficient or filthy clothing; exposure to cold; the immoderate use of intoxicating liquors, or excess of any description; sleeping on the ground, or in low, ill-ventilated apartments, or in the open air; the use of cold, indigestible, or unripe fruits; cold drinks when the body is overheated; fatigue; sudden arrest of the cutaneous exhalations, however produced, &c. Either of these, whether acting shortly before, or at the time, or even soon after the body is exposed to the invasion of the infectious effluvium, will favour the production of the malady, particularly if several of them act in conjunction, and if, at the same time, those causes, whether proceeding from the state of the locality, or of the air, to which allusion has been already made, are also present.

100. One of the most remarkable of predisposing causes to an attack is *advanced age*, as well as one of the most unfavourable circumstances as respects hopes of recovery. Instances of attack previously to puberty were comparatively few; but the frequency of the seizure after 40 years of age increased in proportion to the advance in age, and the mortality in a still greater proportion (see § 21.); so that after 55 years recovery was rare.

101. It has been already stated, that a great number of the medical men called upon to treat this pestilence have imputed it chiefly to atmospheric causes, denying altogether the influence of infection; and the chief arguments which they advance, in order to show the absence of this property, have been and are about to be referred to (§ 97—99. and 102, *et seq.*). I verily believe, nevertheless, that this malady is infectious in a similar manner to measles and scarlet or typhus fever; that is, not by contact, but from the inhalation into the lungs, along with the air, of the morbid effluvium given out from the body or bodies of the affected. We know that the mere contact of persons suffering from the diseases now mentioned, will not communicate them even to the predisposed; whilst the presence in the air which is breathed of a scanty portion of the effluvium given off, during their progress, from the affected, will often produce them: and such, I am convinced, is the case with the pestilential cholera. We further know, that it is not easy to communicate these acknowledgedly infectious diseases by inoculation, when access of the morbid effluvium to the lungs is prevented. It, therefore, can be no matter of surprise to learn that M. Foy, and others of the young physicians who visited Warsaw, failed to propagate the malady by inoculation, or by tasting the matters vomited by the affected; even although the tasting matters vomited, under any circumstances, might well have turned the stomachs of many. Indeed, though cautiously convinced of the existence of the infectious nature of the pestilential cholera, I would have inferred that inoculation, or the introduction of the morbid secretions into the stomach of healthy persons, even were they predisposed to an attack of the malady, would have failed, in accordance with the laws which infectious diseases observe, to communicate it, provided the effluvium proceeding from the bodies of the affected be prevented from passing into the lungs. I as firmly believe that it is the inhalation of this effluvium into, and its influence on, the lungs of the predisposed, that paralyzes the nervous energy and functions of this very important and vital organ, occasions the singular collapse of it observed after death and evinced during life by the state of the hypochondria, epigastrium, and respiratory organs, prevents the changes which the blood is destined to undergo in the lungs from taking place, and gives rise to all the consecutive phenomena of the attack, as I am confident of any fact in pathology.

102. iii. *Arguments of those who contend that the disease is not infectious, further noticed.*—I have adduced above (§ 61, *et. seq.*) sufficient evidence of the

infectious nature of this pestilence, and have stated, under the head of concurrent causes, those to which solely the anti-infectionists impute the disease. I have now to notice, more particularly than I have yet done, certain arguments on which they rely in favour of their doctrine; and, first, they contend that, having had sufficient and admitted proof that cholera has not hitherto been an infectious malady, either as occurring in warm or temperate climates, wherefore should it change its nature, and become infectious at the present time? The ready answer to this is, that it is granted that the common cholera, whether that connected with a vitiated state of the biliary secretions, or that more severe form of the disease most frequently met with in warm countries, and denominated spasmodic cholera, or *mort de chien*, is not infectious; but that this can be no reason why this pestilence, which is distinct from cholera, occurring from other causes and under other circumstances, possessing also very different characters amongst which those of cholera are merely a part, and the least important part, should present this very important feature.

103. Secondly, they contend that, if this malady were infectious, a greater number of those who come near the affected would be attacked; and because, under circumstances already alluded to (§ 93, 94, 95.), so many do escape, that, therefore, the disease is not infectious. This is the chief argument on which Mr. SEARLE, referring to what took place in his own hospital at Warsaw, relies in support of his opinions as to the non-infectious nature of the disease. But as respects the escape of a large proportion of those who are exposed to the infection, this pestilence resembles all other known infectious diseases, not excepting even the most virulent.

104. Much stress also has been laid upon the fact of the disease not having been communicated by inoculation, and by tasting the ejections; but this proves nothing, and is merely an illustration of what ought to be known to every medical man —that diseases which do not generate a specific virus cannot be easily propagated in this way. Who, I would ask, would expect to communicate measles, scarlet fever, or typhus fever in this way? Who would expect to be affected by even a concentrated morbid virus on receiving it into the stomach? It is well known that the matter of small-pox and the poison of serpents may be thus applied without effect. That so many, or that all even, of the attendants in an hospital should escape, is only what most medical men of any considerable range of observation would expect, reasoning from their experience; this point, however, has already been disposed of (§§ 93, 94, 95. 101.). But the facts are, even on this point, as respects this pestilence, opposed to the doctrine of the non-infectionists; for it has been proved on numerous occasions, several of which have been noticed when demonstrating, by direct proofs, the infectious nature of the disease, that a very large proportion of the medical men and hospital attendants were attacked, notwithstanding the absence of all dread with which medical men and their attendants view disease, and their habitual exposure to animal and other insalubrious effluvia.

105. Thirdly, the non-infectionists argue, that numerous instances of the true pestilential cholera have occurred, which could not be traced to exposure to communication direct or indirect with those previously affected. This may be the case in a few instances; but how difficult is it to prove mediate infection, or that which takes place through the medium of fomites; and it may be asked, on how many occasions are persons liable to be affected by an infectious principle, without being able to account for the manner in which it took place, or to refer to the individuals whence it emanated, or to the media through which it was conveyed? We know that infectious diseases may occur almost immediately after the impression of the exciting cause, or not until after many days, or even weeks, according to the state of predisposition in relation to the intensity of the cause, during which interval certain latent or almost imperceptible changes are going on in the frame; therefore, during so indefinite a period of interval between exposure to the cause and the development of disease, how can all those attacked refer to the particular occasion on which they were exposed to infection?

106. Fourthly, the anti-infectionists refer to the occurrence of epizooties, in proof of a noxious emanation from the earth, which, floating in the air, affects both man and beast, and occasions this pestilence. I grant that emanations may, and sometimes do, arise from the soil, and affect man as well as the lower animals; and that, when this phenomenon takes place, it may be a concurrent cause of the pestilence, so far as to increase the predisposition to infection, and the fatal tendency of the disease. But, from a careful review of the occasions on which epizooties have been observed contemporaneously with the prevalence of this pestilence, I can state that they have been few, and merely coincidences, which by no means affect the question at issue. It should be kept in recollection, that several of the seasons preceding and during the prevalence of pestilential cholera have been unusually wet, and that increased mortality amongst the lower animals is often observed at such times. Many even of the instances of such coincidences on record are so vague, and so deficient in accuracy of details and dates, as to deprive them altogether of importance in the discussion of the subject. Besides, during the very long prevalence of this malady over the whole globe, it would have indeed been wonderful if the coincidence of epizooties with it had not been observed.

107. Fifthly, another circumstance made use of by the non-infectionists, is that of so many who have observed and treated the disease having espoused their side of the question. To this I may reply, that a very large number of those who have enjoyed this advantage have not had, even in India, as may be ascertained by referring to the reports of the Medical Boards, and to the documents at the India House, that extensive experience which we in this country suppose. It should be recollected, that a large proportion both of natives and native troops were treated by their native doctors. Besides, are we to expect those comprehensive views of the history and modes of propagation of a disease from those who have seen but a little, and described only what they have seen; or from those who dispassionately investigate the origin, the causes, the phenomena, and the relation of all that has been observed and recorded, and cautiously weigh the evidence on

either side of a disputed topic connected with it? The captain of a company, or even a colonel, performs an important part, individually, in an army during a general engagement; but he can know little, personally, of the disposition, changes, and evolutions of all its parts, and of the plan of strategy, according to which it first acted, or was led to change its operations, in order to meet or counteract those of its opponent. Like the commander-in-chief of the whole army, we, who collect, compile, arrange, and digest facts, on both the one side and the other of a disputed subject, — who observe closely what has occurred within the sphere of our own experience, — who compare, weigh, and meditate upon the whole evidence, personal as well as testimonial, with our minds uninfluenced by prematurely conceived ideas, are the best suited to investigate, and to conclude respecting them. Placed, by the number of accumulated facts, and by minds accustomed to view and to investigate the difficult operations of nature, on the elevated table-land of human science, we may be admitted to be more able to take in a comprehensive view of the causes and nature of disease, and to come to accurate conclusions respecting it, than many of those who, as observation has shown, have drawn hasty inferences from a few and very imperfectly investigated occurrences.

108. Sixthly, the non-infectionists also argue, that if the disease had been infectious, its propagation would have been prevented by the measures resorted to. To this argument I reply, that the disease, during its prevalence in the East, was never expected to be confined by sanatory measures; that it was not until it reached Astrachan that any such measures were attempted, and then only imperfectly; and yet these succeeded for eight years in preventing its entrance into that place; and that, where rigorous quarantine has been adopted, the measure has succeeded; several instances of the success of such measures having already been adduced.

109. The non-infectionists further state, that several continental states and authorities, convinced of the inutility of quarantine, have relinquished it. Granting this to be the fact, it merely shows, what any thinking person must admit, the impossibility of preventing the introduction of the disease into a populous town, situate in the vicinity of others, and of a thickly inhabited country, between which there must necessarily still be, even under the most strict quarantine, a constant intercourse of some kind or other, either by land or water, and perhaps by both. There can be no doubt, if the testimony of several well-informed persons, cognizant of the facts, are to be relied upon, that the distemper was introduced at several sea-ports of this country by the bed and body-clothes of those who died on board mercantile ships, that had been preserved and given up to the relatives of the deceased. But a strict quarantine and purification of these effects only could have prevented this mode of communicating the distemper; and in no instance were these observed. Indeed many ships arrived, during the latter part of 1831, in British ports, from infected places, having lost individuals from among their crews on the voyage home, and the fact was often either concealed or not attended to, the infection either proceeding further, or not, as circumstances concurred to favour it.

110. But let me turn for a moment to the causes which the non-infectionists substitute for an infectious principle. Some argue in favour of a certain distemperature, epidemic condition, or altered state of the air, being the cause of the disease. Now these are mere suppositions. But grant them to exist, how would they explain the progress and propagation of the pestilence? The air is a very mobile fluid, sweeping along frequently at the rate of seventeen and eighteen miles an hour, and being constantly renewed, both in a horizontal and in a vertical direction, unless in situations where it can be confined. But the disease has not been propagated in the course of winds, or with the rapidity which such a source would suggest: it has advanced slowly, and at the rate at which human intercourse takes place, in the lines or channels of such intercourse, and in the quarters where intercourse with previously infected parts has occurred. It has usually spread in a town, visited prisons or sequestered places the last, but affected them severely when introduced; and it has entirely avoided those who placed themselves altogether apart from the rest of the community.

111. If the constitution of the air were the cause, how came isolated places, in the middle of infected towns, or in the track of the progress of the disease, to escape? How could the disease be barricadoed, as it was in some towns in Russia, and shut out from certain districts and streets? How could it spread and travel along one side of a river, in the line of public intercourse, and never appear on the opposite side, or, if it did appear, wherefore did it, either first or merely, at the point where communication with the opposite banks takes place? When introduced into a country, wherefore should it break out first in sea-ports having intercourse with previously infected places, or in towns having inland communication with parts thus circumstanced? If the air were the source, how was its noxious property retained after passing hundreds, or even thousands of miles, as in the case of the appearance of the disease in the Isle of France; or wherefore did it, after this passage, respect the adjoining islands? How came the disease never to appear in any place without previous intercourse with a previously infected part, if it arose from a generally diffused state of the atmosphere?

112. Others, again, impute the pestilence to the exhalation from the bowels of the earth of some peculiar miasm. But the above arguments are equally weighty when directed against this supposition: for, independently of such exhalation being a mere assumption, as well as the foregoing, and putting out of the question the fact, that not a vestige of evidence has ever been adduced of any peculiar change of the atmosphere from its usual condition, or of any miasm, exhaled from the interior parts of the earth, having been observed simultaneously with the appearance of the malady, these causes, even if they did exist, could not account for the specific and uniform characters which it has always presented, in every situation, temperature, and elevation above the level of the sea, in all latitudes and longitudes, and from its commencement constantly up to the present time. A distemperature of the air, whether from foreign gases, electrical states, or whatever other cause, surely could not for such a

period, or under such a variety of circumstances, be so uniform and specific. Exhalations from the interior of the globe, whether proceeding from a great internal fire, from the action of circumambient agency, solar or lunar, or both, or from the electrical changes taking place in the more interior masses and constituents of our planet, surely could not, in all places, at all periods of this epoch, at all elevations, and under every combination of circumstances, be so uniform in their effects, so specific in their action, as the character of this pestilence shows its exciting cause to be.

113. If a noxious exhalation, proceeding from the more interior parts of the globe, caused the disease, it must on some occasions have risen through the depth of the ocean to have affected the crews of ships. Could this have taken place without it being changed by the medium through which it passed?

114. Where we find a distinct agency — a specific effluvium, exhaled from the bodies of the affected, of which we have certain proofs, not merely as respects the manner of its operation, but also as regards its impression on several of our senses — wherefore should we have recourse to supposititious essences and to vain imaginings, to account for the propagation of the disease?

115. It may be supposed that more space has been devoted to this part of the subject than it deserves. It is, however, of the most transcendent importance; for upon accurate views respecting it altogether depends the success of measures to prevent the extension of the pestilence, and even to remedy it where preventive measures have failed. Besides, as this pestilence is placed in the same category with true yellow fever and the plague, both by those who argue for and by those who argue against infection, the evidence for or against this property in respect of it applies also to the others.

116. Having devoted much attention to the phenomena of this pestilence, and to the circumstances characterising the dissemination of it, and having had extensive experience in it during its prevalence in this country*, I proceed very succinctly to state the conclusions at which I arrived as to its causation and propagation.

117. (*a.*) The distemper was caused by infection, which was traced in many cases — in most of those which I saw in private practice: it was manifestly infectious according to the definition I have given of INFECTION, in the article devoted to the consideration of this topic (see § 3, *et seq.*).

118. (*b.*) It was not caused or propagated by immediate or mediate contact — by a consistent, manifest, or palpable virus or matter; but by an effluvium, or miasm, which, emanating from the body of the affected, and contaminating the air more immediately surrounding the affected person, infected the healthy who inspired the air thus contaminated, especially when predisposed in the manner above shown (§ 99.).

119. (*c.*) This morbid effluvium or seminium of the distemper — this animal poison emanating from the infected — was often made manifest to the senses of smell and even of taste; it attached itself to the body and bed-clothes; remained so attached for lengthened periods, if these clothes were shut up in confined places; and reproduced the disease when the air respired by predisposed persons was contaminated or infected by the clothes imbued by the effluvium or poison.

120. (*d.*) The disease was thus propagated in numerous cases; and, as I was convinced, in my own person, even by the clothes of the physician, without himself becoming affected. An infected or contaminated air — infected in the way just shown — caused an attack, without immediate or mediate contact, which was entirely innocuous, provided the air contaminated by the affected person was not inspired.

121. (*e.*) Placing the hand upon any part of the surface of a person in the cold or blue stage of the distemper was often followed by a peculiarly unpleasant or tingling sensation in the course of the nerves of a healthy person, but this would not occasion infection, if breathing the contaminated air surrounding the affected was avoided.

122. (*f.*) When the poisoned air was breathed by a healthy person for the first time — especially the unpleasant air in the wards of a cholera hospital, or that surrounding the dead body, or that contaminated by the evacuations, a morbid impression was often felt and referred to the chest and epigastrium, giving rise to frequent forcible inspirations or expansions of the chest. This impression and its immediate consequences generally disappeared after a recourse to stimuli, or full-living; but were followed by some grade or other of the distemper if other depressing agents, as fear, &c., or high predisposition, favoured their developement.

123. (*g.*) On occasions of subsequent exposure to the efficient cause of the malady — of breathing the infected air — this morbid impression was somewhat less manifest; and each successive exposure was followed by less evident effects, unless the morbid effluvium was more concentrated in the respired air.

124. (*h.*) The operation of the morbid effluvium or animal poison was violent in proportion to the concentration of it in the air respired, and to the weakness of the person inspiring it, and to the grade of predisposition.

125. (*i.*) There is no evidence to account for the generation of the choleric poison in the first instance, and there is as little of its reproduction *de novo*, on subsequent occasions. It is also impossible to form a correct idea of the period during which the infectious miasm or seminium may be retained by clothes closely shut up from the air, or by the dead and buried body, and be still capable of infecting the healthy.

126. iv. *The disease considered in relation to its exciting cause, and the effects of this cause on the vital functions and blood.* — The intimate relations and nature of this pestilence can only be inferred from a careful examination of symptoms or phenomena, in connection with their exciting cause, and with its effects, both direct and consecutive, upon the frame. The uniformity of the symptoms, under every circumstance of locality, climate, and constitution of the affected, would point, as stated above (§ 53. 95.), to one specific or principal cause. But in what does this consist? The manner of the

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* On the introduction of the pestilence into this country, I was desirous of observing it in the cholera hospitals within my reach, especially in those first established; and my friends at the Privy Council Office furnished me with every facility in accomplishing my intention. I saw also many cases in private practice, both in my own vicinity and in various parts of the metropolis and suburbs.

attack, the selection observed in its victims, the circumstances connected with the seizure, the characteristic symptoms which it presents, and various other considerations, strongly indicate, independently of the evidence adduced in proof of it, the existence of some animal poison or effluvium proceeding from the diseased and infecting the healthy. But in what way this poison, or leaven of the disease, first originated, there are no certain data from which to venture an inference. Did it originate about the period of the first irruption of the pestilence in the Delta of the Ganges, and propagate itself by extending its influence to the predisposed ever since, without any subsequent generation of the principle *de novo*, assuming more destructive features under circumstances which predispose to, or facilitate its transmission, as moist, unhealthy, or epidemic states of the air, &c.? Or does this disease arise in distant and unconnected places at nearly the same time, from some peculiarity of the air, or of its electrical states, or from some foreign material extricated from the earth, or floating in the atmosphere; and, having produced the fully formed disease, an effluvium emanates from the affected body, capable of inducing the same train of morbid actions as those in which itself originated, the infectious principle being thus generated *de novo* on numerous occasions? That an infectious property is evinced by the disease cannot be doubted by any one who intimately examines its phenomena, particularly in connection with their origin, or who has attended to his own sensations during and after respiring air contaminated by the effluvium from the sick, or after inhaling the miasms from the excretions or from the bodies of the dead; but whether this principle originated with the first irruption of the malady, or has been reproduced on numerous occasions subsequently, the disease which reproduces it proceeding from a very different cause, is a difficulty which will not readily be solved. It cannot be believed, however, that, where the symptoms of the disease are uniformly the same, the causes which occasion it should be so entirely opposite as are aërial influence and an animal poison generated in the bodies of the diseased; or in other words, that very different and very opposite causes should be *uniformly* followed by the same effects on every occasion and combination of circumstances, the disease at the same time generating a cause which shall perpetuate it, of a very different nature from those in which itself originated. Indeed we have no evidence of the reproduction of this principle in distant and unconnected places, from causes different from itself, inasmuch as there is no evidence of the disease having ever appeared under such circumstances, or, in other words, without communication with previously infected places; and hence we have no right to infer that a contingent combination of causes will reproduce this principle, until we have evidence to show that it does.

127. But in whatever way this question may be answered, if indeed it be ever satisfactorily answered, is not very material, as respects the nature of the malady. Whatever may be the exact origin of the efficient cause, there seems little doubt that it is inhaled into the lungs with the inspired air, where it acts as a poison, depressing the energy of the nerves supplying this organ, destroying the expansile actions it performs during respiration, and impeding those changes which the blood undergoes in the lungs. That the vital energy of the nerves distributed to the respiratory, the circulatory, and the secreting organs is either uncommonly depressed or entirely annihilated, is shown by the nature of the characteristic symptoms constituting the malady. The state of the respiratory function, particularly the laborious inspirations and rapid expirations, the coldness of the expired air, the involuntary and forcible retraction of the epigastrium and hypochondria, and the inexpressible oppression and anxiety referred to the chest, all indicate that the vital actions of the lungs are nearly suspended, and that the state of collapse and congestion, presented by them soon after death, had actually commenced during life. The impaired actions of the heart, the small, weak, and nearly abolished pulse, and the black colour of the blood, evince a suspension of those changes produced upon this fluid during respiration, and demonstrate not only a paralysis of the nervous energy of the lungs, but a marked diminution of the nervous power actuating the heart and arteries; the loss of vital or nervous power being necessarily followed by a suspension of the changes produced upon the blood in the lungs, by congestion of the abdominal viscera, by an exudation of the watery or serous part of the blood from the digestive mucous surface, and the discharge of it from the stomach and bowels, and by a total cessation of all circulating and secreting actions, owing to the loss of organic nervous power, and to the change in the state of the blood. The vital or ganglionic class of nerves (which forms a sphere of intimate union with each of its parts, supplies the lungs, the heart, and blood-vessels, and all the digestive, assimilating, and secreting viscera, and when powerfully impressed in any one part experiences a co-ordinate effect throughout the whole), is primarily and chiefly affected. Hence the alteration of all the natural secretions so rapidly supervening upon the morbid impression made by the efficient cause of the disease on the nerves of the lungs,— hence the almost total abolition of circulation, assimilation, and secretion, — hence the congestions of the large vessels and vital organs,— and hence also the rapid extinction of voluntary power, as a necessary consequence of the suspension of those changes which, being produced in the blood, support the nervous energy and all the voluntary and vital actions. The retchings, evacuations, and spasms so generally observed, frequently follow upon any sudden diminution of vital power, and upon congestions of the nervous centres, and seem to answer wise purposes in the economy, inasmuch as they tend, by their influence on the circulation, to bring about a natural restoration of the vital actions, and to throw off the injurious load by which the springs of life are oppressed. They are efforts of nature to expel what is injurious, or to rally what is sinking. Where the powers of life are not too far reduced, these efforts will be energetic and often successful, as very frequently remarked in respect of the less dangerous cases of this pestilence; but when the vital energies are far sunk, or where the serous portion of the blood is so far drained off by the digestive mucous surface as to render the blood

unfit for circulation in the capillaries, these efforts will generally prove weak and inefficient, even when assisted by rationally devised means.

128. Whatever may be the exact nature of the exciting cause, and whatever may be its mode of operation on the frame — whether this cause primarily affects the organic nervous system, and the blood consecutively through the agency of this system, as now maintained, — or whether it passes at once into the circulation from the air-cells of the lungs, and affects the organic nervous system secondarily, — there cannot at least be any doubt of the very remarkable changes produced on the blood in the course of the distemper. The analyses of the blood, of the bile, and of the evacuations by M. LE CANU, Dr. O'SHAUGHNESSY and others, show that, at an advanced period, the blood has lost one half of its serum, a considerable portion of its fibrine, and most of its carbonate of soda; whilst the rice-water-like evacuations consist chiefly of the serum of the blood, containing albumen, and carbonate of soda, and other saline ingredients which are deficient in the blood. When the disease has gone on to the febrile or reactive stage, then urea accumulates in the blood, and even in the bile, owing to the paralysed state of the kidneys. It is not improbable that a considerable change is going on, in a latent manner, in the blood before the serous portion of it is discharged from the digestive mucous surface; and that this change takes place chiefly in the lungs, and affects the vital relations subsisting between the serum, fibrine and coloured globules, as well as between the capillary vessels and blood circulating through them; and that the fully developed period of the malady is the result, — 1st, of this change, and 2d, of the evacuation of the serum, and other ingredients of the blood; capillary circulation in vital organs thereby becoming arrested. This state of the blood, in connection with the impaired functions of the lungs, of the kidneys, and of the liver, is evidently the source of the consecutive fever.

129. It has been now shown, both by reference to the appearances displayed by investigations after death, and by connecting these with the phenomena presented by the disease during life, that the requisite changes are not produced upon the blood by respiration; and that the emunctories, which remove from the circulating mass those materials which would prove highly injurious and irritating to the frame if they were allowed to remain in it, have their functions entirely suspended; whilst, at the same time, the serous portion of the blood escapes from the digestive canal in so large a quantity as to change the physical condition of the blood in the vessels, and thereby to interrupt the circulating functions in vital organs. Can it, therefore, be a matter of surprise, that, when reaction of the vital powers of the system is brought about, very great disturbance, not only of the circulating system, owing to the altered state of the blood, but also of the encephalon, and of the different emunctories, is immediately manifested? Indeed these consecutive states of disease, which have been well illustrated by observation, are entirely in accordance with *à priori* inferences in pathology.

130. I conclude this part of the inquiry by stating the inferences which may be drawn from an extensive view of what is known of this pestilence, as it has appeared in Asia and in Europe, and from intimate observation of its phenomena, as they lead to various considerations calculated to arrest its progress and to remedy it, when an attack has not proceeded too far in the destructive processes in which it has been shown to terminate.

131. *A.* The pestilential cholera seems to have been propagated by an animal miasm or effluvium of a peculiar kind, emanating from the bodies of the affected; and this effluvium, being inhaled with the air into the lungs, paralyses these organs, and acts as a poison on the class of nerves which supplies the respiratory, the assimilating, the circulating and secreting viscera, vitiating also the whole mass of blood, and thereby occasioning a specific disease, which in its turn gives rise to an effluvium, similar to that in which itself originated; which, also, in like manner perpetuates its kind, under the favourable circumstances of predisposition, aërial vicissitudes, &c., and thus a specific form of disease is propagated far and wide, as long as predisposing, concurrent, and determining causes favour its propagation.

132. *B.* The morbid impression of this effluvium or poison upon the nerves of organic life, and probably the effect of its introduction also into the current of the circulation, are of a sedative kind, rapidly destroying the vital energy of the former, and vitiating the latter, and thereby giving rise to the characteristic phenomena of the malady.

133. *C.* The impression of this effluvium on the organic class of nerves, and the vitiated state of the blood, may be viewed as the proximate cause, not only of the disturbance evinced by the respiratory, the secreting, the assimilating, and the circulating functions, but also of the morbid actions of the stomach and bowels, and the copious serous discharges from these organs, as well as of the muscular spasms, the sinking of all the vital and animal powers, of the shrunk and collapsed state of the surface of the body, of the black, thick state of the blood, and of the rapid depression of the animal temperature.

134. *D.* The states of the perspiration and skin, and the discharge of the serous portion of the blood by the stomach and bowels, imparting the peculiar appearance of the evacuations, proceed from the alteration primarily produced in the vitality of the frame and in the condition of the blood; and it is chiefly through the medium of the cutaneous surface, of the liver, of the kidneys, and of the mucous membranes, assisted, perhaps, also by the other secreting viscera, that the morbid change of the blood is remedied, and impurities removed from it.

135. *E.* The advanced stages, or the consecutive, or febrile symptoms of the disease, whether those chiefly depending upon the state of the nervous functions, or of the circulation within the brain, or proceeding from the condition of the abdominal viscera, arise partly from the shock received by, and the depression of, the vital energy of the frame in the early stage, partly from the congested condition of the large veins and important viscera, and partly, if not chiefly, from the alterations which had taken place in the blood during the early stages of the malady.

136. *F.* The effluvium or seminium, which propagates the distemper, is generated in the progress of the changes produced in the blood,

and is emanated or discharged from the mucous surfaces of the lungs and digestive canal, and from the cutaneous surface, along with their respective exhalations and excretions; and this seminium, by contaminating the surrounding air, or woollen cloths and animal products, capable of attracting and retaining for a time animal effluvia, as shown above (§ 92.), affects those of the healthy who are predisposed, either constitutionally, or by antecedent, concomitant, or determining influences, or on whom this efficient agent acts in an intense or concentrated form, or is aided by accessory or concurrent causes.

137. VI. TREATMENT OF PESTILENTIAL CHOLERA. — The means of cure which should be employed, in order to secure even a moderate share of success, ought to be appropriately prescribed, and strictly directed to the various pathological states and stages which the disease presents in different habits and constitutions, and in its various grades of severity. It is, in some measure, owing to a neglect of this strict appropriation of the numerous plans and means of treatment recommended, and to the empirical manner in which they have been administered, that opinions have been so different as to the utility of the greatest number of them, even at an early period of the malady; at a far advanced stage, very few remedies indeed have hitherto been employed with any remarkable benefit. In order that the means chiefly depended upon by the numerous writers on this malady may be more strictly referred to the circumstances under which they seem to be indicated, and often to have really proved beneficial when early employed, I shall *first* succinctly state the chief forms and stages of the disease, with reference to various grades of intensity, and existing pathological conditions; I shall *next* briefly notice the methods which have been employed by various authors; and, *lastly*, detail, with strict reference to these different states and stages, the treatment I venture to recommend, according to my own experience and observation.

138. i. *Grades and stages of the malady, with reference chiefly to curative measures.* The mode of attack, as well as the severity of the disease, vary materially, according to the intensity of the exciting cause, the nature of the concurrent causes, the state of predisposition, and the strength of the patient's constitution.

139. *A.* The INVASION of the disease generally presents itself in *three* different grades, owing to the above causes. — *a.* The *first* and least dangerous grade or state of invasion is the most gradual, and is usually that of a common diarrhœa, varying in duration from a few hours to one or two or even more days, accompanied with oppression in the chest, and anxiety at the præcordia, and collapse of the countenance and surface of the body. If these symptoms be neglected, they soon pass into those characteristic of this malady, viz. marked and sudden loss of pulse; oppressed and difficult respiration; muscular spasms or tremors; shrunk, wet, and leaden appearance of the surface and extremities; sunk eyes, and watery vomiting and purging, with great distress. This is generally the *least severe* form of the malady, and is commonly met with in the younger and more robust class of subjects. For the sake of distinction I shall term it the slightest grade, or that characterised by premonitory diarrhœa, &c.

140. *b.* The *second* state of invasion is the most frequent, and is generally ushered in by cerebral symptoms, such as giddiness, noise in the ears, by a remarkable oppression of the chest, weight at the epigastrium, and a great depression of the pulse and of all the vital energies, rapidly followed by spasms, commencing at the farther parts of the extremities, and accompanied with watery purging and vomiting, and all the symptoms described above (§ 28.). This is the common form or degree of severity of the malady.

141. *c.* The *third* state or form of invasion is the most sudden and fatal. The patient is suddenly seized, as if struck by lightning, or by a severe blow on the epigastric centre. His vital powers are immediately laid prostrate; inordinate discharges of serous fluid take place from the bowels and stomach, with cramps and spasms of the voluntary muscles; and he is usually found without pulse at the wrist; with most laborious respiration; shrunk, purplish, raw, wet, and cold condition of the surface of the body; and collapsed, terrified state of the countenance. This *severest grade* of the malady generally seizes on the old, the debilitated, or most highly predisposed persons; and often terminates life in a few hours, with a most rapid and continued sinking of all the functions.

142. This *last* form or state of the disease is generally beyond the reach of medicine; it is chiefly in the two former that medical means avail. These *three* modes of invasion and grades of the distemper should be distinctly borne in mind, as requiring very distinct and decisive modes of cure. Besides attending strictly to these STATES of the disease, as indicated chiefly by the modes of its INVASION, the practitioner is required to notice attentively

143. *B.* THE PERIODS OR STAGES which mark its course. *a.* The *first* or premonitory stage, or the incipient state of diarrhœa, during which, in addition to much vital depression and imperfect discharge of the vital and natural functions, the serous portion of the blood is being effused from the digestive mucous surface, constituting, as well as the more sudden and rapid effusion of serum, a serous hæmorrhage from the digestive canal.

144. *b.* The *second*, or the cold and blue stage, is that of *extreme depression*, the symptoms indicating the utmost sedative effect of the exciting cause of the disease on the vital powers, with a morbid state of the circulation. The extreme degree of this period constitutes the *third*, or severest form of the malady (§ 29. 141.), it being so marked as to entirely overwhelm life in a short time, without any other period or stage supervening.

145. *c.* The *third period* is that of morbid reaction, and is evinced by returning warmth and pulsation, and diminution of the leaden state of the surface. It passes either into convalescence, or into exhaustion and disorganisation. This period, as stated above (§ 29.), may not appear in the severest forms of the disease. But when it does supervene, it presents the symptoms already described, when treating of the consecutive phenomena of the malady (§ 33.). In many instances, life is not destroyed by the morbid state forming the first period of the disease; nor is it so completely overwhelmed as to prevent all reaction; but the reaction which is produced, being accompanied with the morbid state of the blood,

the principal part of its serum being lost, and with a considerable share of the congestion of vital organs characterising the preceding period, is necessarily imperfect, and readily passes into an adynamic state of sub-inflammatory action, affecting chiefly important and vital organs, and often assuming the form of malignant fevers complicated with visceral disease.

146. *d.* The *last stage*, or that of exhaustion and disorganisation, is always a consequence of attempts at reaction, which are, however, often imperfect and extremely morbid in their nature (§ 33, 34.), owing to the marked impression made by the exciting cause on the vital energies, and chiefly to the very evident deterioration of the blood. This stage takes place more or less rapidly, and, when once present, the fatal tendency is great, and is very rarely arrested by treatment. In a very large proportion of cases, the febrile symptoms arising from reaction, are accompanied with more or less of congestion or of a sub-inflammatory state of some vital organ, frequently of several, as of the encephalon, alimentary canal, liver, lungs, &c. and when the consequent collapse terminates in death, these organs manifest the nature and extent of their disturbance.

147. It should be kept in recollection that the *third stage*, or that of reaction, as well as its consequences, namely, exhaustion and disorganisation, can only occur in the *first* and *second* grades of the disease, or in those cases which have not proved fatal from the *second*, or cold stage. The *third* stage is identical with, and presents the phenomena described as forming, the consecutive states of the disease (§ 33.). Owing to the important features it often assumes, it requires a more particular notice. — 1st, A congestive and sub-inflammatory state of the encephalon and spinal marrow, assuming the characters of typhoid, or malignant nervous fever, and proving the most frequent and fatal form of the second period. — 2d, a bilious or bilio-nervous form of fever. — 3d, a sub-inflammatory state of the stomach, or of the bowels, and frequently of both conjoined. And, 4th, an irritative or sub-inflammatory state, with congestion of the lungs, accompanied with oppression and pain in the chest, cough, and viscid expectoration.

148. The *exhaustion* into which these stages gradually pass, and which forms the fourth or last stage of the malady, is generally attended by symptoms indicating more or less congestion, particularly of those organs which manifested the chief disturbance during the period of re-action. Its accession is often rapid. It requires to be accurately recognised and promptly met, in order to ensure any share of success in combating it; and even then success very rarely results.

149. When death occurs in the first stage, as it often does in the highest grade of the disease, the chief changes are observed in the blood, the lungs, and vascular system (§ 43. 45.), the vital functions being so rapidly abolished, from the impression of the exciting cause of the malady, that the morbid influence can be evinced only on this system, and there chiefly as respects the state of the circulating fluid — a sufficient length of time to produce disorganisation to any very remarkable extent not having elapsed between the invasion and termination of the disease. But when death takes place after the period of reaction, organic changes are observed in various important viscera (§ 46.), which, however, with the disturbance of vital functions, and in which they chiefly originate, only partly account for the fatal result. The thick and venous states of the blood, owing to the remarkable loss of serum and to the arrest of the changes produced by respiration on the blood, manifestly interrupt the capillary circulation in vital organs, and occasion the phenomena of the advanced stages of the distemper, and ultimately death.

150. It will be necessary to acquire precise ideas of the foregoing *forms* and *stages* of the malady, in order to devise appropriate means for counteracting their fatal tendency.

Synopsis of the Forms and Stages of Pestilential Cholera, depending upon the severity of attack.

First grade. — With marked premonitory symptoms, particularly diarrhœa, &c. (§ 26. 139.). *Second grade.* — Commencing with giddiness, faintness, &c., rapidly followed by the characteristic features of the disease (§ 28. 140.).	*First stage*, or preliminary diarrhœa, which may be readily arrested without further disturbance beyond indigestion, &c. *Second stage*, or that of extreme depression or failure of the circulation (§ 28.), often quickly passing into dissolution, but sometimes followed by the *Third stage*, or reaction, or febrile affection, with suppression of the urinary and biliary secretion (§ 33.). *A.*—Reaction with typhoid, or maligno-nervous febrile affection (§ 34.). *B.*—With gastro-enteric affection, &c. (§ 35.). *C.*—With bilious affection, &c. (§ 35.). *D.*— With pulmonary affection, &c. (§ 35.). *E.*—With two or more of these conjoined. *Fourth stage*, or that of vital exhaustion and disorganisation, often terminating in death.
Third grade. — The seizure sudden and intense (§ 29. 141.).	Most frequently consisting of the stage of depression only, rapidly terminating in death, and more rarely followed by reaction and the stages and states above enumerated.

151. ii. *Notice of various Modes of Treatment employed in different Countries.* — M. Benoit states, that he found the combination of camphor, laudanum, and sulphuric æther, with the external use of sinapisms to the epigastrium and extremities — means employed by numerous practitioners, — successful in the visitation of the pestilence at Manilla, in 1820. Mr. Craw (*Bombay Reports*)

speaks very favourably of large doses of ammonia and musk. Dr. Peitsch (*Fodèré*, p. 261.) states that his practice in Java showed the uncommon efficacy of two parts of spirits of mint, one part of spirit of lavender, and one of laudanum, taken in doses of a spoonful, until the vomiting ceased. Mr. Milward (*Bomb. Rep.*) informs us that he found magnesia, in doses of four scruples, remain in the stomach and procure natural evacuations, other means having failed. Dr. Mahir, of the Polish army, employed large doses of opium and prussic acid, with lavements of assafœtida. Several physicians in Russia, Poland, and Germany, had recourse to moxas, or the actual cautery applied either along the spine, or on the scrobiculus cordis, but with as much benefit as may rationally be expected from such means. Many of the physicians at Warsaw ascribed good effects to the magistery of bismuth, whilst others stated it to be more injurious than beneficial.

152. The treatment which was recommended by Mr. Corbyn, and very generally adopted in India, consisted of from fifteen to twenty grains of calomel, washed down with sixty drops of laudanum, and twenty drops of the oil of peppermint, in two ounces of water. He prescribed full blood-letting in Europeans, and repeated the above medicines every three hours, until relief was obtained. The oils of peppermint and cajuput were very generally used in India, and they seem to have been frequently serviceable, but as adjuvants merely.

153. Mr. Annesley confiding in blood-letting employed early in the disease, and in large doses of calomel, with moderate quantities of opium, followed by warm stimulating purgatives. His object in prescribing these medicines was to remove the tenacious muco-albuminous matter lining the internal surface of the intestines, which he viewed as obstructing the canal. But he ascribed undue importance to a change contingent upon the advanced stage of the malady, the existence or removal of which could but little affect the course of the malady.

154. Mr. Searle advised the patient to be placed between very warm blankets in an airy apartment; and, as he considers a deranged state of the stomach is generally connected with the origin of the attack, the free evacuation of this organ to be amongst the earliest intentions to be fulfilled. For this purpose he recommended, whether the patient has vomited or not, that he should drink freely of warm water in which common salt has been dissolved, — about a tablespoonful of the salt to half a pint of hot water; that bleeding should be practised, and, after the stomach is evacuated, that a full dose — about twelve grains — of calomel, be exhibited, and washed down with hot brandy and water, and that this be repeated every hour or two, until an improvement is observed, when it may be given in smaller doses, and either in conjunction, or alternately, with some mild aperient. For the sub-inflammatory states of the encephalon, or abdominal viscera, frequently supervening during reaction, or the third stage of the malady, he recommends the employment of moderate, general, and local depletion, with injections and counter-irritation, by means of sinapisms. He found the cramps relieved by compression.

155. Mr. Goss, of the East India Company's service, states, that hearing the patients complaining of the excoriating nature of the fluids evacuated, he suspected this property to depend upon the presence of some acid, and that he therefore exhibited about a drachm of the carbonate of soda with fifteen grains of the carbonate of ammonia; the patients, who were very few, and their cases slight, all recovering under this mode of treatment. He likewise had recourse to full blood-letting, occasional doses of calomel and jalap, to frictions and counter-irritants applied to the abdomen and lower extremities. He states that emetics had failed in some instances in which he had employed them, but had succeeded in others. He appears to have employed the ipecacuanha powder merely, without combining it with diffusible stimuli, and therefore his failure in the most severe cases was to be expected.

156. Dr. Raimann, of St. Petersburgh, states, that blood-letting, with calomel and opium, and external heat and irritation, were amongst the most successful means employed against the disease in Russia. Warm baths were of equivocal service, unless at the very commencement of the seizure, or in the slightest cases. They generally exhausted the patient instead of restoring the circulation to the surface in the more severe cases.

157. M. Vos, who practised in Batavia, found blood-letting of service amongst Europeans only: it was injurious in the natives. The remedies from which he derived the greatest advantage were calomel with opium, followed some time afterwards by warm stomachic purgatives and injections. M. Margeot, who observed the disease in the Isle of France, prescribed, every two hours, two drachms of the sulphate of soda in a glass of honey-water, until bilious evacuations appeared. He gave diluents liberally, and administered emollient injections frequently, with the view of promoting the action of this salt. M. Robert, who adopted this practice, added to it the occasional exhibition of a draught with ammonia; and M. Galdemar employed a draught with olive oil, sulphuric ether, and camphor.

158. Mr. Boyle, who treated the disease in India soon after its first appearance, finding, in the post mortem examinations which he first made, that the gall-ducts were obstructed by a thick viscid bile rather than by spasm, was led to exhibit emetics and procure full vomiting, in order to remove this obstruction of the passage of bile to the duodenum; and the advantages which he obtained from the practice induced him to recommend it in preference to other means which he considered subordinate to it, and requiring to be varied according to the circumstances of individual cases, the use of emetics being always requisite. To this gentleman the credit is due of having been the first to recommend emetics for this disease.

159. Several of the American practitioners who had visited India and China during the prevalence of the pestilence, prescribed powdered carbon and burned cork in milk, and conceived that benefit resulted from the practice. This substance, however, as well as many others to which a certain degree of credit was attached, only seemed of advantage, it being apparently successful in the slighter cases of the disease, in which the morbid actions induced in the frame operated their own cure, through the aid of the powers of

the constitution. This practice, however, was strongly recommended by Dr. **Jackson**, an authority of the greatest weight, in dysentery and chronic diarrhœas, in which affections it appears to have been extremely serviceable.

160. When the disease appeared in Persia, the native practitioners had recourse to cold affusions, and cold acidulous, or iced fluids, of which the patients were allowed to drink at will. At Bussorah, M. **Morando** prescribed cold applications over the organs chiefly affected, at the commencement of the attack, and blood-letting, both general and local. M. **Meunier**, at Bagdad, treated the disease by means of venesection, leeches applied to the pit of the stomach, mucilaginous and opiated draughts and injections, and hot fomentations. A similar practice to this seems to have been very generally adopted by medical men in Syria, Mesopotamia, and Aleppo. Of the effects, good or bad, of the cold affusion as adopted in Persia, I can find no precise information. But, judging from the great benefit I have seen derived from the cold affusion on the head, in cases of poisoning by opium, even when life, apparently, is nearly extinct, this practice seems to me not so irrational as many may suppose. It is at least one of the most energetic means with which I am acquainted of removing congestion of the vessels within the head.

161. When the disease appeared at Astrachan, in 1823, the medical commission prescribed the following practice:—A large blood-letting; a dose of calomel, with sugar or gum Arabic, and followed by from forty to sixty drops of laudanum; twenty drops of the oil of peppermint, given in two ounces of the aqua melissæ; frictions of the epigastrium, with an ammoniacal liniment; scarification and cupping over the abdomen; frictions of the limbs and surface generally with camphorated spirit; mucilaginous injections with about thirty drops of the tincture of opium, and calomel in doses of from ten to twenty grains. This practice, which was altogether based on that very generally employed in India, was likewise adopted when the disease invaded Russia in 1830; but on this occasion blood-letting was found less beneficial than formerly, and warm sudorifics, and the external application of heat, were more depended upon.

162. Dr. **Keir**, who had great experience of the disease at Moscow, derived advantage from blood-letting in the young, plethoric, and well-fed, and in the common or intermediate grades of the malady, particularly when employed early, or before the pulse left the wrist. In the most intense grade, or when resorted to late, or when the pulse had disappeared from the arm, it often seemed prejudicial. Full doses of calomel with opium, followed by stimulants, purgatives, and injections, and accompanied by the external and other means usually employed by the Indian practitioners, formed the principal part of the treatment adopted by him.

163. When the pestilence appeared in Warsaw, the medical authorities there had recourse to very nearly the same treatment as stated in the preceding paragraph (§ 162.). Subsequently, many adopted, and several afterwards relinquished, the plan of Dr. **Leo**, which was to give three or four grains of the sub-nitrate of bismuth every two hours. According to M. **Boisseau**, the hydrocyanic acid, the hydrocyanate of zinc, oxygenated water, and oxygen gas, were all tried in this city without benefit; and, I may add, that laurel-water, phosphorus, both internally and externally, moxas, and the actual cautery to the spine and epigastrium, were also made trial of without any remarkable advantage. M. **Briere de Boismont** recommended (when vomiting continued urgent) the cuticle to be removed by means of liquid ammonia, and the denuded surface to be sprinkled with one or two grains of the acetate of morphine.

164. Mr. **Finlayson** derived advantage in one case in Ceylon, from passing a galvanic current through the lungs. Galvanism certainly deserved a fair trial in this disease; but the instances in which it was resorted to in this country did not furnish evidence of its success.

165. Dr. **Barry**, having very frequently observed congestion, inflammation, and softening of the spinal marrow, in a greater or lesser degree, in his examination of fatal cases of the pestilence, was led to recommend the application of the actual cautery to the back, opposite the lower dorsal and upper lumbar vertebræ; it had been employed on the Continent with some success. He also advised full vomiting, and for this purpose preferred a strong solution of common salt and water, given in doses of six ounces. Warm, dry applications to the skin, and continued friction, he considered very beneficial, whilst vapour and hot-water baths he believed to be worse than useless. Bleeding, as well as large doses of either opium or stimulating liquors, he believed to be dangerous in the utmost state of depression, when the powers of life are reduced to the lowest ebb, and consequently easily annihilated; but previous to this state, or when reaction is supervening, he considered blood-letting beneficial to the patient.

166. The following account of the experience of several physicians at Warsaw, abridged from that given by M. **de Boismont**, is important, as showing the results of different kinds of practice: —

Dr. **Janikowski** treated sixty-six cases. He bled the robust and those with evident congestion, and gave every three hours two grains of calomel, with one of opium, with warm stimulating diluents, sinapisms on the epigastrium, and frictions of the limbs with irritating liniments. In some cases he gave the nux vomica in doses of half a grain, every fourth hour, in an emollient decoction, and, he conceived, with some advantage. He lost twenty, chiefly old persons, of the number treated. Dr. **Koehler** had sometimes recourse to blood-letting, but depended more upon the preparations of ammonia. He also prescribed calomel with opium, and in some cases large doses of the sub-carbonate of potash. The further results of his experience are not given. M. **le Brun** treated about sixty cases, of which he lost nearly one-half. The disease was, however, far advanced before they came under treatment. He confided chiefly in blood-letting, warm diluents with opium, and camphor combined with calomel. Of twenty cases treated in private practice, five died. The remaining forty were hospital cases. Dr. **Enoch** treated forty-three cases, of which five were hospital patients. He lost only seven cases, chiefly aged persons. The most of his patients were blooded, and treated with calomel and opium at first, and afterwards with calomel and rhubarb. He directed sinapisms to the epigastrium and extremities. Dr. Jasinski treated thirty cases, of which ten died. In his earliest cases he employed blood-letting when he thought it indicated, or leeches to the painful part of the epigastrium, with small doses of calomel and opium, and the infusion of valerian. In the cases which occurred subsequently, and which were generally more intense, he prescribed leeches to the abdomen, the magistery of bismuth internally, and sinapisms and frictions to the extremities. Dr. Kaczkowski, physician-in-chief to the Polish armies, had recourse in the most severe cases to large blood-lettings, to calomel in doses of three or four grains, with half a grain of opium, every two hours, with the external use of sinapisms, stimulating cataplasms, moxas, &c. He also frequently prescribed, every two hours, small quantities of Dover's powder with mint ptisans, and large doses of magnesia; and states that he derived advantage from the nux vomica, given with the mucilage of gum Arabic and sugar or syrup. He lost one-sixth of his patients, amongst whom, however, he seems to have included several cases which evidently either did not belong to this disease, or consisted of the slight form, or of the incipient stage.

167. Most of the individual means and plans of cure noticed above were had recourse to when the disease appeared in this country, — but generally with that want of success, especially in the severer and more advanced cases, which led to the relinquishment of them, and to the trial of other medicines and different combinations. *Bloodletting*, which had been advised both by Indian and European physicians, was resorted to, but with very equivocal benefit; for it was only in slight cases, or in an early stage of the disease, and in young, plethoric and robust persons, that it seemed to be of service; and in these either equal advantage would have been derived from other means, or recovery would have been brought about by the powers of the constitution. The same remarks apply also to the use of *opium.* This remedy could only be viewed as an adjuvant of other means, and it was often a valuable one, in aiding to check the diarrhœa, in the slighter cases and earlier stages. But, when the attack was violent, and when the collapse was great, it either failed of producing any effect, or occasioned an injurious one.

168. The failure of the more usual means led to the adoption of warm *emetics* by several physicians, especially of those consisting of large doses of mustard; or of the substances usually employed with this intention, conjoined with powerful stimulants. But in the more violent seizures, or at an advanced period of the disease, they did not appear to me to be productive of any benefit.

169. Indian practitioners, owing to their predilection to the use of *calomel*, especially at the period of the outbreak of the pestilence in India, and to the absence of bile in the evacuations, had recourse to this medicine, generally in large or very frequent doses, and in conjunction with opium. They imputed too much importance to the absence of bile, looked upon this as the chief source of mischief, instead of viewing it as a part only of the general circle of consecutive disturbance, and aimed merely at removing a symptom without directing attention to more general and important morbid conditions. In certain states, however, of the malady, hereafter to be noticed, and in certain combinations, it was often of more or less service.

170. Dr. Graves, impressed with the little efficacy of the means previously recommended, and with justice believing that it was of the first importance to arrest the discharge of the serum of the blood from the digestive mucous surface, recommended full doses of the *acetate of lead* to be given with opium — varying the quantity and frequency of the dose with the severity of the case. Previously to the publication of this method, I had been employing the *sulphate of zinc*, with opium and extract of logwood, and *sulphate of alumina*, in similar combinations, with this intention; but my experience hardly enables me to decide as to the comparative merits of either, for each was efficacious in the less violent cases, and inefficient when the collapse was extreme.

171. The saline treatment advised by Dr. Stevens for malignant fevers, with a confidence which subsequent experience has not justified, was sufficiently tried in this pestilence, and in several cases by myself. The ascertained deficiency of the saline ingredients of the blood, in the fully developed distemper, he proposed to restore by giving every half hour or hour half a drachm of sesqui-carbonate of soda, a scruple of muriate of soda, and seven grains of chlorate of potash, in half a tumbler of water. The trials which I made of this medicine did not furnish greater success than that derived from others. The state of vital action — the complete arrest put to the function of absorption from the alimentary canal, and the general relaxation of the capillaries and of the digestive mucous surface, with the consequent serous exudation, did not admit of the passage of saline solutions or fluids from this canal into the circulation.

172. Knowing the deficiency not only of the saline ingredients of the blood, but also of the serum, and believing that the deficiency could not, in the existing state of vital action, be supplied by the alimentary canal, Dr. O'Shaughnessy was thereby induced to propose the injection of saline solutions into the vascular system. The solution most generally used consisted of half an ounce of muriate of soda, and four scruples of sesqui-carbonate of soda in ten pints of water, at a temperature varying from 104° to 112° or 118°; and the whole was injected slowly, and generally during somewhat more than half an hour. Several cases which I attended were thus treated, two of them of medical men; but none recovered ultimately. Dr. Mackintosh of Edinburgh treated many in this way; and, in the institution to which he was attached, of 156 patients in whom this plan was employed twenty-five recovered. Most probably these were all hopeless cases; but, as far as I could learn, this plan was not much confided in generally in the metropolis; and was employed only as a last resource. When recovery did follow after a recourse to it in these circumstances, the event could not fail of attracting particular notice; yet, as recovery did also occur, although in rare instances, even in the worst cases, apparently from the powers of the constitution rather than from the means employed, the

degree of success evinced by this method was more or less questioned. Phlebitis, which always proved fatal, supervened in some cases.

173. The effect of the injection of the above solution into the mass of blood was always remarkable on the disease. All the symptoms subsided, or entirely disappeared, except the excessive evacuations. These, however, returned, or became still more profuse; until a very short time after the injection, the whole of the fluid had passed off by the bowels, and all the phenomena reappeared, generally with increased violence and extreme vital depression, often rapidly passing into dissolution. This circumstance shows that the disease did not merely consist in the loss of the serum of the blood; but in an alteration of the blood still more materially affecting its vital constitution, and most probably originating, as I contended in the work published in 1832 on this distemper, in the altered vital condition of the ganglial or organic nervous system, and implicating the vascular system and circulating fluids consecutively.

174. iii. *Treatment chiefly confided in by the Author after observing the effects of various means and methods.* — When the disease is prevailing in any locality, disorder of the stomach and bowels should receive early attention, and be treated with great decision. Strict attention to my own sensations during and after the impression of the morbid exhalations from the evacuations, and from the bodies of the sick or dead, and the experience of many of my friends when their attention was directed to the matter, convinced me that the morbid impression first made upon the organic nervous system was characterised by depression; and that the consequences of such depression, and of such other change in the state of this system as may have taken place in addition, were soon afterwards manifested in the vascular system, and in the several digestive, assimilating, and excreting functions, if the primary morbid impression was not removed by powerful stimulants and tonics. It is necessary, therefore, not only to develope vital resistance and action by these means as soon as the earliest indications of depression appear, but also to restrain frequent or increased evacuations from the bowels, as being the most prompt modes of preventing these changes from taking place in the blood, which soon induce the most serious and fatal results.

175. When the disease is more fully developed, it is necessary to combine our means judiciously and energetically, to bring several agents into action at the same time, to direct them to different organs and opposite parts of the frame, and thereby to fulfil, directly and contemporaneously, several intentions and indications. In all circumstances, it is requisite, even to a moderate share of success in the treatment of this pestilence, to prescribe the means of cure appropriately to existing morbid conditions — to the pathological states and stages of the malady — and not empirically, or without reference to the known operation of these agents on the diseased actions which we employ them to remove.

176. *A. Treatment in the mildest form and earlier periods of the distemper.* — (*a.*) It has been stated above (§ 27.) that the attack in its mildest form, and in young, robust, or previously healthy persons, was very frequently ushered in by diarrhœa and general depression of the vital powers, with or without nausea, vomiting, or spasms; and that, if these symptoms were removed by energetic means, that the disease generally proceeded no farther. In most cases, however, in connection with diarrhœa and depression of vital power, there was also more or less congestion of vital organs, especially of the lungs, liver, and large venous trunks; and hence it became necessary to remove this congestion, whilst we endeavoured to restrain inordinate discharges from the alimentary canal, and to allay spasm when present; the *intentions of cure* being thus — 1st, To arrest purging and vomiting; 2d, To remove congestion and oppression of the viscera, and to determine the circulation to the surface and extremities; and 3d, To restore the secretions and excretions to a healthy state.

177. The first of these indications should be fulfilled by exhibiting warm astringents and stimulants, conjoined with the remedies usually prescribed for Diarrhœa (see that article, §§ 26. 30.); of these means I have found the sulphate of zinc, with capsicum and opium, the most efficacious; especially when exhibited in frequent doses. The opium should be given in small or moderate doses, so as to support, but not to depress, the powers of life, and always with aromatics and astringents — with capsicum, aromatic confection, confection of black pepper, extract of logwood, sulphate of alumina, acetate of lead, &c. The sulphate of zinc, when conjoined with cayenne or black pepper, or with other aromatics and opium, will not readily excite vomiting. But, if an *emetic* effect be produced by the quantity thus prescribed, the circumstance will not prove injurious; but will tend to remove internal congestions, and to fulfil the second and third indications, without increasing the intestinal discharges.

178. In cases where vascular plethora exists, a moderate bloodletting may be instituted, so as to bring the mass of the circulating fluid more nearly to the state of the moving powers; but it should be prescribed with caution, and only for young, robust, or plethoric persons, and either at an early stage, or in the slighter form, of the malady. If these means do not speedily arrest diarrhœa and other symptoms, they should be aided by the application of dry warmth and frictions to the surface of the body. Dry warmth may be applied by placing the patient instantly in bed, and elevating the bedclothes around him by two or three common hoops, or pieces of whalebone, and then introducing one end of a wide tube, at the other extremity of which the flame of a spirit-lamp or candle should be made to pass; or bags of hot salt, or of hot bran or oats, may be placed around him.

179. The removal of congestion and the equalisation of the circulation will be promoted by employing assiduously, at the same time that external heat is being applied, frictions of the abdomen, chest, and thighs, with a liniment composed of two ounces each of liquid ammonia, of olive oil, and spirits of camphor, with three ounces of spirits of turpentine, and from three to six of hard soap and cayenne pepper, to which about two or three drachms of cajuput or lemon oil may be added. Or hot flannel soaked in a mixture of these may be applied over the abdomen and over the insides of the thighs, and renewed

until warmth is restored. If the attack be attended by spasms of the muscles of the abdomen or thighs, this mixture may be used either as a liniment, or as an embrocation as now advised. The external applications should be assisted by the internal administration of ether, camphor, ammonia, calomel, opium, aromatic spirits, and essential oils, either singly, or in such forms and combinations, as the circumstances of particular cases may point out.

180. If the irritability of the stomach continue, and if the attack be severe, flannels wrung out of hot water, and immediately soaked with the embrocation just now described (§ 179.), or with warm spirits of turpentine, ought to be instantly applied, as warm as possible, over the stomach and abdomen, and retained there, or renewed, until a decided effect is produced. This is the most powerful means I am acquainted with, and the most successful in procuring reaction and restoring the heat of the body.

181. The foregoing means frequently accomplish the last of the intentions of cure enumerated above (§ 176.), by fulfilling those which preceded it. But we should never consider the patient to be placed in a fair way of recovery by bringing about reaction merely, unless the suppressed secretions be also restored. It should be kept in recollection, that an early effect of the exciting cause of the disease is to vitiate the whole mass of blood, and that this morbid state can be removed only by supplying the loss of the serous parts of the blood exuded from the mucous surfaces, and by exciting and calling into active and healthy action the functions of the secreting organs, particularly those of the abdomen. In order to attain this end, large doses of calomel, followed by purgatives or aperients, are required.

182. Calomel was commonly employed in India, and generally in conjunction with opium, in some form or other, and certainly few remedies succeeded better, either there or in Europe, in allaying the vomiting, when the disease was neither unusually severe, nor too far advanced. In cases of moderate severity, and when given early in the attack, it seems to have been remarkably beneficial in restoring the secretions of the abdominal viscera, particularly of the liver; and in these, in conjunction with bleeding, it seems to have had no mean share in preventing the consecutive states of disease, into which this pestilence so frequently passed, more particularly the nervous, congestive, or malignant state of fever, sometimes supervening. Mr. OGILVY (*Bomb. Rep.* p. 210.) remarks, that where the calomel affected the mouth, the consequent symptoms of bilious fever were not observed. Its good effects will be promoted by combining it, as above (§ 179.), with camphor, carbonate of ammonia, and small, or at least moderate, doses of opium. Large doses of this last medicine are injurious in a disease, one of the chief characters of which is great depression of the vital energies.

183. If the means here detailed arrest the malady, or bring about reaction, the treatment must be greatly modified, or altogether changed. If they fail of producing either of these effects, the additional means about to be recommended for the *third* form of the disease must be resorted to (§ 200. *et seq.*).

184. (*b.*) The *third* stage, or that of reaction, being brought about, the chief intentions of treatment are — 1st. To prevent it from proceeding too far; 2d. To promote the secretions, particularly those of the liver and kidneys; 3d. To guard internal viscera from the congestive, sub-inflammatory, and disorganising states often attendant on this stage; and 4th, To promote the return of the healthy functions of the alimentary canal.

185. The above objects are obtained by the cautious employment of blood-letting, either genera or local, but more frequently the latter, in thi stage of the disease, particularly if it have not previously been resorted to, or when it is clearly indicated, and when the pulse is not very soft, broad and open — states which forbid blood-letting; b calomel exhibited in the states of combinatio already noticed, or with ipecacuanha; by aperient or purgatives, combined with gentle tonics an anti-spasmodics, and by vapour baths. If cerebral, typhoid, or nervous affection supervene opium, unless in small doses, and combined wit camphor, or with calomel also, seems to be contraindicated.

186. In the stage of reaction attended by cerebral symptoms, particularly if the vessels of th conjunctiva be loaded, leeches should be applie to the posterior parts of the head and temples, an purgative medicines be employed with the view c removing the congestion of, and the determinatio to the head, and of increasing all the abdomin secretions and excretions; and external derivative resorted to, in order to relieve the internal visce from the load which oppresses them. In this pa ticular state of the disease, as well as in its ear stage, active enemata are especially indicate They should be repeated, without being dis couraged by the circumstance of their not bei retained. The end will be obtained at last, if w persevere in a judicious manner. I have fr quently seen marked advantage derived, in th state of the disease, from the subjoined formulæ: -

No. 308. ℞ Asafœtidæ, ʒij; camphoræ rasæ, gr. tere cum decocti avenæ, ℥viij; dein adde olei terebint ℥ss. ad ℥jss. Misce, et fiat enema.

No. 309. ℞ Olei terebinth. ℥j; olei olivæ, ℥jss.; ca phoræ rasæ, gr. xv.; decocti avenæ, ℥viij. M. Fiat enem

187. Derivatives are of the utmost advanta in the state of reaction with dangerous cerebr affection. Belonging to this class of means, bli ters and sinapisms have been most commonly r sorted to, the former applied between the shoulde the latter over the epigastrium, and insides of t thighs. M. RANQUE has strongly recommend certain rubefacient and irritating applications the abdomen, and M. DE BOISMONT has approv of them. They are required equally during t first stage, particularly when the vomiting a spasms are very urgent, and during this peri when the head is much affected. Of this class means, the warm turpentine embrocations appli to the abdomen and insides of the thighs, as n ticed above (§ 180.) are to be preferred, as bei most quick and decided in their operation. T liniment already mentioned (§ 179.), or the for of the two prescribed below *, may likewise be

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* No. 310. ℞ Linimenti saponis co.; linimenti campho co. āā ℥jss.; olei terebinth. ʒij; saponis duri, ʒij; limonis et olei cajuputi, āā ʒjss. M. Fiat linimentum.

No. 311. ℞ Camphoræ, ʒij; solve in tinct. cantha et Tinct. capsici, āā ʒij; dein adde linimenti sap co. ℥ss. et gradatim, miscendo, liquoris ammon. ℥ olei olivæ, ʒx. Misce bene et sit linimentum.

siduously rubbed over the spine and lower extremities; the latter on the insides of the thighs only, as it is more apt to remove the cuticle than the former. When the turpentine fomentation is not used to the abdomen, the liniment may be applied to this situation. In this period of the malady the *kidneys* may not sufficiently discharge their functions, although this is not so frequently or constantly observed as in the severer grades, where this condition is one of the most dangerous that presents itself, and the most difficult to remedy. When, however, it does occur, the embrocations and liniments already mentioned should then be applied to the loins.

188. When the stage of reaction is accompanied with gastro-enteric affection, or with the additional complication of marked affection of the liver, or disturbance of its functions, or if it assume the nearly allied form of bilious fever, the external medicaments recommended above are also requisite. If the stomach and bowels are chiefly affected, the application of leeches to the epigastrium will be necessary, previous to the employment of these, or of other external or internal means; and emollient injections should be occasionally thrown up. Small doses of opium, combined with camphor and the blue-pill, or the hydrargyrum cum cretâ, may also be given from time to time.

189. Very nearly the same treatment as now stated is required when the symptoms indicate a congested or sub-inflammatory state of the liver. The application of leeches to the epigastrium and right hypochondrium; full doses of calomel given at bed-time, combined with small quantities of camphor, and an aperient draught the following morning, or a few hours afterwards; the use of warm diaphoretics at short intervals; aperient and emollient injections, and the external means recommended above (§ 187.), will generally be requisite.

190. If the consecutive affection assume a dysenteric character, leeches to the perinæum or sacrum, emollient and diaphoretic medicines and mucilaginous injections will be found extremely serviceable. As the dysenteric form of the stage of reaction is frequently either associated with, or dependent upon, a very acrid and otherwise morbid state of the secretions poured into the bowels, and sometimes on an affection of the liver, the occasional exhibition of a dose of calomel with James's powder, and the use of aperients, will be indispensable, in addition to the other internal and external means of cure already particularised.

191. When the stage of reaction is attended with pulmonary affection, local depletion, and the exhibition of those medicines which, while they increase the secretions of the skin and the abdominal viscera, occasion a derivation of the blood from the congested organ, will then be necessary. The most energetic of those are calomel, or the blue-pill, with ipecacuanha, camphor, and hyoscyamus, followed by active purgative draughts and injections, and the application to the insides of the thighs of the liniments or embrocation already prescribed. In these cases the decoction of senega may be given with emollients and aromatics, or the ammoniacum mixture, with liquor ammoniæ acetatis, the camphor mixture, the spiritus ætheris nitrici, and the vinum ipecacuanhæ.

192. Upon the whole, the treatment of the stage of reaction in its various forms of manifestation, as well as the state of *collapse* into which it so rapidly passes, must be directed according to sound views of morbid actions, of therapeutical indications, and of the operation and appropriate application of remedies, as in similar or analogous cases and circumstances of disease. As to the treatment of the *last period* of the malady, or that of collapse, it will be preferable to defer any remark until some notice has been taken of the treatment of the more violent forms of attack.

193. *B. Of the treatment of the severer grades of the disease.* The same objects or intentions of cure as have been recommended for the slighter grade of the malady (§ 176.), will be applicable to the early periods of the severer grades; and very nearly the same agents will be required to fulfil them.

194. Here, also, I recommend astringents and stimulants, and upon the same grounds, with the same views, and in the same or similar forms of combination as those already described (§ 177.). If the astringents chiefly confided in, more especially the sulphate of zinc, occasion or increase vomiting, the circumstance is not to be regretted. In some cases it may even be promoted, with the view of equalising the circulation and overcoming visceral congestions. In young, robust, or plethoric persons I would even propose a moderate venesection, at the same time that vital resistance and reaction are promoted by stimulants and external derivatives; by it the load which oppresses the springs of life, and prevents their reaction, is lightened, and the mass to be moved is thereby brought to a nearer relation to the state of the moving power. But while the mass to be moved is thus reduced, care must be taken to rouse the moving power by a judicious administration of stimulants, of which full vomiting, excited by the means already noticed, the application of external heat (§ 178.), hot epithems and fomentations on the abdomen (§ 179.), and frictions with hot liniments or warm cloths (§ 180.), are amongst the most efficacious.

195. Bloodletting, however, should not be attempted in persons who are advanced in life, in the debilitated, the previously ill-fed, the drunken, and in those inhabiting low, marshy, and unwholesome situations, or who live chiefly on a poor vegetable diet. Even in those from whom the abstraction of blood is admissible, the strength, habit of body, the previous health of the patient, as well as the state and progress of the disease, should be duly considered, the effects of the loss carefully observed, and the quantity cautiously regulated accordingly. Bloodletting ought never to be attempted where there appears evidence of the loss of a large portion of the serum of the blood from the alimentary canal, or when the pulse at the wrist is small and weak. At the time of its being instituted, as well as afterwards, and in those cases where it should not be practised, internal medicines should be administered, in addition to the external means already noticed, in order to rouse the energies of the nervous and vascular systems; and thereby, whilst the second and third intentions of cure are being fulfilled, congestion will also be removed. Of the various internal stimuli which have been recommended — and almost every one in both the mineral and

vegetable kingdoms of nature has been tried — the most eligible, and I believe the most successful, are camphor in large doses, opium, ether, the preparations of ammonia, the aromatic and essential oils, particularly the oils of peppermint, cloves, cajuput; the spirits of mint, lavender, cardamoms, &c.; solutions of phosphorus in ether, or in oil*; the magistery of bismuth; large doses of musk; the hot spices, and numerous warm and aromatic plants, in various forms of combination, &c. Most of those may be conjoined with the astringents already recommended (§ 177.), and taken either in the form of pill or mixture. In many cases, it will be advisable to give also stimulating beverages, especially those to which the patient has been most habituated, as any of the several spirituous liquors diluted with warm water, sugar, &c.; hock, champagne, sherry, or Madeira wine in seltzer, soda, or potash water. In this state of the disease, particularly when the depression of the vital energies is extremely great, the assiduous application of the turpentine fomentation to the abdomen, as well as of the hot liniments to the insides of the thighs (§§ 179, 180.), and the administration of injections, as stated above (§ 186), in conjunction with the internal exhibition of the stimulants now mentioned, will also be requisite, and, when appropriately prescribed, will often prove highly beneficial.

196. It is unnecessary to enter further in detail as to the treatment of the early stage of the severer grades of the pestilence. It may, however, be remarked, that in addition to the medicines already noticed, others have been employed. Amongst these the most deserving of mention are, musk in large doses, with camphor or ammonia, —infusion of valerian with camphor or assafœtida, particularly as an enema, — the decoction of guaiacum, in a similar combination and mode of exhibition, — warm infusions of rosemary, mint, and lavender, with spirit of nitric ether, — and various other vegetable infusions and essential oils. They may be exhibited either by the mouth, or in enemata.

197. (*b.*) When imperfect *reaction* occurs — for reaction is seldom or ever freely and openly developed — it presents the same manifestations, in respect of vital organs, that have been already described (§ 184, *et seq.*); and the treatment, which has been recommended as appropriate to each of the states in which this stage of imperfect reaction shows itself, is equally applicable here, and is directed to the accomplishment of the same intentions as in the first or slightest grade of the malady. The typhoid state of fever, which frequently presents itself, requires the remedies described above (§§ 186, 187.); and the congestive and sub-inflammatory states of the liver (§ 189.), stomach, bowels (§ 188.), and lungs (§ 191.), generally demand the means which are applicable to them respectively. In this state of the malady the secretion of *urine* is very generally suspended, or at least is very scanty, especially when the discharge of serous fluid from the bowels has been abundant, the blood being incapable of furnishing the fluid material of urinary discharge. The chief object of treatment is therefore to change the morbid condition of the circulation, by means of the secreting viscera, and by furnishing the stomach with a sufficient quantity of medicated or simple diluents, whence the inordinate loss of the serum of the blood may be replaced, and the functions of secretion supplied and promoted. At the same time that these views are being acted upon, those organs which suffer congestion and a sub-inflammatory state of action, arising from the depressed state of the vital powers and the morbid condition of the blood accumulated in or circulating through them, must be, as far as possible, preserved from disorganisation. This latter object is best attained by cautious local depletions, by rousing, and, at the same time, controlling the functions of the different emunctories, by expelling morbid matters from the prima via, and transferring irritation to parts which cannot be materially injured by it.

198. In this, and indeed in all stages of the disease, as long as the sensations of heat at the epigastrium and thirst are complained of, the patient should be allowed such fluids or beverages as may prove most grateful to him; and these may be made the vehicle of the medicines already advised, and taken at a temperature which is most agreeable to him — generally in small quantity at a time and frequently. I have often allowed fluids to be taken, either cold or slightly warm, with small quantities of the nitric and hydrochloric acids, when the medicines given at the time wer not chemically incongruous with them. The Anglo-Indian practitioners have lauded these beverages; but I have experienced but little benefit from them unless during convalescence, when they tende to restore the torpid functions of the liver. Durin the period of imperfect reaction, I have found mor benefit result from a liberal use of diluents containing liquor potassæ, or the alkaline carbonates or the biborate of soda; these appearing to favou the passage of fluids into the circulation, to correct the state of the blood, and to excite th action of the kidneys.

199. During the consecutive fever, as well as a an early period of convalescence, the bowels ma become torpid, and require warm stomachic aperients, such as the decoctum aloes compositu with a little cinnamon water; equal parts of th compound infusions of gentian and of senna, or th mistura gentianæ composita; and any of the preparations of mercury which the state of the patie may suggest. The "*droque amère**," a toni aperient tincture long used amongst the Jesu missionaries in the East, obtained much reputation in this period and grade of the pestilence, a well, indeed, as in all its grades and stages, whe a stimulating aperient was indicated, and w much employed by Anglo-Indian practitioner it was generally given in doses of half an ounc to an ounce, in camphor water, or in any suitab vehicle.

200. C. *Treatment of the third, or most inten*

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* No. 312. ℞ Phosphori, gr. j ad ij; solve in æther. sulphur. ʒiij; olei terebinth. ʒij, et adde olei olivæ, ʒij ss.: pulv. gum. acaciæ, ʒj; aquæ menth. pip. ℥iv; olei cajuputi, ♏ xii; syrupi zingiberis, ℥j. Misce secundum artem. Capiat cochlearia ij larga omni bihorio.

* No. 313. ℞ Aloës socot. ℥iv vel ℥v; gum. myrrh gum. mastiches, benzoini, āā ℥ij; rad. calumbæ conci rad. gentianæ, āā ℥ij; croci stigmat. ℥j; spirit. vi Gal. ℔ ix; spirit. vini Hollandiæ, ℔iij. Macera per me sem, exprime et cola. This excellent tincture furnish an illustration of the principle, first clearly explain and inculcated by HOFFMANN, that purgatives, pa ticularly aloës, have their purgative action greatly i creased by being combined with bitters and tonics.

grade of the malady. — In this grade the depression of the energies of the frame is as profound as is consistent with the continuance of life. The means of cure, therefore, ought to be most promptly administered, and energetically devised. The objects proposed to accomplish them are in every respect the same as were stated when treating of the stage of depression, in the slighter grade of the disease (§ 177.); but still more energetic agents are requisite to attain them than have yet been recommended, and most frequently even the most active we can devise are entirely unequal to the accomplishment of the ends we wish to attain. Indeed, the vitality of the several organs is so extremely depressed as to be incapable of being influenced by any moderate agent; the structures are far advanced to the state presented by them immediately after death; and the blood is no longer capable of being circulated. Treatment is therefore entered upon with feelings of despair; still, as recovery from this state does occur in rare instances, it is our duty to employ rational means to attain this end as long as life continues.

201. In this grade of the malady the stimulating *emetics* already recommended (§ 177.), with the view of exciting full vomiting, which the powers of the constitution are of themselves incapable of effecting, should be employed early, if at all, with the intention of inducing reaction; using at the same time stimulating frictions, the turpentine fomentation to the whole abdomen, as hot as it can be made; the hot-air bath, and the internal stimulants already prescribed (§ 195.), or some of those about to be noticed (§ 203.).

202. Bloodletting is advised by some writers, as early as possible in this grade of the malady, and denounced by others. My own experience and that of many practitioners in this country are decidedly against its adoption.

203. When the means already noticed fail, or seem inadequate to arrest the violence of attack, others which have sometimes succeeded in similar states of morbid action, particularly when they cannot prove detrimental, should be prescribed. I would, therefore, recommend a bolus, consisting of from ten to fifteen grains of camphor, an equal number of grains of calomel, two grains of cayenne, one grain of opium, and ten drops of any essential oil, as of mint, cajuput, &c., to be given with a sufficient quantity of conserve of roses. This may be administered after full vomiting, if it can be quickly procured, but without any regard to its continuance. If this bolus be retained, another may be given, and repeated in from one to two, three, or four hours, according to the urgency of the attack; but if rejected, it should be immediately repeated, until it at last remains. Not more than three or four of those boluses ought to be given, and frequently two will be sufficient.

204. Simultaneously with the administration of the above, thirst should be quenched by a frequent recourse to whey, to seltzer water or soda water with milk, by spruce beer, or by other diluents; and dry heat may be employed, and the turpentine fomentation applied, as hot as possible, to the abdomen and chest; and friction of the spine and thighs with any of the liniments prescribed above (§ 187.), made warm by plunging the vessel containing it in hot water, resorted to. From one to three hours after the exhibition of the bolus, a draught, consisting of from two drachms to half an ounce each of spirits of turpentine and castor oil, or of olive oil, with a few drops of the above essential oils, and forty grains of magnesia, should be taken in mint water; and if it be rejected, another should be given, and repeated, if again rejected, in half an hour afterwards; if retained, not until from six to twelve hours, when another may be taken. I have seen cases where the most urgent vomiting existed, and yet the above remedies (although both the bolus and the draught were taken at the same time) allayed, instead of aggravating, this symptom. Besides, it is our object to obtain full vomiting at first; therefore this cannot be viewed as an unfavourable operation of the medicine, if it should follow the exhibition of the first doses of it. In order to promote the influence of these means, a lavement, consisting of ten to twenty grains of camphor, or a drachm of assafœtida, half an ounce to an ounce and a half of the spirits of turpentine, and an equal quantity of olive oil, in a suitable vehicle, should be administered, and repeated according to the circumstances of the case. Much will depend upon the succession in which these remedies are given, the periods which are allowed to elapse between their exhibition, and on the doses and the decision with which they are prescribed. The hot turpentine fomentation, assisted by hot air and frictions with stimulating substances, is the most powerful means I am acquainted with of procuring reaction, restoring the heat of the body, and relieving the viscera from congestion.

205. The internal remedies now recommended, as well as the external means so frequently insisted upon, have been employed by me in many hundred instances of malignant and extremely dangerous diseases, and I have found them the most efficient of all others with which I am acquainted, when judiciously combined and administered, in rousing the energies of life, restoring the secretions, removing the congestion of internal organs, and in subduing that unhealthy sub-inflammatory state of action, which often occurs in fevers, and in diseases proceeding from infection and animal poisons, and which generally advances rapidly to fatal disorganisation. In aid of the above remedies, and particularly when the energies of the constitution seem to react, although most imperfectly, *effervescent draughts* with the sesqui-carbonate of ammonia, and the pyroligneous acetous acid in mint or cinnamon water, or in an infusion of cloves, the ammonia being in excess, may be given from time to time, and a *large blister* applied over the epigastrium upon the removal of the turpentine epithems.

206. I would also recommend, both in this most severe grade of the malady, and that next it in degree, the administration of medicinal substances in the state of vapour, and medicated gases through the channel of the respiratory organs. It has already been shown, that it is through these organs that the specific cause of the disease invades the frame, and that they suffer in a most remarkable manner from its impression, having their functions altogether paralysed, and their substance remarkably congested at a more advanced stage. If this view be entertained, the means of individual prevention, which are hereafter recommended, will appear the more deserving of adoption, and the directing of medicinal agents to this

quarter will, at least, not be considered unreasonable or undeserving a fair trial. Perhaps the inhalation of the nitrous oxide gas, or common air with a slight addition of oxygen, will be the most energetic remedies that can be employed in this way. Other means, also, which will readily suggest themselves to the well-informed physician, may be used; and amongst others the vapour arising from gently heating a strong solution of camphor in aromatic vinegar, or the vapour of the aromatic preparations of ammonia may be mentioned; and shocks of galvanic electricity may be passed through the chest.

207. Besides the use of frictions with hot cloths, or dry substances, or with liniments, which will not occasion cold by their evaporation — means which have already been advised — the application of hot air, or of hot salt, or bran, or hot oats around the body have all been recommended. In cases where the hot turpentine fomentation, or common sinapisms, have no effect; or in this most intense grade of the malady, without waiting for the effects of less active means, the subjoined cataplasm[*] may be applied over the abdomen. A trial may also be given to medicated vapour-baths; to baths, with the fumes of some of the volatile essential oils extricated by heat; and to dry-cupping in the course of the spine, with the view of removing congestion within the spinal canal, as well as of the kidneys and other parts. It may be remarked, that, in the most severe attacks, or when far advanced before medical aid is procured, scarcely any means, however well and energetically devised and practised, will prevent a fatal result; whilst the less severe visitations will generally be removed by any of the remedies enumerated, when judiciously combined and employed. There is reason to suppose that the slightest grade of the malady will even, by means of the vomiting and tumult excited in the frame, operate its own cure; and hence the reputation acquired by various mild or inefficient medicines and methods of treatment. There are few diseases, perhaps, which, while they preserve a perfect identity of character, present a greater range in grade than this; excepting, indeed, those maladies which propagate themselves in a similar manner to it. Indeed, it is chiefly to the mildness of the attack that we are to attribute the imputed success of such remedies as successive draughts of warm milk, olive oil, the Glauber salts, common salt, and various other mild preparations. In the more intense visitations, where the depression of the vital energies of the frame, and the vitiation of the blood are extreme, remedial agents should possess a co-ordinate degree of activity, in order to produce any effect whatever on the system.

208. If the above energetic means be judiciously put in practice, and brought to act simultaneously on different parts of the body, or prescribed in due succession and states of combination, as the scientific, zealous, and experienced practitioner may consider appropriate to the grade and stage of the malady, signs of reaction will sometimes manifest themselves; and then — particularly if it have not previously been employed, or when the state and circumstances of the patient furnish no reason against it, — a small blood-letting, either general or local, may be cautiously resorted to. If the stage of reaction be brought about, however imperfectly, the same intentions of cure, and the same measures to fulfil them, which I have already described when treating of the various manifestations of this stage in the less intense grades of the malady, should be appropriately employed against each of them respectively, as they may supervene in this most severe form of the pestilence, although success from the most active and judicious measures can seldom be expected in this stage of the malady, more especially if the urine still continues suppressed, or means to supply the lost serum of the blood be still unavailing.

209. As the exhaustion of strength is extreme, and as every muscular effort increases it, and as fatal syncope may soon occur in the most severe grades, from being raised to the erect, or even the sitting posture, means ought to be adopted to preclude the necessity of the patient's removal from the recumbent position for the purposes of evacuation. The discharges should be received in a bed-pan; and when medicines are exhibited, his head and shoulders should be raised no higher than is requisite to the accomplishment of the object. Mr. SEARLE very justly remarks, that attention to this injunction cannot be too strictly enforced, and states, that two patients under his own observation lost their lives from neglecting it.

210. It not unfrequently happens, that the active stimulants which we prescribed in the stage of depression, particularly in the more intense grades of the malady, together with the natural tendency of the disease, occasion inflammation, or a sub-inflammatory state of the stomach and bowels. When this occurs, the epigastrium and abdomen become extremely tender, and even tumid. Great irritability of the stomach is also present, and is increased after the ingestion of stimulating substances. In cases of this kind, venesection, the application of leeches, followed by the hot fomentation or the cataplasm prescribed above (§§ 179. 207.), and, upon their removal, by a large blister; the exhibition of calomel combined with small doses of camphor and opium; purgative or aperient injections, often repeated, and sinapisms or stimulating liniments to the lower extremities, are amongst the chief remedies.

211. In the treatment of this as well as of the following stage, all means will prove inefficacious as long as the *urine* is either suppressed or secreted in very small quantity. The defect of this excretion proceeds rather from the want of serum in the blood, than from a paralysed or congested state of the kidneys; therefore the beverages already advised (§§ 195. 198.) should be freely administered, and be made the vehicle of medicines in order to supply the loss, and dry-cupping followed by stimulating embrocations applied to the loins.

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[*] No. 314. ℞ Pulv. sinapeos, ℔ss; pulv. capsici annui; pulv. zingiberis, āā ʒj; acidi acetici pyrolignei q. s. ut fiat cataplasma, dein adde olei terebinthinæ, ʒij. Misce.

The following compound tincture of camphor and opium seems well suited to the worst grades of this malady, in doses of one or two drachms, given in any suitable vehicle.

No. 315. ℞ Opii pulveriz. ʒiij; camphoræ, ʒvj; corticis canellæ contusi; croci stigmat. ʒij; caryophyllorum; pulv. capsici, ʒjss.; potassæ sub-carbon. ʒij; olei anisi, ʒj; spirit. vini tenuior. (vel sp. vin. Gallicæ, vel sp. vin. Hollandiæ), Oij. Macera leni cum calore, per dies viij ad xii; dein exprime et cola.

212. *D. Treatment in the last stage, or that of exhaustion and collapse.* — In those cases in which efforts at reaction, or consecutive excitement, are manifested, exhaustion often rapidly supervenes, owing to the depressed and weak powers of life, to the morbid state of the circulating fluid, and the deficiency of serum. Hence the necessity, during the imperfect manifestation of excitement or reaction, to support the powers of life, even while we have recourse to small general or local depletions, to allow a free use of whey, or other diluents containing saline substances, as seltzer and soda water, and to act upon the secretions by means of purgatives given by the mouth, and in the form of injections: hence the propriety of removing the local determinations and congestions with which the attempts at reaction are more or less accompanied, by means of external derivatives and counter-irritants, employing tonics at the same time that we endeavour to restore the suspended secretion, and thereby to purify the blood, and to derive it from the seats of congestion. It is obvious, however, that these ends cannot be attained whilst the physical condition of the blood is such as not to admit of secretion or even of due circulation — whilst the blood is deprived of one half of its due quantity of serum. Therefore, due care should be taken to administer, by the mouth, and by injections, suitable diluents, and to persist in the exhibition of them, especially of those already mentioned (§§ 195. 198.), in hopes that a portion of them will be carried into the circulation, and supply the deficiency of the watery portion of the blood.

213. As all attempts at reaction must necessarily soon lapse into profound exhaustion, when made during inordinate depression of the powers of life, and a morbid state of the blood, characterised, not merely by loss of the serum, but also by an accumulation of urea, carbon, and other effæte materials requiring removal by the several emunctories, so the objects entertained should be to supply a due quantity of fluid to the circulating mass, and to conjoin with, or dissolve in, that fluid, such substances as will most powerfully and readily excite the action of the excreting viscera, particularly the kidneys and liver, and thereby remove the impurities accumulated in the blood. We ought therefore to resort to these means as early as possible, and in such modes and combinations as are best calculated to attain these objects. If, however, exhaustion proceeds rapidly, stimulants and permanent tonics, given internally; antispasmodic and tonic injections; hot air, hot cataplasms and fomentations; and the other internal (§§ 195. 207.) and external stimulants, described when treating of extreme depression occurring early in the disease (§§ 201—203), may be resorted to. Yet the vital depression will never be removed, whilst the urine is suppressed or scanty, without administering diluents as advised above (§ 204.), and saline purgatives and aperient enemata. It is in this state of the disease that the warm tonic and purgative medicines prescribed above (§ 199.) prove most serviceable, and that the patient requires to have his energies kept up by light nourishment, by grateful diluents and beverages, with a moderate quantity of wine, which latter may also be administered occasionally with injections.

214. In the more extreme cases of this stage of the disease, oil of cloves, or of mace, or of rosemary, or of British juniper, of rue, or lavender, to be applied warm, over the abdomen or epigastric region, and allowed to remain there, or to be renewed, according to the effect produced. In the more urgent cases, a cloth moistened with the warm oil may be placed in this situation, and kept closely applied by means of a compress, which will tend to prevent its rapid dissipation. In milder cases the oil may be combined with camphor and some one of the plasters in common use, as the galbanum, the pitch, or ammoniacal plaster, and these applied and renewed from time to time. I have seen, in cases of extreme vital exhaustion, with depression of the animal warmth, from other causes, the skin of a recently killed animal, particularly that of a sheep, wrapt round the body of the patient, the wool outwards, and advantage derived from the application. Even this or similar means may be tried as a last resort.*

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* I have adverted, in another part of this work, to the influence of the animal warmth of young healthy persons on those who are debilitated, or are labouring under extreme exhaustion. Since that was written, I chanced to find this mode of treatment strongly insisted upon by SYDENHAM (*Observat. Med.* i. 4. § 40.), and as follows, in the "*Medical Notes and Observations*" of SYDENHAM, just now published for the first time by DR. GREENHILL, of Oxford, the learned editor of his works: —

"*De Methodo medendi Morbos per Accubitum Iunioris. Cap.* 16. May y^{e} 19th 1662 I was called in y^{e} night to M^{rs} Change, whom I found very ill of a Cholera Morbus; she had many ugly Symptoms, as coldness of the Extreme parts, talking a little idly, intollerable Sickness, & felt a tingling in her Fingers & flesh outwardly. I judge it dangerous to use Dilutients especially by Clysters in a Women [*sic*] soe green (she having not lain in a Month) & y^{e} Disease pressing soe hard upon my heels; Soe I orderd her to take a warm Cordial, & that a good draught of it, & her Husband to lie close to her Back naked, and her sonn of 12 years close to her Belly, & to lay on more Cloths & to warm her Leggs & Hands wth hot Cloths: She immediately fell into a moderate Breathing, & all Sympt. ceased: & after enjoyning her to keep her bed y^{e} next day, & to eat & drink nothing save a small Quantity of Barly-broth a day for 2 days she perfectly recoverd.

"February 1661 I was called to M^{rs} Hulston, who after a very Chronical fever was fall'n into a very fatallike Diarrhea; I saw it was to noe purpose to give astringents seeing y^{e} Disease proceeded from a Decay of natural heat, therefore I took this Course, viz. I caused her Sonn a plump hot Lad of 13 years of age, & her Nurses sonn of 6 or 7 years to goe to bed to her naked, & to lie y^{e} one close to her Belly, y^{e} other close to her Back, w^{ch} they did, & as long as they continued wth her she had noe stools: but y^{e} Boys rising at any time y^{e} Looseness would immediately return. I commanded that she should persist in y^{e} Course till her cure should be compleat, (the Boys relieving one another by turns in y^{e} daytime) & soe she fully recoverd not only of her Looseness but allso of her Sickness in generall.

"The very same course I took with one M^{r} Little, who had a fever a^{bt} 7 weeks, & at y^{t} time Aug. 1662, soe far spent y^{t} his D^{rs} judged him a Dead-Man: He was ancient & having been much purged wth violent Medicaments, he was as weak as ever I saw any y^{t} recoverd; I (having to noe purpose made attempts to lay his fever by inward Medicines & to raise his strength by Cordials) told his wife that nothing could preserve his life but y^{e} putting a Boy to bed to him: soe she procured a Link boy to lie very close to him all night, & y^{e} next morning I found his fever allmost off, & his Eye & Countenance more lively, upon w^{ch} I pronounced all danger to be over, yett afterwards upon my giving him a Clyster & upon y^{e} recess of y^{e} Boy he began to relapse; but y^{e} Boy being gott again & I giving noe more Clysters he perfectly recoverd.

"The very same way had I cured before Bp. Monk's Lady, who was an aged Woman of a very feeble & thin habit of Body, & had an Ague w^{ch} (tho gone) had soe weakend her y^{t} her Physician Dr. Ridgley looked upon her as dead; when I was sent for she had allso spitten some purulent matter & blood w^{ch} they shewed me (in abundance) upon y^{e} Napkin. I told y^{e} D^{r} y^{t} I apprehended y^{t} nothing could save her life, but a speedy transplantation of some young Spirits upon her, to w^{ch} he

215. *D. During convalescence* from this disease, care should be taken to prevent relapses. It is very frequently observed, that at the commencement of convalescence, the patient is tormented with an uncommon craving for food. This should be restrained, and but little, or at most a moderate quantity only, and of a light, digestible kind, allowed to be taken. The severe nature of the attack, the derangement of the digestive mucous surface, and the disturbance accompanying it of all the digestive organs, must necessarily leave them for a time incapable of discharging their functions in a regular or active manner. They should therefore have no more imposed upon them than they seem capable of performing.

216. It frequently happens that, owing to neglect of this precaution, and occasionally to too early exposure to the vicissitudes of season or of weather, or to cold, chills, or wet, after an attack of this malady, a relapse occurs and carries off the patient. Care, therefore, should be taken to protect the surface of the body, and particularly the extremities, from cold during convalescence, to regulate the diet and regimen of the patient, and to promote the return of the healthy action of the stomach, bowels, kidneys, and other secreting viscera. In order to accomplish this last object, gentle tonics will be necessary; and as the functions of the bowels generally require aid, this should be afforded by combining aperients with tonics, and by gradually increasing the quantity and nutritious quality of the food,

No. 316. ℞ Pilulæ hydrarg. ℈j; Pilulæ aloës cum myrrha ʒss.; Saponis Castil. gr. x. Fiant pilulæ xii, quarum capiat binas alternis noctibus.

No. 317. ℞ Quininæ sulph. ℈j; Pilulæ aloës cum myrrha; Extr. gentianæ, āā ʒss.; Pulv. capsici ℈j; Olei caryoph. q. s. Fiat massa æqualis et divide in pilulas xxx, quarum capiat binas omni meridie; vel

No. 318. ℞ Infusi gentianæ co.; infusi sennæ comp. āā ℥iij; potassæ sub-carb. ʒj; tinct. cardam. co. ℥ss. *m.* Fiat mist. cujus capiat cochlearia iij vel iv ampla, hora somni vel primo mane.

217. After the frame has been fortified to a certain extent by these means, and the functions of the bowels and the secretions are brought to a healthy state, the shower-bath, or the salt-water bath, may be employed, in order to bring about a complete restoration of the energies of the constitution. Whichever of the two kinds of bathing be adopted, active friction of the surface of the body should follow upon coming out of the bath, and moderate exercise be taken in the open air, either on foot or on horseback.

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readily agreed, & a Girl of 13 years was put in close to her Breast, upon this she recovered very speedily both of her Unspiritedness & her Coughing: But y^{e} Girl fell sick, w^{ch} was attributed to her lying wth y^{e} Lady, tho I was confident to y^{e} Contrary, having never known any Mischief y^{t} way; however she had first coming out upon her Petechiæ, & afterwards large Ulcers upon her Breech; But D^{r} Ridgley & I recoverd her."

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PESTILENCE — HÆMAGASTRIC. —

Synon; — *Pestilentia hæmagastrica* (from αἷμα, *blood*, and γαστὴρ *the belly*), Author. — *Typhus icterodes*, Sauvages, Cullen. — *Febris flava*, Auct. Var.: — *Synochus icterodes*, Young; — *Causus*, Moseley; — *Febris flava Americanorum*, I. Frank; — *Epanetus malignus flavus*, Good; — *Fièvre Jaune*, *Typhus Jaune*, *Fièvre Mattelotte*, *Mal de Siam*, Fr. — *Gelbes Fieber*, *Schwartes erbrechen*, *Westindisches fieber*, Germ. — *Febbre gialla*, Ital. — *Fiebre Amarilla*, *Vomito nigro*, *Vomito prieto*, Span. — *Hæmagastric Fever*, or *Pestilence*, Author; — *Yellow Fever*, *Black Vomit*, *Malignant Yellow Fever*, *Pestilential* or *Bulam Fever*, *Epidemic Yellow Fever*.

1. Defin. — *After chills, shivering, and languor, severe pain in the orbits and forehead, also in the loins and limbs; rapid pulse, flushed face; glassy, suffused eyes; peculiar burning heat of skin, and frequently delirium; nausea and vomiting, with epigastric pain, costiveness, great anxiety, restlessness, and watchfulness; subsequently hiccough, black vomiting, scanty or suppressed urine, hæmorrhages from the mucous canals, lemon or muddy yellowness of skin, generally terminating in death in its most severe form.*

2. Pathological Characters.—*An infectious miasm or animal poison, specifically affecting the organic nervous and vascular systems and the vitality of the structures; impairing the crasis and constitution of the blood and the vital cohesion of the tissues; and more especially implicating the stomach and digestive mucous surface, and leaving the frame protected from a second attack, if recovery take place.*

3. The origin, nature, and treatment of this pestilence have attracted the attention of the medical profession, and even of governments, in a remarkable manner for many years. The ravages of it, during 1793 and 1794, in the West Indies and the United States, and the subsequent recurrences of these ravages both in America and in Spain, have furnished most important subjects for investigation, and have engaged the abilities of several eminent physicians, both in this and in foreign countries. Notwithstanding the volumes of descriptions and of controversy which have resulted, opinions are still unsettled respecting the source and true nature of the disease. It may be reasonably inquired, what are the causes which have so long retarded our knowledge of so important a subject? These, it may be presumed, are in many respects the same as those which usually stand in the way of our advancement in every other department of human science. The subject presents also difficulties which are peculiar to itself; and not a few sources of error are attributable to many of the writers who have attempted to furnish information respecting it, or to enter the lists of controversy. There are, perhaps, but few of the numerous disputants on either side of the question, who can at the present day be quoted as authorities, deserving in every respect implicit confidence. The majority of them entered upon the inquiry — if indeed due inquiry or research were ever attempted — with judgments previously biassed. Others possessed neither that amount of scientific education, nor that tutored state of intellect, which are requisite to medical observation in all circumstances, and particularly in those connected with investigations into pestilential visitations. Where it was most necessary that the relations subsisting between the geological formations, the soil, the locality, the climate, and the meteorological vicissitudes of a country, and the states of the brute as well as the human inhabitants, should be comprehensively yet accurately observed, in respect of their healthy condition, of prevailing diseases, and of epidemic visitations, many of the elements

requisite to the formation of sound views have either been overlooked or purposely exaggerated or even misrepresented: some have drawn sweeping conclusions from narrow fields of observation; and many have erred, more or less, in considering this pestilence in too close connection with those maladies which have existed previously or appeared subsequently to its prevalence. The importance of ascertaining differences, as well as of marking points of similarity, upon which specific differences, or identity of nature, may be based, has been overlooked; and much too frequently a few features of similarity have been seized, and identity of character has been thence assumed, without duly estimating the numerous differences associating themselves with each of these features. It must not, however, be forgotten, that occasionally there appeared in the arena individuals, whose opinions will always obtain respect, and who added to their scientific and medical reputation by the discussion, and who evinced, by an honourable spirit and temperate zeal, that truth was the sole object of their inquiries.

4. In thus regretting that the visitations of this pestilential fever, — which I have above denominated, from its prominent pathological characters, Hæmagastric Pestilence or Fever, — have not always been observed, during their rise, progress, and decline, by persons altogether qualified for the undertaking; and that the subject has been viewed as seldom from the "elevated table land of human science," as with minds entirely divested of prejudice or preconceived opinions; it must also be admitted, that the amount of scientific acquirement actually brought to the task of investigation has often tended more to entangle than to elicit the truth. The little that is known, or rather our want of knowledge, of the nature of malaria, of the constituents of emanations from the soil, and of other imputed sources of pestilential diseases, — the mist of ignorance and of prejudice involving these agents and exaggerating their influence — their inferred operation, without further proof of their existence than certain effects which have been imputed to them, either upon insufficient data, or even without the smallest evidence — combined to mislead those who generally repose on the authority of others, and to prevent those salutary measures of prevention being undertaken, which can be based only upon sound views of the source and nature of pestilence. The undue weight of insufficient or false authority, the array of imperfectly observed phenomena and "false facts," and the prevalence of hastily preconceived opinions, of false theory, and of premature generalisation, have swayed the minds of many from obvious truths and natural conclusions, into errors of the most deplorable kind, and plunged not merely towns and districts, but populous cities and kingdoms, into the deepest abyss of misery. Concentrated marsh or terrestrial exhalations, according to many of those who most plumed themselves on their science and philosophy, produced plague in Egypt and other parts of the Mediterranean coasts, gave origin to yellow fever in the West Indies, the United States, and in Spain, and was the only cause of pestilential cholera over the globe. The influence of this cause, and its power to produce all these and many other effects, were as firmly believed in by them and with less, certainly with no greater reason, than TERTULLIAN believed in the power of the devil to produce similar distempers: "Inducere potest morbos et sanitates. Viscerum actiones potest inhibere latenter, et venenis nobis ignotis corpus inficere." And what have been the results? The history of pestilential yellow fever on both sides of the Atlantic during little more than half a century is the reply — a history the more humiliating to medical science, and to human nature, the more intimately it is investigated. Whether a belief in the influence of terrestrial exhalations, as presumed by the pseudo-lights of medical knowledge, or confidence in the power so dreaded by TERTULLIAN and some other fathers of the church, actuated those whom circumstances unworthily and most unhappily clothed with authority on many important occasions, is not material as respects the results; for, as either belief must necessarily have led to similar consequences, and as neither agency could be controlled by available means of prevention or counteraction, so they were left to their own course, and thus gave rise to effects of the most deplorable kind. If the simple truth had been seen and the dictates of common sense been followed, measures calculated to prevent the extension of pestilence at its earliest appearance would have been taken, and successfully carried out on many occasions; but unhappily truth and common sense are as seldom the basis of theory, as they are the incentives of human actions. The simple fact that certain distempers were communicated from one person to several, from a few to many, might have been viewed as sufficiently intelligible, and considered as sufficient grounds for a disregard of all opposing views which had no other basis than vague hypothesis, certainly none stronger than that confided in by TERTULLIAN, and have led to attempts at isolating the affected, and thereby protecting the healthy. But, before proceeding to the discussion of the topics to which this train of ideas would lead, and which will more appropriately be considered in the sequel, I must *first describe* the pestilence now under consideration.

5. I. DESCRIPTION.—*Hæmagastric or continued yellow fever* resembles scarlet fever in some respects, and more especially in the several degrees of malignity and the modifications it presents, in different individuals, during the same epidemic. Generally the higher the grade of atmospheric temperature in which it occurs, the more stagnant the air, the closer the situations and the apartments, the greater has been the prevalence and the mortality of the pestilence. It manifests, also, a greater predilection for some constitutions than for others, attacking some in a very mild, and others in a very malignant form. Sir W. PYM states that this peculiarity was very remarkable at Gibraltar in 1804, where, in some instances, whole families fell victims to it, while others, equally numerous, under the same treatment, escaped with a slight attack. The same was remarked at Seville, Cadiz, and other places, and in other epidemics. The states of constitution and temperament giving rise to this predilection are not so manifest as to permit any thing being stated with precision respecting them. Owing, however, to temperament, sex, age, and constitution, in some measure, and to other *predisposing* and *concurring causes* hereafter to be

mentioned, this distemper presents certain *grades* or *modifications*.

6. i. The *mildest form* of hæmagastric pestilence is most frequently observed in children; and, during some epidemics, in females, although occasionally, females have suffered most severely. It generally makes its appearance with languor and slight chills, soon followed by heat of skin; quick and full pulse; uneasiness in the loins and limbs; severe headache, confined chiefly to the orbits and forehead; a peculiar shining or drunken appearance of the eyes; hot dry skin; a loaded but moist tongue, with little thirst; sickness at stomach, with costiveness, and a feeling of uneasiness, not amounting to pain, at the epigastrium, and a sense of rawness or soreness in the fauces and in the course of the œsophagus. These symptoms may continue from twelve to twenty-four or thirty-six hours, when the patient, having taken only some purgative and febrifuge medicines, or an emetic, falls into a refreshing sleep, from which he awakes in a gentle perspiration, free from pain and fever, and complaining only of debility, from which he rapidly recovers.

7. ii. The *more severe* and more frequent form appears more suddenly, and the symptoms are much more violent. The attack is ushered in by shivering and rigors. The pain in the orbits and forehead is excruciating; severe pain is also complained of in the loins and calves of the legs; the face is flushed; the eyes are glassy, suffused, or apparently inflamed; the pulse is rapid; the skin burning hot and dry; and the tongue is loaded, but moist, with little thirst. A few hours afterwards, uneasiness of stomach, with nausea and vomiting, supervenes; followed by severe pain and tenderness at the epigastrium, with a sense of rawness, heat, or inflammation in the fauces and down the œsophagus; great anxiety, restlessness, and watching, with a desire of sleep. The bowels are constipated, the evacuations scanty and deficient in bile: the urine dark-coloured and small in quantity.

8. If the disease be judiciously treated, these symptoms often become ameliorated on the second or third day; the patient falling into a sleep, from which he awakes refreshed, with a perspiring or moist skin, and nearly free from all the symptoms. Debility only remains, the recovery from which is generally rapid. In many cases, however, either a partial amelioration only occurs, or the more complete subsidence of the symptoms is of short duration; the patient in a few hours beginning to be troubled with flatus in the stomach, and distressing hiccough. Not unfrequently the patient is suddenly and unexpectedly seized with faintness, sickness, and painful retchings, followed by vomiting, at first of whatever had been taken into the stomach, but soon afterwards of a brownish fluid, resembling dirty water, mixed with a dark-coloured flaky matter, which floats upon its surface; and at last, by a matter resembling coffee grounds or thin pitch. At this time, also, a great change takes place in the countenance, which assumes a putrid, dingy, and bloated appearance, which is most remarkable in those of a florid or sanguine complexion. A light yellow or lemon tinge appears under the eyes and ears, and soon spreads down the neck to the chest, and over the whole body. The vessels of the conjunctiva appear relaxed, and distended with blood. The vomitings continue, and the quantity of fluid ejected much exceeds that which has been drunk. They often return without being excited by ingesta; or even suddenly or unexpectedly, and when the patient has just before considered himself relieved from them. In the latter hours of the disease, they are attended by a peculiar loud and hollow noise, which is heard at a considerable distance. During this state, the patient is generally sensible to surrounding objects, and aware of his fate. He is restless, continually tossing about in his bed, with an expression of despondency in his countenance. He looks anxiously and inquiringly around for relief, but unable to express all his misery and his wants. At last, worn out with restlessness and fatigue, he sinks without a struggle.

9. iii. The *third form* of attack also commences with shivering or rigors, and is an aggravation of the symptoms of the second from the beginning. In this form, the face is more flushed, and the burning heat of skin is greater than in the preceding. The sickness at stomach, hiccough, and black-vomiting appear much earlier. The bowels are obstinately constipated, and resist strong purgatives; the motions being watery, of a dirty colour, and rarely feculent or bilious. Violent delirium often occurs early in the attack, and hæmorrhages frequently take place at an early period from the nose, mouth, eyes, ears, and even from all the outlets of mucous canals. The tongue is often clean, moist, livid, or red, and raw-like, or covered with dissolved blood. The action of the kidneys is suppressed, either little or no urine being secreted. The countenance changes to a livid and yellowish hue, with yellowness of the skin. In the most severe of these attacks the patients may be carried off on the second, but generally on the third day, sometimes in convulsions.

10. In plethoric persons and in the sanguine temperament, the attack is often most violent; and in addition to the symptoms just mentioned, the countenance appears bloated and heavy, with an unnatural expression, or wild and agitated. The heat of the surface, which was at first great and pungent, falls first in the extremities, and afterwards over the whole body, especially after the occurrence of black vomiting; and ultimately it sinks below the natural standard. The skin becomes compacted, losing its vascularity, and is insensible to the irritation of blisters. It is rarely dotted with petechiæ, but much oftener streaked with yellowish lines, particularly in the course of large blood-vessels, or is covered by patches of a bluish or leaden colour, especially in flaccid parts. The sense of internal distress increases as the febrile action subsides. Distension of the hypochondria, and explosions of flatus from the stomach, are frequent, with occasional obscure hiccuppings. Sometimes the vomitings are hardly complained of until the more febrile symptoms begin to abate, when they become unrestrainable: the matters ejected are then muddy or turbid, like unstrained coffee; occasionally they are of inky blackness, like the juice of the cuttle-fish. The evacuations by stool sometimes also present a black appearance at this stage. In the more severe states, the disease frequently terminates fatally within the fifth day. In the less severe cases, signs of an imperfect crisis sometimes ap-

pear about the seventh day; and improve to favourable indications; but occasionally they are arrested in their course, and superseded by an unfavourable train of symptoms, as hæmorrhages from the throat, gums, mouth, and sometimes from other outlets of mucous canals. The blood is dissolved, dark, incoagulable or grumous, particularly at a far advanced period of the disease.

11. iv. The *fourth form* of the pestilence seems a modification of the symptoms by temperament and habit of body, although the precise conditions of these cannot always be assigned, the phlegmatic, apparently, most frequently exhibiting it. In this, the symptoms are not so violent as in the third form, but they are equally fatal. It often commences insidiously, the patient complaining, for hours, or even longer, of nothing but languor or fatigue, which is followed by chilliness or rigor, with pains in the loins and calves of the legs. The headache is not very severe. The pulse is quick and small. The heat of skin is very little increased; but there are great anxiety and oppression at the præcordia, and an indifference to surrounding objects. The bowels are obstinately confined, and the secretion of urine is arrested. The tongue is often unnaturally clean, and of a clear shining vermilion colour. Hæmorrhage appears early from the nose, gums, or mouth, and is sometimes attended by petechiæ and vibices. There is little or no thirst, but great irritability of stomach, with hiccough and black vomiting, attended sometimes, as the distemper proceeds, especially towards the fatal close, by an involuntary discharge of the same appearance from the bowels. The peculiar change of countenance, with yellow skin, takes place as in the other states, and is frequently accompanied with a low muttering delirium. The temperature of the surface generally falls below the natural standard as the disease advances. Distress at stomach and intolerance of pressure over this region are generally present. The bowels are almost insensible to the action of purgatives, which either produce no effect, or only watery evacuations — sometimes cold, ropy, and black, as if mixed with powdered charcoal. As the distemper advances, the pulse sinks in frequency, becoming weak and small. In some instances it sinks below the natural frequentcy, and becomes irregular or intermittent. Death in this, as well as in the preceding state, may occur as early as the second day, especially when the brain is the prominent seat of morbid action; but it more frequently occurs on the third or fourth day, or not until the fifth, sixth, or seventh. A favourable change is remarked chiefly on the third, fifth, or seventh day.

12. v. The above are the chief states of the distemper commonly observed, modified, however, or the one passing into the other, according as constitution, concentration of the cause, and varying concurring circumstances aggravate the seizure. Certain anomalies may, however, occur; but modifications in the type are not observed. They are, however, noticed by some writers, and others, as Dr. Jackson, have described a form in which the symptoms are at first remittent, but become continued in the course of the malady. When treating of the more severe states of remittent fevers, especially as they occur within the tropics, and beyond the tropics in localities and seasons favouring the development of the more intense or malignant forms of remittent fever, I have shown, that the passage of that type into the continued, is extremely frequent, especially when vital organs become more and more implicated, and when the disease increases in prevalence, so as to assume an epidemic character, the fever, with this change of type, generally also presenting in the worst cases the chief features of the true hæmagastric pestilence, particularly yellow skin, and in rare cases even black grumous vomiting. (See art. Fever, Remittent, § 233, *et seq.*) These facts are admitted by the non-infectionists, and are indisputable. But it is not proved, that, with this change of type, and with the supervention of these features, the fever, which certainly was non-infectious as long as it was remittent, becomes infectious as soon as it becomes continued, unless a number of affected persons are so circumstanced, especially from crowding and imperfect ventilation, during very warm and humid states of the air, as to contaminate the surrounding atmosphere; and thereby either to superadd the additional cause of a morbid effluvium exhaled from the sick to existing marsh miasmata, or to generate a morbid poison or vapour, which is of itself capable, independently of marshy or other miasmata, of infecting the healthy, and of disseminating the distemper. It is almost impossible on some occasions, and certainly difficult in all, to ascertain, beyond the reach of controversy, whether the one contingency or the other obtains: still the observing physician will generally arrive at just conclusions on the subject, and act in such a manner as the great responsibilities reposed on him will justify.

13. That a superadded property, or at least a change of character, should result from the circumstances just alluded to, may be rationally inferred; for the aggravation of symptoms and the development of new features, in these altered circumstances, have frequently been observed, are undoubted, and are the chief sources of much of the differences of opinion and of the discussions which have appeared since the end of the last century on the subject of yellow fever; for, owing to them, and to causes sufficiently noticed above (§ 12.), these aggravated states of remittent fever, either passing into, or originally assuming more or less of a continued form, have been confounded with the true or infectious yellow fever — with the pestilence now under consideration. The circumstances, moreover, of the latter being developed only during those high ranges of temperature, and in those situations which render remittents thus malignant and prevalent, has increased the difficulty of distinguishing the one from the other, and has led several writers, who have observed the simultaneous prevalence of both maladies in the same locality — a circumstance by no means infrequent in the West Indies, and in some other countries — to describe both as varieties merely of one distemper, and to ascribe the properties possessed only by the one to the other also. As much ambiguity has arisen from this source, I will notice, more particularly than can be done when treating of the *diagnosis* of this pestilence, certain symptoms which require attention, as well as others which are only occasionally remarked. Such diversities or modifications of character evidently result from diversity of the predisposing and concurring causes, from the con-

centration of the infectious agent, or the dose of the animal poison conveyed in the atmosphere, and from the idiosyncrasy or constitution of the infected.

14. *Suddenness of attack* is one of the prominent characters of the malady; there seldom appearing any premonitory ailment, at least of such severity as to attract particular notice. In some cases, however, a feeling of fatigue or lassitude, with headach and costiveness, are complained of for a short time previously. *The pains* felt in the head, loins, limbs, and often also in the large joints, generally precede or accompany the chills, shiverings or rigors attending the seizure; and these are often very severe, but they appear to change their character, without being less distressing, as reaction takes place. *The seizure* usually occurs in the night or morning, but there are numerous exceptions to this period. The *pulse* during the cold or incipient stage varies. It is small, frequent, and irregular, during the incipient state of chillness or rigor, during which the temperature of the skin over the trunk is generally increased, although it is much lower in the extremities. The pulse becomes more frequent, sometimes very quick, as reaction is developed, but it is also broad, open, soft, or very compressible. As collapse supervenes, it is soft, weak, or irregular, ultimately becoming small, feeble, or suppressed. The pulse, however, in this stage of exhaustion varies much in different cases, owing to the loss of a considerable portion of the serum and hæmatosine of the blood by vomiting, and according to the amount of such loss, as well as to the impaired irritability of the heart. The *tongue* varies in its character as the disease advances, and often also at the commencement, as well at the close of the distemper, it presents different appearances in different cases. It is frequently at first furred or loaded in the middle or root, but moist and red or inflamed at the point and edges. It is in some moist, red, purplish, and clean; in others it presents a dry streak in the middle, and in many, and those the most unfavourable, it is of a vermilion-red or purplish-red colour, covered in a few instances with an exudation of fluid blood, either at an early, or at an advanced stage, according to the violence and danger of the attack. It often has a raw appearance, and is more or less swollen or flabby.

15. The *countenance* varies in appearance and expression with the progress of the distemper, and the age, habit of body, and temperament of the patient. At the commencement of the seizure, the face is usually pale, and the features somewhat sunk; but, as soon as the chills and rigors cease it becomes full, flushed, and turgid; the lips tumid and red; and the eyes protruded, prominent, bright, and inflamed, with exquisite pain at the bottom of the orbits, and in the forehead. As the disease advances, the countenance assumes a peculiar *pale lemon colour*, which, in the most unfavourable cases passes into a *livid, muddy, or putrid appearance*, which has been aptly likened by Sir W. Pym to that presented by the face in the childish diversion of snap-dragon. In thin, emaciated, and aged persons, the features become sunk, especially as the disease advances; but in others, unless when the quantity of dark fluid thrown off the stomach is very great, the face continues tumid to the last, particularly when the fatal progress of the malady is rapid. A sense of constriction is often felt in the *chest*, and anxiety at the præcordia; and towards the close there is a continued movement of the hand over the præcordia and chest. The *breathing* is often laboured, occasionally deep or suspirious, with a peculiar groaning or moaning; and the voice is frequently altered. A burning heat is usually felt at the epigastrium, and not infrequently in the course of the œsophagus. Every thing is rejected from the stomach, and the patient tosses his head and limbs about. *Stools* are always procured with great difficulty early in the distemper, and whilst reaction continues; but, after the deceitful calm, about to be noticed (§ 17.), they often become more free, and sometimes involuntary. They are always scanty at first, offensive, watery, and deficient in bile; but they frequently are black and watery, sometimes with small lighter-coloured flocculi in the last stage, and when black vomit has taken place. The *urine* is at first scanty and high-coloured; and in the worst cases it is entirely suppressed, none being secreted, owing either to a paralysed state of the kidneys, or to the quantity of serum lost by the blood, as in the pestilential cholera, by the frequent and copious discharges from the stomach. The patient generally feels severe pain in glans penis and urethra when the urine is suppressed, or passed only in a few drops. The *blood* is always more or less changed — most remarkably after the calm occurring on the third day. Even at the commencement and during reaction, it does not coagulate, or does so imperfectly and loosely, and is deficient in fibrine. It afterwards becomes still more loose and defective as to crasis, and ultimately very dark, partially dissolved, and grumous; and apparently insufficient in quantity, in many cases, to distend the veins. The *perspiration* and the *evacuations* are very offensive, and have a peculiar sickly odour, which thoroughly imbues woollen and cotton clothes, and the patient's bedding.

16. The *mental manifestations* are variously affected in different persons. In some, violent delirium occurs; in others, low delirium, occasional wanderings of the mind, or waking dreams, are remarked; in many, the mind is not materially affected throughout, unless inasmuch as the patient may be despondent, taciturn, depressed, or apathetic. An early conviction of a fatal issue, indifference to the result, and a calm apathetic resignation to his fate, are frequently observed without any further mental disturbance, the patient's intellects continuing unimpaired to the last. In some, the violent delirium present during an early period disappears, and the mind afterwards remains calm until death.

17. Slight *exacerbations* are sometimes remarked in the evening, and ameliorations in the morning; but these are rarely so considerable as to amount to remissions, the disease generally pursuing a continued course until the third or early in the fourth day, when a deceitful *calm* appears. The pulse then often falls to nearly its natural frequency, sometimes even below it; the eyes lose their brilliancy. The heat of skin also sinks, especially in the extremities, when it often falls below the natural standard. This calm usually continues all the fourth day, and the patient, feeling some returning craving for food, thinks himself

convalescent; but lemon-yellowish of the skin, sometimes delirium, mental depression or apathy, faintness upon being raised up, or upon being placed on the night-stool, vomitings, and hiccough often appear about the following evening or night; sinking of the pulse and temperature, especially in the extremities, black vomiting, suppression of urine and other fatal symptoms supervening more or less rapidly. In many cases the heat of surface sinks remarkably, and the extremities assume a livid appearance, the pulse being hardly felt in the limbs.

18. In the above description of this malady I have followed my own observation and recollection, aided by notes taken during my attendance upon cases which came before me within the tropics. Some of these cases occurred in a vessel in which I was a passenger; and in circumstances which strongly favoured a belief in an infectious source, as will hereafter be alluded to. The numerous descriptions of the disease which I have perused, vary somewhat, especially in certain subordinate particulars, most probably owing to the varying features of the distemper in several epidemics, and in different climates, localities, and constitutions. The chief difference, however, consists in the severity of attack, and the intensity of affection evinced by the blood and digestive organs. The most dangerous cases are not those in which the symptoms are most violent, in respect of vascular or nervous excitement; but those in which the vital powers are most depressed, the blood most changed, and the black vomit most early, copious, and frequent. (See §§ 9—11.) The differences between these and the slightest grade (§ 6.) are very great; the degree of fatality of the disease in America, West Indies, Spain, or Africa, depending upon circumstances about to be mentioned.

19. vi. Several of the writers on this distemper have divided it into certain *stages or periods.* These stages are often well marked; but, in many cases, they are hardly manifest. In the most violent seizures, the patient is suddenly struck, and the distemper proceeds rapidly without reaction, or nervous or vascular excitement, to vital and structural dissolution, with every indication of extreme vital depression, of vascular contamination, and of impaired or nearly lost irritability and cohesion of the tissues. When either the powers of the constitution are sufficient to resist the overwhelming influence of the pestilential poison, or the dose of this poison is weak relatively to the state of vital resistance, then vascular reaction takes place, with or without nervous excitement, and a division of the progress of the malady into stages or periods, according to the successive changes in the states of morbid action, may be made with justice. But writers are not agreed as to the precise division which should be adopted. Some recognise merely two stages, viz. that of *excitement*, and that of *collapse* or *exhaustion*. Others contend, and with much justice, that the stage of *invasion*, or that period which is characterised by chills, rigors, or an alternation of chills and heats, and which in a few cases is preceded by a sense of mal-aise, fatigue, and headache, for a shorter or longer period, should be viewed as a distinct period. I am of this opinion, and am confirmed in it from having had an opportunity of almost constantly observing, in several cases, the phenomena during this stage, and its frequent passage into the next, or that of excitement or reaction. Other authors have considered the delusive calm ushering in the period of vital exhaustion as a distinct stage; but it rather indicates the passage of reaction into collapse, the subsequent severity of the symptoms being merely the efforts made by the vital resistance of the constitution in endeavouring to overcome the morbid changes which oppress and ultimately overwhelm it.

20. It has just been remarked, that, when the infectious agent is very powerful relatively to the constitutional powers of the patient, the attack may then be so violent, and its subsequent course so malignant, as to deprive the vital energy of all power of reaction. In this case the *invasion* is sudden and severe, and is attended by general tremor, dread, terror, or despondency; the vital depression of this period passing into vital and even structural dissolution, with greater or less rapidity, and either with no attempts at reaction, or with weak and abortive efforts merely; the symptoms of the first period insensibly passing into those of the third. In those cases, which are much the most numerous—in which reaction or excitement occurs, and which are generally met with in the young, robust, plethoric, and in persons whose health has been previously good, the following division of the periods of the distemper, with their chief characters, may be made.

21. First Period — *or that of invasion*: *Charact.* — Chills, rigors, or shivering, or alternation of chills and heats; headache, with pains in the loins and limbs; fear and timidity; universal trembling; tremor of the tongue when held out, and inexpressible terror in the most severe or fatal attacks.

22. Second Period — *or that of vascular reaction and excitement.* — *Charact.* — Very frequent, full, broad, or bounding, but soft or very compressible pulse; a loaded and pasty tongue, with redness at the edges and point; caustic heat of surface; rending or throbbing headache, with red, suffused, protruding, and brilliant eyes; pain at the epigastrium and anxiety at the præcordia; racking pains in the loins and limbs; tossings and watchfulness; general redness, turgidity, and suffusion of the face; sometimes delirium; vomitings and thirst, obstinate costiveness, and scanty pale stools.

23. Third Period — *or that of vital exhaustion.* — *Charact.* — Often an amelioration of the above symptoms during the third or fourth day, followed by an increased frequency of vomiting; a lemon hue of the skin, with dirty, lurid, or livid patches as this stage advances, the matters ejected becoming in some instances black; distressing singultus; low or muttering delirium, or resignation or apathy to the result, or a desire of dissolution; quick, small, feeble pulse, which is sometimes at last irregular, intermitting, or slow; raw, red, livid, moist, or dry, and clean tongue; faintness, especially on moving; loss of temperature in the surface and extremities; irregular, laborious, deep, and moaning respiration, the expired air being raw and colder than natural; scanty or suppressed secretion of urine; small, black, watery, and involuntary stools; exudations of blood from the mouth, nostrils, anus, vagina, &c.; a peculiar offensive odour from the body and evacuations; the appearance of large livid or

discoloured patches, terminating in dissolution, with marked putridity, the body exhaling a tainted odour.

24. vii. The *duration* of these stages is various. The *first* is seldom longer than a few hours; but it may be hardly of an hour's duration, or so slight as not to attract particular attention. The *second* stage varies from two to three days — it is seldom longer, and it may be even shorter than the time named. It may be, as above noticed (§ 20.), altogether wanting, or imperfectly manifested. The duration of the *third* is still more indeterminate. It may be only a few hours, or it may be two or three days or even somewhat longer, it altogether depending upon the violence of the attack and the powers of the constitution. In slight or favourable cases, this stage may not be remarked, or merely a few of the milder symptoms may only be noticed. In the most severe or fatal cases, this stage follows closely upon the first, and is attended by most of the malignant symptoms just enumerated, as early as the second or third day; and in some epidemics by others, but occasionally only. The *whole duration* of the malady varies from three to eight or nine days, but in rare instances it has been protracted to ten or twelve days.

25. viii. The *sequelæ* ascribed to the distemper by some writers deserve notice, only to observe that I do not believe in their existence. The debility consequent upon the attack cannot be justly viewed as belonging to this category, more especially as convalescence is generally rapid and complete. The visceral congestions, obstructions, and enlargements mentioned as sequelæ of yellow fever by several authors rarely or never occur after the true hæmagastric distemper, although they are frequent after severe forms of remittent fever (see FEVER, §§ 237. *et seq.*), attended by yellowness of skin. They have been mentioned in connection with hæmagastric pestilence owing to the circumstance of it, and the worst cases of the seasoning fever of hot climates, and of remittent fever, having been confounded with each other by these writers. This circumstance also explains much of the imputed frequency of *relapse* in this pestilence; for the debility attending convalescence or recovery from it, renders the patient predisposed to be affected by the miasmata causing remittent fever; and hence, when hæmagastric fever prevails, as it usually does, in situations where remittent fever is endemic, and in seasons when it is most prevalent and malignant, recovery from the former malady is extremely likely to be followed by an attack of the latter; and, more than this, the one disease is very liable to be mistaken for the other.

26. II. APPEARANCES AFTER DEATH. These vary remarkably with the form and character of the malady. — *A. In the most malignant* and rapidly fatal cases, a lemon tint of the surface, with livid or dark blotches, is generally observed. The ears, fingers, penis, scrotum, and in some the hands and arms soon become of a dark or brownish hue. The *muscles* are softer and flabbier than natural, of a dirty or dusky hue, and are easily broken down by pressure. The substance of the *heart* is similarly changed. Softening or greater friability of the tissues soon after death is generally remarked, and is extended to all the organs and viscera. The *body* seldom appears to suffer any diminution of its bulk, as in other fevers; and when the fatal issue has been rapid, and the quantity of black matter vomited not very great, the several viscera are more or less congested, and the body seems even more tumid than natural, as well as discoloured; presenting a marked putrid or malignant aspect, and indicating a remarkably rapid loss of the vital cohesion of the several textures. In such cases as present any diminution of the bulk of the body, the muscles are paler, softer, and more flabby than usual; the viscera paler and softer, and even somewhat shrunk; and the bloodvessels contain very little blood. In these cases, a very large portion of the blood has been exuded from the digestive mucous surface, and been thrown off during life, in the form of black vomit, or of passive hæmorrhages from the alimentary and other canals.

27. The *liver* is changed chiefly as regards its cohesion and degree of congestion. It is almost always softer and more friable than natural; in some cases congested, in others pale, according to the quantity of blood evacuated during life, in the form of black vomit. Light olive-coloured patches are sometimes observed in it. The *gall-bladder* most frequently is shrunk, and contains little or no bile. The *spleen* and even the *pancreas* are somewhat softened; and the former frequently congested. The *œsophagus* and *stomach* present discoloured streaks or patches, of a dirty purple, dark, or livid colour, in their mucous surface, and the latter viscus often contains more or less of a similar fluid to that constituting the black vomit. In cases where the quantity of this fluid thrown off has been great, the stomach, intestines, and other viscera are paler, but also much softer than natural. The *small* and large *intestines* are often contracted in parts, and occasionally introsuscepted. In other respects they offer the same appearances as noticed in the stomach, but in a less degree. They often contain small quantities of fluid similar to that voided shortly before death; but this presents neither a bilious nor a fæcal character. The *epithelium* of the digestive mucous surface seems to be more or less detached in the several portions of the canal; and the mucous membrane is softened and readily separated from the adjoining tissue. The *follicular glands* are not prominently affected, further than being somewhat enlarged in some instances. In those cases which present congestion of the chief organs, as of the brain, lungs, auricles of the heart, liver and kidneys, slight serous effusion, sometimes sero-sanguineous, is occasionally also found in the *chief cavities*, particularly the pericardium and arachnoid, and but rarely in the peritoneal and pleural cavities. The *urinary bladder* is always empty and contracted.

28. *B. The more protracted cases of this pestilence* present changes depending much upon the symptoms during life, and most upon the continuance or amount of black vomit, and of black fluid discharged by stool. In many instances the appearances found agree in all respects with those above described. In others, the *liver* and *spleen* are remarkably congested and softened. In some, the liver is changed more or less in colour as well as softened. It is often of a pale olive hue, or it presents a mixture of yellow and green, and of dark green in streaks. AREJULA mentions a change of colour in the liver to a reddish brown.

But the other changes detected furnish no evidence of inflammatory action in this organ. Dr. GILLKREST notices a remarkably pale colour of the liver in females and children, and a marked absence of bile from the biliary ducts. The *gall-bladder*, however, frequently contains bile of a thick consistence and dark tar-like appearance. The *stomach* often contains the matter of the black vomit. Its mucous surface, as well as that of the *duodenum* and *œsophagus*, is frequently discoloured in patches, in a few instances paler than usual, and in all much softened. The epithelium of these parts is generally detached; and Dr. JACKSON remarks, that he has found the villous coat often abraded, loose, and partially separated. A black jelly-like substance is sometimes found in the *intestines*. Dr. GILLKREST states, that this substance is sometimes found in the jejunum, but oftener in the ileum, and that it is occasionally found in both the stomach and the ileum, the intervening jejunum not presenting a trace of it. He adds, that he has found this substance in these situations even in cases where no black vomit had existed before death. The glands of PEYER are generally unaffected. The villous surface of the *colon* and *cæcum* is generally softened, discoloured in parts, and covered by an adhesive black substance. Frequently on removing this substance the membrane underneath is seen paler than natural. In a few cases, the fluid contained in the bowels is of a reddish tint, and more nearly approaches the appearance of blood. The intestinal canal is often irregularly contracted in parts, more rarely with portions introsuscepted, and in some instances, in addition to the matters now mentioned, an albuminous dirty pale substance is found in the colon.

29. The states of the *heart* and *lungs* depend chiefly upon the quantity of blood exuded during the last stage in the form of dark vomit. When very much has been evacuated, but little change of these organs is observed beyond collapse and softening. In other cases more or less congestion is frequent, the blood being fluid, grumous, but not always very dark. False polypi are sometimes found in the cavities of the heart. Within the *cranium*, congestion is the most common change, but this is not constant. Occasionally slight opacity of the arachnoid, with slight serous effusion, and in rare instances, sero-sanguineous exudation, are remarked.

30. These are the chief alterations found in cases of true hæmagastric pestilence, when the examination has been made a few hours after death; but further changes take place, and are often confounded with the foregoing when the inspection has been delayed even some hours later. The disease is rarely observed, excepting in such high ranges of temperature as preclude delay in *post-mortem* examinations, if the changes which appertain to the disease are the objects of investigation. Doubtless, however, the circumstance of rapid dissolution of the structures after death, and the ascertainment of the parts which are the first to experience such rapid change, are matters of great moment in estimating correctly the nature of the malady; and so highly do I consider their importance, that I am desirous to direct more attention to them than they have hitherto received.

31. III. DIAGNOSIS.—From the description now given, it will be perceived that sporadic, occasional, or scattered cases of this distemper, and the earliest of those occurring when it assumes the form of a devastating pestilence, will often be recognised with great difficulty, and be liable to be mistaken for the more malignant cases of *remittent fever* (see Art. FEVER, §§ 233. *et seq.*); or even for the *inflammatory seasoning fever* (§§ 359. *et seq.*) to which Europeans are subject when they migrate to intertropical or warm climates. The difficulty is chiefly owing to the mildness of the symptoms in some instances, and to the circumstance of yellowness of the skin, and vomiting of a dark brown or black fluid being observed in many of those cases as well as in the true hæmagastric disease. The mild character of the symptoms in some persons, the disease appearing merely as an ephemeral fever, or in a form but little more severe, is analogous to what is observed in respect of other infectious maladies, which frequently assume a most malignant character, as small-pox, scarlet fever, &c.; nevertheless, the infectious effluvium proceeding from mild cases propagate the malady equally with that from the most virulent, and often give rise to the latter, whilst the latter frequently occasion cases of the former character; the violence of attack depending chiefly upon the predisposition of the individual affected.

32. There are certain phenomena which serve more especially to distinguish this pestilence from the malignant cases of fever with which it has frequently been confounded, and from which it is distinguished with great difficulty, especially in warm climates and localities, and in hot seasons. The former is more silent, insidious, yet rapid in its course; the latter more open and phlogistic. As soon as the body appears to be infected by the hæmagastric distemper, there are furnished indications of a greater or less shock sustained by its vitality, and of a marked contamination of the circulating fluids, and even of the soft solids; and these indications appear earlier and more decidedly in this distemper, than in the fevers for which it is liable to be mistaken. Jactitation, mental depression, apathy or delirium, appear much earlier, and in a more marked degree at the outset. The lemon-colour of the skin is also earlier; and such also is the case with the nausea and vomiting, which is more distressing than in those, and the quantity of fluid thrown off, at first and sometimes throughout colourless or nearly so, is much more considerable, without reference to what has been taken into the stomach. It is evident, that the fluid ejected is chiefly an exudation or secretion from the stomach, that its great amount must more or less diminish the serous portion of the blood; and that, in those cases which are attended by black vomit and discharges of blood from mucous canals, the diminution of, and other changes in, the blood, must be still more considerable. In these more especially the vomitings often occur without retchings or effort.

33. The character of the pulse is of importance; and in respect of it, the rapid rise in frequency soon after the attack; the soft and asthenic condition; the weakness, inequality, irregularity, and subsequently the slowness, the intermissions and smallness of it, are more or less remarkable. The red, suffused, state of the conjunctiva, with brilliancy of the eyes in the young and robust, but without this brilliancy in the aged, and at an ad-

vanced stage; the lurid redness or suffusion of the features, in the former class of subjects, and the depressed and anxious expression in all; the severe pain, deep in the orbits, and the drunken-like appearance of the eyes; the red, raw, clean and smooth, or bloody state of the tongue; the pain and soreness of the throat, pharynx, and along the œsophagus; the acrid burning sensation at the stomach, constriction in the chest, and anxiety and burning pain at the præcordia; the thick, compacted feeling furnished by the skin, the diminution of its sensibility at an advanced stage, and the dingy tint of it, with leaden or livid patches, at last; the singultus; the scanty secretion, or complete suppression of urine; the costiveness, absence of bile from and state of the stools; and the flaccid, leucophlegmatic, swollen, and pallid appearance of the soft solids, without very evident emaciation in most instances, but with an appearance of morbid plumpness, or turgidity in the more malignant and rapidly fatal cases, serve further to distinguish the malady.

34. Vibices and livid patches are characteristic both of the pestilence itself, and of the advanced and fatal period of it; and depend upon the alteration that has taken place in the constitution of the blood, as well as in the vitality of the capillary vessels, both venous and arterial. The delirium is generally different from that observed in the worst forms of remittent fever. It is characterised by a peculiar imbecility, fatuity, and apathy, and by faultering of the voice, or stammering. Furious or violent delirium rarely occurs unless in the early stage of febrile excitement. The pupils of the eyes are usually dilated, especially during an advanced period of the malady, and frequently even at an early stage, when the conjunctiva and countenance are suffused and injected — a state of the pupils which is not observed in yellow remittent fever. The pains in the legs are also different from that complained of in other fevers; and are generally felt where the gastrocnemii and soleus muscles unite to form the tendo Achilles.

35. The yellowness of the skin, in the hæmagastric pestilence, is either a pale yellow or a dingy tint, often presenting patches of a dirty yellow or livid hue: in the *yellow remittent fever* the colour is more complete and deep than in the former, and more manifestly the result of biliary disturbance; whilst the discoloration of the pestilential malady arises from vital exhaustion, manifested chiefly in the capillaries and in the blood itself. M. GUYON very justly remarks that, in the latter, the colouring of the skin is owing to the presence of blood which stagnates in the capillaries, or which escapes from them, and is nothing else than the tinge of a contusion; whilst, in the remittent fever, the colour is owing to the presence of bile, and is that of true icterus. This alteration of the blood and of the vital condition of the capillaries is evidently the source of the black vomit, and of the dark colour of the evacuations, in the last stage. The singular spasmodic force with which the fluid is often ejected from the stomach; the presence of hiccup when the dark matter is less copiously thrown off; the peculiar dark stain which this matter imparts to linen, and which is not easily removed; the raw and unpleasant odour, which, as Dr. W. BARRY remarks, "is so peculiar, that, on entering the chamber, the state of affairs becomes immediately manifest," serve further to distinguish the malady. The early appearance of a dingy yellowness on the neck and chest, and the state of the patient's mind, even when there is no delirium, are also worth remarking. The sufferer is generally either unconscious, or quite indifferent to his hopeless condition, and expresses himself as being much better, until vitality, receding from the extremities and external surface, ceases altogether in the central organs. During the last flickerings of the expiring flame, there are often observed incoherent expressions, violent straining of the eye-balls, and convulsive motions, rapidly passing into dissolution.

36. About the end of the second day, or during the third day, the patient begins to complain of a violent pain in the testes, with contractions of the spermatic chord towards the abdominal ring. On examination, the testes feel much diminished in size, are drawn towards the abdomen, and the scrotum is flaccid and empty. The surface of the scrotum soon after becomes very painful, and an excoriation takes place on the surface, chiefly of the most depending part, from which much offensive puriform matter issues. At the same time a similar discharge often takes place from the urethra, which ceases as the symptoms become favourable, but which becomes bloody, ichorous, and insufferably fœtid, when dissolution ensues. The most violent attacks are generally attended, in the last stage, by an offensive and ichorous discharge from both the scrotum and the penis, these parts frequently becoming more or less sphacelated and gangrenous shortly before death.

37. *A.* Besides the *diagnosis* depending upon the presence of certain symptoms, characterising the hæmagastric pestilence, which are not observed in the worst forms of *remittent fever*, the origin and course of the former, compared with those of the latter, malady should not be overlooked. Malignant or bilious remittent fevers, even in their most intense grades, proceed entirely from malaria, or emanations from endemic sources of disease of a more or less concentrated kind (see ENDEMIC INFLUENCES), and present more or less ma[illegible] *remissions*. In many of the situations furnishing these emanations, dead animal matter, as well as dead vegetable matter, aided by a deep, rich absorbent soil and great humidity, performs an important part. Still the resulting malady does not produce a specific effluvium, capable of itself to propagate a similar disease, at least in ordinary circumstances; and if ever such a phenomenon occurs, it can take place only under peculiar circumstances, which furnish a new and superadded cause, as shown above (§ 12, 13.), this cause giving rise to a very different malady from that which arose from endemic causes, however concentrated or intense.

38. On the other hand, the hæmagastric pestilence appears independently of endemic or terrestrial sources or malaria, and proceeds from an infectious or contagious poison, which, however formed *originally* (see hereafter, § 139, *et seq.*), infects the healthy by contaminating the air immediately surrounding those already affected; or which, being absorbed and retained by other bodies (as shown in the article INFECTION, §16, 17.), is afterwards given out from them on exposure to the air, thereby contaminating and infecting the air and adjoining objects.

39. The *course* also of hæmagastric pestilence is generally different from that of yellow remittent fevers. The former malady is not only much more sudden in its seizure, but also more insidious, silent, *continued*, and rapid in its course, than the latter. The one, even in its most intense grades, as I have observed them in Africa, where they are most malignant, very rarely ending fatally before the 8th, 9th, or 10th day; the other generally terminating life before the first of those days, and frequently as early as the second day. Mr. Fraser, whose experience of this pestilence in Gibraltar was frequent and extensive, observes that a variety of very striking symptoms, rarely seen in the fevers of the country — such as tremors and nervous agitations; singultus; extraordinary mental aberrations; an unexampled range of hæmorrhages; affection of the urinary evacuation, vomiting becoming seemingly vicarious of urinary discharge; a peculiar odour perceptible on approaching the sick, this odour being presumed to occasion the infection of the healthy; quick and perfect recoveries from violent attacks, with little or no risk of relapse, or of consequent visceral diseases, — sufficiently distinguish this malady from all others. He further adds, that the seizure of this malady is characterised by peculiar dejection of countenance, pain in the orbits, often attended by a peculiar delirium, similar to the effects of narcotics, or of poison on the nervous system, causing algor, tremor, anxiety, sighing, singultus, and sudden death. The course of it, he says, resembles that of the exanthemata, viz. a synochal stage of sixty hours, suddenly terminating in apyrexia, or running into malignant or putrid symptoms, unattended by remissions, but with vespertinal exacerbations, and with a fallacious calm, similar to that which marks mortification, and closing generally, in fatal cases, before the seventh day; recovery protecting from a second attack. Whilst, on the contrary, *endemic* or *yellow remittent fever* is a disease of high arterial action (in the Mediterranean), with that turgescence of countenance which usually attends pneumonia, with a general sense of fulness in the encephalon, and throbbing of the temple, but with little delirium; is much more prolonged in its course, and accompanied with heat of surface, and often with bilious yellowness; sometimes terminates in intermittent fever, or in visceral disease; is very prone to relapse, and second attacks are common. (See art. Fever, § 225, *et seq.*)

40. It is not only upon the characteristic symptoms, *continued type*, and course of this pestilence, compared with those of remittent fevers, that the diagnosis is to be based, but also upon the cause, origin, and propagation of it, — upon its infectious nature — *infectious* in the sense which I have attached to the term (see art. Infection, § 13, 16.), or contagious, without direct or immediate contact between affected and healthy persons; a property admitted not to exist in respect of remittent fevers, even of the worst forms. This subject, however, as it involves the most important considerations, and as having called forth the most virulent and ungenerous discussions, will receive a fuller consideration in its more appropriate place.

41. *B.* Hæmagastric pestilence differs from the *plague*, in being attended by more violent febrile excitement; in the absence of carbuncles and buboes, the lymphatic glands being enlarged only in the most intense and fatal cases, and in few instances only; and in the occurrence of the black vomit, which is very rarely observed in the latter pestilence. Undue importance has been attached to the circumstance of the former appearing during a high degree of temperature, which would put a stop to plague; for, although hæmagastric pestilence generally requires a high range of heat, still it will often continue to prevail, after it has become epidemic, during very temperate states of the atmosphere. Doubtless, however, the plague will continue to prevail during low ranges of temperature — ranges which will altogether arrest the progress of the hæmagastric pestilence.

42. *C.* The milder cases of this malady are distinguished with great difficulty from *common continued fever;* for some of these not infrequently assume the form of ephemeral fever, or of simple inflammatory fever; others, that of bilious or gastric fever; others, that of the seasoning or ardent fever of Europeans recently arrived in warm climates; some resemble adynamic fever, and others true typhus. The predominant affection of a particular organ; the more sthenically inflammatory character of all the symptoms, especially of the pulse; the more diffused pain in the head and forehead; the states o the eyes, of the evacuations, and of the skin, attending *inflammatory fever*, will readily distinguish it from this pestilence. When this fever occur in Europeans lately arrived in a warm climate, o assumes a more intense form, or that of *seasoning fever*, the diagnosis may be much more difficult especially when, as is not infrequently the case much biliary derangement and gastric irritabilit are present. In these cases the conjunctiva an skin may become yellow; and blood may be exuded in some instances from the digestive mucou surface, and impart a black grumous character t matters ejected from the stomach, or evacuate from the bowels. Here the diagnosis is difficul particularly when such cases occur only occasionally. Still, the close observation of even a fe cases will enable the physician to recognise th character of the disease, which is always precede by distinct præmonitory symptoms, is inflammatory at the commencement, and is attended by free discharge of bile — phenomena which are n met with in this pestilence. Seasoning fever i moreover, of longer duration than this malady and in many localities, or during or subsequent the rainy season, generally presents more or les or lapses into, a remittent type, and is often fo lowed by visceral disease — occurrences which n not met with in the hæmagastric malady.

43. *D.* Hæmagastric fever can hardly be co founded with *typhus* or *typhoid fevers*, for th prominent symptoms, the course and duration each, are altogether different. Dr. Bancrof whose writings on this pestilence, and on the caus of pestilential diseases, have misled the inexpe enced, and long mystified many, has stated t circumstances in which the former differs from t latter; but his statement (see p. 51. of his wor betrays a remarkable ignorance both of true y low fever and of typhus. Indeed I doubt mu his having seen a case of true hæmagastric fev when he published his Gulstonian Lectures, d livered at the College of Physicians in 1805, a which constitutes the substance of his work

yellow fever; or, if he had seen any case of this pestilence, he must have confounded them with the more malignant cases of remittent fever, as his remarks on the diagnosis, and much of his description of the former, are much more applicable to the latter than to it: indeed, throughout his work he evidently confounds the hæmagastric malady with malignant remittent fever, and considers them identical diseases; for he no where attempts to distinguish between them; and he merely points out, in a manner the most imperfect, certain points of difference between yellow fever, plague, and typhus; but in a way altogether worthy of the Coryphæus of the non-infectionists.

44. The symptoms which have been above enumerated (§ 7, *et seq.*) solely appertains to this pestilence, and so certainly indicates it, that, should a patient present them in a country liable to be afflicted with it, or in an European sea-port, holding intercourse with parts in which it is epidemic, during warm or temperate seasons, we may be assured that a case of it has occurred; and this assurance should give rise to measures hereafter to be indicated. If the case be a solitary one, or if only a very few such occur — and if isolation and other early precautions be taken, this may be the result — the fact may be disputed in the special-pleading mode in which the subject has been recently discussed; and the more especially if the patients recover, or if no examination of the bodies of those who have died has been made; for in these the black vomit and several of the other pathognomonic symptoms may have been wanting. The circumstance of the disease, particularly when epidemic, frequently assuming a mild form, should not be overlooked; for amongst a certain number of cases at the outbreak of the pestilence, a small proportion may only present the black vomit, several of the rest appearing only as a simple ephemeral fever. As M. LOUIS has well observed, in respect of the Gibraltar epidemic of 1828, although some of the symptoms of other diseases are similar to those of yellow fever, the symptoms taken together, and their progress, are very different.

45. In *typhoid fevers* vomitings are rare, whilst in this malady they are very common, frequent, and urgent; and, in the worst cases, they are peculiar (§ 8.). Diarrhœa, more or less abundant, occurs in a large proportion of the cases of typhoid fever, and often also at the commencement of the disease; whilst an opposite condition of the bowels is observed in true yellow fever. The stools are also very different, both in colour and character, and are never so dark or blackish as in the latter malady. The form of the abdomen is natural in hæmagastric fever; there is usually more or less meteorismus in typhoid fevers. In true typhus there is a peculiar eruption on the surface of the body, a characteristic delirium, and other febrile symptoms, and extreme prostration, not observed in the other malady. Whilst typhus and typhoid fevers are slow in their course, the hæmagastric pestilence is rapid.

46. *E. Gastritis* may, in some circumstances, especially in warm climates, or when associated with hepatitis, be mistaken for hæmagastric fever. In both diseases there are more or less frequent vomitings, attended by burning epigastric pains, anxiety, &c.; but the duration of gastritis is generally longer than that of this fever, and the anxiety is less. The yellowness of the skin is absent, unless when gastritis is complicated with hepatitis or with disease of the biliary ducts; and when such is the case, the yellowness is a true jaundice, and not that of this pestilence. Besides, the intense pain of the orbits, the appearance of the eyes, the blackish stools, the suppression of urine, and, in fatal cases, the black vomit of this latter malady, are not present in the former.

47. *F.* In *hepatitis* there is yellowness of the surface, but with these are also more or less severe pains in the right hypochondrium, and an increase in the volume of the liver, as may be readily ascertained by examination of the trunk, and by percussion; no such increase taking place in this pestilence. Then the severe pain in the orbits and the injection of the eyes at the commencement, the anxiety and the several nervous symptoms, so constant in this latter, are not observed, whilst the course of it is so much more rapid than that of hepatitis.

48. *G.* In fatal cases, the *post mortem* examinations generally will decide the question as to the existence of the hæmagastric malady; for in them the presence of the peculiar black matter in the stomach or intestinal canal, or in both; the absence of material alteration of PEYER's or BRUNNER's glands; and the usually *yellow colour* of the liver, independently of other very manifest organic changes, are especially characteristic of this malady. M. LOUIS observes, "that if the liver be found of a more or less pale yellow, its cohesion and consistence natural or increased, all doubts as to the disease should be removed." But the consistence of the liver is not infrequently diminished, and the colour of the liver is rather that of rhubarb than a pale yellow, and is often such as described above (§ 27, 28.). The pale yellow colour of the liver, considered so diagnostic of this pestilence by M. LOUIS, was also insisted upon in the very excellent work of MM. FRANCOIS, BALLY, and PARISET on this malady, as they observed it in Barcelona in 1821; but, in the numerous dissections they made during that epidemic — one of the most prevalent and destructive on record — they particularly notice the rhubarb colour of this organ.

49. IV. PROGNOSIS. — It is only from a very close and attentive scrutiny of the several symptoms individually, and of their combination, as constituting the general state of the patient, that a correct opinion can be formed of the event in this malady. — *A.* The expression and appearance of the eyes, the general aspect of the countenance, the torpor of the system, the depression of the spirits, and the imbecile state of the mind, described under the last stage of the malady (§ 16.), afford the worst, and the reverse of these symptoms the most favourable, prognosis. Tremors of the hands and lips; restlessness; violent spasmodic contractions of the legs or arms; aphthæ, resembling curd, on the tongue or gums; dark spots or specks around the mouth or on the upper lip; hæmorrhages from the nostrils, mouth, anus, urethra or vagina, or from the eyes, ears, or pores of the skin, especially when the blood is dark, decomposed, or ichorous, or has an offensive odour, and the parts from which it proceeds have a raw or a sphacelated appearance; and sphacelation of the scrotum or penis, — are fatal symptoms.

50. Pain in the fauces and throat, descending

in the course of the œsophagus, with redness of the tongue and pharynx; a burning pain in the region of the heart, especially when attended by great agitation, or by an expression of despair in the countenance; a change of voice, from the usual manly sound, to a weak treble, or to a tone much weaker, softer, lower, and shriller than the natural one, the words being drawled out in a strange whining manner, particularly when this change of voice occurs early in the disease; very scanty, offensive, and discoloured urine, or its dark, greenish, blackish hue, or its suppression, or its passage in drops with severe pain above the pubis and in the urethra, with retraction of the penis; petechiæ, vibices, livid spots and patches on the surface; enlargement of the glands of the groins, armpits, and angles of the jaws; vomiting of black, grumous, or flaky fluids,— are, even when existing singly, most dangerous symptoms; but when several of them are present, they preclude hopes of recovery.

51. When the disease appears with early symptoms of malignancy; — when the pain in the head is intense, and confined chiefly to the lower part of the forehead, the orbits, and eye-balls; the conjunctiva being red, and the face deeply flushed; — when a violent or a melancholic or despondent delirium occurs early, or a fixed opinion that death will ensue is entertained; — when the pulse is full, very soft, and very rapid; or irregular, unequal, intermittent, or at least slower than natural, small, and weak; — when the skin is very harsh and hot at the commencement, and cold at an advanced period, the patient complaining of burning internal heat; — when the tongue is red, smooth, flabby, or covered by a sanguineous exudation; — when yellowness or a mottled state of the skin, patches of discoloration, and black vomit appear, and especially if either or all supervene early in the disease; — when exudations of uncoagulable blood take place from the mouth or other outlets of the body, or the quantity of black fluid thrown up is great; — when singultus is attended by extreme anguish and restlessness, or with muttering, moaning, or with a weak, sharp, or wild unnatural tone of voice; — when the urine is suppressed, or the evacuations are black, grumous, or watery; — when the extremities become livid, cold, or mottled, and the patient lies on his back; — then, whether these symptoms appear either singly or combined, recovery very rarely takes place; and never when the lips are cherry-red, and tumid; the eye ghastly, or glistening; the skin damp, flabby, torpid, and presenting streaks or patches of a livid, greenish, or violet colour, and when a nauseous odour issues from the body. Recovery is also never observed after violent hiccup occurring late in the distemper, especially if it be attended by discharges from the stomach without effort, or with loud flatulent eructations.

52. *B.* On the other hand, hopes of recovery may be entertained when the distemper is mild at its outset, or during the first three days; but, even in some such cases, the malady proceeds so insidiously as suddenly to present many of the most unfavourable symptoms on the fourth or fifth day, more especially yellowness of the skin, black vomit, suppression of urine, &c. The longer the stage of excitement continues, provided that the symptoms do not increase in severity, the event is the more likely to be favourable; and this may be expected with more reason when an agreeable, warm, and general diaphoresis breaks out; when the irritability of the stomach ceases; when the eyes become more lively or natural, the discharges more healthy, and the urine more abundant. On the contrary, when the stage of excitement quickly or abruptly passes into the state of apyrexia preceding the stage of vital exhaustion, the worst form of this last stage, with delirium, coma, and the several signs of malignancy above enumerated (§ 23.), may be expected. If unfavourable symptoms do not appear before the fifth or sixth day, very reasonable hopes of recovery may be entertained. Mr. Fraser, whose experience of this pestilence has been most extensive, states that he "never had reason to be apprehensive of the issue after the sixth day, unless fatal symptoms had already set in."

53. If epistaxis occur early, or during the stage of excitement, and be moderate, and attended by amelioration of the cerebral or other symptoms; — if the pulse is neither very rapid, nor very weak, nor very soft, during the second day; — if the skin remain at an early stage soft, and without the caustic heat above mentioned; — if a miliary eruption break out; — if a quiet sleep take place, uninterrupted by vomiting; — if the patient lie on the side, and draws the clothes around him; — if the urine be voided in some quantity, and without pain in the urethra or glans; — if the evacuations become more copious, feculent, or bilious; — if the tongue, from being dry, turn to moist, hopes of recovery may be entertained; yet a guarded prognosis should nevertheless be given.

54. *C.* Dr. James Clark, one of the earliest and most experienced writers on this malady, observes, that if the yellowness appeared in 24 hours or 36 hours after the first attack; if the case had been left to nature, or the patient had been bled, and no powerful remedies attempted, recovery never took place. The sooner the febrile stage ended, he adds, when the case was left to nature or only simple remedies were used, the greater the danger; and, on the contrary, the sooner the fever was subdued by powerful remedies, acting in an evident and decisive manner, the greater chance the patient had to recover. If the debility was not great after the febrile stage, and the yellowness did not appear before the fourth or fifth day, the sick generally recovered. Many also recovered after the yellowness, and even afte bleeding at the nose; but, in all his practice, he recollected only four patients who recovered afte black vomit had appeared (p. 18.). Of the case which I had an opportunity of treating many years ago, one only recovered after this symptom had fully and unequivocally manifested itself. I should, however, be remarked, that vomiting of a dark grumous fluid, occurring with or after yellowness of the skin, not infrequently occurs in the last stage of malignant bilious or remitten fever (see Fever, § 233, *et seq.*); and that recovery occasionally takes place in that fever, even afte these symptoms have appeared. But the case is very different in the true hæmagastric pestilence Most of the instances of recovery which we hea of from the black vomit, are recoveries from thes states of yellow or remittent fever, which hav been confounded with this pestilence.

55. Dr. Chisholm states that the critical pe

riods or days are more distinctly marked in this malady than in any other observed in warm climates. The cessation of the disease, and the death of the patient, he remarks, always happened on the odd days; but the change in the state of the symptoms which preceded either event took place on the even days. Thus, if the patient was worse on the evening of the second day, he would die on the third; if worse on the fourth, he would die on the fifth; and so on as far as the fourteenth day. In the same manner, if the patient was better on the second, fourth, or sixth day, the resolution of the disease would happen on the following days.

56. *Pregnant females* always experience abortion, which is attended by excessive hæmorrhage, when attacked by this pestilence, and very seldom recover; and when women are seized by it during the first fortnight after delivery, recovery rarely or never takes place. Dr. JAMES CLARK states that, during the epidemic in Dominica of 1793 and 94, children, adults, and old people, labouring under small-pox, were generally attacked by this pestilence "about the time that the secondary fever usually comes on; and that none recovered but those who had begun to take bark and wine after the eruptive fever, and continued this remedy and a nourishing diet for some time after. It made no matter whether the small-pox were of the confluent or distinct benign kind. All fell victims to this disease who were not treated in the manner just mentioned."

57. V. MORTALITY. — But little can be stated respecting either the numbers attacked in a locality where this pestilence prevails, relatively to the amount of population, or the proportion of deaths to recoveries. It is obvious that, as regards the extent of diffusion of the distemper among the community, much will depend upon the means resorted to of guarding against it. As respects the epidemics which have occurred in Europe, and in some other places, the greatest fatality has been remarked among the early cases, or when the spread of the disease is reaching, or has reached, the utmost limit. Towards the decline of the epidemic, the proportion of recoveries increases; and this may be owing either to the less predisposition of the affected; to the depression of the temperature about the close of an epidemic; to the most susceptible, the most timid, and most exposed to the exciting and concurrent causes, having been the earliest attacked; or to the joint operation of these circumstances. Much, however, will depend upon the ventilation, cleanliness, and measures of prevention adopted; and more especially upon the avoiding of all those causes which tend to contaminate the surrounding atmosphere, and even of those articles which the foul air may imbue.

58. Dr. ROCHEAUX states that, at Barcelona, during the early part of the epidemic there, in 1821, the mortality amounted to 19 out of 20 attacked; but it diminished to much less; and at the close of the epidemic was two-thirds. Dr. KILLKREST remarks that, at Gibraltar, in 1828, very few recoveries occurred among the earlier cases in the Civil Hospital. "Of the first 35 Jews received into the establishment," but one recovered. The unusual rate of mortality among this people may partly be referred to their very general (constitutional?) despondency, when attacked by dangerous or epidemic maladies. In this epidemic at Gibraltar, one half the cases died in several of the military corps. It is stated by the physician just quoted, that, of the first 134 cases treated in Murcia in 1804, not more than three or four recovered.

59. The greater malignity, and consequently the greater fatality, of the cases, have been observed not only at the commencement, but also at a far advanced period, of some epidemics; as if the violence of the distemper had received a fresh impulse. Dr. TOWNSEND states this to have obtained in New York in 1822, the proportion of deaths to the affected being, as late as October, as three to four. On the other hand, a milder form of the malady has been more frequently observed in some epidemics and localities than in others. This circumstance may be partly attributed to the intensity and concurrence of those causes which predispose to, and determine or aid the more efficient and specific cause of the distemper, especially of a warm, confined, stagnant, and humid atmosphere; want of ventilation and of cleanliness; crowded sleeping apartments, &c. (§ 71.); dread of the disease; the season, temperature, and situation. Much, however, of the different degrees of malignity said to exist in different epidemics, and in different climates and places, may be imputed to the circumstance of the malignant states of remittent fevers on the one hand, and the inflammatory remittent and continued fever on the other, being often confounded, by some writers, with hæmagastric pestilence, when either of the former has become remarkably prevalent, and has been attended, as they sometimes are, by yellowness of the skin.

60. Some of the epidemics of yellow fever said to have occurred in the West India Islands, and in parts of the American continent, have been much milder than the visitations of this pestilence have been in Spain, during the early part of the present century. But it is by no means fully ascertained whether all the epidemics observed in the western hemisphere were actually the true yellow or hæmagastric fever, or merely an unusual prevalence of endemic or remittent fever, rendered more continued by intensity of attack, predisposition of the affected, and other circumstances. No doubt several of these epidemics were the pestilence under consideration. Their symptoms, remarkable prevalence, and fatality proved that some of them were this distemper; but others were of a different nature; and probably some of them resulted from the crowding of a number of human beings in a confined space, either in barracks, or in transports, or between the lower decks of ships of war, in a high range of temperature, and without sufficient renewal of the air. Numerous instances of malignant and even of pestilential fever of an infectious nature have occurred in this manner, and have been recorded by writers, and some of them have been noticed in the articles on EPIDEMICS.

61. Still the degree of mortality has varied much in most of the visitations of this pestilence which have been observed during the last half century, and must be attributed to the concurrence of several causes, especially to the predisposition of the attacked, the season and locality, to crowding of the population and of the sick, and to the amount of ventilation both before and after the seizure. The extent to which treatment may in-

fluence the proportion of deaths can hardly be estimated; and yet it doubtless, also, has very considerable effect. A recourse to "heroic remedies," in the language of some contemporary foreign writers, is certainly not attended with marked success; but much depends upon the nature of such remedies. For many years past medical practice was considered excellent in proportion to its activity, or, more justly speaking, to its violence; copious blood-lettings, large and frequent doses of calomel, &c., constituting sound and judicious, as it was no doubt active, practice in the eyes of the inexperienced.

62. All that can be said, as to the rate of mortality in various epidemics and visitations of this pestilence, as far as the data have been furnished, may be stated as follows: —1st. Where the infection has been introduced amongst the natives of temperate countries, either removed to a warm climate, or during a very warm season, and especially if the population thus predisposed be dense, or living in a close, crowded, and ill-ventilated locality, and if the air be very humid as well as very warm, and much more so if it be stagnant or imperfectly renewed, the distemper has been not only the more violent, more rapid in its progress and more fatal, but it also has been more rapidly spread. Thus the results have been most disastrous in towns where these circumstances have existed; and in ships of war and in transports, particularly after storms or states of weather which induced the closure of gun-ports and hatches, thereby preventing the renewal of the air, and favouring the development of concomitant causes. The spread of the distemper has been the more general or almost universal, and the proportion of fatal results has been the greater, the more the above circumstances have predominated, the more completely ventilation, segregation, and cleanliness were neglected, or imperfectly attained; and the greater the panic or dread of the distemper.

63. 2d. When the distemper has appeared in a population, of which a greater or less proportion has been formerly attacked, or has resided long in a warm climate, or consists of dark skined races, although such residence and race by no means confer immunity, as proved on many occasions;—also when it has appeared in more temperate countries, at a time when the cold season is fast approaching, and where due ventilation, segregation, and other due precautionary measures have been taken, and confidence has been secured, it is much more limited in its diffusion, milder in its character, and less fatal. Thus removal to a more open and elevated locality, the strict quarantine of the infected, free ventilation, a lower range of temperature, and a cooling regimen, have severally tended both to limit the extension of the malady, and to diminish the proportion of fatal cases; whilst opposite circumstances have invariably increased both the one and the other.

64. VI. Causes. — Although this distemper is owing to a certain specific cause — and the existence of this cause will be demonstrated in the sequel — still the infection of the previously healthy will be favoured by other causes, which either *predispose* the system to the invasion of the specific cause, or *determine* or aid the development of this cause, if the system have previously been exposed to it. Thus, the same influence may either *predispose* the frame to the reception of the infection, or *determine* the development of the malady, the infection having been received, but not manifested.

65. *A.* Of these causes or influences, which are rather *predisposing* than determining, the most important are age, sex, constitutional peculiarities, mental emotions, temperature, seasons, &c. The influence of these is apparent not merely in certain epidemics, but more or less in all, whether occurring within the tropics, or appearing in temperate countries. Certain of these predisposing and determining causes are *intrinsic*, or appertain to the individual; others are *extrinsic*, and implicate more or less whole communities.

66. *a. Age* has a considerable *predisposing* influence in this as well as in several other epidemic distempers. Adult age presents a greater degree of susceptibility to infection than either childhood or old age; and this is manifested both at the commencement and during the height of an epidemic. Towards the conclusion of very general and devastating epidemics, a larger proportion of children and aged persons is observed to be attacked than at an earlier period of the epidemic: but this is owing, as in the epidemic of Barcelona in 1821, to the circumstance of the increased proportion of these classes remaining unattacked, or liable to be infected towards the close of the epidemic; nearly all those of adult and middle ages having caught the distemper. The more rapid and general infection of adults, and those at the prime of life, is probably in part owing to their greater exposure to the existing cause of the distemper; nevertheless, more or less of increased susceptibility of infection appears to exist during these epochs of existence, than in any other. A similar circumstance obtains in other infectious fevers, and shows that the primary impression of the exciting cause is made upon the organic nervous system; for if this cause acted directly on the blood, the aged and debilitated, the susceptible the non-susceptible, the protected and the unprotected, would be equally liable to the contamination. Nevertheless, when the infectious effluvium is concentrated, or the exposure to it is more than usual, both children and old persons are attacked, and some infants at the breast do not escape.

67. *b. Sex.* — The frequency of seizure in the two sexes differs much in different epidemics, owing very probably to the varying degrees of exposure of each to the exciting cause. In the epidemic of Barcelona, females were as frequently infected as males, but a greater proportion of the former recovered. Much will necessarily depend upon the state of society in the place where the distemper prevails; but in most epidemics, a less prevalence, as well as less fatality, is remarked amongst females, as well as among children, than in adult males. This is probably owing in part to the state of the female constitution during the period of uterine activity.

68. *c. Constitution, habit of body, and race.* — It has been remarked in almost every epidemic that persons of a robust constitution, those of a rigid fibre, the plethoric, and sanguine temperament were the most frequently attacked, and had the disease in the severest form. However, when the pestilence became general in any locality, it has spared no constitution nor habit of body, excepting that which had previously been attacked. The greater immunity of the *negro race* has been often

remarked, but with insufficient precision. Individuals of this race have, however, not infrequently been attacked, both in the West Indies, Africa, and in America; but the distemper in them has assumed a milder character (§ 6.).

69. *d. The depressing passions*, more especially fear of the disease the loss of relations, anxiety, disappointment, &c., all tend remarkably to predispose the system to the operation of the exciting cause. Irregular modes of living; excesses of any description; prolonged abstinence; fatigue, of body or mind, and want of the requisite repose, exert a similar influence, although not so remarkably as the depressing emotions of the mind, and, with these, act both as predisposing and determining causes.

70. *e. Pre-existing disease*, and general feebleness of constitution, or debility in any form, certainly have no influence in predisposing to an attack, but rather prevent it. MM. BALLY, FRANCOIS, and PARISET, state that this was very obvious in the epidemic of Barcelona; and that in their numerous inspections of bodies dead of the distemper, old visceral or pulmonary disease was very rare. They however remark, that syphilis did not protect from an attack; and that setons and issues appeared not to possess a prophylactic influence. They found that a few of the patients in the portion of the general hospital set apart for the insane were attacked, showing that insanity did not prevent the seizure of this pestilence. The chief of the *intrinsic* influences now mentioned, which seem to act also as determining causes, or which appear to aid the operation of the specific cause on the frame subsequently to exposure to this cause, are, the depressing emotions of the mind, excesses of any description, want of the natural repose, fatigue, and prolonged abstinence.

71. *B. Of the extrinsic influences or agents*, which tend not merely to predispose the system to the action of the specific cause of hæmagastric pestilence, but also to aid in developing the effects of this cause, *warm, humid, and stagnant states of the atmosphere* are the most remarkable. This pestilence has generally prevailed during high ranges of temperature, and at that season, and in those localities, in which considerable humidity was associated with warmth; and these with a still or calm state of the air, or with crowded habitations and imperfect ventilation. Such has more particularly been the case when this distemper has become epidemic in countries without the tropics. Within the tropics, all sheltered situations near the level of the sea, or near the sea-coast, present at all seasons the conditions, in respect of warmth or of humidity, requisite to the epidemic prevalence of the malady. Still, although these conditions are required for the development and dissemination of the infection, they are not either individually or conjointly capable of producing the distemper, without the operation of the specific exciting cause. They are merely the atmospheric conditions required to give the infectious germ activity.

72. The *seasons* which are characterised by a high range of temperature, and much humidity, as summer and autumn, are those in which this pestilence has become prevalent in temperate climates, when the infection has been imported or conveyed thither. A low range of temperature, and dryness of the air — although attended by much heat, have been found, on the other hand, to check the propagation of the distemper, and even to prevent its development. When the infectious seminium has been introduced in a crowded locality during degrees of atmospheric warmth and humidity favourable to the evolution and propagation of its effects, and when the consequent epidemic has become very general, the distemper often continues to rage, although the temperature of the season has fallen much below that observed during its outbreak; or even below that which is believed requisite to its development. This has been remarked in respect of epidemic visitations of the pestilence both in Spain and in the United States. That unusually high ranges of temperature have no influence alone in producing the malady, may be inferred from the facts observed in connection with the prevalence of it, both in hot and in temperate climates; for the periods of its appearance in the one, and the seasons of its occurrence in the other, have not been always, or even generally, characterised by unusual warmth. Indeed, a careful perusal of facts connected with the outbreak of the distemper in Africa, the West Indies, in Spain, and in America, fully convinces me that excessive warmth is not concerned in its production, more than a somewhat lower grade; a high degree of heat, as I have just stated, being only one of the conditions requisite to its prevalence, but then the presence of the efficient agent — the infectious seminium — is indispensable: this is the seed; warmth and humidity are merely the conditions of the soil requisite to its germination; and although the former may lie dormant for a time until the latter give it activity, still it is not less the efficient, the specific, and the undoubted cause of the pestilence.

73. *C. Infection.*—According to the definition I have given of this term in the article INFECTION, there can be no doubt in the mind of the unprejudiced, after a due examination of the evidence respecting it, as to the dissemination of this pestilence by infection. My limits will not permit me to detail, circumstantially, or even fully, all the facts which have been adduced by most respectable authorities, proving the propagation of this malady by infectious emanations proceeding from the affected, but I shall adduce sufficient evidence to show, that the true hæmagastric pestilence spreads in this manner, and that the evidence of its infectious nature is similar to that by which the infectious nature of scarlet fever or small-pox is proved and admitted. But small-pox, scarlet fever, and some other infectious diseases are amongst the most common maladies in our climate, and can no longer be prevented by measures in any way tending to embarrass traffic and mercantile speculation, whilst this pestilence, plague, and pestilential cholera, are foreign to this and most European countries, and the only modes of preventing their extension to these countries hitherto attempted, have been such as more or less hamper commercial undertakings at certain seasons and with some foreign parts. It cannot be denied by any one who has attended to the subject of quarantine, especially as it has been agitated in recent times, and with a due knowledge of the influence which the ruling passion—the desire of amassing wealth — exerts upon all the more generous and social emotions of the mind, that the restrictions imposed upon trade, arising out of precautions

against the introduction of pestilential infections, have been the chief causes, directly or indirectly producing the opposition to the doctrine of the infectious properties of pestilences; and that all that has been written to disprove this doctrine — and written with no small virulence by some — has not proceeded from a firm conviction of the justice of the cause espoused, but are either special pleadings subservient to sordid purposes, and to the gratification of disappointed feelings or of private resentments, or the outpourings of minds teeming with mistaken views, arising out of imperfect observation and hastily formed opinions, and excited by a desire of acquiring notoriety in a contest involving the interests of the whole community.

74. Let any one altogether unprejudiced as to the infectious or contagious properties of pestilential maladies, attentively peruse most of what has been written respecting them in this and in other countries, carefully examine the evidence adduced before committees of the House of Commons, or in other places, and critically weigh the import and truth of the conclusions arrived at by commissions sent to investigate facts on the spots of their occurrence, and the various circumstances connected with the facts adduced — let any one who possesses sound common sense with some share of science, but who is at the same time entirely free from the undue influences of prejudice, of temper, and of interest, enquire into the matter — and I cannot believe that he can arrive at a different conclusion from that to which I have arrived, after the best attention I have been able to bestow upon this most important and much discussed subject. Whoever may enter upon this very unpleasant investigation, with these moderate qualifications, which, however necessary, are quite sufficient to the formation of just conclusions respecting it, will be surprised to find that, amongst members of a learned profession, so much ignorance should be displayed in the literary character of some of these writings, in the scientific and professional execution of others, and in the illogical inferences of many of them. The duly qualified and candid investigator will detect statements made without proof, facts assumed without evidence, and supposititious agents believed in as real existences, and these made the bases of reasonings altogether inconclusive even as regards the conduct of the argument. He will find things, facts, and diseases dissimilar from one another, and presenting no connection either as to nature or to sequence, viewed as identical with each other. He will detect the suppression of important facts and circumstances, and an undue prominence given to others of a doubtful character. He will remark the imputation of motives which did not exist, and ignorance of those which influenced, if they did not impel the writers. He will observe the precipitancy with which the young, the inexperienced, and the ignorant have rushed into print, and attacked with disgusting flippancy and intemperance much abler and better informed writers. In every medical periodical existing during the late war, he will find accounts of a disease never seen by the describers, their own mistakes, proceeding from profound ignorance of the name and nature of the malady seen by them, serving as the basis of their lucubrations and of their arguments. And he will, moreover, be grieved to remark the opinions of learned and experienced men either misrepresented or impugned in jejune and paltry performances, evincing a most remarkable ignorance of the language in which they are written, and a still greater ignorance of that from which they profusely and inappropriately quote. In thus attempting to reach the pure spring of truth at the bottom of the deep well of research, he will have to penetrate not only through the rubbish thrown in by unfaithful, by mistaken, and by ignorant inquirers, but also through the accumulated filth of uncandid and intemperate controversy.

75. *a. The history* of the various manifestations of this pestilence conveys to the experienced physician a certain degree of evidence as to their infectious characters, although the circumstances connected with them have been very imperfectly recorded. The earliest notice of the appearance of the hæmagastric pestilence in the West Indies is made by Ligon in his "History of Barbadoes." He states that it broke out early in September, 1647, and that before the expiration of a month the living were hardly able to bury the dead. After the year 1647, no mention is made of this malady until 1686, when it was said to have been imported to Martinique from Siam, and was then called the "*Maladie de Siam.*" M. Desportes, who practised during many years in St. Domingo, says, that it appeared in Martinique in consequence of a large fleet from Siam which arrived there with a "malignant or pestilential fever, of which a great number of the sailors perished;" and several French writers state that, having been communicated to the inhabitants of Martinique, it was afterwards carried to St. Domingo. Captain Phillips states that this malady prevailed in Barbadoes in 1694; and Mr. Hughes, on the authority of Dr. Gamble, mentions the prevalence and fatality of it in 1695; and the circumstance of its being called the *new distemper*, or *Kendal's fever*. Dr. Trapham, in a work on the health of Jamaica in 1679, says that "about eight years since, when the victorious fleet returned from the signal Panama expedition, they then brought with them a high if not pestilential fever, of which many died throughout the country: but this being a foreign distemper brought from abroad, the causes of which I could not so well judge of, but conclude Jamaica more happy than to be annoyed therewith, directly and originally" (p. 81.).

76. Don Ulloa affirms that this pestilence was unknown at Carthagena and Porto Bello before the year 1729. Medical literature furnishes very few instances of the appearance of this pestilence in the West Indies during the eighteenth century, until the dreadful outbreak in 1793. Still we are not to infer that occasional visitations of it did not take place, although no published record of them exists; indeed, imperfect notices of such visitations are to be met with in several works; still they appear to be few and far between, and evidently prove that they have not been the results of endemic causes, or of circumstances connected with locality or season, and to have been altogether different from the maladies arising out of these causes and circumstances.

77. Dr. Currie, in his work on Bilious Fever states that "a contagious fever, called the yellow fever, has occurred at Philadelphia six times since

the first settlement of the city: — viz. in the years 1699, 1741, 1747, 1762, 1793, and 1797." Gough, in his history of the Society of Friends, says, "that the fever which prevailed in 1699 had, for a considerable time before, been very mortal in the West India Islands." Dr. Lind states that, in the year 1741, "the disease was introduced by means of a trunk of wearing apparel received from Barbadoes, which had belonged to a gentleman that died of it in that place; and that the disease spread from the family that received the trunk into the town, and destroyed above two hundred of the inhabitants." Mr. Lardner, mentioning its prevalence in 1747, adds, "that many, whose business and families would permit them, fled from the city." In an account of the prevalence of this pestilence in 1762, communicated to the College of Physicians by Dr. Redman, it is stated that "the disease was introduced about the end of August, by a mariner, who arrived from the Havannah ill of it, and took lodgings near the new market, below Pine-street. It was confined principally to the vicinity of the new market, and the street west of it, spreading gradually from one family to another, till towards the end of September."

78. Dr. Lining, of Charleston, has described this distemper in a letter to Dr. White, and given the following account of its appearance in that city up to the period at which he wrote: — "This fever does not seem to take its origin from any particular condition of the atmosphere, independent of infectious miasmata; for within these twenty-five years, it has been only four times epidemical in this town, viz. in the years 1732, 39, 45, 48, though none of those years (excepting that of 1739, whose summer and autumn were remarkably rainy) were either warmer or more rainy, (and, some of them, less so,) than the summers and autumns were in several other years, in which we had not one instance of any person being seized with this fever. But that this is really an infectious disease seems plain, not only from this, that almost all the nurses caught it and died of it, but likewise, as soon as it appeared in town, it soon invaded new comers, *those who never had the disease before*, and country people when they came to town, while those who remained in the country escaped it, as likewise those *who formerly felt its dire effects*, although they walked about the town, visited the sick in all the different stadia of the disease, and attended the funerals of those who died of it. And, lastly, whenever the disease appeared here, it was easily traced to some person who had lately arrived from the West Indies, where it was epidemical." (*Essays, Phys. and Lit. &c.* vol. ii. p. 370.) Dr. Warren gives similar testimony to that now stated by Dr. Lining respecting this pestilence as it occurred in Barbadoes and adjoining islands during the early part of the last century. (*See Treat. on the Malignant Fever in Barbadoes and neighbouring Islands, &c., by* H. Warren, M.D., 8vo. Lond. 1740.)

79. Although this pestilence has frequently broken out in the West Indies and in several of the sea-ports of the United States during the last century, still considerable intervals, especially as regards individual towns and localities, intervened between its appearance. De La Fosse makes no mention of its occurrence in St. Domingo between the years 1775 and 1785. Dr. Chisholm asserts that no contagious fever, nor any epidemic of the character of this pestilence, appeared in Grenada from the year 1763 until 1793: and Dr. Gilpin, who resided many years in this island previous to 1793, confirms his assertion.

80. That the West Indies were not very unhealthy for many years previously to 1793 is shown by the testimony of Dr. Davidson, who, in a letter to Dr. Mease of Philadelphia, states that, in the more healthy islands of St. Kitts, St. Vincent, and Barbadoes, soldiers have arrived from Europe and remained there for years in the enjoyment of good health, notwithstanding their debaucheries. And Dr. Weir, Director-General of Army Hospitals, states, "that he arrived in Jamaica in 1785, from which time till 1792, only one officer died out of four regiments quartered in that island; that the troops were in general healthy; that although fevers were frequent they were not fatal," and that no fever of a bad type occurred during these years, until 1793, when this pestilence appeared. Dr. Theodore Gordon served in Barbadoes, Dominica, and Jamaica, during five years preceding the occurrence of this malady in 1793, and considered the health of the troops remarkably good, the chief diseases being remitting and intermitting fevers, dysentery, and affections of the liver. That this malady is not a constant resident in the West Indies, although frequently appearing there, is further shown by Dr. J. Hunter, Dr. Franklin, Dr. Gordon, and others, who have found troops remain during several years remarkably healthy; and yet, in the most healthy seasons and localities, this malady has occurred and swept off many hundreds in a very short period. Its outbreak in these islands, after many years of immunity from it, occurred in February, 1793, in Grenada, at a time when bilious remittent fever does not prevail; at which time also, and for a considerable period afterwards, all the other islands continued healthy. But after the appearance of this pestilence, every station, however healthy before, suffered severely from the contagion. It did not reach Dominica until the end of July. Barbadoes was unaffected until the beginning of 1794; and St. Domingo did not suffer from it until late in this year; and then in consequence of the introduction of the contagion by a detachment of troops from the island of Guadaloupe, where it was raging. This pestilence appeared in Philadelphia in the month of July, 1793, and during the latter part of that year and 1794 it reached most of the West India islands.

81. The re-appearance of this malady in the West Indies, after an immunity from it during many years, was attended by many distressing results, owing to the circumstance of its having been confounded, by superficial and inexperienced observers, with the common remittent fever of the country. We frequently find, upon referring to reports of medical officers, that the pestilence broke out and was most destructive amongst regiments which had marched into barracks, in which it had already prevailed. Thus the 35th regiment landed in Guadaloupe on the 12th of May, 1795, and on the 30th of June of the same year, in six weeks, it had lost 136 men. The 2d regiment landed at Martinique in March, 1805, and in the following May it had lost 97 men. These men landed

during the prevalence of this pestilence in these islands, and without any exposure, they instantly, and without marching or service, occupied quarters in which this malady had prevailed; but, as it was supposed not to have been infectious, the highly predisposed troops were instantly introduced to the operation of its efficient cause. The distemper was viewed as having been free from infectious properties and as being the common seasoning fever of the climate, and no precautions were taken, in these instances as well as in many others, against its dissemination. Numerous other instances might be adduced of the dreadful effects resulting from monstrous ignorance on the part of those who ought to have been informed by the experience and judgment of those who had gone before them, if they were incapable of arriving at rational inferences by their own unassisted reason; but the subject is humiliating to human nature, especially when viewed with reference to medical doctrine and to professional character. In those days, and even down to the present day, the arrival of Europeans within the tropics was generally inferred to produce what was called a *seasoning fever*—a name imposed upon all fevers, however occurring, within the first twelve or eighteen months after the change of climate—a name, moreover, applied very frequently to conceal ignorance or even to mislead. But fever solely depending upon change of climate merely, irrespective of infectious or other miasms, is neither so immediate in its invasion of new comers, nor so rapid in its course, nor so malignant, nor so fatal, as the pestilence now under consideration. In this, I speak from observation in two quarters of the globe. But to proceed with the evidence as to the infectious nature of this distemper.

82. Dr. J. Stuart, who practised during many years in the island of Grenada, both before and after the prevalence of the pestilence in that island in the years 1793, 1794, and 1795, states in a letter to Dr. Chisholm, "As to the character of this fever, my experience has fully satisfied me that it was specifically distinct from every form of the indigenous bilious remittent which I had ever observed,—because it appeared at a season of the year which I had always found healthy during a period of nineteen years' residence in the colony; because it did not appear particularly in those situations where bilious remittent fever usually prevailed during the unhealthy season of the year; because there was an evident difference in the character and type of the two diseases; because I never knew this fever terminate in intermittent, as remittent or bilious fever commonly does; and because I did not find the same mode of treatment successful in both kinds of fever." Dr. Stuart goes on to remark, "that a thorough belief existed in the minds of all the medical gentlemen in Grenada that the malady was infectious," one only, and he merely *at first*, doubting this property; that he himself and several other medical men contracted the disease in their attendance on the sick; and "that the malady, in his decided opinion, was propagated by visiting infected apartments, or by the near approach to, or contact of, people labouring under it." (See Dr. Chisholm's *Letter to* Dr. Haygarth, p. 24.) Dr. Gordon, of St. Croix, government physician to the Danish West India Islands, concludes his remarks on the malignant pestilential fever prevalent in these islands and in North America near the close of the last century, by stating his belief in the importation and diffusion of infection, "by ignorance, perversity, selfishness, or the abstraction of the sentiment of public good; by the abuse of all preventive measures in the promotion of the speculations of cupidity and the calculations of venal men; by the prostration of truth and humanity, and the eluding the laws of quarantine."

83. Dr. Dancer, of Jamaica, after a close examination of the opinion emitted respecting the malignant pestilence of 1793—6, states most decidedly that "it is an imported disease and is communicable by contagion." He adds, "that it has no apparent connection with local causes; that it has appeared in the healthiest seasons and localities, and has prevailed least in unhealthy and marshy places."

84. *b.* Dr. Charlton, president of the Medical Society of New York, states, in a letter to Dr. Hossack of the 9th September, 1803,—"I have practised physic in this city since the year 1762. The fevers that have usually occurred in summer and autumn during this period, were intermittent, bilious remittent, and nervous or typhous fevers. I never saw a case of yellow fever in the course of my practice before the year 1793." He adds, that he always considered the yellow fever as "a disease of foreign origin;" and that he "never met with a case of it in the country but which could be clearly traced to infection from the city."

85. Dr. S. Bard, who commenced practice in New York in 1766, remarks, that although he observed hospital and jail fevers there during the revolutionary war, he never saw a case of true yellow fever until 1795; that he considers it a distinct idiopathic disease, and not a variety or grade of any other; and that he believes it to have been an imported malady. Dr. Hossack states that Dr. Ledyard at first believed this pestilence, as it appeared at New York, was generated in the place; but subsequently had reason to change his belief, as all his observations at the Health Office satisfied him that it was exclusively derived from the West Indies (p. 32.).

86. It has been supposed that the fatal prevalence of the pestilence chiefly in cities, towns, and localities near the level or on the margin of the ocean, is a proof of its origin in such situations; and that it does not admit of appearing at any considerable distance from these places; but that it would frequently be propagated through inland districts if the malady possess infectious properties. The truth, however, is, that it has not unfrequently been conveyed to places around, and inland, from the sea-ports where it broke out and prevailed in Africa, America, and the south and east of Spain. Dr. Stratton met with numerous instances of the propagation of the pestilence, when it appeared at Philadelphia in 1797 and 1798, to persons residing at considerable distances, and who had not visited the locality in which it prevailed. Thus he states that twenty-seven persons had retired from Philadelphia and Washington with the disease, and fifteen received the infection by communicating with them. "One young lady fled from Wilmington into New Jersey, was attacked about a week after, and communicated the malady to her uncle, her nurse, and a young man who visited her. Two of the four died;" and he adds, "there have been many instances of the pestilence being brought from Philadelphia to

Jersey, and of its being communicated from the persons thus infected to others; and, if it may be thus conveyed from the former to the latter, I see no difficulty in supposing that it may be brought from some other place to Philadelphia."

87. The College of Physicians of Philadelphia in 1798 came to the following conclusions: — "1st, That the pestilential yellow fever lately prevailing in that city differs essentially from every other disease which is common to North America, and agrees in its most essential symptoms with what is called the yellow fever in the West Indies. — 2d. That it has been regularly traced to the vicinity of some vessel or vessels from the West Indies, or to persons or clothing connected with them. — 3d. That the principal peculiarities of this fever are its contagious nature, the progress of the symptoms, and the mortality consequent on it. — 4th. That to prove the contagious nature of this disease would be equally useless as to prove the contagion of the plague. — 5th. That, in all their observation and practice, they know of no case where the autumnal bilious remittents of the country have proved contagious. — 6th. That although these are sometimes attended by violent and dangerous symptoms, this striking characteristic of contagion being always absent, they never become an object of public dread or concern." Preceding these conclusions, these physicians put the following pertinent questions:—"Where do we see the first appearance of this pestilential fever? Is it among the marshes to the southward of our city, or in the neighbourhood of our wharfs? Is it in the confined alleys, or on the salubrious banks of the Delaware at Kensington? Is it not always near those places where vessels from foreign countries are found? Do the fevers common to the country steal on insensibly, infecting one person after another in a family and in a neighbourhood? Are they equally severe in seasons so opposite as in 1797 and 1798?" They likewise remark, "that very erroneous opinions have arisen, from confounding this pestilential fever with the malignant remittents of the West Indies and America;" and they further subjoin proofs of the importation of the infection in 1798.

88. Dr. Bancroft insinuates that Sir W. Pym had formed his ideas as to this pestilence, from the accounts furnished by Dr. Chisholm, of its introduction into Grenada. Sir W. Pym, however, witnessed its appearance in Martinique in 1794, before he had even heard of Dr. Chisholm; and his extensive experience of it in the West Indies fully confirmed this physician's account of it. Indeed, when Dr. Bancroft first wrote upon this distemper, it is even doubtful whether or not he had ever encountered it, or seen any other fever than the remittents of warm climates, which he had confounded with it; at any rate, his experience of it was very limited. Sir W. Pym's account of his experience of this pestilence, both in his own person, and in the several armies and expeditions with which he served in the West Indies, conveys the strongest internal evidence of his thorough knowledge of the origin and nature of it. Of his later experience in Spain and the Mediterranean, and of the successful measures which were on several occasions adopted in order to extinguish this calamity, it is unnecessary here to speak, as they will partly appear in the sequel.

89. Sir W. Pym distinctly states, that, when this malady broke out in the islands where he served in 1794 and 1795, other physicians, both English and French, considered it distinct from the endemic of the country. He mentions respecting one of these isles, that it originated in three companies of the 70th regiment quartered in bomb-proof barracks, and extended from them to men in hospital with other complaints, and, in succession, to the surgeon and hospital attendants. It next invaded the troops quartered in more elevated situations in the same fortification; whilst the only persons in the town of Fort Royal that suffered from the distemper, were officers who had joined the mess or visited the sick officers of the 70th regiment. Sir W. Pym advised the men to be encamped on an elevated and airy place at a distance from the town; and in a few days the malady disappeared from the camp, and the regiment continued free from it until the arrival of convalescents from the hospital with their blankets and knapsacks, which, having been distributed among the different companies, communicated the pestilence so very generally, that in a very short time none escaped it but those officers who either had it very slightly, or had resided some years in the West Indies.

90. This was the first regiment who had suffered from this distemper in that campaign; but the infliction was viewed as a seasoning fever by some; as the endemic of the country, aggravated by fatigue, by others; as the result of malaria, or of any thing else under the sun excepting what it really was, by many. The few who entertained correct views were disregarded, and were not in positions to procure attention from ignorant superiors, and the results were exactly what might have been anticipated. The distemper extended, "and soon ran through every corps that had arrived from England, and even through the regiments that had been some years in the West Indies; with this difference, that the last-mentioned suffered a smaller mortality." Nevertheless the total loss of the army in the course of a few months was not less than 6000 men. "The inhabitants also suffered severely; but the mortality was small among the natives and those long resident in the island; but the newly arrived, sea-faring persons, and men belonging to transports, suffered in as great a proportion as the military." He adds, that people of colour also suffered from fevers, but in a much slighter degree, and less dangerous form. "During 1794 and 1795 reinforcements continued to arrive, and from occupying the same barracks and quarters with the troops which had suffered from the disease, the contagion was frequently communicated to them immediately upon their arrival, and there were many instances of officers and men not surviving a week after debarkation."

91. The opinions of several physicians are adduced by Dr. Bancroft in favour of the non-infectious nature of this pestilence; but, upon referring to them, it will be found that they actually support a very opposite doctrine; and that their ideas, as to a non-infectious character, had reference entirely to the remittent endemics of which they were treating, and not to epidemic yellow fever — a piece of sophistry of the most dishonest and contemptible kind. Thus Dr. Gillespie, who is thus misrepresented by this author, and adduced by him as an evidence against infection, states, that "infection could in many instances be traced, and appeared to operate as well through the medium

of terror as that of the *effluvia emitted from the bedding and persons of the patients.* Of this a melancholy instance happened in an armed sloop, into which a draft of about fifty men had been judiciously sent to cruize, and thereby to be preserved from sickness; but the *contagion having been carried on board* previously to her sailing, and being destitute of medical aid, the men were attacked in succession, and three-fourths of them died;" whilst in other armed vessels in which similar drafts had been sent with the same intention, the people continued in good health. Dr. PASCALIS, who is also quoted by Dr. BANCROFT in favour of non-contagion, states as follows:— "It has appeared to me, as well as to many practitioners, that a considerable number of the cases could not be traced *but to a contagious power of the fever itself:* such were the cases of whole families, who seemed preserved as long as they had no patient in their houses, and who all perished or were sick, without exception, as soon as they admitted among them any one affected with the disease. This deplorable effect has been seen in the most wholesome parts of the town (Philadelphia), and at any period of the season; so that, in many instances, where the disease seemed most universal, by care and precaution people were preserved; while in the country they fell victims to their unreserved intercourse with patients when the epidemic was fast decreasing in every part of the town." Dr. LEMPRIERE, another of Dr. BANCROFT's authorities, testifies, in opposition to the special pleadings of this writer, that "he could not admit a doubt in his own mind of the disease being of a contagious nature;" and M. GILBERT adds that "he cannot deny that the malady may be communicated by the expired air, or by the contact of matters impregnated by the miasms exhaled from those affected."

92. Of the several outbreaks of this pestilence in the United States it is unnecessary to state more than has been already advanced, especially as the details connected with one of them are in every respect similar to those of the rest, as well as to those connected with the appearance of the distemper in Europe. The localities in which the malady first broke out in North America have been viewed as the sources from which it emanated, independently of importation or infection, by those who argue against this property, and who consequently consider it incapable of being thus propagated or imported; and however small the grounds furnished them for believing that these localities were or are capable of furnishing the exhalations, miasmatous or terrestrial, or however denominated, still they contended that it acknowledged this and no other source—that it was propagated by the air of the locality, contaminated by exhalations from the soil and matters covering or existing in that soil, and not by emanations proceeding directly from the bodies of the sick, or imbibed by substances capable of retaining them for a time and afterwards imparting them to the surrounding air. That the distemper, however, appeared in various places in that country where no evidence of terrestrial exhalation could be produced, and even where the presumption of such having ever existed seemed absurd, unless, indeed, it can be credited that a specific flatus or gaseous poison may be exhaled at certain particular parts of the earth's surface, without affecting the senses in a perceptible manner, or all who may be within its sphere, and produce a certain specific effect, identical in every respect, on all occasions, and in all quarters of the globe. However gross and absurd this assumption may appear, it actually forms the basis upon which the non-infectionists found their doctrine. If the truth of this doctrine be for a moment conceded, it necessarily follows that this terrestrial exhalation or poison may proceed from any situation, soil, or place, without reference to physical condition or geological formation, seeing that its specific effects have appeared in all kinds of locality whenever the range of temperature favoured their evolution. The yellow, or hæmagastric fever broke out in September, 1811, at Perth-Amboy, in New Jersey, U.S., a town and surrounding country presenting none of the endemic sources of disease, but holding frequent communication with the West Indies. On this occasion, the board of health at New York, consisting of several of the most eminent men and physicians of that city, recommended the mayor to issue his proclamation interdicting all communication between the city of Amboy and the city of New York; and to appoint a committee to inquire respecting the malignant and infectious fever which had appeared in the former city. Dr. MANNING, physician in Amboy, reported to the committee that it was the pestilential yellow fever; that "there was but one opinion with either the inhabitants or physicians as to its origin, namely, that it was derived from some of the West India vessels which had been lying at the wharfs; and that the brig Ocean from St. Bartholomew's, and the ship Favourite from the Havannah lying along side of the Ocean, were generally supposed by the inhabitants to have introduced it." He stated that there were no local causes to which this calamity could possibly be referred, that the city is very elevated, the soil chiefly composed of sand; free from all lodgments of water; the streets wide and the houses for the most part spacious; and that the whole town exhibited an uncommon degree of cleanliness. He further reported that the citizens were so perfectly convinced that the feve was imported in the vessels at the wharfs, that they were removed to the stream; and that the persons first attacked were frequently on board of the vessels above named. The committee, after visiting Amboy, reported, "that other persons taken ill had been exposed either directly by being on board the vessels, or by visiting those who were il of the disease." About this time, also, the Boar of Health of Philadelphia issued a proclamation prohibiting all communication between Amboy an the city and county of Philadelphia on accoun of a pestilential disease prevailing in the forme city, and imposing a quarantine of fourteen day on all persons after leaving Amboy, before the can be admitted into Philadelphia.

93. *c.* Of the earlier occurrences of this pest lence in the *south of Europe*, but imperfect informa tion has been furnished. It appeared in Lisbon i 1723, black vomitings being the most prevailin and fatal symptom. Dr. KENNEDY, physician t the English factory there, states, "that it was ver contagious in the lower parts of the city, goin through a family, and very few families escaping, especially in the ill-ventilated streets. It showe

itself at Cadiz in 1764, and did not again appear in that city until 1800. A vessel arrived there in August of that year from the West Indies, and on board of her some persons had died of the yellow fever on the passage. After her arrival at Çadiz, the whole crew, passengers, and pilot were landed, and died of the disease. The infection rapidly spread throughout the city, and extended to several neighbouring and inland towns.

94. This pestilence appeared at Malaga[*] in 1803. The governor of that city informed his relative, the consul general of Spain in London, that it was brought there by a French ship from the West Indies. After disappearing during the winter, it re-appeared in the following summer. In this year, 1804, it spread to Gibraltar from Cadiz, and to several parts of the Mediterranean, to Leghorn and St. Lucar. Sir W. Pym, then superintendent of quarantine at Gibraltar, met with one case of the distemper in this fortress in 1803; and, as Dr. Hennen remarks, this may not have been the only case; for many attempts were made to impose upon the authorities and keep them in ignorance, and the malady was at that time prevailing at Cadiz and Malaga, cities not far removed from Gibraltar.[†]

95. The deaths amongst the military and their families during the two preceding years, were 35 in 1802, and 56 in 1803; but, in the last four months of 1804, the deaths were as follow, from this pestilence: — Officers 54; soldiers 864; soldiers wives' and children 164; civilians 4864; — being altogether 5949. Dr. Nooth and several surgeons, both military and naval, believed that this pestilence, which had thus in four months carried off nearly half the population, to have been local as to origin and non-infectious; whilst Sir W. Pym and Sir J. Fellowes, and the surgeon of the artillery gave their decided opinions that it was highly infectious, and that it had been introduced from abroad. But the scientific and experienced reader — especially if he have ever seen cases of this pestilence — will be much surprised, and at once know how to estimate Dr. Nooth's opinions on these topics, when he reads in that physician's first official report, that he considered the fever "as decidedly inflammatory as it possibly could be;" that he believed many of the medical officers to have lost their senses for believing the malady contagious and of a putrid character; that he laboured to convince the public that there was nothing to be dreaded from a communication with the sick; and that he (evidently then a stranger to the malady!) dictated peremptorily to the medical officers below him (for most unfortunately for thousands, he was at the head of the medical department) the mode of treatment they ought to pursue. In his *second* official report something of the results of these hastily formed opinions and measures becomes apparent; for he states the losses in certain corps to have been "enormous," and, amongst the inhabitants, the ravages of the distemper, "as beyond description terrible." He, moreover, now begins to waver as to the source of the malady, and either gives very opposite opinions, or is altogether ignorant of the meaning of the terms which he employs. Thus, after stating that he had himself "contracted the fever in that *focus of contagion*," he adds that "the disease by no means seems to be *infectious*, but the whole atmosphere on the rock is *pestiferous*; and I am inclined to think that, in addition to the ordinary causes of *contagion*, we may consider a large *lime kiln* in the upper part of the town as aid and part in the general mischief!" And this is Dr. Bancroft's great authority for the local and marsh origin of this pestilence and for its non-infectious nature! The whole of the four letters to the surgeon-general written by this physician — this infliction on the profession and the military service — abounds with similar drivellings and peculiarities. How admirably successful his endeavours to restore "the lost senses" of his "weaker brothers in medicine!" and "*to convince the public that nothing was to be dreaded from communication with the sick*," must have proved, may be inferred from the fact that, out of the civil population of this important fortress, amounting to nearly 14,000, only twenty-eight escaped an attack of the pestilence, and twelve of these had previously been affected either in the West Indies or in other parts of Spain. Fortunately for this place, at the height of a sanguinary war, Sir W. Pym and Sir J. Fellowes arrived to save 1200 of the soldiers, by segregation, from an attack of the distemper. Mr. Kenning, surgeon to the Royal Artillery in this fortress, published a detailed

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[*] The introduction of the pestilence into Malaga in 1803, is stated by Dr. Arejula to have commenced in the house of C. Verduras, a noted smuggler, who had brought from one of the vessels in the bay, and secretly conveyed to his house, a person labouring under a disease of which he soon afterwards died. It was subsequently discovered that the body was privately buried in the adjoining church of St. Peter. On the 26th of August, and next three days, the son of the smuggler and two other men, associates of his, were attacked, and two died. Soon after the death of the son, on the 3d of September, his mother and two sisters sickened with the same symptoms, according to the report of the physician. Verduras the father died on the 15th of September, and his daughter and another son, who also had been attacked, died on the 19th. Whilst the distemper was thus running through this family, persons adjoining and friends of the family were seized, the malady spreading gradually from this house and locality. Dr. Arejula states that the person who was secretly landed and died in Verduras' house was buried by and with the connivance of the curate, who was himself taken ill a few days afterwards, and died together with the physician who attended him; "and in like manner every person connected with the curate's family was taken ill and died; even the sacristan and his wife, as well as the boy who attended the priest at the altar." Those also who entered the church of St. Peters, where this person was buried, to hear mass on St. Michael's Day, were all taken ill, and a great part of them died. This church was therefore shut up, and continued closed until December 1805, when Dr. Arejula entered it, and directed the fumigation of it. The account furnished by this physician was confirmed by the researches of Sir J. Fellowes, who obtained the same information as he had obtained, and traced the distemper to the same source.

[†] The facts connected with the introduction of the pestilence into Gibraltar in 1804, are thus stated by Sir James Fellowes: — "From the confession of *Santos* the person first attacked, and from the oath of a respectable witness, it appeared that *Santos* had recently left an infected house at Cadiz; that he had been three times in company with a person actually labouring under the disease on the 23d and 24th of August; that he arrived at Gibraltar on the 25th, was taken ill on the 26th, and was seen by a French practitioner, M. Jarg, on the 27th, and that in less than eight days after his being attacked, his mother, two aunts, one brother, and two sisters, all residing in the house, were also seized with a disease of a similar nature." (p. 103.) "The malady spread from the house of Santos to the adjoining buildings, whilst the rest of the garrison were totally exempt from it. For several days the distemper was confined to the range of buildings to which it had been traced, and where Santos lived; and it was observed to make a gradual progress amongst the different families who resided there, and to spread to the sheds in the neighbourhood." The further progress of the distemper to the military as well as civilians may be learnt in Sir James's work. (See p. 104, *et seq.*)

account of the introduction and subsequent progress of the pestilence; and Mr. Burd, who was at the head of the medical department of the navy, wrote officially to Lord Nelson commanding the fleet, cautioning him against communication with ships from Gibraltar. But, although Dr. Nooth's "*weaker brothers in medicine*," were bound to obey their superior officer, as to his measures, they were not constrained to conform to his opinions.

96. Although this pestilence had appeared several times at Cadiz, after long intervals, and at Malaga, places only about forty or fifty miles east and west of Gibraltar, when it might have been inferred that this fortress could not have escaped if the cause of the mischief had existed in the atmosphere, and that no police or quarantine regulations could have excluded it; yet we find that this place, as well as many adjoining places in Spain, had escaped up to 1804, owing to such regulation in parts, if not altogether. Measures of purification were adopted after the subsidence of this epidemic, and proved successful, so that the garrison enjoyed perfect health from that time until 1810. In this year the pestilence ravaged Cadiz* and Carthagena; and during its prevalence there, four transports from the latter port, two of them having on board deserters from the French army, anchored in the bay of Gibraltar. Sir W. Pym put them in quarantine, and the distemper appeared in all of them in a few days. He instituted measures for the separation of the healthy, and for preventing communication with the fortress. Notwithstanding these the disease appeared on shore; but a strict supervision was instituted, and the sick were separated from the healthy, and removed to the neutral ground. A cordon of troops was placed around the infected part; and proper persons appointed to superintend the purification of houses, furniture, &c., and to report the appearance of the distemper. Owing to these measures the pestilence was arrested before it had infected many in the fortress. In 1804, the infectious nature of the distemper was denied by the head of the medical department, and communication with the sick encouraged, and nearly all were infected, and nearly one half died. In 1810, the infectious character was recognised, the infected were segregated and removed to an airy locality, communication with these was prevented, the healthy protected, and the mischief was very soon arrested.

97. In 1813, the disease again made its appearance, and its commencement and progress were described by Dr. Gilpin and Mr. Fraser, Deputy-Inspector of Hospitals. The persons who brought the pestilence into the garrison were ascertained. One of them was ill when he arrived, and he communicated the distemper to those residing in the same house; thence it extended to both sides of the street in which the house was situated. All escaped who cut off communication with the infected. Of 500 persons confined to the dockyard, not one instance of infection occurred, although this was the spot most likely to be productive of terrestrial effluvia, and that suffered the most in 1804, owing to communication having been then unrestricted. When the pestilence appeared there were about 5000 persons within the walls, who had been subjects of it at a former period; and after a careful inquiry there did not appear to be one well authenticated case of a person having been infected a second time, at the termination of the epidemic. At its commencement nearly 8000 persons left the garrison, the greater part of them encamping upon the neutral ground. Very few cases occurred amongst them, and these chiefly after their emigration, and from previous infection. The strong breezes and current of air in this place were expected to prevent the accumulation and concentration of infectious effluvia, especially in tents, and consequently to arrest the progress of the malady; and the results proved the correctness of the inference.

98. In August 1811, the disease appeared at Carthagena, and Mr. Vance, who had been infected by it in the West Indies, was sent to that city to report respecting it. He stated that it had not been confined to any particular part of the town, and that no persons were exempted from it, but those who had been previously affected by it. He, however, mentions the important facts, that bilious remittent fever, which has been so frequently confounded with this distemper, also prevailed at this place, and that many soldiers were in the Royal Hospital labouring under the gaol-fever. Mr. Vance imputed the appearance of the malady in Carthagena this year, to the general neglect of destroying the bedding, clothes, &c. of those who had died of it during the previous autumn; the infection lying dormant during the cold weather, and until called into activity by the summer's heat. He further states, that the malady was introduced into Murcia, where it became destructive, by refugees from Carthagena; and that these cities had been placed in quarantine by the Spanish authorities.

99. Of the hæmagastric pestilence that has appeared on several occasions in Gibraltar and other parts of Spain, and has created so much interest and controversy, it may further be remarked, that much additional information, to that already furnished by Sir W. Pym, Dr. Gilpin, and Sir J. Fellowes, has been adduced by Dr. Hennen, Mr. Redmond, Mr. Fraser, &c.; and by the reports of the several commissions sent to inquire into the nature

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* In September, 1810, the harbour of Cadiz was crowded with ships from several ports of Europe and America, and several regiments of British troops were in the town. On the 11th, the physician to the board of health discovered some persons with fever similar to that of 1800 and 1804; and it appeared from the reports that this malady was infectious, having spread gradually in the quarter where it broke out, four out of five of the first family attacked having died; the only surviving individual not having been seized; and it having been ascertained *that he had passed through the disease in* 1800. Sir J. Fellowes communicated this information to the British authorities; and measures, such as the circumstances of affairs allowed, were adopted to preserve the health of the army and of the crews of British ships: but these precautions, owing to various circumstances, could not be sufficiently enforced. The British troops, however, continued free from the disease, although it surrounded them until the end of October. Dr. Snow, physician to the army, in his official report states that, "as far as his experience extends, and from all the information he has been able to collect, he thinks this disease contagious; and that nothing but the very active measures which were taken to check it in the beginning could have prevented its destructive influence from being more severely felt by the troops." Dr. Plenderleath, physician to the forces, had charge of the hospital at the hospicio at Cadiz, and he reports that the fever then prevailing was identical with that of 1800 and 1804; that it was violently contagious; and that the dangerous consequences to the army were prevented by the timely precautionary measures adopted; the army having lost only 25 men, although upwards of 4000 were carried off by it from among the inhabitants. The Spanish physicians also believed the disease to be contagious, and imported.

and source of the outbreaks of this pestilence in the south of Spain and Barcelona. And it may be premised, that the several epidemic manifestations of it which have occurred in the West Indies, in the ports of the United States, in Africa, and in several places in Spain, being admitted to have been identical as to nature, it necessarily follows that the evidence as to its source and propagation in one locality or epidemic equally applies to all other localities and epidemics. Mr. REDMOND states in his letter to Sir W. PYM, that the fever under which the 54th regiment suffered in Gibraltar in 1804, and again in Jamaica in 1808, was the same disease, and that it was infectious on both occasions. Of this he adduces the most convincing proofs. He notices the circumstances of the fever having been introduced by infection into the regiment in Jamaica, in 1808, that it infected all who had not previously been attacked by it; that, in a few weeks, his two assistants, and twenty out of twenty-one hospital attendants, were infected; and that none of those who had had the disease in Gibraltar, were attacked in Jamaica.

100. In the reports made by order of the governor as to the first appearance of the pestilence in the fortress, Mr. KENNEDY, who recognised its nature, and watched its progress from the commencement, adduces the following evidence: — At the beginning of September of 1804 the distemper appeared in the vicinity of Boyd's Buildings; and a bombardier and his wife, residing next door to the house of the person Santos said to have imported the malady from Cadiz, where it then prevailed, and who was then labouring under it, were the first attacked in the artillery. Those who visited the bombardier and his wife were the first taken ill in that corps; and that part of the corps quartered nearest to their residence was the most unhealthy. Mr. REDMOND, surgeon of the 54th regiment, traced the disease from man to man, and reports as follows: — Whenever a man was admitted into hospital his comrade or bed-fellow soon followed. When an officer was affected, the servant was also affected: the same could be said of husband and wife. Of twenty-six persons employed as the hospital servants of this regiment not one escaped. When officers and families in this corps avoided communication no disease appeared, but the moment they neglected this precaution they were no longer safe. Two families lived in seclusion at Europa and escaped until, on the setting in of the rains in November, they returned to town, when the whole were attacked, excepting one who had been in the West Indies.

101. Dr. HENNEN states the following demonstrative and undenied facts: — 1st. The deaths among the military in Gibraltar on the 1st of October, 1804, were upwards of 130; and among them the garrison chaplain, who was attacked three days after attending a woman in her last moments. The five persons who carried the body to the grave were attacked on the fourth day, together with eight others who attended the funeral. Colonel FYERS, who at first had considered the malady non-contagious, was induced by these proofs of infection to change his opinion. He removed his family, consisting of fourteen in number, to Europa, established a strict quarantine, and they all escaped; while DE ROLLE's regiment who were encamped within forty yards of them, but not prevented from communication with the inhabitants and the rest of the troops had no less than 442 cases out of a strength of 635, the mortality being 197. — 2d. Capt. DODD's family, seven in number, and Mr. STRAITH's, three in number, lived in detached houses, and avoided all communication; the distance between the houses being 300 yards. On this intermediate space the 54th regiment was encamped. Of this regiment, consisting of 747 men, 456 were attacked and upwards of 100 died; and yet not an individual of DODD's and STRAITH's families on each side of this corps was affected.

102. It should be recollected that Dr. HENNEN was no partisan; but he adduced the facts which came officially before him at Gibraltar with praiseworthy candour. He further states other circumstances resembling the foregoing, and remarks, "That the sole cause, therefore, could not have existed in the atmosphere breathed in common by all, whether soldier or civilian, is rendered highly probable." The following facts further demonstrate the truth of this inference. The Spanish troops doing duty at the Lines, 3000 in number, within one mile and a quarter of the garrison, had no sick. At San Roque, five miles distant, with a population of 6000, no sickness appeared during this epidemic period at Gibraltar. At Algesiras, ten miles distant by land, and five or six across the bay, the disease appeared on the 7th of October, 1804, the prevalent opinion being that it was imported from Malaga and Cadiz. At Los Barios, four or five miles from Algesiras, no precautions were used, and the disease extended thither and to Smeras, another small town about twenty miles distant: whilst at San Roque and in the Lines opposite Gibraltar, all communication with Gibraltar, on the one hand, and with Algesiras, on the other, was completely cut off, and the distemper never appeared. Dr. HENNEN* adds, "if these facts are not in favour of segregation and moderate quarantine, I know not what can be deemed so; at least they convey to my own mind the most perfect conviction upon these points." (p. 107.) It was stated, moreover, by Sir J. FELLOWES and by Mr. BENYON, surgeon of the 10th regiment, "that every master of a transport who had business in the house of the agent for transports, whose family was attacked with the malady, caught the fever, while all those vessels in the mole, which had no communication with the shore, escaped."

103. That the clothes and bedding of the sick will propagate the distemper is shown by the fol-

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* Dr. HENNEN, who was at the head of the medical department of the garrison of Gibraltar, when the epidemic pestilence of 1828 broke out, and who died of the distemper at an advanced period of this epidemic, must have seen enough in the course of the early part of it to confirm his opinion as to the infectious nature of it, or to establish his belief in this property if it were previously not quite determined, for in an official communication *to the military secretary of the governor*, he writes as follows:

"*Gibraltar*, 24*th Sept.* 1828, 9 *o'clock. Immediate.*

"Sir — Nothing has yet been done about the infected bedding at the Naval Hospital. Pray allow me to order it over the line wall at Camp Bay, instantly, as much loss of life may be the consequence. The barrack master's plan of taking it direct to the sand-pit, is fraught with danger. It should be steeped in the sea for sixty hours at least before it goes to any place, when it may be mixed with other beds. (Signed) J. HENNEN, M.D."

lowing circumstance. — A quarantine encampment of those who had not passed through the fever was formed in Gibraltar on the 9th of November, 1804. These men, with the exception of the 13th regiment, took their bedding with them; but the 13th, by the precaution of their colonel, left their old dirty bedding behind, and brought clean blankets in lieu: not a man of this corps was attacked; whilst on the 22d of this month, five men of other corps were seized, and within the three following days every regiment, except the 13th, had men taken ill. (HENNEN, p. 40.) In whatever light this fact may be viewed, it suggests a most requisite precaution; and that such a precaution should have been neglected may be viewed as one of the many evil results arising out of the doctrine so assiduously inculcated by the heads of the medical staff on the outbreak of the pestilence (see § 95). The non-infectionists argue that the malady is not propagated by emanations from the sick, either direct or by fomites, and hence, that no such precaution as the one now stated is requisite. That it was most requisite — that the neglect of it in this and on numerous occasions in America, the West Indies, Africa, and in Southern Europe, was most calamitous — even most murderous, is apparent to any reflecting mind. Ten times as many lives have been sacrificed during the last sixty years by the abettors of a most erroneous doctrine — by following the false glare of what has been ignorantly deemed the lights of science, instead of adopting the suggestions of common sense — than have been lost on the field of battle.

104. Mr. FRASER, the experienced chief medical officer at Gibraltar during the epidemic of 1813 and 1814, writes as follows: — "The features of the epidemic; its course through families; the early and almost universal seizure of the medical officers, clergy, and rabbies, and of those immediately employed about the sick, if not emancipated by a previous attack; the sickening of washerwomen, the good effects of seclusion, and the remarkable escapes of those who took particular precautions, led to, and finally confirmed the belief of the infectious nature of the malady." He further states, what my own observation has confirmed, "that, of the number of medical authors who deny the contagious properties of the disease in their closets, many yield to the ineffable impression made by the immediate view of the epidemic calamity," and acknowledge the communicability of it by their fears, by their acts rather than by their words — "by their personal manners; their care of those dear to them; the placing of their patients under observation; and the adoption of other means, which could originate solely in a latent belief of infection."

105. Dr. AREJULA, an eminent Spanish physician and author of a work on this pestilence, states, that "a regiment of dragoons in the centre of infected places in 1800, continued in uninterrupted good health during the whole time of the continuance of the epidemic, guarded from its dangers by the good sense and vigilance of its commanding officers, who formed a cordon from the corps itself for the protection of its own quarter. This fact is quoted by Dr. JACKSON from Dr. AREJULA's work, with the remark, "that it is imposing, and, if the truth of it were authenticated officially by the signature of the officer who commanded, it would go far to decide the question under discussion." But the fact respecting the immunity of those shut into the dockyard in Gibraltar in 1813, (§ 97.) is equally strong and admits of no doubt. Why does Dr. JACKSON throw doubt upon a fact stated by so respectable a physician as Dr. AREJULA is known to have been, when he might have ascertained the accuracy of it when he was at Cadiz not many years afterwards? It is, however, duly credited by Mr. FRASER, who must have possessed some means of ascertaining the truth of it. Indeed, the fact does not repose upon the testimony of Dr. AREJULA alone, nor does it require the confirmation of Mr. FRASER, for it should be known that it was witnessed by the French commission sent to the south of Spain in order to investigate the nature of this epidemic, and was adduced, in the report of that commission, with many other facts, proving the introduction and infectious nature of this malady; which report is published in the original French in Sir W. PYM's work on this pestilence, and ought to have been known to Dr. JACKSON* long before he either went to the south of Spain or wrote upon this distemper, seeing that it was published both in Paris and London long previously, and again noticed by the French commission sent to Cadiz to report on the epidemic there in 1819.

106. M. PARISET, in his report of the progress of the pestilence in Andalusia in 1819, states, that it was in all respects that of an epidemic diffused by contagion. That, having appeared at a single point, it extended itself like an inundation, and gained in succession places near its source, and progressively those more distant, respecting only such places and persons as protected themselves from communication with those already infected. Thus, appearing first in the Isle of St. Léon, it pervaded Cadiz, where no means of arresting its progress had been taken; attacking two-thirds of the inhabitants, it was conveyed to Xeres and Seville. In the last-named of these cities, measures were employed to arrest its diffusion, and in Xeres similar measures were adopted, but not so strenuously carried out as in Seville; and the results in both these cities were proportionate to the vigilance and promptitude with which those measures were enforced. M. PARISET further states, that the pestilence appeared in no town or village adjoining Cadiz, Xeres, or Seville, without previous communication with one or other of those infected cities, or with some other place

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* Dr. JACKSON was sent to the south of Spain in 1819, to inquire into the pestilential epidemic prevailing there at the time. He returned to England and wrote a very laboured work respecting this distemper, in which the various modifications of it, according to temperament and habit of body, are described, with numerous arguments, pleadings, &c., against infection, now and then, however, with certain admissions, proving the opposite doctrine to that for which he argues. What reliance may be placed upon his opinion as to the matter I shall leave the reader to determine, after having read a paragraph, to which I have already referred, actually admitting the presence of infectious properties in this pestilence, and which concludes as follows: — "I was indisposed myself on various occasions, never in health, though my visits to the sick were desultory and comparatively few." (*See* p. 49. *of his work.*) This having been the case, as Dr. JACKSON admits of himself, how was he enabled to describe so fully, I cannot say so accurately, this distemper? and how came he to support a most important but dangerous doctrine as to the origin and nature of a pestilence, the occasions of his seeing and judging which he admits to have been "*desultory and comparatively few?*"

already infected; that, in populous towns, the distemper prevailed in proportion to the freedom of communication with those primarily attacked; and that wherever all communication was cut off in due time, no instances of the malady occurred. (Pariset, &c. pp. 64—67.) It may be mentioned that, in the case of this epidemic, as well as of others, the distemper did not appear in distinct and separate points or localities, at the same time, unless communications had previously existed between those and some other places already infected. M. Pariset goes on to remark, that in 1819, as well as in 1820, wherever the distemper appeared, it commenced in some individual, who communicated it to those who waited upon or nearly approached him, and that those sickened with it either in succession or together. Thus the inhabitants of the same apartments, then those of the same house, then the adjoining houses and those opposite, then the adjoining streets, &c. were infected in succession. One quarter of a town, or street, or house, being infected, persons proceeding thence into other quarters or streets, or coming from these into the infected houses, either were themselves infected, or carried the infection with them. This able writer further observes: — "Open the work of Dr. Arejula—a treatise founded on the most authentic documents and the most enlightened observation; read what this very eminent physician has adduced respecting the origin and progress of the malady in Cadiz in 1800; in Medina Sidonia in 1801; in Malaga in 1803 and 1804; and pass on to the appearances of it in the last year (1804) in Ronda, Antequerra, Montilla, Espejo, Rambla, and Alicant, in all which places it was introduced from Malaga; — follow his recitals respecting the epidemic of Carthagena in 1804, showing the transmission of the infection to Vera, by the wife and daughter of an officer who arrived at the latter place during the prevalence of the pestilence in the former, and who were taken ill soon after their arrival at Vera; the relations of them, the inhabitants of the same house, and those of adjoining houses, being successively infected; — peruse other facts of a similar nature adduced by this physician, and compare them with those which have occurred in Andalusia and elsewhere, and it will be impossible for the candid mind to resist the conclusion, that this malady is eminently contagious, inasmuch as it rests upon evidence the most conclusive that can be offered; and upon facts as positive and incontestable as historical facts can be."

107. Don J. A. Ferrari, physician in Xeres, in his account of this pestilence as he observed it in that city, has offered some very judicious observations and recorded several important facts respecting the topics now under consideration. "Xeres," he states, "is situated at an elevation of about sixty feet above the level of the sea. It experienced the yellow fever in the years 1800, 1804, 1819, 1820, and 1821. There are no morasses, marshes, or other sources of insalubrity within its boundaries." Whence then did this distemper proceed in those years? If it is proved that heat alone, however excessive, cannot produce it; and if this city is free from those local causes to which it has been imputed by the anti-contagionists, no other source or cause of it proper to this city having been shown to exist, whence did it arise? It is satisfactorily proved that, in all these years, the distemper existed, previously to its appearance in Xeres, in Cadiz, Malaga, San Fernando, and Puerto Santa Maria: and Dr. Ferrari shows that Xeres was infected from these places. In order to decide the questions of importation and contagion, he remarks, "it will be necessary to prove, in the first place, the arrival of some infected person in some particular quarter, and this is precisely what I shall endeavour to demonstrate from the facts which took place in this city, during the five epidemics which have been experienced in it since 1800, and which have fallen under my observation. In all these the mode of invasion has been the same. The malady had appeared in some of those towns, from which the infected person, who introduced the contagion into Xeres, had removed; as fully proved by the Municipal Board of Health in this city (the evidence and documents to this effect being lodged in the library of the board); and it has uniformly happened that the fever began in that quarter only where such person had lodged." "At the time of its appearance, or before its progress had extended, the malady existed only in the quarter in which it was first seen. Confining itself to that for some days, its progress slowly increased, following the direction of the street in which it first appeared; and of the houses adjoining the first infected. When it had spread through the city its propagation increased in proportion to the great number of communications which the increase of sick occasioned; and during all these periods, it was uniformly observed, that the disease began with units, proceeded by tens, and concluded by hundreds. When we consider," he adds, "that the distemper has always appeared in the sea-coast towns having intercourse with the West Indies, and extended itself to the adjoining towns and villages having had a communication with these, and not in those which have no such intercourse, or with which all communication has been cut off; nor with those in the centre of the peninsula, nor in any other save coast towns, although the latter may be less exposed to heat than the former; if it has been observed that its prevalence in Xeres took place only at the period when its importation could be traced; that during the time when the intercourse was less and the navigation less common, the disease was also less frequent; and if the patient suffers the distemper only once, as in the case of the small-pox, can we doubt of its importation and contagion."

108. Dr. Ferrari thus states the results of his observation: — "1st. That the cause of pestilential yellow fever is a poisonous miasma of a peculiar kind.—2d. That this contagious poison is the effect of the union of certain causes, developed by a high range of temperature.—3d. That the high temperature is only a necessary condition, but not the exciting cause.—4th. That as, in this city (Xeres) there does not exist, nor has ever existed, that union of circumstances necessary for its production, this distemper is not spontaneous, but has been imported as often as it has been experienced.—5th. That, from its mode of invasion, communication, and propagation in this city, we are necessarily led to consider it contagious: — and 6th. That, although it is certain that contagion and not heat alone may re-produce this pestilence, the re-production is neither so frequent nor so easy as is supposed."

109. This pestilence appeared in Barcelona in 1821, and extended to several places in the vicinity, and a commission was sent out by the French government, consisting of four eminent physicians, to inquire into its source and nature; and, in 1823, a very detailed account of it was published by the commission, forming perhaps the best treatise extant on this distemper. This commission consisted of MM. Bally, Francois, Pariset, and Mazet, the last of whom died at Barcelona. Barcelonetta first experienced the malady, although this suburb is remarkable for its cleanliness and dryness; and soon afterwards the port; these places having the most frequent intercourse with the shipping. About the end of April, 1821, many vessels left the Havannah and Vera Cruz, where this pestilence was then prevailing, for several destinations; a large number proceeding to Barcelona, where they arrived about the end of June and in July. During the voyage to Europe many of the sailors died with the black vomit; their clothes and bedding being generally preserved and brought in the vessels. Notwithstanding these occurrences, free communication became established between the port and the ships, and between the ships themselves. These facts, as well as the following, were furnished by the authorities in Barcelona to the commission, but were mostly verified by it in various ways. The ship, "Grand Turk," had conveyed a number of negroes from Africa to Cuba; these negroes suffered severely from malignant dysentery. Having landed them at the Havannah, she departed thence for Barcelona and arrived in sixty-one days; having lost several of her crew by yellow fever on the passage. Soon after her arrival the captain received on board his wife, children, and a servant. The whole of this family were very soon afterwards taken ill and died at Barcelonetta. The mate also entertained on board of this vessel, his wife and his wife's sister and brother. Twenty-four hours afterwards his wife's sister and brother were attacked with fever and both died with black vomit; several other persons were also seized after visiting this vessel. Now the commission assert that they went on board this vessel and heard these facts stated by the captain and mate; and they, moreover, furnish further details of the infection conveyed in other vessels which arrived either about the same time as this or soon afterwards, and communicated to persons holding intercourse with them; and of the various circumstances which occurred in connection with the appearance of the pestilence in the city, all tending to explain the rapid extension of it, and the very inefficient measures taken to restrain its progress. It is impossible for me to advert to the numerous facts and circumstances bearing on the topics under discussion adduced by this commission. They may be perused in detail in their able work. From these they contend, 1st. That the pestilence which desolated Barcelona and several places in the vicinity in 1821, is the same distemper as the malignant yellow fever of the West Indies, and as the epidemics which have desolated the south of Spain at various periods since 1800. — 2d. This pestilence is eminently contagious. — 3d. That it was imported into Barcelona by the vessels which left the Havannah on the 28th of April, 1821, and soon afterwards. — 4th. That the germs of this distemper conveyed by these vessels reside either in those actually sick of it, or in their clothes and bedding or other effects similarly contaminated, or in the air respired in these vessels by those visiting them.

110. Now these facts have surely either been unknown to, or, if known, entirely suppressed by, Dr. O'Halloran, who has professed to give an account of the Barcelona epidemic, and who has espoused the doctrine of local origin and non-infection. This writer states that persons sickened of the pestilence who observed the strictest seclusion; and that the attendants on the sick, the nurses in the hospitals, and the washers of clothes and bedding "generally escaped the impression of the malady." Notwithstanding this most unblushing assertion, the facts, as verified by official documents and by medical men of high character, are of a most opposite description; namely, that very few of the nurses and attendants on the sick escaped; that next to these confessors and priests in attendance on the sick were most frequently attacked; and next to them medical men. Thus the Capuchins were constantly engaged in assisting and confessing the sick, and their whole number, sixty-three, were infected and twenty died; and, so far from his assertion being correct as to the failure of seclusion, I may state that the evidence of its success is the most complete. The following convents, — the Capuchins, Los Angelos, Santa Theresa, San Juan de Jerusalem, the Hieronymites, and the Carmelites — observed the strictes seclusion, and not one of them had a single inmate infected; whilst all the other convents which communicated with the city had the greater number of the sisters attacked. Thus the Magdalen, consisting of fifteen sisters, lost ten, all having been infected, The sisters of Jerusalem, consisting of twenty-eight, had eleven deaths, and the others in nearly the same proportions. The French commission state that, at least twenty-two physicians and surgeons died at Barcelona of the pestilence besides medical pupils, assistants, and apothecaries In the military hospital almost none of the assistants to the physicians and surgeons escaped the disease, and many of them died. One of the members of the commission stated, that the great mortality among the medical men at Barcelona was an illustration of what he had witnessed during the epidemic yellow fever of St. Domingo in 1802 which carried off, in eighteen months, 206 physicians and officers of health.

111. In consequence of a decree of the Corte of the 13th of December, 1821, requiring the authorities of Cadiz, Malaga, Barcelona, and the principal cities which suffered from the hæmagastric pestilence to consult the scientific bodie and the most celebrated physicians regarding the existence of contagion, medical juntas were formed in these cities and several other places; and al these convocations decided that this distemper i unquestionably contagious; that it is exotic and imported; and that the best means of preserving the country from its ravages is the establishmen of regulations which may prevent the entranc of the pestilential infection.

112. It is of the utmost importance to the community, as well in temperate countries as in tropica regions, that the subject so long agitated, as to the nature of this pestilence, should be put to rest The questions, as to the origin and diffusion of it

have been explained in so different and even so opposite a manner during the early part of this century, and discussed so frequently and so variously — in a calm and philosophic temper by a few, with intemperance and an incoherent want of argument by many, with manifest ignorance of the subject and even of the language in which they wrote, by not a few — that they have been received as matters of the utmost doubt and uncertainty by those who have mere authority only to guide them to a just conclusion, without having suffered that experience and toiled in that field, which might have enabled them to judge for themselves. Much that has been written upon the subjects embraced by the questions at issue has tended to mystify, rather than to enlighten; to involve in utter confusion when attempting to explain what was already clear and unmistakeable; and to gloss with a false science what was manifest to common sense. Let the writings of the apostles of non-infection, especially as regards this distemper, be adverted to, and the mode in which they handle a very simple question be considered. In our simplicity we believe that, when one subject becomes infected with small-pox, or measles, or scarlet fever a short time after having been near to one or more persons already affected by either of these maladies, the infection has been communicated by these persons, whether the disease in question be epidemic at the time or not; and that, when persons who have recently experienced either of those maladies, or when the clothes of some one who has recently died of it, have been conveyed into places where the disease did not then exist, but where it soon afterwards broke out and prevailed, the infection of that particular malady was actually introduced. Now, observing these occurrences so frequently as to become familiar in respect of these distempers, and knowing that occurrences identical with these in every particular have taken place in regard to this pestilence, can we be so blinded by a false doctrine or by prejudice as not to infer, that the latter belongs to the same category as the former, — that the one is infectious as well as the other; more especially when, like them, it attacks the same frame only once, as long since stated by many observers, and now satisfactorily determined and admitted? But the enlightened observers of what is going on in the "bowels of the earth," consider this view of a scientific subject too common-place for their credence, and see it otherwise; and, in one sense of the word, although not in that which they would attach to it, much more profoundly. They either avoid allusion to this mode of communication altogether, or endeavour to explain it conformably with what they would term scientific views; and in place of what is based on incontrovertible evidence — upon what is palpable and unmistakeable — they substitute hypothesis and mystery, and adduce vague and unintelligible explanations to veil what is manifest, and to prevent the adoption of measures which alone can protect the lives of thousands, however they may for a time affect the pecuniary interests of the few — of the speculator and the capitalist, the modern curses of the general community. With no other object than the promulgation of truth, the surest basis of national prosperity as it is of all human science, I proceed to notice the last appearance of this pestilence in Gibraltar, respecting which the closest inquiries have been instituted both by a board of British officers and by a commission of physicians sent by the French government; and I shall adduce nothing but what has been satisfactorily proved by the most irrefragable evidence.

113. By the official returns there arrived at Gibraltar between the 1st of June and 1st of September, 1828, several vessels from Cuba and ports of Spanish South America, on board which at least ten deaths occurred during the passage. The ships more especially suspected were the Meta, the Hyperion, and the Dygden. They had come direct from Cuba and the Havannah; having been from forty-six to fifty-four days on the passage. Shortly before leaving the Havannah, where this pestilence was then raging, the Dygden lost four or five of her crew by the distemper; and, at least one of the men engaged to supply their places came directly from the hospital where he had laboured under this malady. During her passage to Gibraltar of forty-six days, nine persons were ill and two died. This vessel was put in quarantine; but the quarantine appears not to have been rigidly enforced; for during its continuance she was visited by smugglers; and at its termination, if not before, dirty clothes were landed to be washed; and two sailors were admitted into the Civil Hospital from this vessel, evidently ill of this distemper, although it was either not recognised, or not entered in the books of the hospital as such, by the medical attendants. From the smuggler and washerwoman to whom the foul clothes were sent, and from their families, the disease spread; and to them as well as to others who held communication with the importers of infection, it was traced much more correctly than it could be possible to trace the early progress of an epidemic of small-pox or scarlet fever, the infectious nature of which is undisputed.

114. It was satisfactorily proved to the boards of inquiry, and to the French commission as shown by their reports, that in addition to these facts, the mate of the ship was ill whilst in quarantine, and not reported to the inspector, — that one of the men who went on board to assist in navigating her to Cadiz was taken ill a few days afterwards, — that the clothes of the men who died on board this ship were sold to sailors who landed from her about the 6th of August whilst at Gibraltar, — that the sister of a sailor who landed from this vessel, and who had had the black-vomit fever in the Havannah immediately before he embarked from that place for Gibraltar, received a bag of foul clothes belonging to that sailor, and fell sick on the 20th of August, — that the health guard, Teste, who was placed on board this ship on the 27th of July, declared to several persons that she brought the yellow fever to this garrison, — that the sister of this health guard who, on the 11th of August, assisted to wash his clothes which he brought from this ship, fell sick on the 21st, — that the first persons attacked were the connexions of sailors and health guards, and persons who had recently been on board ships, and washerwomen; and that the ship Dygden was admitted to Pratique on the 6th of August, and the first case of the pestilence occurred on the 12th of the same month. It cannot be disputed that, when the sailors of this ship landed at Gibraltar with the clothes of the men who died of this distemper on board her, all the

collateral circumstances favourable to the propagation of it were present, namely, the sultry calm of a southern autumn; the peculiarly sheltered, unagitated, and humid state of the atmosphere at this season; the steady high range of the thermometer, and the abundance of subjects liable to receive infection from not having experienced the protecting influence of a previous attack. From the above evidence, from the circumstance of this fever being identical with the black-vomit fever of the West Indies, and with the epidemic fever, which have committed such ravages in this garrison and in the south of Spain, at different periods; from the fact that it is essentially different from every fever indigenous in any part of Europe, in its mode of attack, its symptoms, its duration, its consequences, and its anatomical characters; and, above all, from its affecting the same individual only once during life, it was rationally inferred that this malady was imported, and was not of local origin.

115. These inferences were further supported by the considerations,—1st. That not one case of fever identical with this pestilence had occurred in Gibraltar within the thirteen years preceding 1828, excepting four, which occurred in lightermen and Jews who had been in the habit of having intercourse with West India ships; although it is presumable that during that period all the physical causes inherent in the place and capable of generating disease, had been in as full action as at the breaking out of the epidemic; and although the population was more dense, and the houses less commodious during these years than in 1828, as proved by undoubted evidence. — 2d. That there was no evidence to show that there is any source of malaria within the Gibraltar territory, or that the effluvia arising from drains, even when they were most offensive, had any share in producing the distemper. The general conclusion, that this pestilence was imported into Gibraltar in 1828, and that it was afterwards propagated by direct communication, and by means of the clothes of persons affected by it, is conformable with facts observed in numerous other places, and with the results of enlightened observation and rational reflection—with the dictates of good common sense.

116. Dr. Jackson, in his work on this pestilence, especially as it appeared in the south of Spain in 1829, evidently considers, and in this respect errs with many others in thus considering, it identical with the endemic of the West Indies, and differing merely in its epidemic form—that it is the endemic heightened in degree, and rendered more prevalent owing to the intensity and diffusion of the terrestrial cause. It is painful to observe how injuriously this impression has acted on his mind whilst describing the true pestilential disease; for in that description he has mixed up many of his recollections of the West Indian endemic, and has wandered into lengthy lucubrations as to the type of the malady, and as to the influence of temperament in modifying its form, and has furnished the most undoubted internal evidence that he entertained no distinct views of the distemper, inasmuch as the whole is laboured, and in many places quite unintelligible. He remarks that "there is not one practitioner in one hundred who has resided for years in the West Indies, who believes that the concentrated endemic of that country, usually called the yellow fever, is a disease which possesses the power of propagating itself from person to person within the tropics." Certainly there is not. It is well known that all the writers on West India diseases during the last and present centuries admit this, but many of them — nay, the majority — also admit, what is the fact, that the severe endemic of that climate is not this pestilence; that the former is liable to be mistaken for the latter; and that both are often confounded together, although they are as distinct, indeed more distinct from each other, than measles and small pox. And in this Dr. Jackson errs with the minority, using at the same time terms which involve a theory, or mean nothing. Thus his "concentrated endemic" must either mean the more malignant form of remittent, which I have described, from frequent observation of it in warm climates, in the *art.* Fever, by the name of *malignant remittent*, and which I know well is neither infectious, nor the pestilence now under consideration, the differences between which have been long since pointed out by many very intelligent and experienced observers (see §§ 39. 121, *et seq.*).

117. Those who rightly contend for the infectious nature of this pestilence, view it as entirely distinct from the endemic and sporadic malady or remittent which resembles it, in some respects, as shown above (§ 39.). The non-infectionists, on the other hand, consider both diseases to be the same, the endemic or sporadic malady being, as they believe, heightened in degree under peculiar circumstances of the soil and situation, and of the atmosphere. They contend that these circumstances are sufficient to account for the phenomena observed in the epidemic or true pestilential disease without calling in the aid of infection. As the infectionists themselves admit the non-infectious nature of the endemic or sporadic fever which occurs in warmer climates, and which often appears in more temperate countries, during hot seasons, and assumes many of the characters of hæmagastric pestilence the problems to be solved are, 1st. Is the latter distemper also non-infectious? 2d. As it is admitted that the former arises from terrestrial emanations or malaria, during high ranges of temperature and a humid state of the atmosphere, altogethe independently of infection, does the latter distempe also acknowledge only the same sources, when they are rendered more intense?

118. What has already been adduced may appear to the unprejudiced sufficient to solve th above problems. Phenomena, circumstances, and facts cannot be annihilated by special pleadings by confident assertions without proofs, and by vague hypotheses; and when we find that thes have been chiefly confided in by the non-infectionists, and that they have confounded togethe two diseases possessing very distinct and altogethe different characters, and, in their various pleadings have imputed to one malady that which does nc belong to it, because it appertains to the other, ar we not compelled to believe either in the innocenc of their ignorance, or in the guilt of their sophistr and unfairness? I shall leave the reader to adop either alternative he pleases after perusing th following coquettings with infection by the greatest authority which this party can boast of, desirin only that the postulates, and the terms either ("no-meaning," or involving some crude hypc thesis, may not be overlooked. Dr. Jackson ru minates as follows: — "The general atmospher

of an epidemic circle is charged with a material of an unknown quality, distinctly offensive to health and animal life. The epidemic influence is general throughout a given district, more concentrated at some points of the district than others, from causes totally unknown to us, or only partially known. The atmosphere in the apartments of the epidemic sick, particularly if these apartments be crowded and ill-ventilated, may be supposed to be charged with this offensive material in a comparatively higher proportion than the common atmosphere, inasmuch as it has there less opportunity of being diffused. That, however, is only supposition; the following is fact: — *Persons of every habit, but more especially persons of susceptible habit, who enter into the apartments of those who are ill of the epidemic fever, rarely fail to experience unpleasant sensations at stomach, viz. distension and irksomeness; not infrequently uneasiness in the bowels; suspension or change in the natural functions; headache, heat, pain of the eyes, thirst, white tongue, disturbed sleep, and dreaming, amounting to reverie.* These beginnings of the morbid act are local; and as such they are for the most part removable by the prompt application of remedies that act locally, that is, by emetics, purgatives, or others, which produce decided changes in the secreting surfaces of the alimentary canal." "It is not said, that the impressions which produced indisposition on these occasions were impressions from the cause of yellow fever; it is evident, that the general atmosphere was epidemic; and it was probable that the atmosphere of the sick ward was so in a higher degree than elsewhere; or, if not so, that the diseased act was there suffered to explode with more facility, in consequence of the diminished coercive energy of the atmosphere which filled the sick apartments" (p. 49.).

119. I have copied the above verbatim; the postulates and nonsequiturs will be readily recognised without much logical aid. If the passage which I have put in italics is not a convincing proof of infection, especially when recorded so innocently, so unconsciously, by the arch non-infectionist, I know not what else can be considered as such. But wherefore should Dr. Jackson say as above, that "emetics, purgatives, or others which produce decided changes in the secreting surfaces," act only locally? His experience surely should have proved the contrary. The reader will further perceive the "no-meaning," or absurdity, into which he lapses at the conclusion, when he attempts to escape from the very obvious, the palpable effects admitted by himself to be produced by the emanations from the sick. But he goes on further to admit as follows: — "The yellow fever, during the reign of epidemic influence, often strikes like a pestilence by the mere concourse of people in a close place; and if a mass of sick persons be collected into an hospital during the epidemic season, the common emanations from the sick bodies, whether saturated with contagious particles or not, often act offensively on those who enter the circle, and often appear to be the cause of the explosion of a disease which, without such accessory or changed condition of the medium in which men live, would have probably remained dormant for a time, and perhaps for ever. The instances of persons who have lived in apparent good health in simple epidemic atmospheres, and who have become sick soon after they entered into the circle of a crowded assembly, or the crowded wards of an hospital of sick, are numerous, and so well marked, that they stagger, on a superficial view, the opinion here contended for, of the non-contagious nature of the yellow fever." (p. 44.) To be sure they do, and being admitted by Dr. Jackson they become evidences of infection as strong as "proofs from holy writ." But the superficial view, which he here deprecates, may nevertheless be the just one; at all events, I leave the more profound doctrine of the fons et origo mali e profundis, which he considers the truly scientific and credible one, for the adoption of those who,

> —— "by the glare of false science betrayed,
> That leads to bewilder, and dazzles to blind,"

can see no truth in that which is a topic of general belief, which has good common sense to recommend it, and which is based on established facts, and supported by numerous collateral evidences and analogies.

120. I have already, and perhaps sufficiently, adverted to the circumstances of the great majority, if, indeed, not all of those who believe in the non-contagious nature of the hæmagastric pestilence, having confounded this distemper and the more malignant forms of remittent or endemic fever with each other (§§ 121—123.), and of the infectionists having considered that this pestilence is distinct from the latter; that it is infectious, but that the endemic is non-infectious, and of local origin; and that, whilst the same person cannot be infected by the former oftener than once, he may be attacked by the latter twice, or even oftener, especially under circumstances which will appear in the sequel. To these topics it is necessary more particularly to advert.

121. *d. That this pestilence is not identical with the endemic or remittent yellow fever of Africa and America,* I can assert, from my own observation and the testimony of the most experienced writers. The results of my observations are certainly in accordance with the evidences furnished by Mr. Boyle, and several of his contemporaries in the British settlements in Western Africa*, in so far, at least, as that the former distemper is distinct from the endemic fevers of Sierra Leone and the west coast of Africa. The hæmagastric pestilence appeared at Sierra Leone in 1823 and 1829, presenting identical characters in its invasion, progress, and termination with those observed in the West Indies, North America, and the south of Spain; and although it was most fatal among the crews of vessels, and those recently arrived, yet it carried off many of the old residents and coloured population and of those who had undergone the season-

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* Misstatements having appeared, although of slight consequence, respecting the author's visit to Western Africa, he thinks it due to himself explicitly to state, that he never had the honour or advantage of being in any public service, or in any service whatever; that his passages to and from Africa were altogether at his own private cost, and were dearly paid for before embarking in both instances; and that his travels between the several British settlements and other places, as well as his residence in the former, were also at his own charge and expense. He may further state, that having obtained his degree in medicine after a continued residence of seven years at the university, he has exercised his profession in no other capacity than that of physician; and that he employed the time which intervened between that of leaving the university, and that at which he joined the College of Physicians of London, and commenced practice in the metropolis, in travelling, unaided and unpatronised, in various countries, with the view of obtaining medical knowledge.

ing and remittent of the country, and who were considered safe from any return of these. The above writer and Dr. W. Barry agree in stating this to have been "a fever, not entirely new, but extremely rare" in that country; and that it appeared during the healthy season, when the endemic remittent fever is not prevalent. That this pestilence was infectious at Sierra Leone is shown by the conviction to this effect of the educated and respectable part of the population; by the history of it in the Bann and Eden ships of war, and in many other vessels, and by its extension from the Bann to the military in the Isle of Ascension, and to other ships. There is generally much difficulty in distinguishing the malignant remittent of Africa from this pestilence, owing to the imperfect remissions of the former, and to the presence, at an advanced stage of fatal cases, of many of the symptoms characterising the early and rapid progress of the latter; and hence the epidemic is generally advanced, or has extended to many, before its nature is recognised. Opinions as to the origin of these two epidemics in Sierra Leone were by no means consistent with each other. The disease was said to have commenced amongst the inland native population, and to have extended to this town and the shipping, as well as to places to the northward of it on the coast. There can be no doubt of the fact of the prevalence of this distemper among the natives of those places before it appeared at Sierra Leone, but it was milder, less prevalent, and less fatal among them, than among Europeans. On the other hand, the grand jury of this port state in their presentment, as respects the epidemic of 1829, "that they attribute the present unhealthy state of Freetown to the practice of landing slaves from the prizes in the centre of the town, where they are necessitated to remain under the disease with which they are afflicted in a small yard, not more than 120 yards square."

122. It would be more tedious than instructive for me to adduce even a part of the evidence now before me of the distinct nature of this pestilence from the endemic remittent yellow fever of warm climates. Every writer, from Lining to the present time, who has espoused the infectious nature of the former, and all those whose opinions I have noticed above, both British and Foreign, agree in admitting the distinction, whilst many of the non-infectionists either cannot recognise a difference, or do not choose to do so, as it militates against their doctrine. I shall only adduce the opinion of M. Guyon, one of the chief physicians attached to the French army which occupied Cadiz in 1827 and 1828; because he states, that he formerly believed in the identity of this pestilence with the malignant form of remittent fever; but that his observation and experience in Spain had convinced him that he was wrong. He remarks: "Not that, with all my belief as to these diseases being identical, I had failed to perceive well-marked differences between the one and the other; but it must be owned, such is the influence of an opinion already formed, that, of the facts connected with it, we see only the side favourable to that opinion. The differences between these two maladies are many;" and he forthwith proceeds to point them out with much accuracy. Much of the misconception which formerly existed respecting these maladies, was owing to the unfortunate names given to them, especially to the application of the term yellow fever, which, as will be seen from what has been adduced from various writers, was generally applied to this pestilence, although the yellowness of the surface was more remarkable in the severe endemic remittents, not only of Africa and America, but also of the south of Spain and shores of the Mediterranean.

123. The remittents, whether bilious, gastric, malignant, &c. (see Fever, *Remittent*), with which this pestilence has been confounded, are diseases depending upon the nature of the locality — upon exhalations from the earth's surface and its productions, varying however, in character and severity, with the temperature, humidity, and stillness of the atmosphere, and most probably also with the electrical states. But this pestilence is produced in all cases by an animal poison—by an infectious miasm generated by, and emanating from, the affected; and contaminating the immediately surrounding air, and various animal or other substances capable of imbibing it, and of imparting it to the atmosphere, but requiring certain states of the air as regards temperature, humidity, and stillness for its dissemination; and thus, as it will be more fully seen from what has been stated respecting *remittents*, and from what has been already adduced as to this pestilence, the one proceeds from a distinct and specific cause, the other arises from terrestrial exhalations, of various grades of concentration, producing coordinate effects. This pestilence, wherever it appears, presents certain prominent features, like small-pox, or scarlet fever, however it may vary like them in severity and in certain subordinate characters. If it proceed from terrestrial exhalations, as the non-infectionists suppose, how is it that it does not appear in many situations where these exhalations are the most indisputably produced, and are as remarkably favoured by a humid, warm, and still atmosphere, as in those places where it has occurred the most frequently? And wherefore is it not observed within the tropics, in the eastern hemisphere, where the most malignant as well as the most mild forms of remittent fever is prevalent at some season or other?

124. Dr. Wilson, who observed this pestilence in the West Indies, states that 117 cases occurred within a few weeks, and that "though they varied much in violence, and in many other points, they were uniformly continued, and that nothing like remission could be detected in any of them." (p. 180.) — Jackson, Bancroft, Fergusson, and others, however, believe in obscure remissions, confounding this malady with remittent fevers; and hence arguing most illogically against the protection from it afforded by a previous attack. They further contend that reasons for not detecting remissions are to be found in the "violence of cerebral action and speedy gangrene of the stomach;" or in the circumstance of the functions having been overwhelmed and extinguished. Now cerebral action is often not violent. The power of the brain is rather depressed than excited; and it is well known, that the stomach is not found gangrenous in those cases, in which the examination of the body after death is not too long delayed. Besides, in a large proportion of cases there is neither overwhelming nor extinction of the functions, but a slight grade of febrile actions in many instances followed by quick recovery; and yet, even in these, no remissions

occur. But this topic requires no further illustration. Another important circumstance evincing the marked distinction between this pestilence and the worst forms of endemic fever is the fact, that recovery from the former is generally rapid and complete, without the visceral enlargements and obstructions so frequently observed to follow the latter. The morbid appearances after death are also different, for, whilst the liver and spleen are generally more or less congested, enlarged, and softened by the endemic remittent, these organs are even paler and less vascular than natural, although often somewhat softened in common with the rest of the textures, in the hæmagastric pestilence.*

125. *e. That this distemper attacks the same individual only once*, a previous infection protecting the system more decidedly from a future seizure than even small-pox or scarlet fever from a second attack of these maladies, has been remarked by every experienced writer since Lining, and is an additional proof of the two propositions which I have endeavoured to establish, namely, 1st. That this malady is propagated, like them, by an infectious emanation or animal poison; — 2d. That it is different from the more malignant forms of remittent or endemic fever which is produced by terrestrial exhalations, which is non-infectious, and which attacks the same individual oftener than once, especially if he have had a change of climate after the first attack. Dr. James Clark, who had great experience of this malady in the West Indies during the latter part of the last century, and who has carefully distinguished it from the remittents of these islands, states, "that those who recovered of this fever were never attacked a second time, at least no instance occurred of it in our island, nor in any of the other islands, as I have been informed." (p. 19.) The truth is, that no recent writer has denied this fact, excepting those who have confounded this pestilence with remittent fever; and who, having seen repeated attacks of this latter malady in the same person, and believing both maladies to be identical with each other, have fallen into the sophism of believing that what was true of the one was also true of the other. The protection afforded by a first attack, although recognised by several writers before Sir W. Pym, was never duly insisted upon and turned to a beneficial account, until his services were so usefully exerted in the early epidemics of Gibraltar. About the same time that he was acting upon this knowledge to the advantage of many thousands, the Spanish physicians also became aware of the fact, from observing that all those who had suffered from the distemper during former epidemics were not infected by it subsequently. Notwithstanding the numerous evidences of this important fact, adduced both in Europe and America, and by the French medical commissions, still the truth of it was disputed by the non-infectionists; for they believed, and believed truly, that the admission of it would be the surrender of one of the strongest positions which protected their doctrine. But the determination of this fact so as to place it beyond the cavils of a party, and the special pleadings of the prejudiced, was undertaken by Sir W. Pym at Gibraltar; and notwithstanding the opposition of writers, already passed into oblivion, is now established as one of the most undoubted truths in medicine. He acted upon it in Gibraltar in 1810, and was thereby enabled to cut short at once an incipient epidemic. "He separated the first sick and the suspected from the healthy population, using, as his instruments of separation, those who had acquired the necessary immunity in some former epidemic. This proceeding now forms the basis of the sanatory law in Spain, and has been successfully repeated in Barbadoes in 1821 by Mr. Green." (Sir D. Barry, *loc. cit.* p. 97.)

126. *f.* Much, indeed the greatest part, of the numerous calamities of which this pestilence has been the cause, has arisen from the manner in which the crews of ships have been disposed of in respect both of the appearance of it in ships whilst at sea, and of the communications of the crews and of their personal effects with the ports to which they are destined. Of the latter of these topics sufficient notice will be taken hereafter; but it will be necessary to the full consideration of the infectious nature of this distemper, that some notice should be taken *of its appearance in ships of war, in transports, and in other vessels.* I have perused most of the accounts of the outbreaks of this malady on board of ships to which references are made in the Bibliography to this article; and I have been particularly struck, not only by the very imperfect manner in which so very important a topic as the origin of the distemper on ship-board has been considered in most instances, but even by the neglect of it altogether, the reader being either left quite in the dark and to his own inferences, or he has intruded upon him various suppositions or false facts in the shape of foul ballast, bilge-water, chips, shavings, &c., which have been considered quite sufficient to account for the accumulated horrors which have been witnessed. Amidst the numerous distressing details, through which the reader who wishes to investigate the subject will be doomed to labour,

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* Dr. Imray states that, in the epidemic of this pestilence which he observed in Dominica in 1838, the yellow hue extended over the body, but was deepest in the neck, shoulders, and breast, with here and there dark irregularly shaped spots and blotches, these parts and the scrotum assuming, immediately after the extinction of life, a greenish colour and livid appearance, while the yellow tinge over the whole body was deepened. Black vomit was not so constant as the yellowness of the surface; but it occurred in the majority of the fatal cases. "On examination after death, even when black vomit had not occurred, the stomach was always found to contain that fluid; and in all probability, in most of those cases that ended very rapidly with but little gastric disturbance, dissection would have revealed the presence of that fluid in the stomach. This deadly symptom usually occurred on the third or fourth, sometimes on the second day." When the dark vomit came in contact with the patient's linen or sheets, it left a dark indelible stain. In the endemic remittent of the island, (he adds,) "yellowness of the skin not unfrequently takes place, but is unaccompanied with that peculiar lividity of the neck, shoulders, and breast," which is so frequent in this pestilence; black vomit occurring very rarely in the endemic remittent.

To the above distinctions, Dr. Imray adds that this latter disease is seldom so sudden in its attack as the former, is usually ushered in by chills or rigors, and is marked throughout by distinct remissions and exacerbations; but in this pestilence, any sensation of cold was seldom experienced, either at the commencement of the attack or subsequently; and no remission was ever observed until the period of deceitful calm, when all pain and febrile excitement subsided. "This state, however, was never followed by an exacerbation, but seemed to proceed from loss of excitability and exhaustion of the vital energies." The above is a very correct and precise diagnosis of the two maladies which has been so ignorantly, if not dishonestly, confounded with one another by so many writers against the infectious nature of the hæmagastric distemper.

he will find very few who impute this distemper to any other source than to the above, or to some other cause equally absurd, and quite as inadequate as they are to explain the results. Although the ships which have been the subjects of these dreadful visitations have proceeded very shortly before from ports in which this pestilence was prevailing, or have recently received persons on board from, or otherwise communicated with, these ports, or with other vessels containing cases of the malady, or even although they have been actually lying in the harbours of the towns where the pestilence was prevailing, still these writers could see nothing to account for the appearance of it on board the ships of which they had the medical care, than some one of the suppositious causes now mentioned, which, even if proved to exist altogether in their fullest force, are quite inadequate to the production of the effects, often too weakly or too lightly noticed. Let any one, who feels duly the responsibilities of the medical character, read the accounts so frequently furnished us by the chief actors in the scenes which they describe — the statements of black vomit or yellow fever having broke out; of the greatest part, or the whole, of the crew having been attacked, and of nearly the half having died — without any rational explanation of the occurrence being attempted, without any idea of or reference to infection being entertained, without any evidence to show the absence of infection, or that it had not been introduced; and, what is still more monstrous, without any satisfactory attempt, or even without any attempt at all, having been made to limit the mischief, or to prevent the extension of the infection to the healthy, — and having thus read the dry details of facts thus furnished him — facts barren as to the minds of most of the narrators, and of them only — let him then come to the conclusions if he can, that all has been correctly observed, and rightly inferred; and that measures of prevention have been sagely, or even at all adopted.

127. This pestilence appears in the crews of ships of war, or transports, or other vessels, and is readily recognised by the rapidity of the fatal result, by the black vomit, &c. The ships are at the time either in a port, or have recently left a port in which it was prevailing. One ship is provided with pig-iron ballast, and therefore, as it cannot be viewed as the cause, bilge-water, or chips, or shavings, below the limber-boards, which generally exist in all vessels, are most logically inferred to be the cause of the distemper. Another ship has shingle ballast, and lo! the source of mischief is discovered. A third has neither shingle, nor chips, nor shavings, nor even bilge-water to furnish an explanation, and as the idea of infection cannot for a moment be tolerated by the very scientific surgeon, he therefore arrives at the very transcendental conclusion, that the pestilence which has seized the whole crew, himself and assistant, and killed nearly half, is nothing else than the effects of a "*ligneous principle*" developed from wood by a high temperature! Whilst the men are dying like rotten sheep — in equal numbers and with equal rapidity with these not very sagacious animals — the commander is alarmed, all are amazed, explanations are required of the learned doctor, and in almost every case the reader will find that some one or other of the above causes is assigned by him. Infection suggests itself to common sense people, and probably to the commander; but the unfortunate surgeon's common sense is over-laid, is smothered, by vicious authority and worthless writings. Besides, he thinks infection a "vulgar error," and its recognition below the dignity of science; or, if it intrudes itself upon his mind as the pestilence progresses, he feels that he has already committed himself, and cannot retract without practically exposing his ignorance. He, therefore, sticks to his explanation, even acts upon it, and afterwards, perhaps, writes a book to prove his sincerity. All the while, as the imputed cause is supposed to have already produced all the bad effects that will ensue, either nothing is attempted to get rid of it; or, if any attempt be made, the measures connected with such attempt tend only to diffuse, or to concentrate the infectious poison, which either was not dreamt of, or not guarded against, nor in any way restrained nor counteracted. Indeed, on too many occasions the prevention of disease in the public service is considered beneath notice: it has formed no part of professional education; and when the information, which has been acquired chiefly with the view of passing an examination, has to be applied to great or pressing emergencies, the cure of cases as they rapidly occur is attempted by certain heroic remedies, whilst measures of prevention are either never thought of, or very imperfectly employed.

128. Now the reader may suppose that the above is an extravagant, an exaggerated statement of singular or rare occurrences, and of the notions which they have suggested to the very scientific observers. But let him peruse the voluminous writings on the subject, if he can command the patience or the temper necessary to the drudgery, and then let him decide. In some instances he will find it admitted, that no cause for the evil could be detected in the ships themselves, and that, therefore, there was no cause for the existence of the pestilence, — or in other words, that the most terrific effects were produced without agents. They will, however, think that I am now actually doing the celebrated persons who have thus distinguished themselves a gross injustice by this statement; but they are themselves the perpetrators of the act. In Dr. Wilson's book on this pestilence he will find sufficient evidence to this effect. This writer has favoured us not only with his own opinion, but also with the officical opinions of Dr. Bancroft, Dr. Adolphus, and Dr. Macnamara, as to the appearance of this pestilence on board of certain ships of war. Now, these physicians held the highest medical appointments in the West Indies; and as we ought to find the highest amount of medical knowledge in the highest places, their opinions deserve respect — at least until we know them; but unfortunately after that knowledge is acquired all respect vanishes in spite of the most anxious efforts to retain it. As the reader may be more fortunate in this respect, let him peruse the official reports of these physicians in Dr. Wilson's work (at p. 141 — 147.); and let him endeavour to give as much credit as the amount of his credulity may permit to this writer's doctrine of the "*ligneous origin*" of this pestilence; for he avers that, if this origin be not admitted, "we shall be under the necessity of contemplating and endeavouring to counteract

a disease, regarding the origin of which we know nothing; we must look upon this sweeping pestilence as an effect without a cause, excepting such a cause as that *which smote the fourteen thousand Israelites in their tents*." One would have supposed that, after this apparent endeavour to discover a cause, some attempt would have been made to show that the malady did not arise from infection or contagion, either directly or indirectly introduced on the occasions in question, before the "*ligneous origin*," or "*principle*," or *product not arising from dry-rot* — this something proceeding from wood, but not recognised by the senses — this essence not seen, but believed in, nor detected chemically or otherwise — this ignis fatuus so alluring to the doctor, yet so destructive to his patients — could have become the object of a devoted faith, of a firmly rooted belief. But no such attempt is made, and although the ships of war were lying at Port Royal, Jamaica, when this pestilence first appeared in them; and although it is well known that it was more or less prevalent in this place, and in several of the ships in this port at the time, yet no notice is taken of the probability of infection having been conveyed on board the ships of war which were so terribly ravaged by it; and there does not appear that any attempt to prevent its introduction was made at any time. Indeed, on these occasions, as well as on most others, the adoption or non-adoption of measures of prevention rests with the commander of the vessel, or with the surgeon, under the sanction of the former; and where neither the one nor the other believes in infection no restraints are imposed. It would appear from the official reports of the high medical functionaries above named, that they did not believe in infection. It is well known that Dr. Bancroft has written voluminously, but it may not be equally well known that he has written either candidly or truthfully, in disproof of infection. By the official reports on the ships of war at Port Royal just alluded to, neither he nor his coadjutors have done themselves much credit. They have most entirely and most signally damned the cause they wished, at least professed, to support. Dr. Bancroft furnishes, "*proprio Marte*," the most damaging proofs — the most conclusive evidence that could be adduced against that very doctrine which he attempted to establish by means of too thick octavo volumes of misrepresentations and special pleadings. Dr. Wilson would have deserved the thanks of all candid minds for the publication of a report which entirely destroys the most vicious doctrine — the most destructive in its consequences to the community — that has blinded the understandings of weak men, had he not at the same time attempted to rear a structure equally injurious, and even more unstable and absurd than the one which he has so completely overturned. But let me advert more particularly to the case of the unfortunate ships of war which called forth the reports of the above great West India authorities.

129. It should be premised that the infection of this pestilence had lurked for several years or even longer in the most frequented sea-ports of the West Indies, as Port Royal, the Havannah, Vera Cruz, &c.; and as the inhabitants, especially those who have resided long in these places, have been once attacked and are no longer liable to be attacked again, it follows that comparatively few are predisposed to the affection, excepting strangers or young persons; the arrival of a number of the former, particularly of persons from Europe, being followed, whilst the infection remains in the place, by an increased prevalence of the distemper. Hence the arrival of ships from Europe — whether ships of war, transports, or traders, and of troops from a different climate, is often very soon followed by an outbreak of this pestilence among them, more especially if no measures are taken, as too generally has been the case, to prevent the introduction of the infection, or to sequestrate those first attacked. The Iphigenia ship of war, whilst in Port Royal harbour, became infected with this pestilence. At the desire of the admiral, Drs. Bancroft, Adolphus, and Macnamara proceeded to examine her, and reported her clean, dry, and sound in every respect. They admit that the malady prevailing in this ship was this pestilence; and that it could "only be produced by an external cause," as no cause could be detected by them in the vessel herself; but what this external cause might have been they appear to have been at a loss to imagine, for they summarily dismiss the idea of infection, without, however, adducing any evidence or argument against either the introduction or diffusion of the distemper by this cause. Whilst thus drivelling respecting the existence of "*an external cause*" — this suspected entity or non-entity — the following statement is made by this sage commission:—"We abstain, at this time, from offering any opinion as to the probable cause of the disorder [and this pestilence is only a *disorder* in Dr. Bancroft's estimation — the reporter of the commission] in the Iphigenia; though we think it right to state, that we have not hitherto found evidence sufficient to authorise the belief, that her anchorages in the harbours of Curaçoa, off Puerto Cabello, or Port-au-Prince, within the last five months, at all contributed to produce the fever." Now, what is here aimed at? They assert there was no internal cause or source of mischief; that hence there must have been an external one; but that this external one was not derived from the harbours just mentioned: they therefore would seem to infer that it existed, or was derived, from the port where this ship was now lying. But Dr. Adolphus comes to this conclusion, in a separate document. "I consider the fever (in the Iphigenia) to have been produced by increased temperature and other atmospheric causes;" and here he stops without a single word being added. This, therefore, we must consider as his "external cause." Dr. Macnamara next enlightens us with his "external cause," also in a separate document of most palpable absurdity. Here it is: "It is difficult to account for the generation of disease in a ship so well regulated, and in such a state of high discipline as the Iphigenia: and I am most positively and decidedly of opinion, that the disease, which has already committed such ravages on board that ship, is to be solely attributed to a particularly vitiated state of the atmosphere, the influence of which has been experienced along the whole of the American coast, from the northern bank of the Oroonoko to Boston in New England, and in the adjacent islands." How precisely this vitiation of the air, this arch assumption is limited! What countless crews of ships must have suffered,

what interminable wretchedness on ship-board, and on coast-board also, must have been produced by a "particularly vitiated" air, extending from the Oroonoko to Boston, inclusive of the West Indies, &c. How few could possibly have escaped destruction, seeing that the air which all within these extended bounds must have breathed, was in the "positive and decided opinion" of Dr. Macnamara in "a particularly vitiated state!" What a loss science has sustained in having had the particular vitiation in question, so decidedly and yet so precisely extended, left entirely unexplained, and its nature unascertained! But this deficiency may have been subsequently supplied, and the document supplying it may be buried in the rich repositories of the Medical Board and Somerset House. The reader has now got the opinion of the majority of the commission as to the mysterious "external cause" of this fever. What Dr. Bancroft's opinion is does not appear. Probably his experience as to his former opinions makes him more reserved on this occasion, and he comes into the field fortified by the caution of an old soldier.

130. The crews of ships of war, transports, or traders, are rarely the subjects of fever in the West Indies, unless they are exposed to the infection of this pestilence in the ports where it is prevailing at the time, or have the infection introduced among them from these ports, or from infected vessels. They are rarely in that country exposed to the malaria proceeding from marshes or lagoons, unless when watering, or when allowed to remain on shore, and then they readily are attacked by remittent fever, especially if they have slept within the sphere of these sources of disease. The pestilential fever now under consideration has appeared on board many vessels whose crews have not been exposed to these sources, and not a few of these have been ships of war which were certainly not so exposed. Nevertheless, attempts have been made, although most fruitlessly, to show that the causes of the distemper have existed in the ships themselves; either the ballast, or the bilge-water, or the wood itself of which these vessels were built, having been imputed as the cause, without the least endeavour to prove any thing actually noxious proceeding from any one of these sources, or to demonstrate the generation of any gas from them, whereby the air could be vitiated. Ships of war are now, and have long been, provided with iron ballast and tanks, so that the chief source to which the non-infectionists imputed the distemper did not exist in them; and yet we find that many ships of war have had their crews nearly altogether carried off by it; and although the introduction of infection might have been presumed, owing to the remarkable probability of such an occurrence, these vessels either being at the very time in infected ports, or very recently having left such ports, or having communicated with infected vessels, yet no satisfactory inquiry was ever instituted by the surgeons of these vessels to determine the question as to the propagation of the malady from these sources; the only inquiry that was made being that respecting the conditions of these vessels as to cleanliness and discipline. The probability, or even the possibility, of infection was not dreamt of: indeed, many of those to whom the matter more especially appertained, would neither see nor admit infection under any circumstances, neither the word nor the meaning attached to it being comprised within the limits of their belief. Take for instance the following:—

131. The distemper existed at Port Royal, in Jamaica, both previously and subsequently to the arrival of the Rattlesnake ship of war there, in July 1824; this vessel being clean, sweet, well ventilated. Dr. Wilson, the surgeon of her, admits that he was himself the first who was attacked; and that he, as well as the purser, was seized "*from exposure to the cause on shore.*" Indeed, there can be no doubt of both of them having contracted the disease on shore, for Dr. Wilson admits this in no less than two places at p. 159. of his book, written to prove the "ligneous origin of the distemper." And there is as little doubt of their having introduced the infection on board this vessel, although he argues against the existence of infection, but without furnishing any proofs of his position; the efforts to infer the non-existence of this property obviously originating either in a desire to establish his own hypothesis, or in the consciousness of having neglected measures to prevent the diffusion of infection — a diffusion fatal to a large proportion of the crew. The following are facts which cannot be refuted.

132. First; this pestilence prevailed at Port Royal, more or less for several years, about this epoch, namely, from 1819 to 1826; but the doctrines of Bancroft and other non-infectionists were exerting a most noxious influence over the minds of medical officers in the public services in the West Indies. Owing to this circumstance no measures were taken, with few or no exceptions among either the military or the naval forces, to prevent, to limit, or even to restrain, the spread of infection. The only restraints which were attempted, and these but few, were owing to the good sense of commanding officers. During this period the crews of many ships became infected with this pestilence at Port Royal; but the surgeons of these ships, with the exception of the surgeon of the Scout sloop of war, were blinded against infection, and had some favourite hypothesis to support.

133. Secondly; the Rattlesnake having thus arrived at Port Royal, where the distemper existed, communicated with that port; the officers who first went on shore were the first attacked by it; and nearly the whole of the crew were afterwards seized, at first gradually, but subsequently much more rapidly; for the ship having put to sea under a false impression as to the cause of the malady, and bad weather having come on, and occasioned the shutting of the gun-ports, &c., thereby preventing due ventilation, the distemper spread with greatly increased rapidity and fatality. These are the facts respecting this ship of war, and they cannot be gainsaid by any special pleader.

134. Thirdly; but in these fatal years, other ships of war arrived during the years 1824 and 1825 at Port Royal, and suffered in a similar manner to the Rattlesnake. The Isis ship of war arrived at this port in 1824, and this distemper appeared on board of her in October. She was ordered to the Gulf of Mexico, where the prevalence of north winds at this season reduces the temperature to about 65°, or even lower, and the disease subsided. This ship returned to Port

Royal in the following autumn, and the malady re-appeared in her, and was very destructive. In this year, the Lively, Pylades, and Ferret were half unmanned whilst lying in this port; and other ships were similarly infected. But the calamitous consequences of a general indisposition on the part of medical officers to admit the existence of infection were not limited to the naval service. The military medical officers, with the Coryphæus of non-infection then at their head, were equally blinded to every perception of the property to the non-admission of which the lives of thousands were sacrificed. Stoney Hill in Jamaica is situated 1300 feet above the level of the sea, and would be healthy for troops if precautions against the introduction of infectious fever were duly instituted. The seventy-seventh regiment arrived in Jamaica in 1825, and was stationed here. This pestilence appeared among them, and no satisfactory means of preventing its spread having been taken, it attacked nearly all, and carried off a very large proportion. It should be moreover recollected that the greatest prevalence of the distemper on shore among the military, and amongst the inhabitants of Port Royal, who were not protected by a previous attack (for this protection and its influence should not be lost sight of in the argument), was in the very year and season of its most destructive prevalence also in ships arriving at this port.

135. The surgeon of the Scout sloop of war sent home documents proving the contagious nature of this distemper on board of this ship; and Dr. J. Johnson, whose belief in this property appears to have been very limited, or contingent as he terms it, states that he "had seen these documents, and can vouch for the highly contagious character of the fever." (*Med. and Chirurg. Rev.* vol. ii. p. 12.) Now, if admitted to have been contagious in the case of this ship, and likewise in the case of the Bann, as demonstrated by Sir W. Burnett, the able and zealous head of the naval medical service, how comes the same identical malady to be non-contagious on board of other vessels, placed in similar circumstances to these, in which others it has been even more general and more fatal? Surely, if in about a dozen ships of war the same distemper appears after arriving at a certain seaport where that distemper exists, and if it be admitted by one from whom the admission is almost extorted, that it was actually contagious in one of these ships, it could not be less contagious on board of the other ships which had arrived at the same port, which had been infected from the same source, and in which it was even more fatal than in the one to which the contagion is conceded. This is a matter which concerns the lives, not only of the crews of ships, but also of regiments, of armies, and of the inhabitants of populous cities and towns; and yet it has been allowed up to the present day to be disposed of, and measures, or rather worse than no measures, have been permitted to be taken respecting it, in our numerous colonies and dependencies — in our fleets and in our armies — according to the visionary notions of the totally inexperienced, and of those altogether unacquainted with the nature and cause of the pestilence in question; or, what is still worse, to those who have formed erroneous notions respecting its source and properties. What can be the use of accumulated facts and of countless observations to prove that which requires no further proof, if they are not to furnish data, from which correct inferences are to be drawn for the benefit of the inexperienced, for the direction of the wrong-headed, and for the advantage of the general community, by those competent persons it is to be presumed to whom these facts and observations have been officially furnished? And possessing these data, should it not be required that such inferences shall be drawn by minds capable of weighing evidence and of devising rational expedients of protection, that these inferences might be made the basis of instructions for the institution of salutary measures for the guidance of the uninformed and the unthinking, and for the strict observance of the reckless and the vain theoriser, in order that hundreds of thousands of human lives may not be sacrificed to the Moloch of false doctrine, as they have been during a long series of years.

136. *g.* Let the occurrences at *Sierra Leone* in 1823 and 1829 be taken as a specimen of the mode of medical protection from pestilence in a colony most liable to outbreaks of it, although provided with a colonial surgeon, a deputy inspector of hospitals, and with other medical officers. This distemper has appeared at this place also in other years; but the colonial surgeons and deputy inspectors have written on the occurrences of these years, and books and reports have been the results of their Sisyphian toils. The governor of the colony, however, has thrown light upon a subject which they have confused and mystified; and has shown, as respects the epidemic of 1829, that it was imported into the colony, and that it was highly contagious both there and among the shipping. (*Narrat. of the Ashantee War, and Present State of Sierra Leone, &c.* By Major Ricketts, Governor. 8vo. Lond. 1830.) The medical writers on those epidemics — for they cannot be called authorities as regards this malady, unless they be viewed as such against the doctrine which they toil so ineffectually to support — found that a distemper which they recognised, after a time, as altogether different from the endemic of the country, had come among them; but they were quite unprepared for the occurrence notwithstanding the records and recollections of former visitations. They appear at first to have mistaken the malady for the endemic of the country; and when their eyes were opened they were amazed and alarmed; and they acted as they have written, in a state of imbecile confusion and bewilderment. Their accounts are full of contradictions. Whilst they argue against infection, they, in the unconsciousness of helpless ignorance, furnish the most conclusive evidence of the existence of this property. They admit that the persons attacked first in the colony had visited a place in the vicinity two or three days previously where the pestilence was then raging, yet they deny the existence of infection, and issue notices to prevent the adoption of precautions against the spread of the distemper, at the very time when such precautions ought to have been taken under their directions. They admit the identity of the malady on shore with that on board of several ships in the roadstead, and of both with the pestilential yellow fever, and yet they contend that it was altogether non-infectious in the former, and infectious in the latter! Their admission of this property in the ships was

evidently extorted from them by undeniable facts, and the firm belief of every rational and unprejudiced mind; but no measures of protection were proposed by them.

137. The *source* of the distemper might have been readily ascertained in both these epidemics, if the inquiry had been instituted by competent, candid, and unprejudiced persons. Indeed, in their unfortunate endeavours to mystify the matter they sufficiently indicate the source, although without the precision and force which might have been imparted to it by positive evidence. Still the admissions of infection which escape their powers of concealment are perhaps the strongest proofs of the fact that could have been adduced. The infection having been introduced without having been recognised or suspected, until its mischievous effects had proceeded far, by those whose duty it was to watch for, to detect, and to guard against it, their secret yet manifest desire was to deny its existence, and to suppress, misrepresent, and distort occurrences and circumstances accordingly. Although persons belonging to the colony had visited places adjoining where the pestilence was raging at the time, had returned to the colony, and were immediately afterwards attacked and died, other cases of the disease following upon these admitted to have been the first; and although ships, more especially slave-ships with sickly cargoes of human beings, arrived at the colony just before and at the time of the outbreak of these epidemics, some of the writers on the subject contended that the distemper had arisen from malaria brought from a distance by the winds, and others concluded that it had travelled from the interior of Africa to the coast — a sufficient admission of infection; whilst the more observant of the residents believed in its introduction through one or other of the channels just indicated, or through both. There can be no doubt, however, that the distemper was conveyed in 1823 on board of the Bann ship of war, then at Sierra Leone, where it was prevailing both on shore and in the shipping, either from one of the slave-ships detained at Sierra Leone, or from a trading vessel at that place; that the crews of the Bann and of the San Raphael, a tender to and accompanying the former ship, were generally attacked, a very large proportion having been carried off on the voyage to the Island of Ascension, from Sierra Leone; that the pestilence was introduced by these ships into that island where every one was seized, and many died of it; that the Driver sloop of war arrived in perfect health at this island, where a very restricted communication took place between her and the Bann; and that three persons "were taken ill with the prevailing fever, two of whom were sent on shore, and one died on board; and the captain very properly put to sea and used every precaution; and with these three cases the disease ceased." (Sir W. Burnett's *Official Report of Sickness, &c. in the Bann.*)

138. Whilst the pestilence was prevailing at Sierra Leone in 1829, the Eden and Champion ships of war left that colony for Fernando Po, and immediately upon their departure it appeared, and ravaged these vessels, all the medical officers, five in number, having been attacked, three having died. When the ships reached Fernando Po they had lost about half their crews. At this latter place communications took place between the crews of these ships and of the Sybille, the Hecla, and Black Joke; and the distemper appeared also in these ships, and became most destructive. These facts cannot be disputed, and whatever attempts may be made to explain them away by self-sufficient cavillers, they will still remain remarkable indications to all common-sense persons of that very important property of the distemper upon which every means of preventing and of restricting its propagation should be based; and to the neglect of which so much misery has been inflicted upon extensive communities, both civil and military, up even to the present day. During the continuance of this epidemic the crews of several trading vessels were nearly altogether swept away. Every person on board of two ships were attacked, and only two survived. This frightful mortality appears to have been mainly attributable to erroneous notions entertained by the medical officers of the colony as to the cause of the distemper, and to the neglect of every precaution against it, and of all means calculated to prevent its extension. Their minds were pre-occupied with one idea, and were incapable of conceiving another. This single article of their faith and belief was malaria; it was their evil genius which distorted their vision, disordered their understanding, perverted their judgment, and rendered them altogether incapable of meeting the crisis, which their incapabilities had tended to develope. Malaria, according to them, was in the winds, in the waters, in the earth, and in the regions under the earth; and yet it did not, they believed, originate where it was so mischievous, but was brought from a distance on the winds, and even over the extensive bay into which the Sierra Leone river empties itself. To this absurdity they joined a second, namely, the belief that a distemper of a continued and rapid course, such as they observed and described, could proceed only from a cause always producing effects of a very different character.*

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* Whilst the foregoing pages were passing through the press, the author received the official returns to Parliament respecting the disease which prevailed, in September, 1845, on board the "*Eclair*," steam ship of war, on her return to this country from the coast of Africa. The conveyance of this pestilence to the very shores of Great Britain — almost to the portals of the metropolis — and the alarm of the public mind consequent upon the circumstance, gave rise to the correspondence and documents on the subject, which have been printed, and from these the following particulars are derived: —

The "*Eclair*" steam ship left Plymouth on the 2d of November, 1844, with a crew of 146 officers and men. On the 20th of December she was at the river Gaboon, on the west coast of Africa, and passed thence westwards and northwards along the coast until she arrived at Sierra Leone on the 23d. She there took in 40 Kroomen and liberated Africans, allowed to assist the crew. She departed from Sierra Leone on the 28th of January, and continued off Sheerboro, watching slave-traders, until the 4th of February. During this time, the vessel could not have safely approached nearer than three miles to the shore, owing to the shelving nature of the coast; but the boats were sent in, and the men landed frequently, and slept on shore on two or three occasions. Most of the men who had slept on shore were attacked with fever, which appeared to have been of a malignant kind, as nine or ten of those attacked died; but two of the men who were severely seized had not been out of the ship. These cases occurred during the months of April, May, and June; and were said to have been the endemic remittent of the climate; but no details of symptoms are given. When the vessel returned to Sierra Leone, on the 4th of July, the crew was healthy; but, from that time until her departure on the 23d, the men were engaged in cleaning out the hold of the "Albert" iron steam ship, and were allowed to go on shore, and several of them slept on shore. Of these, four were attacked with fever on the 19th, 21st, 22d, and 23d; one was landed, but the other three were treated on board and died. No account of the symptoms are given. But Sir

139. *h.* From what has been advanced above it may be admitted without any assumption—1*st*, *That this pestilence is altogether different in its causes, progress, and nature, from every form or*

William Pym, who went on board on the arrival of the "Eclair" in England, and examined the officers, states that the first man who died after leaving Sierra Leone on the 23d had black vomit, and that the cases which occurred then and subsequently, as well as those which were still remaining, were actually this pestilence. On this point it is impossible for Sir William to have been mistaken; seeing that his experience of this distemper in the West Indies and in the south of Spain has been greater than that of any other physician whatever; and although no description or details are given in the official papers now before the author, yet quite sufficient is stated to show the nature of the distemper.

The "Albert" was taken in tow by the "Eclair," and brought into the Gambia on the 10th of August. After leaving Sierra Leone, three other men were attacked in the end of July and died; these men had also slept on shore; and a merchant who embarked on board the "Albert" at Sierra Leone was also taken ill in that vessel, and died on the 27th of July. The first three of those attacked in August were on board of the "Albert" when taken ill. "Afterwards the fever became indiscriminate in its attacks." The "Eclair" touched at Goree to take in coals, but was not allowed pratique. She went on to Bona Vista, one of the Cape de Verd Islands, where she arrived on the 21st of August, having had, from leaving Sierra Leone, 18 men attacked by the distemper, and of these thirteen died, most of them with the black vomit.

At Bona Vista the disease continued to spread rapidly amongst the crew, when permission having been obtained from the Portuguese governor, it was determined to land the crew, sick and well, and purify the vessel. A fort was appropriated for the accommodation of the seamen and sick, and the officers obtained lodgings in the town. Every means were taken to purify the ship by washing and whitewashing, fumigation, &c.; all the Kroomen remaining on board, with the exception of six employed in attendance upon the sick. The disease, however, continued to prevail amongst the officers and men on shore, thirty-one men having died between the 21st of August and the 13th of September. Under these circumstances a consultation was held by three naval surgeons, and upon their report and recommendation it was determined that the steamer and crew should proceed to England. The ship's company were in consequence re-embarked, and sailed on the 13th of September; Captain Estcourt having been taken ill the day before leaving Bona Vista, and died on the 16th. At Bona Vista, the Assistant Surgeon Harte, of the "Eclair," died, when Dr. McClure, a naval surgeon, passenger in the "Growler," and Mr. Coffy, assistant surgeon of the "Growler," volunteered their services on board; here also seven seamen volunteered from the "Growler." Dr. McClure died on the voyage to Madeira, and one of the volunteer seamen was taken ill of the fever and recovered. Upon the arrival of the steamer at Madeira the authorities refused permission to communicate with shore, as had been previously done by the French at Goree; but at this island Mr. Barnard, a naval surgeon, volunteered his services, and was received on board with two seamen. From the day of her sailing from Madeira, the 21st of September, up to the 30th, seven deaths have taken place from the fever, and eight new cases have occurred.

On the passage from Bona Vista to England forty-one were attacked, and twelve died. In the short time of the vessel's remaining at the Motherbank two men were seized and died. From the time of her being put in quarantine on her arrival until the 31st of October, nine new cases occurred, five of which were fatal. The pilot who was taken on board on the 1st of October to take her to Standgate Creek, was taken ill on the 7th. An officer was also seized on the same day, and both officer and pilot died in three or four days. The surgeon was taken ill on the 4th of October, and the assistant surgeon on the 5th; the former died. The illness of the two surgeons occasioned the sending two other medical officers on the 5th on board the "Eclair," and one of them was attacked on the 11th. After this period but slight illnesses occurred, and the disease entirely ceased soon afterwards, owing to the arrangements made under the directions of the quarantine establishment, aided most probably by the low range of temperature at this season, and in this climate.

There appears to have existed in the minds of the medical officers attached to this vessel a strong belief that the distemper, which was so fatal, was merely the endemic remittent of the African coast. As such they reported the disease, and hence were allowed, with great hospitality and kindness, all the advantages which could accrue from visiting Bona Vista; and yet, when they drew up their report advising the return of the vessel to England, the three medical officers concur in characterising the distemper as "a malignant fever," causing "great mortality;" and in stating that "many fresh cases were daily occurring;" and they further add that "the extremely malignant character of the fever, *which has resisted the treatment usually found successful in the common endemic fever of the coast,* its continuance since the removal of the 'Eclair' from the coast, &c., induce them to recommend the return of the vessel to England;" a resolution most proper in the circumstances; but the very terms in which the recommendation is worded, show a tacit consciousness that they had not the endemic remittent of the climate to deal with. That the distemper was genuine hæmagastric pestilence is shown by the very few particulars furnished by the printed papers as to the appearances and symptoms of the distemper. I state this from my experience of this pestilence and of the endemic remittent of the coast of Africa. Dr. Stewart in his medical report of the few cases which came before him after the 7th of October, when he joined the 'Eclair,' mentions "black vomit and slight yellowness of the skin, which became of a deeper shade after death. In the second case there was hiccup during the last fifteen hours of life, and with the hiccup a plugging, guggling sound, which conveyed an assurance that had it been possible to examine the stomach after death, coffee-ground fluid would have been found in it. There was a slight tinge of yellowness in that case, also, during the last hours of life; and after death the body became very yellow, whilst the neck was as dark as if the patient had been strangled." (p. 90.)

That an infectious fever had been introduced into this vessel, and that it spread by infection to all who were attacked, are proved by the history of its progress; by the extension of it to all but one of the medical officers who attended the sick, and the death of most of them; by the introduction and spread of the pestilence to the inhabitants of Bona Vista; by the infection of five of the Kroomen, or native Africans, who are exempt from remittent fever, but not from this pestilence, although they are little subject to it; and of the persons who went on board the vessel after her arrival in England; and by the "fact of the sick attendants from the 'Worcester' getting fever after returning to the 'Eclair.'" (p. 90.)

In further proof of the above, it may be added, that of four officers of the "Growler" steamer sent to survey the purser's stores on board the "Eclair," three of them—the lieutenant, purser, and clerk—were attacked in consequence, and several of the crew; "in all thirteen cases; and two of the three last cases died at Woolwich with all the symptoms of the disease." (p. 77.)

It now remains to notice what occurred at Bona Vista after the departure of the "Eclair;" and, in doing this, it is necessary merely to furnish abstracts from the official reports of the British consul and of H.M's commissary judge to Lord Aberdeen. Consul Rendall states—that the "Eclair" was allowed pratique, and permitted to land her crew at Bona Vista on the representation of the medical officers that the cases of fever which had occurred on board were the endemic remittent; that black vomit had not been mentioned; that, seven days after the steamer had left, one of the white Portuguese soldiers who had been housed with the crew of the "Eclair," died in the fort (which had been given up to the crew); that on the following day another also died, and the remaining soldier in the fort (a coloured man) was reported sick; that another coloured soldier sent to assist his comrade was also taken ill; and that the authorities therefore abandoned the fort and island, and caused the two sick men to be brought into the town. The distemper then began to spread, and the first fatal case in the town occurred in the house where the two coloured soldiers from the fort had been brought and recovered from their sickness. "Up to the first week of December the fever continued to rage, and at that period it had found its way into almost all the country villages, the deaths averaging seven or eight daily." "The English have suffered considerably, having lost one third of their number," and amongst them the resident English surgeon, Mr. Kenny. The symptoms were black vomit, pains in the head, back, and thighs, with suppression of urine, and sometimes hæmorrhage. The consul adds that the fever had proved contagious to those who acted as nurses to the sick; this was observed to be the case without exception.

The commissary judge, Macaulay, in his letter to Lord Aberdeen, after remarking the usual healthy state of Bona Vista, and the introduction of a malignant fever into it by the "Eclair," notices the improper conduct of the medical officers who had reported the disease to be merely the endemic remittent of the coast, whilst *grade of remittent fever:* — *2d, That it is infectious in its nature amongst the predisposed, and more especially in a warm, humid, and close atmosphere:* — *and 3d, That it attacks the human frame only once, the exceptions to this being even fewer than in respect of any other infectious malady.*

VII. Of the Origin of this Pestilence. — The next *topics* which may require a brief consideration are those involved in the following questions: — *a.* Can remittent fever, or fever proceeding from malaria under circumstances of crowding, insufficient ventilation, and a high range of temperature, change its character and become this distemper? — *b.* Can the accumulation of the sick of other diseases in a close, hot, and humid air, give rise to this pestilence, or generate its seminium? — *c.* Can the accumulation of a number of persons in similar circumstances, and more especially of a large number of negroes in the close hold of a slave-ship within the tropics, so contaminate the air as to occasion, or otherwise generate, the distemper, the pestilence being thus produced *de novo*, whenever any of the foregoing circumstances exist in a marked or decided manner? — *d.* Does this malady ever arise *de novo* from the decomposition of accumulated animal excretions or exuviæ, or of dead animals in a warm, humid, and still atmosphere; or from exhalations from foul or obstructed drains and sewers during states of the air favourable to their concentration? — *e.* And lastly, is this pestilence propagated only by a specific cause, like to small pox or scarlet fever, that may be preserved for a considerable time in *fomites*, during circumstances unfavourable to its outbreak, but may occasion it as soon as those circumstances supervene which favour its operation, viz. a high temperature and a humid and still atmosphere?

140. *A. Can remittent or periodic fevers proceeding from malaria so change their characters and properties under circumstances of crowding, of insufficient ventilation, and a high range of temperature, as to become this distemper, and to assume infectious properties?* — The solution of this question is by no means easy. The evidence bearing upon it is probably insufficient to prove the negative; but most certainly we have no satisfactory proof of the affirmative. The occasions certainly have not been few on which a large number of persons affected with remittent or other periodic fevers produced by malaria, have been confined in close apartments, or otherwise placed in circumstances favourable either to the evolution of a new character in these cases, or to the production of a distemper with different properties from those attending the pre-existent malady; and yet I can find no satisfactory evidence of such conversion of disease having occurred within the tropics, or in more temperate climates, during hot seasons. I cannot deny the possibility of this conversion; but I have not met with it on two or three occasions of this description which have fallen under my observation; and although it has been contended for by several very respectable authorities, still the evidence in favour of it is not conclusive. In order that the necessary elements of sound conclusions should be furnished respecting it, the proofs of malaria and of its consequences, periodic fevers, should be adduced; and evidence of persons holding communication with others affected with these fevers in a warm, humid, and close air, becoming infected with this distemper, no other source of infection existing, ought to be furnished. The existence of remittent fever and its origin in malaria, the actual conversion of the remittent fever into the true hæmagastric infectious pestilence, and the circumstances connected with this conversion, should be fully and unequivocally shown; or, in other words, the assumption of the properties of the latter by the former, under the circumstances just specified, and the propagation of the assumed properties and converted malady, thus originating *de novo*, in a similar way to other manifestations of this pestilence in an epidemic form, ought to be satisfactorily demonstrated. I cannot, however, satisfy myself, after the diligent attention I have devoted to this topic, that these premises are so established as not to admit of doubt. We do not find in the eastern hemisphere, where remittent and other periodic fevers are prevalent, and where the occasions favourable to the conversion of them into this pestilence are as likely to occur as elsewhere, that such conversion has ever taken place, for there this pestilence is unknown. During the late Niger expedition, the occasions favourable to the conversion of the remittent fever into this pestilence must be admitted, and yet I know that this conversion — that this pestilence, did not result. Similar facts have fallen under my own observation.

141. This doctrine of *contingent infection* owes its origin chiefly to the fact of remittent fever in its worst forms having been so frequently confounded with this pestilence, and to the circumstance of the infectious nature of the latter having been so fully demonstrated as to preclude scepticism, whilst the belief in malaria as the original

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it was obviously a malignant and fatal pestilence; and remarks that these officers, not having "previously served on the African station, had mistaken the malady," declaring from first to last that it was nothing but the common coast fever. He further adds that Mr. Mantell, the Queen's advocate, who had come from the Gambia to Bona Vista in the "Eclair," first mentioned the occurrence of black vomit in one of those who had died on the passage from the Gambia; but that the medical officers would not admit that any importance should be attached to this circumstance; and he concludes his letter with the same account as the consul has given, of the infection of the soldiers from the crew of the "Eclair," and of the population of Bona Vista from the former (see above). The latest published accounts state the number of deaths in this island to be upwards of 400, and the distemper to be still prevailing.

I cannot refrain from directing attention to the evils which have resulted on numerous occasions, and even more flagrantly and flagitiously than on this, from the confident tone so often assumed by very young and quite inexperienced medical officers on the non-infectious nature of the distemper under consideration, and from the circumstance of their confounding it with the endemic remittent. These false notions are mischievous enough even when entertained by theorists and speculators after popularity with money-getting traders, who view restrictions requisite to the protection of public health as invasions of and abstractions from the amount of their private interests and gains; but they become ten-fold more destructive, when they are made at the caprice or upon the hasty suggestion of an inexperienced and reckless young surgeon, the basis of measures involving the lives of thousands. Why, in the name of all that is honourable and humane, amongst the regular members of our profession — and we believe, as yet, none but such can gain admission into our public services, although such limitations may not be observed in palaces or courts — are not definitive instructions furnished by the heads and boards of the medical departments of the public services, which may guide the inexperienced in devising precautions against the extension of malignant and pestilential distempers when they first appear in ships, garrisons, and armies. The votaries of medical science would, in their simplicity, believe that such ought to be one of the chief functions of those boards; but, alas! this at least does not appear to have hitherto been one of their offices.

cause was still adhered to. But the undoubted and now generally admitted fact, that this pestilence attacks the same individual only once, strongly militates against the conversion in question, and against the *contingent origin* of infection, whilst it strongly supports the doctrine of a specific cause of the malady, different from, and independent of the causes productive of periodic fevers. That the conversion of these non-infectious fevers, under the favourable circumstances mentioned above (§ 140.), into the hæmagastric pestilence, which is afterwards propagated by infection, may be *possible*, I will not attempt to deny. I, however, believe it to be very *improbable*. I know that my own observation and research have not furnished me with any evidence of its occurrence that can be implicitly relied upon; and hence that conclusive proofs of the fact are still required. Besides, most of the outbreaks of this pestilence have commenced by solitary cases, without any instances of remittent fever having then existed in the locality or vicinity, and without any communication having been known between those first attacked and persons labouring under remittent fevers.

142. *B. Can the accumulation of the sick of other diseases in a close, hot, and humid air give rise to this pestilence, or generate its seminium?* What I have stated in answer to the former question also applies to this, and even with still greater force. Without, however, denying the possibility of such an occurrence as that involved in this question, I cannot find sufficient proof of the fact. Moreover, as this distemper possesses certain specific properties analogous to those of other infectious fevers, arising also from a specific cause — as it, like scarlet fever, measles, and small pox, presents regular stages and periods; attacks the same person only once, and spreads amongst the unprotected by means of an effluvium from the bodies of those already affected by it under circumstances favourable to the concentration and operation of that effluvium — so it may be inferred to be no more the contingent result of the accumulation of the sick in a close, humid, and hot air, than any one of the maladies just mentioned as analogous to it; and we know that there is no proof of any one of them having so originated or having been caused by emanations from the sick of diseases different from itself.

143. *C. Can the crowding together of a number of persons in a close, hot, and humid atmosphere, and more especially in the close hold of a slave-ship within the tropics, so contaminate the air as to occasion, or rather generate, this distemper, and thus produce it, de novo, whenever the foregoing circumstances coexist in a marked degree?* That the contamination of the air, especially when it is humid, warm, and close, either by other fevers, or by other maladies, or by a number of persons previously in health confined in it, will take place, so as to produce fevers of a malignant character, more especially that fever which I have called Putro-Adynamic (see Fever, §§ 484—496.), I have shown when treating of that malady (§ 496.); but satisfactory proofs are wanting of this pestilence ever having originated in this way. Since my visit, however, to several places in Africa, and knowing the very limited space in which a large number of slaves are often confined, both on shore and in slave-vessels, I entertained the idea that this pestilence or its seminium, or specific infection, had been generated originally by the congregation of negroes in a close atmosphere, or is generated *de novo* by this race when placed in the circumstances now stated; and that, although it affects them in a comparatively slight manner, it is most particularly baneful to the natives of cold countries; as small-pox is comparatively mild in the white races, whilst it is most pestilential and fatal amongst the negroes. This opinion, entertained since 1817, I have endeavoured to ascertain the truth of whenever I have had an opportunity of making any inquiry respecting it; but the evidence is not sufficient to establish this as the source of the infection. The following, however, may favour the truth of this idea. A small vessel in which I was a passenger was anchored, in May of 1817, a short distance from Sierra Leone; and the ship's boat with four of the crew was bringing me on board when a tornado suddenly overtaking us we took shelter on board of a ship recently brought into the harbour full of slaves, and near which we were at the time. The men belonging to the boat took shelter down between decks. I remained under a small poop on the quarter-deck. All these men in two or three days were seized with this distemper, the vessel having just put to sea, and I escaped. The sick men were constantly kept on deck, free ventilation was enforced, and every possible precaution under the circumstances was used, and no more were attacked.

144. The organisation of the negro, and the more extensive functions of the skin of this race as an excreting organ, give rise to a most offensive and foul state of the atmosphere, when numbers of this race are confined in a limited space, and particularly in a humid and warm atmosphere. Indeed, nothing can be imagined more nauseous and depressing than the respiration of air so contaminated; and it cannot be disputed that the concentrated and virulent effluvium generated from this source poisons the surrounding and sometimes stagnant atmosphere; and it may further be admitted that it so affects the organic nervous system and the blood as to develope this pestilence, when all the circumstances requisite to the production of this effect exist in due force. The above fact, these considerations, and various occurrences or outbreaks of this distemper, after communications with slave-ships that have come to my knowledge, induce me to attach some importance to this source of the evil, and to suggest that some endeavour should be made to ascertain the amount of credit it may deserve. At the same time I must admit, that some of the arguments I have used against the doctrines involved in the foregoing questions may be urged against this.

145. *D. Does this pestilence ever arise, de novo, from the decomposition of animal excretions or exuviæ, or of other animal substances, in a warm, humid, and still atmosphere; or from exhalations from foul or obstructed drains and sewers, during states of the air favourable to their concentration?* The remarks already made also apply, in some respects, to the present topic. If the distemper ever arises from negroes crowded in a confined space, as suggested above, this question should be answered in the affirmative, inasmuch as the accumulated cutaneous excretions in these cases are mainly concerned in causing it. That the putrefaction of animal substances in a humid, warm,

and stagnant atmosphere, will cause malignant fever, cannot be doubted; the only question being, whether this pestilence, or a form of fever, such as I have described under the name of *putro-adynamic* (FEVER, §§ 484—496.), will be the result. Circumstances have proved to me the production of this latter fever in these circumstances, and in forms more or less malignant and rapidly fatal; but I have no proof of the pestilence now being considered having originated in this latter source. The same remark applies to the concentrated exhalations from foul drains and sewers. I believe that these are quite sufficient, especially before they are much diluted by the atmosphere, to occasion the putro-adynamic fever just referred to; but, after examining into the attempts which have been made to connect this pestilence with that cause, I believe them to have been quite futile, and by no means supported by even the slightest evidence. In many warm regions and climates, more especially in eastern countries, as shown in several parts of this work, emanations from the excretions, the exuviæ, and the dead bodies of animals, combine, with the exhalations from a humid or marshy soil, to give rise to a low or putro-adynamic fever, which may present, with more or less malignancy, evident remissions, more particularly when the terrestrial exhalations are the most influential in causing it, as shown in the article FEVER (§ 435. 484.), still this fever will not acquire an infectious character with a moderate attention to ventilation and the avoidance of crowding of the sick. When, however, emanations from the decomposition of animal matters, and from drains and sewers, are concentrated in a warm and humid air, and predominate over those from vegetable matter or from a marshy soil, the resulting fever will assume more or less of the continued type and putro-adynamic characters, and become infectious in circumstances favourable to the manifestation of this property. Still the fever hereby produced (and fully described in the article FEVER, § 434, *et seq.*), is not the pestilence now under consideration; and I cannot find any evidence that this pestilence has ever really originated in this source.

146. In thus disputing the origination of the true pestilential yellow or hæmagastric fever in several sources to which it has been very loosely imputed, it may be stated that my scepticism is caused by the entire want of evidence of the truth of such occurrences, and by the very general assumption, without any proof, of these as the sources of the distemper. I have no favourite doctrine or cause of my own to support; and no theory to subvert, merely because it is different from the one in which I believe. I am most anxious to know the truth, wherever the truth is obscured or difficult of access: but I lean the most to that doctrine which is most truthful, which rests on the most convincing evidence, and which, as being itself truth, is the safest to follow, and is, moreover, the most advantageous to adopt as regards the welfare of the general community.

147. *E. Is this pestilence, like to small-pox and scarlet fever, propagated only by a specific cause that may be preserved in fomites for a considerable time, without causing it, during circumstances unfavourable to its outbreak, but may occasion it as soon as those circumstances supervene which favour its operation, viz. a high temperature, and a humid and still atmosphere?* That the cause is specific cannot be doubted, inasmuch as the effect — the distemper — is also specific or determinate, as the other specific maladies just alluded to. It has been repeatedly observed that this cause has been preserved in the bed and body clothes of those who have been affected by the disease, for a considerable time; either when these clothes have been shut up from the air, or when they have remained during the cold months unexposed or unused; and that, when these fomites have been exposed among susceptible persons, and during states of the atmosphere favourable to infection, the disease has been reproduced. Thus, in several towns in the south of Spain, as shown by most of the authorities already quoted, the distemper has gradually ceased with the accession of cold weather; but it has appeared again in the summer, or as soon as the atmospheric temperature and humidity reached those grades which are requisite to the production of infection. If, therefore, it be admitted, that the distemper is specific — is so determinate in character as neither to lapse into remittent fever on the one hand, nor to pass into plague or putro-adynamic fever on the other; and that the cause is also specific, and like other specific causes capable of being preserved for a considerable period without losing its poisonous properties and capability of germinating and reproducing itself and the distemper, we may further infer, whatever may have been its most remote origin, that it is not a frequent contingent production or result of the circumstances to which it has been imputed, and which have just been passed in review. If it were a contingency merely of one or more of these circumstances, it must have occurred in other warm countries besides those in which it has been so frequently observed. It must in this case have appeared both in the eastern hemisphere and on the shores of the Pacific, where it has never been met with. It may, however, be stated that, whilst this consideration militates against the contingent production of the specific poison causing this pestilence in the circumstances against which I have argued above, it in some degree supports the opinion which I have suggested, as to the not improbable origin of the distemper in the concentrated emanations from the bodies of a great number of negroes confined in the close, humid, and hot holds of slave-ships (§ 143.). If this opinion as to the probable origin of the infectious poison be not admitted, there is certainly none other deserving greater confidence, and we are left entirely in the dark as to the earliest origination of the mischief, although the fact of the communicability and diffusion of that mischief cannot now be disputed, nor the circumstances which favour its communicability, on the one hand, and those which prevent or retard it, on the other. The cause being obviously specific from the very determinate and specific character of its effects, we have no greater reason to believe, in the absence of conclusive proof of the fact, that this specific cause is contingently produced in the course of other maladies, or in the circumstances above considered, than that the specific causes of small-pox, scarlet fever, and of other pestilences, are also contingently produced in similar circumstances.

148. VIII. NATURE OF THIS DISTEMPER. — It has been supposed that the plague of Athens, described by THUCYDIDES and noticed by PLUTARCH,

vas identical with this malady ; and certainly the esemblance between them is strong in many oints. THUCYDIDES states that it prevailed in Lemnus and other places, although not so extensively and fatally as in Athens where it afterwards ppeared ; that it suddenly broke out in the port, he Piræus, and extended over the city; that vhen it had reached the upper parts of the city, it ad become most fatal; and that, having ravaged thens, it was conveyed to other places which were nost populous. These are the specific statements f THUCYDIDES, and indicate a similar importation f an infectious malady and its extension from the ort over the city, and to places with which the ntercourse was greatest, to that demonstrated on everal occasions in the south of Spain during the ast fifty years. The infectious nature of the Athenian plague is still more distinctly stated by PLUTARCH, who remarks that the distemper appeared in the army with which PERICLES besieged the sacred city of Epidaurus, and affected ot only it, but all those also who had intercourse vith it. (PLUTARCH, *Vita*, &c. 8vo. Lond. 729, vol. i. p. 378.)

149. Not only in their propagation, but also n their symptoms, may the resemblance between he Athenian and the Hæmagastric pestilences be raced. THUCYDIDES notices the peculiar febrile eat, and the pale greenish yellow (χλωρὸν), and ivid colour of the surface of the body ; the singular affection of the parts of generation ; the xcessive sense of internal heat; and the peculiar mentia, insanity, or apathy attending the distemper. The abundant bilious evacuations menioned by him, may have been the black or dark rown matters characterising the modern disemper, for it cannot be doubted that the black tools produced by altered blood were ascribed o black bile by the ancients. He further notices he very rare occurrence of relapses ; the fact of he disease never having seized the same person second time ; and the greater liability of strangers, and of persons from the country visiting the city, to be attacked.

150. Whatever may have been the original source of this distemper, in whatever way the cause of it may have been at first generated, and however this cause may have been afterwards preserved and propagated, there can be no doubt of the appearance of it in many places and on many occasions, where it can be accounted for in no other mode than by referring it to the operation of an infectious emanation proceeding from a recently affected person, or from clothes imbued with this emanation. The difficulty of obtaining information as to the first persons attacked is lways great, and sometimes impossible, as respects not only this distemper, but all other infectious diseases ; and hence the early proofs of infection can rarely be obtained even as regards any of them. In respect of the outbreak of his pestilence in America, Africa, and Europe, we know that it has occurred both after and uring states of season and weather of the most different and even opposite kinds; the only tmospheric requisites to its appearance being igh ranges of temperature and of humidity. It as occurred in the driest and in the most marshy ituations ; in dry as well as in rainy seasons ; fter prolonged droughts, and after excessive ains ; on the surface of all soils, whether rocky, sandy, gravelly, or clayey ; and in ports, towns, garrisons, forts, and ships of all descriptions, both foul, clean, unhealthy, and healthy, and placed in every possible circumstance that may be conceived in respect of them. It has appeared in one or two isolated persons who had not previously breathed the foul air of sick wards or apartments ; nor visited the places in which either the sick or the healthy had been confined ; nor inhaled the effluvium from decomposing exuviæ and animal substances ; and thus by the exclusive process of reasoning we have left only that cause to which I have imputed it ; and by means of which it is as undoubtedly propagated and perpetuated as any other malady whose infectious properties are admitted.

151. The terrestrial exhalations believed by Dr. FERGUSSON and others to be emitted from the fissures of the soil, caused by prolonged drought, or from the dried-up beds of rivulets, &c. ; the wooden theory propounded by Dr. WILSON, and its combination with a limestone influence ; the malaria carried by winds from great distances, or issuing forth in currents of only a few feet in diameter ; the emanations from bilge-water and ballast ; and the vegetative principle imagined to be thrown out from rich absorbent and alluvial soils, are the several sources which have been assigned; but are merely illusions, which have played before the minds of medical theorists, and which are dissipated by a more comprehensive glance of the very different circumstances attending each outbreak of the pestilence. The chief circumstances which remain without very material alteration, in all the most destructive visitations of the distemper, are certain ranges of heat and humidity, a still atmosphere, or an imperfect renewal of the air, and a more or less dense population ; all which especially favour the propagation of infection of every kind, and which are indispensable to the extensive prevalence of this distemper.

152. *The Pathological Inferences* which may be drawn from what has been advanced respecting the *causes*, the *symptoms*, and *course*, and the *consequences* of the distemper, may be stated as follows : — 1st. Of the numerous *causes* and *sources* which have been assigned to this pestilence, there is not one which has been ascertained to have existed in all, or even in the majority of, the occurrences of it since it became in modern times the subject of medical interest, with the exception of a *specific infection*, or poisonous animal emanation proceeding from the sick, and directly, or by fomites, affecting those among the healthy who have not previously been attacked, and who are otherwise predisposed. It should not be overlooked, that the majority of those who have reasoned against the operation of this cause have either wittingly or ignorantly overlooked the now well-established fact of the immunity from a second attack, produced by the first, and have attributed much importance to the escape of many of those among whom an infected person has been placed, without admitting the great probability of the majority of those having been protected by their having had the disease. This particularly applies to the inter-tropical parts of America, and to many of those who have written upon the disease as it has there appeared, and who have even never inquired into the manner in which this exemption affects the diffusion and

prevalence of the distemper, nor in any way concerned themselves with this very important fact, although it so very materially affects the results, and although they present themselves before the profession with the dogmatism of an infallible inspiration.

153. Secondly, that the effluvium proceeding from the bodies of the affected being so remarkably offensive as to attract the notice of every observer, is itself a proof of the infectious nature of this distemper; for when it is admitted even in single and isolated cases, how much more remarkable must this fœtor become when numbers are affected in a humid, warm, and still atmosphere, and in a limited space, in which circumstances even the birds in the air and the lower animals are also infected. Dr. Imray, who has given a remarkably correct description of this pestilence as it appeared in the island of Dominica in 1838, where it could not be expected to have been very prevalent amongst old residents, owing to the exemption arising from a previous attack, and where, indeed, he states the number attacked to have been small, with the exception of the military, remarks that the "odour of the cutaneous exhalations was often extremely disagreeable, as well to the patient himself as to his attendants," and that "*the fœtor became more intolerable towards the last stage of the distemper.*" Now, I believe that every one whose experience of diseases attended by much fœtor of the exhalations from the skin and lungs, will admit that these diseases are more or less contagious or infectious, especially in the circumstances so frequently alluded to above, and where numbers are exposed to this cause, or inhale an atmosphere contaminated by these exhalations. There can be no doubt, however, that where those exhalations are much diluted by the atmosphere in an open situation, they will generally fail in producing those effects, which undoubtedly result from them in a close, crowded, and humid air, and where numbers of predisposed persons are congregated. The dissipation of these exhalations by a rapid renewal of the air is the chief cause of the limited extension of the distemper to high and open situations, and to places thinly inhabited, and is one of the chief means of arresting the progress of an epidemic, facts proving what reason asserts, namely, that on those occasions of the outbreak of the distemper in close streets and barracks, the removal of the inhabitants to open and airy grounds and encampments, so that a free perflation is allowed under the tent-cloths, is always followed by a rapid subsidence and total disappearance of the malady. A person from the country visits a town in which the malady is prevalent, and another from a ship lands in the same town, and both persons probably visit the same place or house in which the disease exists. Both persons, if unprotected by any circumstances, and equally predisposed, are infected, but the infection will not become manifest until two or three days subsequently. The one returns into the country and is attacked, but owing to the circumstances favouring the communication of the malady being wanting there, — owing to free ventilation, a high and airy situation, and a sparse population, with numerous other favourable circumstances, — the distemper either extends no further, or extends merely to a few, even in the absence of any other sanatory measures; whilst the sailor returns to his ship, and in the ill-ventilated, and perhaps over-crowded forecastle, or between decks, where he is confined, he communicates the malady to every one who is not protected by a previous attack. Now, these occurrences have actually taken place, as now stated, times out of number; and, moreover, the additional fact has been often observed of a third person having come from a distant town and city, been infected at the same place as the two others, and carried the infection to such town where he has sickened, and owing to crowding, ill-ventilation, and other circumstances favouring infection, the malady spreads rapidly, although it has proceeded no further as respects the first person here instanced.

154. Thirdly, if we connect the circumstances attending the impression made by the exciting cause of the distemper, — by the effluvium from the affected, — if we consider the phenomena which immediately result, those which are subsequently developed, and the lesions which are ultimately produced, we shall have every reason to conclude that this cause produces a specific morbid impression upon the organic nervous system, through the medium of the lungs; that it changes the vital manifestations of this system, and contaminates the blood; and that this contamination further affects the organic and cerebro-spinal nervous systems, which again, in their turn, re-act upon the vascular system and blood, until the vital tone and cohesion of the tissues and capillaries are remarkably impaired, and the vital crasis of the blood more or less dissipated.

155. Fourthly, it cannot be doubted, by any person who has seen both maladies, and who is uninfluenced by partisan views, that this pestilence is altogether distinct in its causes, its progress and course, and in the lesions found on dissection, from more malignant states of remittent fever. The admission is made by many of the non-infectionists themselves; and sufficient has been adduced above (§§ 37. 122.) to prove this difference. In those cases of the pestilence which proceed more rapidly to the extinction of life, the poisonous emanation which has infected the body produces but little structural lesion in its fatal course, excepting the changes in the digestive mucous surface and in the vascular system, especially in the blood. The viscera present no remarkable alteration beyond the defect of vital cohesion just mentioned, and the tendency to rapid decomposition. The pale yellow appearance of the liver, first accurately observed by the French physicians, who described the distemper as i appeared in Spain, and subsequently noticed in the West Indies by Dr. Imray and others, i obviously occasioned by the loss of blood from the digestive mucous surface. The loss of the vital cohesion of this surface and of the capillarie supplying it, and the more or less extensiv detachment of the epithelium, with the othe changes described above (§ 26, *et seq.*), are consequences of the remarkable depression of the organic nervous or vital energy, and of the change produced in the blood by the poisonous emanation causing the infection.

156. Fifthly, that the changes produced on th blood are not merely the ultimate effects of th disease, but supervene, to a certain extent, at more or less early stage, in consequence either

the morbid impression made on the organic nervous system by the exciting cause, or of the absorption of the cause into the blood itself during the respiratory process, or of a combination of the two modes of operation, is sufficiently evident from the appearances of the blood during the earlier periods of the malady. In the cases where the vital depression and changes in the blood are the greatest at these periods, blood-letting would be improperly, and has been rarely, resorted to; but in those cases where vascular tone and action have been less impaired, and where the blood has consequently presented the least amount of change observed in this distemper, this fluid, even at the time of its escape from the vein, has been more or less altered. It has generally been much darker than natural, and it has separated very imperfectly into serum and crassamentum. This change in the blood, remarked and described by me many years ago, is further noticed by Dr. IMRAY in the epidemic observed by him in the West Indies. He states that "the blood, as it flowed from the arm, presented a singularly mixed appearance, as if the vein had contained two differently coloured fluids, the one bright red, the other almost black; and on examining the blood an hour or two after being withdrawn, the separation into serum and crassamentum had taken place very imperfectly. In the centre was observed a loose coagulum, easily broken down, the surface of which was streaked green and yellow, the serum being in large quantity, and intimately mixed with the colouring matter of the blood. These changes in the vital fluid were invariably noticed to a greater or less extent in every instance where blood-letting was had recourse to, which was always at the very outset of the attack; and as the disease advanced to the last stage, the blood was so altered and broken down as to escape from the capillary vessels of all the mucous surfaces." (p. 92.)

157. Sixthly, the changes in the digestive mucous surface more especially, and in the crasis and constitution of the blood, favour the escape of this fluid from this surface, and these are necessarily followed, near the close of the attack, and when the black vomit and anal evacuations are very abundant, by an anæmial state of the liver, giving rise to the pale yellow hue of it so generally observed after death. At an advanced stage of the malady more especially, and even from a very early period, the organic nervous or vital power, by which the portal circulation is chiefly carried on, is more or less impaired; and, consequently, the abdominal organs and digestive mucous surface become congested. As vital power and the crasis of the blood are further impaired with the progress of the disease the congestion increases, and ultimately the digestive mucous surface allows the altered blood to exude from the weakened and overloaded capillaries; and the discharge from these capillaries into the digestive canal proceeds with an increased rapidity as the portal circulation becomes more and more impaired. The loss of blood from this surface at last leaves the vessels of the liver comparatively empty, and the organ pale, notwithstanding the dark appearance of the blood at this period. The changes which are thus early and extensively produced in the vascular system and gastric organs, and the prominence of the symptoms referrible to them during the progress of the distemper, have suggested the name *hæmagastric*, which I have used to designate the distemper, and to distinguish it from those states of remittent fever which are often attended by yellowishness of the skin.

158. Seventhly, although the digestive organs and vascular system betray the most prominent affection during the progress of the distemper, still the nervous system, and more particularly the organic nervous system, with the organs chiefly supplied by it, are very remarkably, and most probably primarily, affected. The morbid impression made upon this system, and the contamination of the blood, whether they be produced in succession or contemporaneously, ultimately at least react on each other, until the functions of vital and of excreting organs, and the vital cohesion of the several tissues, are impaired to an extent incompatible with the continuance of life. The consequences necessarily flowing from the morbid impression made by the cause of distemper upon the nervous systems are impairment of the functions of the lungs — the channel through which this impression is made — diminished secreting and assimilating actions of the liver; and consecutively an almost total suspension of the functions of this organ and of the kidneys. A marked diminution, also, of the cutaneous and intestinal exhalations and secretions is present from an early period of the attack. The results of these changes, as respects the blood, are the accumulation of effœte and injurious elements in this fluid, and the combination of them, as they are partially eliminated from secreting surfaces, into those specific infectious emanations which propagate the pestilence. When the alterations in the nervous and vascular systems, in the blood, and in the several tissues are approaching an acme, the altered blood exudes from the relaxed capillaries and tissues, especially from the digestive mucous surface; and when the passive hæmorrhages which thus supervene are considerable, previous congestions are removed, and the portal vessels and larger veins are either left comparatively empty, or contain a small quantity of black fluid, or semi-dissolved blood. With the failure of organic nervous power, the due adaptation of vascular tone to the states of vascular fulness on the one hand, or of vascular deficiency on the other, is lost, and the progress to a fatal issue is greatly accelerated, without the conservative influence of life being able to arrest the advance. But when the passive hæmorrhages in the last stage are considerable, the fatal result is rapidly accelerated, owing to the powers of life being inadequate to the adaptation of vascular tone and action to the amount of circulating fluid, and to the quality of this fluid being such as further depresses the already depressed state of the nervous systems.

159. Eighthly, whether the progressive alterations in the blood actually arise as stated above (§ 154.), or are owing to the introduction, into the circulation, of the infectious molecules given off from the affected, and inspired with the air in which these molecules float, is a question which does not admit of a positive answer in the present state of our knowledge. If we adopt the latter alternative it follows, that the absorbed molecules,

which infect the system, multiply themselves either in the blood or during the processes of excretion; and that the morbific leaven thus introduced gives rise to the progressive phenomena of the disease in the process of reproducing their kind, and in the course of vital deterioration and vascular contamination.

160. The inferences which I have now attempted to draw from what appears established as to the *causes* and *nature* of this pestilence, must, at least in the present state of our knowledge, be made the basis of those measures which should be adopted, 1*st. For the protection of the general community;* 2*d. For the prevention of individual attacks in circumstances of imperfect general protection; and* 3*d. For the recovery of the affected.* As the measures for the attainment of the 1st and 2d of these objects are nearly the same as regards the three kinds of pestilence discussed in this article, I shall consider this important topic in a separate chapter, and with reference to each of these pestilences. (See PESTILENCES, GENERAL AND INDIVIDUAL PROTECTION FROM.)

161. IX. TREATMENT. — There are very few distempers which are less under the control of treatment than that now under consideration, or in which the protective influence of life is less manifestly exerted. Persons who are the most robust, the previously healthy, the young, and those in the vigour of life, are generally the most susceptible of infection, the most violently attacked, and often the most rapidly carried off. Something, however, may be attributed to the dose of the infectious emanation, or poison, which has impressed and contaminated the frame; and something, also, may be owing to the violence of reaction in persons of a plethoric habit of body and strong constitution. In the first case, the concentration and intensity of the cause may be so great as to overwhelm even the most powerful, and to annihilate altogether that vital resistance which is always opposed, in various grades in different persons, to the influence of injurious agents; in the latter case, excessive action, whilst vital power is depressed, rapidly exhausts itself, and accelerates, with remarkable rapidity, those changes in the blood which so generally supervene upon high vascular action in warm climates or in hot seasons, and more especially in robust and plethoric persons who have recently migrated from a cold to a warm country. From this it is manifest that the treatment which is advantageous to persons circumstanced as these latter are, cannot be equally, or even at all, beneficial to others who are otherwise circumstanced, or to those who have resided long in a warm, or in an unhealthy climate; and it is equally obvious that medical means will be of service, or even detrimental, to the person requiring them, according to the judgment regulating the exhibition of them appropriately to the morbid conditions existing in each case individually, and in the same case, at the several stages of its course.

162. The treatment, also, should be modified, or even very different, according to the circumstances in which the patient is placed during its employment, for the patient who is removed into an open, well-aired, and healthy locality before he is attacked, will bear, and indeed require, very different measures from those required by persons who remain in the close, low, and infectious air of a crowded hospital, or in the sick bay of a ship of war. Hence the necessity of removing those who are attacked as much as possible from under the influence of the contaminated air in situations where numbers are affected, and of preventing the air surrounding them from being contaminated by as rapid a renewal of it as possible. Thus, in cases of infection in low and ill-ventilated houses and streets, removal to a well ventilated hospital, or even tents having a continued current of air passing under the tent cloths, is most beneficial, not merely as respects the chances of recovery, but also in arresting the progress of infection, for the contamination of the air surrounding the patient is thereby prevented, at least to that degree which is hurtful to himself and infectious to others. In the instance observed by myself, of several sailors becoming infected by communicating with a slave ship, the sick were constantly kept on deck, sheltered only from the sun by means of an awning, open all around, and the result was most favourable as regarded the infected, the distemper not extending further than to those men who had gone on board the slave ship.

163. Impressed with the necessity of applying the means of cure with strict reference to the peculiarities of individual cases, and of each stage of these cases, I shall not attempt to describe the treatment which is more especially applicable to the disease as it occurs in different *constitutions* and *temperaments*, because I should thereby be led into irksome repetitions, and very imperfectly accomplish the end in view. Besides, different constitutions and temperaments are not so readily recognised, nor are they so precisely marked out, as to enable practitioners of even admitted discernment to detect them during the tumultuous disorders of function characterising this distemper. The means which are particularly suitable to *grades of intensity*, and to *the several stages of the disease*, may be stated with more reasonable hopes of advantage to the inexperienced; still it should not be overlooked that the malady is very mutable in its character, and that an attack which may appear very slight, and by no means dangerous, during the second, third, or even the fourth day, may suddenly change its state, and become remarkably severe, or even rapidly fatal. Having particularised the several grades (§ 6, *et seq.*) and stages (§ 21, *et seq.*) of this distemper, I shall first give a rapid sketch of the treatment which appears to me the most appropriate to each *grade* and *stage*, and afterwards notice those means individually which have been, or may be, employed, and endeavour to estimate the true value of each.

164. *i.* TREATMENT AS TO GRADE OR FORM. — *A.* IN THE MILDEST FORM (§ 6.), our chief reliance should be placed on free ventilation, and due promotion of the several secretions and excretions; measures equally applicable to all forms of the distemper. The bowels ought to be early evacuated by means of calomel with jalap or rhubarb, or any other purgative, and afterwards kept open by olive oil taken by the mouth, and administered freely in enemata. A tepid bath or the cold affusion may be resorted to, if there be much heat of skin; and, after the surface has been carefully dried, frictions of the trunk and all the limbs with olive oil will prove extremely beneficial, and favour a free perspiration. This object will be further promoted, after the bowels

have been freely evacuated, by the exhibition of the liquor ammoniæ acetatis, and the spiritus ætheris nitrici, in bland diluents or demulcents. In the majority of cases of this grade, nothing more than the above may be required; light farinaceous articles of food and simple emollient diluents being allowed as the febrile action subsides. If, however, the abdominal excretions are not duly evacuated by these means, they should be repeated in increased doses; the oil should be more freely administered, and the oleum terebinthinæ, or common salt, may be added to the enemata, which may be repeated according to circumstances. If the malady should suddenly assume a severer form, the treatment hereafter to be described may be resorted to. The physician should endeavour throughout to inspire confidence in the mind of the patient, and to dissipate desponding ideas.

165. *B.* THE TREATMENT OF THE MORE SEVERE FORM (§ 7.) of this pestilence is generally beset with more or less difficulty. In many instances a recourse to the foregoing means may be the most judicious, at least until the more serious symptoms characterising this form supervene; and they are the more likely to be of service if the bowels are freely acted upon by them, and if the perspiration is copious and general. In these circumstances, a recourse to the more heroic and perturbating means may be productive of more mischief than benefit. Where vascular action appears high, bloodletting has been advised by many, and many have been induced to employ it, and to repeat it even oftener than once; the seductive calm produced by it for a few hours, often alluring the reckless and the inexperienced to carry it to an injurious amount. But the calm is only momentary, and is generally followed by reaction still more violent than that preceding it, although vital power and resistance are materially depressed. Unless in the circumstances hereafter to be noticed (§ 167.), and regulated as will be mentioned, this measure is of doubtful efficacy, and in most instances should not be resorted to.

166. If the means now mentioned be followed by a subsidence of the disease, attention to the several secretions and excretions, and to diet and regimen, will insure recovery; but if the morbid actions assume an onward course—if the pulse become weak, compressible, unequal, irregular, or slow; and more especially if discolouration of the skin about the neck, chest, &c. appear, either alone or with increased irritability of stomach, a most dangerous exhaustion of vital power has now taken place, and powerful stimulants, or other restoratives, as about to be advised for the *third stage* of the malady, are urgently required. To these symptoms black vomit and hiccup are soon added, if they be not removed by energetic means: and in many instances such means will fail in producing the desired effect. Nevertheless they should be employed perseveringly, and be variously associated, according to the changing features of the case. Sulphate of quinine, with camphor and capsicum, or with the addition of opium, each dose being immediately followed by a glass of champagne; friction of the general surface with olive oil and spirits of turpentine, or embrocations of these kept constantly applied over the epigastrium and abdomen, by means of flannel frequently imbued with them; enemata with olive oil, turpentine, and assafœtida; and even more powerful stimulants than the above, as brandy with an equal proportion of water, ammonia, or others hereafter to be mentioned, are the chief means on which any reliance can now be placed. If black vomit be imminent, or commence, an occasional dose of spirits of turpentine with olive oil, and two or three grains of capsicum; sulphate of quinine, with sulphate of zinc and opium; or the acetate of lead with camphor and opium; the acetate of lead, with creosote, acetic acid, and tincture of opium, brandy in small quantity, but given frequently with arrow-root, sago, &c., and the enemata already advised, may, even in this almost hopeless state, be followed by recovery in some instances. In all cases, a careful watching for the successive changes taking place in the advanced course of the malady, and a recourse to means which are appropriate to them, with good nursing, are amongst the most essential requisites.

167. *C.* THE TREATMENT OF THE THIRD FORM (§ 9.) is not very different from that just considered. Bloodletting, if at all resorted to, should be employed only at the commencement of vascular reaction, and be confined to the young, plethoric, and robust. It ought not to be carried so far as to produce at any time full syncope, for excessive reaction is the more likely to return when this effect is produced by it. Even in this form, and in this class of patients, it is doubtful whether or no general bloodletting is of service. I believe that it will rarely prove beneficial in those cases which remain during the treatment within the range of the contaminated atmosphere surrounding numbers of persons affected by the pestilence, or in low, humid, and ill-ventilated places. An early recourse to the tepid bath, followed by frictions of the surface with olive oil; to purgatives and cathartics with calomel, in full doses, and promoted by enemata containing olive oil and turpentine; and to the diaphoretics already mentioned (§ 164.), ought not to be neglected. When the vascular excitement is about to lapse into exhaustion, the means already advised, as well as those about to be noticed (§ 173.), are the most deserving of confidence.

168. *D.* IN THE FOURTH FORM (§ 11.) of this malady, bloodletting in any mode is most injurious; and the means required for the third stage (§ 172.) are early required. The early exhibition of chologogue purgatives in full doses, and the promotion of their action by means of the enemata already mentioned, and by olive oil taken internally, in frequent doses; the warm bath, followed by assiduous frictions of the surface with olive oil and turpentine; and an occasional dose of spirits of turpentine (from one to four drachms), with one or two drops of creosote, and two or three grains of capsicum, taken on the surface of milk, coffee, or any aromatic water, aided by the more powerful stimulants noticed above (§ 166.), as the symptoms may indicate the necessity of having recourse to them, are the means most likely to make that impression upon the system which is required to subvert the morbid action, to support the conservative influence of life, and to restore the secreting and excreting functions. When yellowness of the skin, black vomit, or passive hæmorrhage supervene the measures already mentioned, and others to be noticed in the

sequel, may be adopted, although with faint hopes of deriving advantage from them.

169. ii. TREATMENT OF THE STAGES. — It is unnecessary to remark at any length upon the means which the pathological states characterising these stages may suggest. — *A.* THE FIRST PERIOD, *or that of invasion* (§ 21.), is generally so sudden in its accession, and passes off so rapidly, as often to elude the observation of the physician. In some cases, also, it is extremely slight, or the chills, rigors, or horrors characterising it, are either so little complained of by the patient, or so imperfectly manifested, or even so entirely wanting, the disease approaching most insidiously with most of the symptoms of the second stage in a slight degree, as almost to warrant a total disregard of it in many instances. When it is present, measures should be taken to counteract the injurious impression produced on the frame by its continuance, to restore the equilibrium of the circulation, and to procure freedom of secretion and excretion. The immediate removal of the patient into an uncontaminated atmosphere; a warm bath with frictions of the surface both in the bath and when removed from it; or warm baths medicated with aromatic and stimulating substances, and followed by frictions of the surface with olive oil; warm and chologogue purgatives; and warm diaphoretics and diluents, are the most appropriate to this period. But we cannot expect these to cut short the disease, or prevent the accession of the other stages. All that we can hope for, seeing that this stage indicates the actual infection of the frame, is to render the periods succeeding it more mild, and more amenable to treatment, than they might prove if it had been left to the unaided efforts of nature; and possibly to prevent that contamination of the circulation which takes place, and advances with the progress of the distemper.

170. *B.* IN THE SECOND STAGE (§ 22.), the treatment should always be conducted with a perfect conviction of the important truth, that, however high arterial action or nervous excitement may appear, and however robust and plethoric the patient may be, both the action and the excitement are unattended by vital power or organic nervous energy or tone. Vitality is overpowered or poisoned by the infection contaminating not merely the nervous and vascular systems, but the whole frame. Hence the very general failure of bloodletting even in those cases which seemed most urgently to require it. For owing to the relaxation of the tissues, the want of tone throughout the vascular system, and the early contamination of the blood, the vessels soon lose the power of accommodating themselves to any marked diminution of the usual amount of their contents. With this pathological state, the use of tonics and restoratives is by no means incompatible; and, as I have proved on numerous occasions, the only way of subduing excessive action, when thus associated with deficient and sinking power, is to administer the more permanent stimulants, or such tonics as are most efficacious in counteracting the loss of vital cohesion of the soft solids and of the crasis of the blood, a loss more or less rapidly advancing during the unfavourable progress of the distemper. Instead, therefore, of endeavouring, as many have advised, to overcome the vascular excitement characterising this stage by means of bloodletting and depressing agents, I would recommend the exhibition of camphor, sulphate of quinine, ammonia, capsicum, decoction of cinchona, chlorate of potash, spirits of turpentine, wine, brandy, &c., either singly or in such combinations as the states of the case may require. During this stage the blood is not only deficient in fibrine, but also in those healthy requisites resulting from complete assimilation and free excretion of effœte elements; and the deficiency of fibrine, of healthy crasis, as well as of normal purity, increases progressively through this and the succeeding stage, until these several morbid conditions reach their acme. Now, by what means are these changes most surely counteracted or arrested in their course? If not by the above means, we shall have much difficulty in finding others more efficacious than they. It will be in vain to attempt the cure of the malady, even in this comparatively early stage, by any other means than such as are capable of producing these effects — of counteracting or arresting these changes. Can bloodletting possibly accomplish these ends? It may possibly indirectly aid other measures to this effect; but this is the utmost amount of its agency as respects the blood; and it may save, in a few instances, some important organ from injury during the heighth of reaction. With this latter view it is most frequently practised; but I much doubt its capability of producing this effect in this distemper, and am inclined to believe that this solitary advantage is more than counterbalanced by several unfavourable contingencies; for the increased loss of power, consequent upon bloodletting during morbid states of the blood, is as frequently followed by hæmorrhagic or serous effusions or exudations, as the pre-existent state of vascular fulness; for, after bloodletting, the accommodation of vascular tone to the amount of the vascular contents is deranged, and various consecutive changes take place that might not otherwise have occurred. In some of the less violent states of vascular excitement, when the pulse is less rapid, and less expansive or tumultuous, where it is less open and presents more of tone than is observed in the more violent and rapid states of vascular excitement, the liquor ammoniæ acetatis, with potassæ nitras, and spiritus ætheris nitrici, taken either in camphor mixture, or in the decoction or infusion of cinchona, will often prove of manifest service, especially after the bowels have been freely evacuated, and the functions of the skin restored by the tepid bath, and frictions with olive oil.

171. In this period the urgent thirst usually present should be alleviated by spruce beer, soda water, or by water rendered pleasantly acid with vinegar, raspberry vinegar, lime-juice, &c. Of these I prefer either of the kinds of spruce; but the selection should partly be guided by the nature of the medicines prescribed, and the quantity taken at each time should be small, as large draughts, especially of cold fluids, are very soon afterwards followed by vomiting. Even at this stage of the more severe cases, and especially of the 3d and 4th forms (§ 9—11) of the malady, restorative and stimulating beverages, taken often, but in a moderate quantity at a time, are frequently of service, and are the only drinks which should be allowed. Of these, champagne

or hock, with soda-water or seltzer-water, or with milk; small quantities of brandy in spruce beer; and, in other circumstances, seltzer-water with milk, or milk with lime-water, are to be preferred. In general it is preferable to allow a considerable portion of the fixed air to escape before the fluids containing them are taken, as this air distends the stomach, occasioning a reaction of its coats, followed by the rejection of the distending body, in the form either of painful eructations, or of vomiting.

172. *C.* THE TREATMENT OF THE THIRD STAGE (§ 23.) has been partly anticipated (§§ 168. 171.). In the favourable cases of the distemper, the vascular excitement glides into a calm, attended by a return of the secretions, and by a general and genial warm perspiration; and the third stage, or that of vital depression or exhaustion, can hardly be said to have appeared. But unfortunately, in the more violent attacks, and when the vascular excitement of the second stage has been excessive or violent, vital power is so depressed or overwhelmed as to be unable to make the usual resistance, or it sinks in the struggle. When such sinking or exhaustion appears, whether suddenly or more gradually, the energies of life require to be supported by means which may be rationally inferred to be commensurate with the existing depression. It will be seen, from what I have stated above (§§ 170, 171.), that I would advise the depression characterising this stage to be anticipated by a somewhat earlier recourse to stimulants than has been advised by some writers; for I am confident, from my limited experience in this distemper, and from a more familiar acquaintance with the vascular excitement attending the earlier stages of other malignant fevers, that a judicious recourse to those remedies may be had much earlier in these diseases than has usually been advised. This fear of stimulants and restoratives has arisen from the rapid, tumultuous, and expansive state of the pulse; the restlessness, nervous excitement, and harsh heat of skin, so generally present, so frequently misinterpreted, and so injuriously treated by evacuants and other lowering remedies; the remarkable loss of power accompanying this state, and the morbid condition of the blood — circumstances strongly militating against such treatment—being entirely overlooked, or, if taken into account, being inaccurately estimated.

173. Anticipating, therefore, with more or less decision or activity the accession of vital depression in this stage, by commencing the exhibition of stimulants before the stage of excitement or reaction has altogether ceased, these medicines should be still more strenuously prescribed after this stage has actually supervened. In the fourth form of the malady, where vital reaction or excitement is very imperfectly developed, the treatment appropriate to this period should be employed without hesitation or delay. In several instances of the distemper which came under my care in Africa, I had exhausted the various combinations of camphor with nitrate of potass; of ammonia, ether, and aromatic spirits; and of cinchona, serpentaria, and capsicum, in the treatment of this stage, without deriving that benefit from them which I had expected. I then had recourse to the following — to warm cloths imbued with spirits of turpentine and kept constantly applied to the epigastrium, abdomen, and insides of the thighs; to brandy with an equal quantity, of warm water, or in sago, arrow-root, or in spruce or ginger beer, &c.; to enemata with oil, spirits of turpentine, and camphor, or assafœtida; to camphor with capsicum, either in the form of pills or bolus with opium, or rubbed up with olive oil and taken on the surface of some aromatic water, or spirits and water; to Madeira and other wines, either alone or with soda-water and ammonia; and, when hæmorrhages and black vomit either were threatened or had appeared, to spirits of turpentine in various forms and combinations, and the results were certainly most beneficial, several cases having recovered that presented some of the worst symptoms of this stage of the malady. The quantity of wine or of spirits taken in some of these cases, was most remarkable, and generally with no other effect than that of allaying the sickness and vomiting, and calming the restlessness, tremor, and delirium. It was often found necessary to the securing of a successful issue, in these cases, to repeat the stimulus frequently, and to continue the treatment for several days. It was remarked that thirst, heat at stomach, and anxiety were more certainly removed by these stimulants than by milder fluids, or by simple diluents. I have mentioned these means, having experienced their good effect; but it is very probable that the addition of *creasote* to some of them, as to the camphor, capsicum, and opium, and that the further addition of the acetate of lead to the creosote and to these, would have increased the benefit derived from them.

174. iii. REMARKS ON VARIOUS METHODS AND MEANS OF CURE.—*A. Bloodletting.* It is generally found that the usual mode of treating fevers, occurring to persons who have recently migrated to places within the tropics, sanguineous depletions,—a mode generally found beneficial and even necessary in young and robust Europeans—is not only inefficacious, but often highly injurious, even in those persons when attacked by this pestilence. The experience of Dr. IMRAY as to this very important topic, is so accordant with my own, and with that of the most discriminating and judicious physicians, that I shall adduce it here, in almost his own words. Although a few instances, he remarks, of recovery take place after bloodletting, yet the effect seems rather an acceleration of the fatal event. Where, from the onset, the pulse is feeble, and the prostration of strength extreme, the abstraction of blood is clearly contra-indicated; " but on the other hand, when the patient is young and robust, the pulse strong, the skin burning hot, and gastric irritation constant, it at first sight seems evident that a prompt and decisive use of the lancet is urgently demanded; and yet when depletion is carried to its fullest extent, the only good effects produced are but a temporary alleviation of the symptoms." When the blood is allowed to flow until faintness or actual syncope take place, the patient afterwards expresses himself greatly relieved; the violent headach, pains in the back and lower extremities are removed, and the skin becomes cool and moist. This short respite unhappily lasts but a very short time, giving place, after one or two hours, to a renewal of all the symptoms, perhaps in an aggravated form. If bloodletting be again prac-

tised, the same result follows as from the first bleeding, "and to whatever extent it may be carried, or however often repeated, no permanent impression is made upon the disease, but the stage of collapse is hastened and the strength becomes much impaired by the loss of blood, rapid sinking being the consequence." (p. 85.) It will generally be found more beneficial in cases of local congestion or prominent affection of an important organ, especially where moderate blood-letting is indicated, to have recourse to local depletions, by cupping below the shoulder blades, or by leeches behind the ears, or in other situations, and to an amount which will be indicated by the circumstances of the case, than to resort to large bleedings from a vein.

175. *B. Mercurials*, more particularly *calomel*, have been much employed in this distemper since they were so strenuously recommended for it by Dr. Chisholm; but in this, as well as in all other malignant diseases, confidence in them, either alone or chiefly, will be followed by disappointment. In the West Indies and America, in the south of Spain, and in Africa, *calomel* has been given by many physicians for the cure of this pestilence, in large and frequently repeated doses, with the view of bringing the system under its influence as speedily as possible; but the difficulty of effecting this object was generally in the ratio of the severity of the malady. It is stated by Dr. Imray, that "the more malignant the symptoms the less probability there was of the calomel exerting its specific action; but even where this object was attained, the patient could never be pronounced absolutely safe, inasmuch as cases terminated fatally when calomel had been given in large quantities, and the system was decidedly under its influence;" and that when the desired object of salivation was produced by enormous doses of calomel, "recovery, if it did take place, was much protracted, and intolerable sufferings inflicted on the patient. In the more malignant cases, the only approach to salivation was swelling and soreness of the gums, tongue, and throat, with a decided increase of the tendency to hæmorrhage from the mucous surfaces." There can be no doubt of the accuracy of these remarks as regards a recourse to frequent and large doses of calomel when given alone; but when full doses of this medicine are prescribed early in the disease with purgatives or cathartics, or when they are continued after free evacuations of the bowels, in conjunction with large doses of camphor, capsicum, and opium, a much more beneficial result is produced by them. I have had many opportunities of testing the effect of large quantities of calomel given alone, in several malignant distempers, and have observed the general failure of the practice; but when the calomel was conjoined with equally large doses of camphor, capsicum, and opium, and employed thus combined early in the disease, the result has been very different; more especially when these remedies have been aided by the application of the warm epithems and frictions of the surface, and by the enemata already recommended (§ 166.); recovery having very frequently taken place in most unfavourable cases and circumstances, and often without salivation having been produced. Much certainty was to be ascribed to the medicines conjoined with the calomel and to the rest of the treatment; but something certainly was also owing to this latter substance. I believe, however, that the effects of these conjoined means are much more beneficial than may be inferred from their individual operation, not only in removing the irritability of the stomach and internal congestions, but also in restoring the secretions and excretions, and in calming the perturbation of the nervous and vascular systems. The quantities of those substances which I have prescribed, and the intervals between the doses, have varied much with the character and nature of the attack; but I have given from 5 to 20 grains of calomel, with 3 to 15 of camphor, 2 to 5 of capsicum, and from one third of a grain to one grain of pure opium every four or six hours; and in some instances, where it was not necessary to give the former of these substances so frequently, I have prescribed even a larger dose of the opium.

176. *C. Purgatives* are required in all the forms of this pestilence, and more especially early in the attack — not merely for the evacuation of accumulated morbid secretions and excretions, but also for the promotion of the functions of the liver and intestines; and the selection of them is generally a matter of some moment. A full dose of calomel may be given with jalap or the compound extract of colocynth, and half a drop or drop of croton oil; and be followed by the infusion of senna with a neutral salt and an aromatic tincture, and shortly afterwards by the oleaginous enemata already advised (§§ 164. 166.). These will be less apt to offend the stomach, if one or two drops of creasote be added to each dose. The quantity of calomel may vary from 5 to 20 grains; and may be taken with the other ingredients in the form of bolus, or of pills. After the free action of these, the frequent recourse to sweet oil, in the earlier stages, and of this oil with spirits of turpentine, in the last stage, as noted above (§§ 166. 173.), aided by enemata, will generally procure a sufficient evacuation of the bowels; more especially if calomel be given with camphor, capsicum, and opium, as already mentioned (§ 175.).

177. *D. The irritability of stomach*, so constantly attending the disease, is not only a distressing symptom of itself, but is one interfering remarkably with the exhibition of medicines, and preventing their retention by the stomach and passage into the intestines. In order to allay this state, various means have been devised. Blisters, bleeding, opium, effervescing medicines, &c., were those most commonly had recourse to when I visited intertropical countries in 1817 and 1818; but I soon perceived their general inefficacy. Bleeding often aggravated, although it frequently mitigated for an hour or two, this symptom. Blisters produced only a very temporarary effect. Effervescing draughts occasioned a more rapid and complete evacuation of the stomach, and often a painful reaction of this organ upon the distension produced by the fixed air. Opium often produced no sensible effect when given alone, or with fluids, it being generally thrown off; I therefore gave it with full doses of calomel and capsicum, and found great benefit derived from it. The beneficial influence of these upon the state of the stomach was much promoted by the application of turpentine epithems over the

epigastrium and abdomen. In the first and second stages of the distemper, these means will often prove most serviceable; and very probably the addition of *creosote* will further promote their efficacy, not merely in these stages but also in the third stage, when the antiseptic and anti-emetic properties of this substance are so remarkably required. In this last stage it is remarkable that the vomitings are more completely allayed by a most nauseous medicine, viz. by the spirits of turpentine, than by any sedative or narcotic, especially when taken on the surface of milk or some aromatic water, &c. The irritability of stomach, in the slighter cases, is often removed by means of almond emulsion, or of sweet oil with calcined magnesia and small doses of tincture of opium, taken after short intervals; especially when these are aided by the turpentine epithems on the abdomen and purgative enemata (§ 166.).

178. *E. Tonics, stimulants, and antiseptics* are severally more or less serviceable in this distemper, but I believe that they are rarely prescribed in sufficient quantity to make a due impression on the system in its existing state of vital depression. — *a.* Formerly cinchona in various forms was employed, but was either inert, or not retained on the stomach unless conjoined with camphor, or ammonia, or capsicum. I have given it in substance, in large doses, and in these combinations in as much as half a pint of Madeira, in malignant remittent fever, with great benefit; but in this distemper it is neither so frequently retained by the stomach, nor so beneficial when retained. The sulphate of quinine is now substituted with great advantage in the former disease; but it has been found much less serviceable in the pestilential distemper. Dr. Imray states that, whilst the stage of excitement lasted, no opportunity was afforded of exhibiting quinine, and when this stage subsided, and that of collapse came on, it was completely inert, even in the largest doses; and he adds that it was also equally inefficacious in arresting the malady if given at the commencement of those cases which were accompanied with extreme vital depression. There can be no doubt of its general inefficacy in the last stage, and even early in the fourth form (§ 11.) of the distemper; for, in these states of vital exhaustion, it is either imperfectly, or not at all, dissolved in the stomach, even when retained; and even granting that it is dissolved, the degree of depression is so great as not to be roused by it alone. Hence the bark in substance, taken in wine, with ammonia, capsicum, &c., as mentioned above, would be preferable, if it were retained by the stomach. I would advise that quinine should be given earlier in the disease than it usually has been, if given at all. The existence of vascular reaction ought not to delay its exhibition, which should be directed in full doses, and generally conjoined with camphor, capsicum, and opium or creasote, or both, according to circumstances; for it should be recollected that, however tumultuous and excessive vascular action may seem, vital power is so deficient as to render tonics and stimulants indispensable to the reduction of such excess.

179. *b.* Mention has been made (§ 173.) of those *stimulants* which I have employed in this distemper. In one case, to the notes of which I have referred, I find that somewhat more than two bottles of brandy were taken within twenty-four hours, in the treatment of the period of exhaustion, besides some Madeira, the patient having rallied and ultimately recovered. Dr. Imray states that few stimulants were found to answer so well as champagne. "If any irritability of stomach remained, a greater or less quantity of this wine, sometimes as much as half a tumbler-full was given every hour or half hour, alternated with farinaceous food containing brandy; and in some instances the quantity of stimuli taken, with merely the effect of warding off impending fatal sinking, was truly surprising." The circumstance most to be dreaded, and indeed to be prevented by an earlier recourse to stimuli than is usually advised, is exhaustion of the vital power of the stomach, so as to be past being influenced by this class of medicines. If, however, the cold clammy feel of the body and the sinking of the pulse have come on before stimulants are administered; and if the pulse rise in strength, and if a glow of returning warmth be diffused over the surface, the best hopes may be entertained of the patient's recovery, — notwithstanding the late period at which they have been exhibited; but the strictest care will be required for several days to prevent symptoms of sinking from supervening. *Brandy, Madeira, hock, &c.*, taken in soda water, generally with the addition of the sub-carbonate of soda, or carbonate of ammonia, or in spruce beer, seltzer water, &c., or the former in arrowroot, sago, &c., are generally of service in the more severe states of the malady, and when the stage of excitement is about to pass into exhaustion.

180. *c.* Of medicinal stimulants, *camphor, ammonia, capsicum,* &c., are most deserving confidence in this malady, especially when conjoined with *opium* and *aromatics*, or with the preparations of cinchona. *Spirit of turpentine* is, however, the most generally applicable, as respects both the state and stage of the distemper and the modes of administering it; and it is even more certainly beneficial when given during the stage of excitement, especially conjoined with other oils, so as to act freely on the bowels, and administered in enemata, as noticed above (§§ 166. 173.). When the stage of exhaustion is approaching, or has supervened, and indications of passive hæmorrhages or black vomit appear, it then should be prescribed in smaller and more frequently repeated doses, with small quantities of tinctura opii, capsicum, or other aromatics, and administered largely in enemata, with camphor, assafœtida, &c., or with tinctura camphoræ composita. Much of the advantages derived from this substance result in this as well as in other malignant diseases from the mode of prescribing it, according to the varying states of morbid action; and the modes most appropriate to these states are to be learnt only from attentive observation of its effects in various circumstances. It will be more easily retained by the stomach when vital depression is very remarkable, if a drop or two of creasote, or of cajiput oil, or of tinctura capsica, be added to each dose.

181. *d.* The use of *antiseptics* in this and other malignant diseases was more generally adopted by the older than by recent writers. The humoral pathologists recognised the virtues of those substances which possessed antiseptic properties; but with the adoption of the doctrine of Hoffmann and Cullen, the possibility of antiseptics proving

serviceable was disputed and even denied, because they believed that benefit from these substances was inconsistent with their doctrine. Thus an important class of medicines for the most dangerous states of disease was sacrificed to a theory, and the results of sound and close observation were despised, because they could not reconcile them with their limited views. Many of the substances which act as stimulants, act also as antiseptics, and serve to prevent the tendency to a dissolution of the vital cohesion of the tissues, and of the crasis of the blood, characterising the malady, and manifesting itself even before life is extinct. The preparations of *cinchona*, *camphor*, the *chlorides*, the *chlorate of potass*, the *terebinthinate substances*, *creasote*, *aromatics*, &c., severally exert not only a stimulating influence on the vitality of the frame, but also an antiseptic effect not merely on the digestive mucous surface, but also upon the whole body, by imbibition and absorption into the circulating fluids, if the exhibition of them has not been delayed until the powers of life are sunk too low to be impressed by physical agents. The cause of the failure of most of these agents in pestilential and malignant distempers is often to be attributed either to the late period of the malady in which they are prescribed, or the inadequate doses in which they are given.

182. *F.* With the *chemical pathology* of West Indian fevers, Dr. Stevens introduced a different practice in their treatment from what had hitherto been adopted; but, as might have been expected by those who have studied the laws of living bodies, in connection with those displayed by inert matter, the practice has not justified the praise lavished on it by its author. The chemical doctrines of Liebig, with reference to physiology and pathology, have tended to impart much greater importance to a purely chemical treatment of disease, than might otherwise belong to it; still chemical agents, as aids to the due development of the controlling influence of life, ought not to be overlooked, but should be rationally employed, under the guidance of observation and experience. The important truths, that the chemistry of living bodies is not the chemistry of inert matter, — that the vitality of the body developes a vital chemistry of its own, and controls the chemical actions of material elements to its own ends, — that it is only the deficiency or loss of vitality that allows purely chemical actions to be manifested, whilst the due ascendancy of this principle converts them from their natural and purely chemical tendencies, and directs them to its own purposes, — and that due energy should be imparted to this principle when we wish to develope those chemical changes which are strictly vital, and which are indispensable to the continuance of animal existence, — ought never to be lost sight of in our speculations on the treatment of malignant and pestilential distempers, and should be made the basis of our indications of cure.

183. Dr. Stevens justly stated that the colour of the blood was changed in the more malignant cases of fever; but he was not equally correct as to the loss of the saline ingredients of the blood, nor even as to the cause of the loss of the colour of this fluid. The still more important loss of the fibrine of the blood had not its proper place assigned to it in his appreciation of the changes evinced by the circulation. Believing that the alteration of the blood arose from the loss of the saline ingredients, he prescribed the neutral non-purgative salts, viz. the *chlorate and nitrate of potass* and the *carbonate of soda*, at short intervals and in moderate doses, and confided in them entirely. There can be no doubt of changes in the blood occurring in the course of the disease; but these changes are not of a purely chemical nature, for even admitting that a partial deficiency of the saline ingredients of the blood is actually present, it is evident that this deficiency arises rather from a want of an accustomed supply of these ingredients during the course of the disease than from any increased loss or waste of them, as shown in another place. They are strictly a part only of those changes which depend upon the state of vital influence, or of organic nervous power in the several viscera; the deficiency of fibrine being even greater and more remarkable than that of the saline ingredients. The treatment of Dr. Stevens, as well as his pathology, was too exclusively chemical to be consistent with actual morbid conditions. He saw a portion, and that but a small portion, of the mischief; yet that little was large enough, in his eyes, to intercept the view of much more important truths. The puny progeny of his mind was rapidly nurtured by his imagination into premature and gigantic growth, but like all objects attaining large dimensions prematurely, it wanted the vitality necessary to endurance. Whilst he unwarrantably magnified changes which he considered to be chemical, he mistook their origin, and entirely overlooked those which are vital, — which depend upon the state of vital endowment. He did not even appear to recognise any alteration that was vital. What was most prominent and unmistakeable was altogether hid from him. The highly diseased condition of the blood was sufficiently obvious; but it was also equally obvious that the alteration was much more vital than chemical. Dr. Stevens' theory failing in support from observations and experience, has fallen " like an inverted cone." Dr. Imray thus states the results of the treatment which was based upon it: — " Unhappily, the salutary change said to be effected by the action of the neutral non-purgative salts did not take place, as may be inferred from the malignant symptoms continuing unabated. Notwithstanding the exhibition of these salts in large doses, and the administration of the carbonate of soda, muriate of soda, chloride of soda, nitrate of potass, &c., variously combined, yet in no instance in which they were prescribed could it be said that they produced any marked effects, either in preventing malignant symptoms, or in removing them after they had made their appearance."

184. The inefficiency of this treatment has partly been owing to the erroneous views entertained by its author respecting it, and to the circumstance of its being confided in solely, to the neglect of other and more important remedies. If certain of these salts had been employed as adjuvants of other means in states and combinations appropriate to existing morbid conditions, I believe, from my experience of them in other malignant distempers, that more benefit would have been derived, especially if they had been prescribed before the vital powers were too far reduced, and before the consequent changes had proceeded too far to be influenced by them. The *chlorate of*

potass was recommended many years ago by Dr. Garnett and others; and for more than thirty years I have employed it in the low adynamic states of fever, more especially in malignant scarlet fever, with carbonate of soda and *hydrochloric æther*, in the decoction of cinchona or the infusion of valerian; combinations which, with some modifications or additions, might be prescribed with advantage in this pestilence, if not delayed until a too advanced period.

185. *G.* The *external means* which offer the most advantages are, during the first or cold stage, or that of horror and invasion, the warm bath, followed by frictions of the surface with warm olive oil, and sinapisms or turpentine embrocations over the epigastrium. When the period of excitement and vascular reaction has supervened, the hair should be removed from the head, and cold applications, or the cold affusion be prescribed, and repeated or continued according to circumstances. The tepid bath, or cold sponging of the whole surface, is generally as beneficial as it is grateful to the patient in this stage; and when either the one or the other is followed by frictions of sweet oil, a copious and general perspiration usually supervenes, and proves critical, especially when aided by the warm sudorifics, particularly the liquor ammoniæ acetatis, spiritus ammoniæ aromaticus, and the æther hydrochloricus, or spiritus ætheris nitrici, as advised above (§ 164.). In the last stage, and even early in the fourth form of the distemper, the external applications should be of a different kind from those required in the second stage. Warm and rubefacient substances are now required, the same means as are advised in another part of this article being also the most appropriate in these states of the distemper. (See Pestilence, Choleric, §§ 179, 180.)

186. *H. During convalescence* the utmost care is requisite to prevent a relapse, especially into that state of dangerous exhaustion or depression marking the third stage and the fourth form of the malady; a relapse being the more to be dreaded the earlier the period of convalescence, and the more liable to occur when the patient has been rescued from sinking by recourse to powerful stimulants and restoratives; for in these cases the too early suspension of these remedies allows the distemper to resume that course which had been arrested only for a short time by their aid; for if they be altogether or even partially relinquished before the secretions and excretions are restored, and the condition of the blood very materially improved, the disease returns, the morbid actions characterising it being only suspended for a while under the influence of the agents which had been administered. When convalescence is further advanced, the distemper having altogether ceased, recovery generally takes place more or less rapidly without any disposition to relapse, unless errors of diet, excesses, or most injurious exposure to noxious influences have occurred; and even in these cases it is doubtful whether or not the consecutive disease is the same as that from which the patient had recovered; for it must be obvious that a patient convalescent from this distemper cannot be exempt from the operation of malaria, or of other causes of disease, but on the contrary more likely to be affected when exposed to them, owing to existing debility and impaired resistance of vital power to injurious agents. During convalescence from this as well as from other pestilential maladies, very nearly the same measures may be adopted as have been advised in another place, with such modifications as the circumstances of particular cases may suggest. (See Pestilence, Choleric, §§ 215—217.)

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(*Classes this pestilence, the plague, choleric pestilence, and exanthematic typhus, as species of the genus—contagious typhus.*) — *P. C. A. Louis*, Anatomical, Pathological, and Therapeutic Researches on the Yellow Fever of Gibraltar, &c. transl. by *G. C. Shattuck*, 8vo. Boston, 1839.—Report of a Special Committee of the House of Assembly of the State of New York, on the present

Quarantine Laws, 8vo. Albany, 1846. This able report, kindly forwarded by Dr. P S. Townsend, of New York, reached me as this was passing through the press. It contains the evidence of the most eminent physicians in tha city, and numerous facts, fully confirming the views entertained in the preceding article. It is most satisfactory to have so important and convincing a body of evidence as this report contains, so opportunely furnished, although too late to aid in my labours.

PESTILENCE, SEPTIC. — Syn: — *Pestilentia Septica*, Author. — *Pestis* (from pasco, pastum, quod depascatur artus; *or from* pessum, quod pessum det); *Pestis Septica; Pestis glandulosa; P. Adeno septica* (from Σηπω, putrefacio; Σηπτὸs, *σηπτικὸs*, septic, putrid, liquescent, &c.); — *Λοιμos*, Hipp.; Galen: — *Λοιμωδηs πυρετos*, Auct. Græc.; — *Λοιμὸs σηπτικὸs*; — *Pestilentia*, Celsus, Pliny, Cicero; — *Pestis*, Auct. Var.; — *Pestis Orientalis*, Auct.; — *Typhus Pestilentialis*; — *T. Gravissimus*; — *T. Anthracicus*; — *T. Bubonicus*; — *Febris Pestilentialis, &c.*, Auct. Var.; — *Typhus Pestis*, Young; — *Anthracia Pestis*, Good; — *Exanthema Pestis*, Parr; — *Loimopyra*, Swediaur; — *Pestis Acutissima*; — *P. Inquinaria*; — *Pestilitas*; — *Ephemera Pestilentialis*; — *E. Mortifera*; — *Febris Adeno-Nervosa*, Pinel; — *Peste, Pestilence, Fievre pestilentielle*, Fr.; — *Pest, Plage, Pestfieber, Pestilienz*, Germ; — *Pest, Pestilentś*, Dan. Swed.; — *Peste, Pestilenza*, Ital.; — *Plague, Pest, Pestilence, Levant Plague, Septic or glandular Pestilence, &c.*

Classif. — Same as Choleric and Hæmagastric Pestilences.

1. Definit. — i. Nosological. — *After chills, rigors, or horrors, nausea, and vomiting, with vertigo, headache, or stupefaction, and fever; sense of heat or burning at the præcordia; rapid, weak, irregular, or intermitting pulse; and carbuncles, buboes, spots, pustules, or petechiæ of various colours distributed in different parts of the body.*

2. ii. Pathological. *An animal poison or miasm specifically affecting the nervous and vascular systems — the circulating fluids, vessels, and glands, and remarkably impairing, and very frequently entirely subverting, vital resistance and the cohesion of the tissues.*

3. Annihilation of vital resistance and of the cohesion of the tissues characterises more or less all severe cases of pestilence, and all malignant febrile diseases. The causes which occasion them — specific animal poisons — exert a manifest septic influence; manifest at least in their results, however the powers of life, in their resistance to the noxious causes which have invaded them, may give rise to various modes of reaction, or attempts at reaction, and ultimately either throw off the destructive agencies, or sink beneath them. But the virulence of the poison occasioning the plague, and the septic or life-dissolving influence it exerts, as evinced by the spots, by the carbuncles, by the sphacelations of portions of the cutaneous, adipose and cellular tissues, by the softening of the internal viscera, and by the diffluent or softened state of the lymphatic glands and surrounding structures found immediately after death, are remarkably so, especially where this pestilence is epidemic, that I have thought that these malignant properties, as being the most characteristic and the most generally present, should furnish the specific designation of the distemper. I have, therefore, used the word *septic* in the sense usually attached to it, to mark this tendency to vital dissolution and its actual consequences in this pestilence, as being perhaps the most appropriate, as marking the chief disposition and pathological conditions — the remarkable malignancy of the fully developed distemper. It may not be approved by many, as not indicating the states of nervous power and vascular action characterising the attempts made by the nervous and vascular systems under the influence of life, to resist the exterminating influence of the poison which has infected them; and I cannot say that it quite pleases myself; but I am anxious to avoid, on this occasion, as I have hitherto avoided, the introduction of new and foreign terms into this work. I shall, however, adopt any one that is unquestionably better, if the objectors will furnish it; but the topic will be discussed more fully hereafter.

4. There can be no doubt of this pestilence having appeared at various epochs as remote as history has furnished the records, in several countries bordering on the Mediterranean, and especially in Egypt. The sacred books of the Old Testament, and the writings of Hippocrates, Aretæus, and Galen furnish notices of pestilences, which may be considered as more applicable to this than to any other species. Still they give no description sufficient to enable us to decide positively as to their identity with that now under consideration. The earliest notice strictly applicable to this distemper to be found in the writings of the ancients is that by Rufus, preserved in an inedited book of Oribasius, and to which reference is made by M. Littre, in his edition of *Hippocrates*, and in his article on the plague in the *Dictionaire de Medicine.* Rufus describes buboes as appearing in the neck, arm-pits, and thighs, and as being either with or without fever. But the buboes called *pestilential*, he states, are the most acute and the most dangerous. Such as are seen especially in Lybia, Egypt, and Syria; and of which Denys, surnamed Kyrtus, has made mention. Dioscorides and Posidonius, he adds, have concerned themselves chiefly with the pestilence which prevailed in Lybia. They state that in this plague there were acute fever, pain, and tension of the whole body, delirium, and the formation of buboes, which were hard and large, and which did not go on to suppuration. These buboes appeared not only in the usual places, but also in the hams and bends of the arms. (*Classicor. Auct. e Vaticanis Codicibus Edit.* curante A. Maio, 8vo. Romæ, 1831, t. iv. p. 11.)

5. No further account need be taken of the brief notices of plague which are scattered through the works of the ancients, until we come to the description of the fatal epidemic by Procopius that depopulated the Roman empire in the reign of Justinian. An abstract of these notices will be found in Mr. Adams's translation of Paulus Ægineta (vol. i. p. 279.). The pestilence which prevailed in the reign of Justinian is also described by Evagrius and Agathias. It resembled the plague of Avignon, described by Guy de Chauliac. According to Procopius, the usual precursors of an attack were disturbed dreams and various delirious fantasies; but the early symptoms were not well marked; for there was neither increased heat nor discoloration of the skin, nor did the patient apprehend danger. Generally on the first or second day, but in a few instances

somewhat later, buboes appeared not only in the groins, but also in the arm-pits and below the ears. Some were affected with deep coma, and others with wild delirium. Some died from sphacelus of the buboes, which, when inspected by the physicians after death, presented the appearance of an anthrax, or carbuncle. Some died at the commencement, and others after the lapse of several days. In certain cases, the skin was covered with black phlyctenæ, of the size of a lentil, which were usually succeeded by sudden death. Others were unexpectedly cut off by a discharge of blood. To women in the puerperal state it proved particularly fatal. When the buboes came to a proper suppuration, they generally proved a favourable crisis; but when they did not suppurate, they were commonly followed by a wasting of the thigh. One of the consequences of the distemper was an affection of the organs of speech. All the usual prognostics proved fallacious; and the effects of the common remedies were uncertain. In some cases the bath proved beneficial, and in others it had a contrary effect. The amount of deaths in Constantinople, at one time, was said, but probably with great exaggeration, to have ranged from five to ten thousand each day. (*De Bello Pers.* 22, 23., and Adams's *Comment. on* Paulus Ægineta, vol. i. p. 281.) This plague appears to have very closely resembled the plague of London in 1665, as described by Dr. Hodges. My limits will not permit any notice of the descriptions of the septic or glandular pestilence contained in the writings of the Arabian physicians. The reader, however, will find a brief abstract of these descriptions, and of the treatment recommended by these writers, in the volume by Mr. Adams just referred to.

6. This pestilence has presented various grades of severity, malignancy, and prevalence, according to the several accounts which have been furnished by contemporary historians and physicians, since the days of Avicenna and other Arabian writers; and even within our own memories, since the commencement of the present century, it has evinced different degrees of severity and prevalence, according as it has appeared in a sporadic or endemic, or in an epidemic form. In the countries of the Levant, and particularly in Egypt, the distemper occurs sporadically or endemically, or rather appears in isolated cases, without becoming epidemic, unless after periods or epochs of indefinite but of considerable duration. In more northerly climates, it has occurred only as a destructive epidemic, and then often without any manifest dependence upon season, time of the year, or weather, although a temperate or warm season has appeared to favour its malignancy and prevalence. During the middle ages, numerous epidemical visitations of this pestilence occurred in Europe, Africa, and Asia, not merely in the countries surrounding the Mediterranean, but also in others more or less remote from this sea. The most destructive outbreak, however, of this pestilence upon record is that which occurred near the middle of the fourteenth century.

7. This pestilence, usually denominated the *black death* or *black plague*, first appeared in China in 1333, when it was said to have destroyed more than one fourth of the population; and it thence proceeded gradually to the western countries of Asia, to those surrounding the Caspian Sea; to Arabia, Syria, and Egypt; and to the eastern and southern kingdoms of Europe. It reached Avignon in 1348, gradually extending northwards to France, Germany, England, Denmark, Russia, &c. It invaded Russia in 1350; and there, as well as in other northern countries, it proved nearly as destructive as in southern climates. It appeared first in the southern counties of England, and gradually proceeded northwards; and in this, as well as in other countries, was most remarkably destructive in the large, close, and crowded cities and towns. It did not altogether cease in some places, or it continued to recur after intervals, until 1360 or 1361, when it seems to have entirely disappeared. Dr. Hecker has collected from numerous sources much information concerning this pestilence. He states that it was an oriental plague, marked by boils and tumours of the glands, such as break out in no other febrile disease. From these boils or buboes, and from the black spots and carbuncles indicatory of a putrid decomposition which appeared in the surface, it was called, in the northern countries of Europe, the black death; and in Italy and other southern countries, the great mortality, or great plague.

8. According to Guy de Chauliac, the victims of this plague were frequently attacked with an ardent fever attended by discharges of blood, which proved fatal in three days. Buboes and and boils did not come out at first, but a carbuncular affection of the lungs often occasioned the destruction of life before the external symptoms were developed. He adds, that "the plague thus raged in Avignon for six or eight weeks, and the pestilential breath of the sick, who expectorated blood, caused a terrible contagion far and near; for even the vicinity of those who were affected was certain death; so that parents abandoned their infected children, and all the ties of kindred were dissolved. After this period, buboes in the axilla and in the groin, and boils over the body made their appearance; but it was not until seven months afterwards that some patients recovered with buboes as in the ordinary milder form of plague." (*Tract.* ii. c. 5. p. 113.) This pestilence appeared in a similar manner in Egypt, destroying quickly with burning heat and expectoration of blood.

9. Boccaccio makes no mention of the first appearance of this pestilence in China, and of its progress westwards, but remarks that "this most terrible plague happened in Florence in 1348, that it had broken out some years before in the Levant, and that after passing from place to place, and making incredible havoc all the way, it had now reached the west." It began to show itself in the spring of the year, "in a sad and wonderful manner; and different from what it had been in the east, where bleeding at the nose was the fatal prognostic; here there appeared certain tumours in the groin or in the arm-pits, some as big as a small apple, others as an egg; and afterwards purple spots in most parts of the body; in some cases large and but few in number, in others less and more numerous, both sorts the usual messengers of death." (*Decameron*, Giorn. i. *Introd.*)

10. The same phenomena were remarked in this pestilence as it occurred in Germany, France, Norway, and Russia, and the most prominent amongst these were the infallible signs of the oriental or glandular plague. But in different

countries certain symptoms appeared more prominently than others, or perhaps were more particularly noted by contemporary or subsequent chroniclers. In France many were struck as if by lightning, and died on the spot, and this more frequently among the young and strong than the old; and the patients with buboes scarcely survived two or three days. In England the distemper was attended, as at Avignon, with spitting of blood, buboes, and carbuncles. In Norway and Poland spitting and vomiting of blood are stated to have occurred in addition to the characteristic signs. In Russia the distemper was said to have commenced with rigors, heat, and darting pains, to have been attended by spitting of blood, and to have terminated fatally in two or at most three days. It was chiefly when the spitting of blood had continued for some time that buboes and carbuncles appeared.

11. Dr. Hecker remarks that all the descriptions of this most remarkable pestilence which have come down to us contain, with a few important exceptions, all the symptoms of the true plague as observed in modern times. No doubt can obtain on this point. The facts are placed clearly before our eyes. We must, however, bear in mind that this distemper does not always appear in the same form; and that while the essence of the poison which it produces, and which is separated so abundantly from the body of the patient, remains unchanged, it is proteiform in its varieties, from the almost imperceptible vesicle, unaccompanied by fever, which exists for some time before it extends its poison inwardly, and then excites fever and buboes, to the fatal form, in which carbuncular or gangrenous inflammations affect the most important viscera, as appeared to have been the case in a large proportion of cases of this pestilence.

12. The hæmorrhages which were so frequently remarked, in various countries where this pestilence prevailed, and soon occasioned death, were obviously the result of the vital dissolution of the structures and of the crasis of the blood; the inflammations said to have existed being a state of asthenic vascular congestion with sanguineous exudations, or inflammation of a gangrenous nature, owing to the rapid loss of the vital power of the capillaries. That such was the case in a remarkable degree, as respected the capillaries, the tissues, and the blood itself, was evinced by the rapid discoloration, the purplish hue, and the loss of sensibility of the affected parts. There was a loss of vital cohesion throughout the whole frame, those tissues and structures, as the mucous, the cellular, the glandular, and the parenchymatous, that possess the least density, and the capillaries supplying them most rapidly and most completely undergoing this septic alteration.

13. The plague, which devastated the empire of Morocco in 1799 and 1800, appears to have been equally virulent with the above, but much more circumscribed in its spread. Mr. Jackson, who resided in that country during its continuance, has described it as it came under his own observation. He states that Terodant, the metropolis of a province, lost above eight hundred each day, during the height of the pestilence; the city of Morocco lost upwards of one thousand daily; and that old and new Fez, about fifteen hundred daily. Young, healthy, and robust persons were for the most part attacked first, then women and children, and lastly thin, sickly, emaciated, and old people.—The *symptoms* of this plague varied in different persons with age, constitution, and habit of body. "It attacked some with a sudden and violent shivering, others with a sudden delirium, succeeded by unquenchable thirst. Cold water was eagerly resorted to by the unwary, and proved fatal to those who indulged in its momentary relief. Some had one, two, or more buboes, which formed and became as large as a walnut in the course of a day; others had a similar number of carbuncles; others had both buboes and carbuncles, which generally appeared in the groin, under the arm, or near the breast. Those who were affected with shivering, having no bubo, carbuncle, spots, or any other external disfiguration, were invariably carried off in less than twenty-four hours, and *the body became quickly putrified*, so that it was indispensably necessary to bury it a few hours after dissolution."* (p. 273.)

14. The plague of London in 1665, or the Great plague, of which, according to Dr. Hodges, upwards of 100,000 persons died, presented the phenomena already noticed variously grouped. This writer remarks that this pestilence puts on various or even different appearances, according to the constitution and age of the patient, the season of the year, the modes of living, the preceding and present distempers, and the virulence or de-

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* The following brief notices of cases will illustrate the characters and nature of the pestilence. — 1. M. A. fell suddenly down in the street, and was conveyed home. Three carbuncles and five buboes appeared the same day, in the groin, under the joint of the knee, in the armpits, and inside of the elbow, and he died three hours afterwards.

2. L. R. was suddenly smitten when following his avocations, and fell down. He described a sensation similar to that produced by running needles into the parts; and in the situations where this was felt carbuncles afterwards appeared. He died the same day.

3. Mr. Jackson's cook appeared in good health and spirits; but in half an hour afterwards he came to the room door with his eyes starting from his head, and his bed-clothes in his hands, saying "Open the gate for me, for I am smitten." The next morning he came to the gate half dressed, saying that he was quite recovered. He was not admitted; and accordingly returned to his apartments and expired the same evening, about twenty-four hours after his seizure; and before daybreak his body was in such a deplorable state that his feet were quite putrified. His wife was soon afterwards seized, but recovered.

4. H. ben A. was smitten suddenly, and felt at the time as if two musket-balls had passed through his groins. A giddiness and delirium followed; and immediately afterwards a green vomiting, and he fell senseless to the ground. A short time subsequently buboes formed in the places where he felt as if shot; and on suppurating, discharged a fetid black pus. A carbuncle in the bend of the arm was full of a thin ichor contained in an elevated vesicle, and surrounded by a burning red areola. He ultimately recovered.

Mr. Jackson remarks, that those who had vomitings of green or yellow bile generally recovered after suffering in various degrees; but that those who were affected with giddiness or delirium, followed by vomiting of black bile, invariably died after lingering one, two, or three days, their bodies being covered with small black spots similar to grains of gunpowder. In this state, however, they possessed their intellects until their dissolution. He adds, that when the constitution was unable to throw the poison to the surface in the form of buboes, carbuncles, boils, or blackish spots, "the virulence seemed to have acted inwardly, or on vital parts, and the patient usually died in less than twenty-four hours;" and that, when the carbuncles or buboes had a blackish circle round their basis, the case was invariably fatal. "Sometimes the whole body was covered with black spots like partridge-shot. Such patients always fell victims; and those who felt the blow internally did not survive more than a few hours.' (p. 238. 4.)

gree of infection. Dr. Hodges practised in London during the continuance of this plague; and, notwithstanding the admixture of the prevailing pathological notions of the day with his description of the symptoms, has given a very instructive account of them. He *first* states "*the manifest signs of infection*," and afterwards describes "*the appearances after infection.*" The manifest signs of infection he states to be horror, vomiting, dizziness, delirium, headach, and stupefaction. The appearances after infection are fever, watching, palpitation of the heart, bleeding at the nose, and great heat about the præcordia, all which may occur in other pestilences, but in this they are conjoined with *those which are peculiar to it*, as pustules, commonly called blains, buboes, carbuncles, spots, marks, or tokens. (*Loimologia*, p. 86, *et seq.*)

15. Septic pestilence, which had become much less prevalent for several generations after the black plague of the fourteenth century, again devastated many countries in the sixteenth century, as shown in the writings of Langius, Valleriola, Schenck, Joubert, Palmarius, Ingrassias, and others. In the following century, also, it prevailed in various countries of Western Europe; and, although limited chiefly to large and commercial cities, it was most destructive in those places; as fully shown by the writings of Diemerbroeck, Hodges, De Foe, and many others. During the last century, this plague became even more generally epidemic than in the 17th, and invaded most of the countries of Europe, some of them far remote from those to which it was commonly confined. Of these pestilences full details are to be found in the works of Chenot, Schraud, De Mærtens, Minderer, Samoilowicz, Russell, and others.

16. I. Symptoms. — There are few distempers in which the symptoms are so diversified as in the pestilence now being considered. The severity of the attack, resulting from the intensity of the cause, or dose of the poison, relatively to the susceptibility of the patient; the age, habit of body, and temperament of the person attacked; the severity or character of the prevailing epidemic; and the various circumstances influencing the patient at the time of seizure or during the continuance of the malady, tend to modify the phenomena in a more or less remarkable manner. Diemerbroeck has given a very succinct view of the symptoms of this pestilence, and of the diversities they present, and which I shall here exhibit with but little alteration. Fever, jactitation, extreme anxiety, frequently a remarkable internal heat, dull or gravative pains in the head, rarely acute; terror, horror, or delirium, convulsive startings of the tendons, or slight contractions of the limbs; in some continual watchfulness, in others an overwhelming somnolency; a restless expression of countenance, noises in the ears, and in some deafness; a dry but rarely a black tongue; great fœtor of the breath and of the perspiration; leipothymia or syncope; the pulse sometimes almost natural or full, but most frequently rapid, feeble, unequal, or even intermittent, in many very small, rapid, equal, or irregular; a short or dry cough, sometimes hæmoptysis; thirst, loss of appetite, pain at the epigastrium and cardiac orifice of the stomach, nausea, vomitings, hiccup; crude alvine evacuations, remarkably offensive, sometimes containing worms, occasionally an exhausting diarrhœa; the urine often almost natural and depositing a settlement, in many high-coloured and scanty, in others crude and turbid, in some sanguineolent, and generally very different in the course of the distemper, or even in the course of the day; sudden prostration of strength, and incapability of motion from the commencement in some, in others but little impairment of power until the moment of dissolution; the heat of skin sometimes acrid and increased, sometimes natural or even reduced; the colour of the countenance either pale or reddened, or somewhat livid, or even natural; purple, violet-coloured, black, or red spots on different parts of the body, sometimes in small numbers, in others in great numbers, and either large or small, but always round, occasionally seen chiefly in certain parts of the body, but confined to no one part in particular, and often scattered over the whole surface; tumours or buboes in the groins, armpits, neck, &c.; carbuncles in different parts of the body, &c. These symptoms are generally not all present in one case; but many of them occur in one, and the rest in others. During the epidemic prevalence of plague in various countries, the symptoms have presented several grades or states, most probably owing to the causes just assigned. These grades or states have been described by several writers of the last century, and their descriptions have been confirmed by those of the present day. I shall first notice these grades, and afterwards the several stages in which the progress of the distemper may be divided.

17. i. Grades or States. — Chicoyneau, Verug, Soulier, and others have noticed five grades or states of this pestilence; and which they have described nearly as follows: — 1st *Grade.* This, the most *intense form* of plague, is observed chiefly at the commencement and during the early course of an epidemic, and consists of all those cases in which the symptoms are most severe, and are most promptly followed by death. The patient is attacked by irregular chills or rigors, or a feeling of general cold, a very small, soft, slow or frequent, unequal or irregular pulse; by a heavy pain in the head, with a stunning, vertiginous feeling; and by a stupid, muddled, or drunken appearance. The countenance seems fixed, or vacant and apathetic, or presents a look of alarm or despair. The speech is slow, hesitating, plaintive, or interrupted; the tongue is white and afterwards dry, red, black, and rough; the face is pale, or of a leaden hue, or cadaverous; the contractions of the heart are very frequent; the spirits are remarkably depressed; faintness or syncope, vomitings, retchings, great restlessness, distressing anxiety, &c., are frequent, and terminate existence. Persons thus attacked often sink in the course of a few hours, sometimes almost suddenly, or in the course of a night; frequently within twenty-four hours; and seldom survive longer than thirty-six or forty-eight hours; the powers of life sinking lower and lower, without being able to make any resistance. Frequently tremors, or slight convulsive movements occur at intervals; but none of the external signs, tumours or eruptions characteristic of the pestilence appear; the powers of life being insufficient to throw them out on the surface.

18. *B. Second Grade.* This grade generally

commences, as the foregoing, with chills or rigors, and with a similar affection of the head; but these symptoms are followed by some evidence of vascular reaction. The pulse becomes frequent, open, quick, expansive, but remarkably soft and compressible. The patient complains of burning heat internally, whilst the external temperature is either natural or but little augmented. Thirst is unquenchable; the tongue is white, or reddish brown, or dusky red; speech is hurried, or impetuous or stammering; the eyes are suffused, fixed, or wild, and bright; the countenance is reddish or slightly livid; respiration is frequent, laboured, or large and slow, but without cough or pain; nausea is common, with vomitings of bilious, greenish, black, or bloody matters, similar matters being passed by the bowels, without tension or pain; the urine is sometimes natural, sometimes turbid, or pale, at other times black or sanguineolent; and the perspirations are offensive, and instead of relieving, merely enfeeble the patient. In some cases hæmorrhages from mucous canals take place, and produce fatal depression. Wandering or phrenitic delirium is common; and when the patient is rational, there are great depression and apprehension of immediate dissolution; nothing tending to rally his spirits, or to re-assure his confidence. In this grade, the characteristic signs always appear from the commencement, or in the course of the distemper. Painful tumours or buboes occur in the groins or a little below them, in the arm-pits, or beneath the ears or lower maxilla, or neck; as well as carbuncles chiefly in the arms and thighs, but sometimes also in other parts; and frequently pustules of a whitish, pale, or livid, black and carbuncular appearance, or purple spots spread over the surface of the body. Recovery rarely takes place from this state of the pestilence, although death does not occur so quickly as in the foregoing. Nearly all those attacked seem to be carried off by a rapid sphacelation of the parts chiefly affected, extending even to the thoracic and abdominal viscera. It is singular that this form of the disease is met with principally in the fat, robust and plethoric; and the more these conditions are remarkable, the less is the chance of recovery.

19. *C. The third form* or class of cases, comprises the two former; for the writers on the plague of Marseilles, observed during the whole course of the pestilence, numerous cases which presented in succession several symptoms referable to both the foregoing grades; so that most of the signs characterising the second were the precursors of those attending the first form, which always indicated the rapid extinction of life. In these, the buboes receded; and if carbuncles had advanced, they rapidly assumed a more extended and gangrenous form.

20. *D. The fourth state* or class of cases, consists of those attacked with the same symptoms as are noticed in the second grade (§ 18.), but these symptoms abate more or less on the second or third day, either spontaneously or from the effects of treatment, and almost always owing to a considerable eruption of buboes and carbuncles which seem to have concentrated the morbid leaven, and which, proceeding on towards suppuration, in this way procure the recovery of the patient.

21. *E. The fifth grade* or class of cases comprises all those in which there are no febrile or other disorder, or but very slight disturbance, but which present buboes or carbuncles, or both, that either go on to suppuration, or become hard or chronic, or are more rarely resolved without occasioning any unfavourable result. Thus there were seen at Marseilles a number of persons of both sexes who went abroad, lived as usual, and experienced but little or no impairment of strength, and yet were affected with buboes and carbuncles, or with one or other.

22. *a.* M. Gosse, one of the most recent writers on the plague, and who saw the disease during its prevalence in Greece in 1827 and 1828, furnishes some interesting particulars as to its history. He remarks that the contagion produces a form of the distemper which, as respects the primary local symptoms, very closely resembles *malignant pustule*, or anthrax: this is the *carbuncle*. First, there appears in some part of the skin, but especially on the limbs, the arms or neck, a small brownish spot, like a flea-bite, attended by an itching and smarting, and afterwards by a burning heat. This spot increases to the diameter of three or four lines, assumes a violet hue, and is covered by a flattened vesicle or phlyctena formed of the detached epidermis. The base is hard, and swollen like that of a boil. In a short time the central part assumes a bluish black appearance, and the margins, as they diverge from the centre, form concentric circles of a violet tinge, then a dark purple, a bright purple, &c., or they assume an erysipelatous appearance. The black centre extends rapidly, as well as the surrounding areola. When this *carbuncular pustule* has reached the extent of an inch and a half in diameter, it generally about the third day continues for a short time stationary. In some rare instances vascular reaction is developed around the gangrenous centre, an inflammatory circle is formed between the living and dead parts, suppuration takes place with symptomatic fever, and detaches the central slough, and the disease terminates. But much more frequently inflammatory action is either not established around the gangrened part, or if it exist it is insufficient to separate or throw off the slough; absorption takes place, and the poisonous fluid of the part is absorbed, contaminating and inflaming the lymphatic vessels and glands, so that red lines may be traced from the carbuncles to the glands through which these vessels pass; these glands rapidly becoming most painful and swollen. When the patient is robust, and the case proceeds favourably, the glandular enlargement increases rapidly, and the pains in the glands are acute and lancinating. The *buboes* thus formed tend rapidly to suppuration, with moderate symptomatic fever; and if the patient is guilty of no imprudence in diet or otherwise, and if his vitality is sustained, the suppuration proceeds favourably. Whilst the buboes are developed the carbuncles extend, the gangrenous portion or central slough tends to separate from the surrounding inflamed tissue, suppuration is established, and the central slough is detached, leaving a deep wound, which is often slowly healed. In some cases the slough thus detached is very large. When suppuration takes place in the buboes recovery generally follows; but if

the patient be weakened by any cause, or be depressed by cold, by mental anxiety, or disordered by indigestible food; if a temporary swelling of the glands merely occurs, the tumour disappearing without passing on to inflammation or suppuration; if, especially, no buboe follows a carbuncle which has not suppurated, the constitutional symptoms assume the worst form, and soon pass into dissolution.

23. *b.* The *other form* of plague, according to M. GOSSE, instead of presenting the local or external symptoms as the primary and prominent phenomena, manifests intense affection of the whole system from the commencement. Chills or rigors, with acute frontal headach, noises in the ears, vertigo, or a stunning sensation or confusion in the head, are first complained of. A sensation resembling sea-sickness is often felt, and these are generally followed by all the worst symptoms mentioned when describing the first and second grades of the distemper (§ 17, 18.)

24. *c.* DE MERTENS describes the *carbuncle* of the plague to be a gangrenous spot in the skin, resembling that caused by a burn. It consists of a reddish spot covered by small vesicles, which are pale, livid, or black, and surrounded by an inflamed circle; and passing quickly into a black, hard eschar. The term *anthrax*, he states, is usually applied to a sore resembling the carbuncle, but is larger and more elevated. It penetrates deeper, and is surrounded by pain and inflammation. Carbuncles are found on the neck, on the cheeks, the chest, the back, and the extremities, sometimes even on the buboes. The anthrax is seen chiefly on the neck and back. Carbuncles sometimes appear without buboes; frequently they accompany these swellings of the glands, or even occur later than they. M. AUBERT remarks that carbuncles rarely appear alone, but are generally followed or preceded by buboes; and that the plague, termed carbuncular, is not the more dangerous, especially if the carbuncle is solitary. He adds that the largest carbuncle which he has seen was on the middle of the back, and was four inches in diameter; the cicatrisation of it was very slow. He has met with as many as eleven carbuncles in the same case; and with an instance of a pregnant female, who died of the plague, having a carbuncle on the breast. She was delivered of an infant of seven months during her illness, and it had a carbuncle on its forehead.

25. *d.* The *petechiæ*, which are seen in plague, are stated by DE MERTENS, AUBERT, and others, to be a most unfavourable symptom, and to occur chiefly at an advanced period, or shortly before dissolution. M. AUBERT, however, remarks that he has seen recoveries after the appearance of petechiæ. They are always in this pestilence round, purplish, or black, varying from an almost imperceptibly small point to the diameter of two lines; and are found on all parts of the external surface of the body as well as on the internal surfaces. — *Ecchymoses* more immediately precede death; and proceed from effusions of blood of greater or less extent in the cellular tissue and membranes, owing to loss of the vital cohesion of the capillaries and tissues, and of the crasis of the blood. — HODGES, MOREA, and others, mention certain eruptions, *marks*, or *tokens*, which are very different from petechiæ or the furuncular pustules now described. They are small tubercles, somewhat resembling warts, callous, and more or less deficient in sensibility; varying in size from that of a millet seed to that of a bean. They are probably merely a modification of the early stage of carbuncles, in the more unfavourable cases.

26. *e.* *Various modifications* of the symptoms are observed during the prevalence of this pestilence. HODGES mentions cases of persons who walked about, or presented the appearance of health, and partook of their usual meals, and yet had the most unfavourable signs of the distemper in various parts of the surface, death taking place in a few hours. Some became delirious immediately after being seized, and wandered about until they fell down exhausted and dying. In the plague of Noja, it was observed by MOREA, that when buboes appeared in the neck, especially near the carotids, the eye on the same side as that presenting the buboes became inflamed and ultimately destroyed. RENSA states that he has seen persons so little affected by the disease, as to walk about, to eat and drink as usual, and to dress their own buboes. Those who have been already affected by the pestilence, generally escape during subsequent epidemics, or experience in rare instances a modified attack, or merely pains in the cicatrices of old sores and buboes.

27. *f.* *A secondary and modified attack of plague* is occasionally met with, although a person who has been once infected is generally secure against a second seizure. M. GOSSE states, that, in Turkey and Greece, those who had been already attacked and who presented the cicatrices of buboes or carbuncles, were employed in preference to others as attendants on the sick; and that although they took no precautions in waiting upon the infected, slept and ate near to them, handled their clothes and persons, and interred them after death — although exposed to the influence of infection in its full intensity, they generally escaped a second attack of the distemper. Many of them, however, experienced pains in the cicatrices of the old buboes without any other ailment. A few complained during a subsequent epidemic of headach or vertigo, or disorder of the stomach and general debility. Others had slight enlargement of the glands in addition to these symptoms; and but very rarely new carbuncles or sores appeared. M. GOSSE mentions only one case in which the second attack was so severe as to terminate fatally. This person had been much exposed to the effluvium proceeding from the fœtid evacuations of the sick, upon whom he was an attendant. He was soon after infected, and died on the sixth day of the disease.

28. ii. STAGES OR PERIODS. — Although this distemper may consist of only *one stage*, in its most aggravated cases; that one being characterised by rapid sinking of the powers of life as manifested by the nervous and vascular systems and internal organs, still it much more frequently exhibits the several periods into which febrile, exanthematous, or other diseases attended by vascular reaction, have been usually divided. These periods have been variously divided; but they may be described as follows, and as they appear in the majority of cases.

29. *A.* The *period* which elapses between the first impression of the exciting cause, and the actual manifestation or irruption of the symptoms of

plague has been differently estimated by different writers. The *duration* of this period obviously depends upon the intensity of the cause, relatively to the susceptibility of the patient—upon the dose of the poison infecting the individual. During devastating epidemics, when it may be presumed that the infectious agent or poison exists in its greatest intensity, and when its activity is augmented by an increased susceptibility of infection amongst the great majority of the community, this agent produces its effects with more or less rapidity. In some instances where it may be presumed that the morbid effluvia from the bodies of the dead, or evacuations of the diseased, have been more than usually abundant, the effect upon those very nearly exposed to them has been most depressing, and almost instantly overwhelming to the powers of life. Many writers have mentioned the seizure of persons thus circumstanced as suddenly as if they had been struck by lightning, vital exhaustion proceeding most rapidly, with a feeling of the utmost internal anxiety and distress, and terminating in fatal sinking in an hour or two. In these cases, and even in many of much longer duration, the malady admits not of any division into *stages* or *periods*, these having, in fact, consisted of only one stage, namely, that of progressive exhaustion of the powers of life, following immediately after the impression of the exciting cause, and terminating fatally with great yet variable rapidity. In these, as there is no variation in the course of the distemper, so there can be no division of it into stages; and there is also no *latent period* between the impression made by the poisonous agent and the manifestation of its effects—no period for the incubation of the morbid seminium, the fatal results of which are rendered instantly apparent in such cases.

30. In different circumstances, however, and in the large majority of instances, the distemper requires a longer or shorter period from the time at which its cause has infected the system before its effects are apparent. This period, which has been denominated that of *incubation*, or the latest stage of the malady, cannot be said to exist in the circumstances just mentioned; and even in some of those which are now about to be considered, it is often of so short duration, as either to be entirely overlooked, or to attract but slight attention. In hese, as well as in other cases, when the period between infection and the irruption of the distemper is much longer, the patient is not generally in sound health during the interval. Although no complaint may be made, and but little ailment s felt, still more or less of malaise, or lassitude, or slight disorder may be detected; at last, after a period varying from a few hours to several days, the *actual manifestation* of the distemper, naccurately called the *period of invasion* by many writers, takes place, and the malady proceeds in s usual course. It is fully ascertained that the morbid phenomena may instantaneously follow he impression made by the poisonous effluvium pon the susceptible, when it is intense, reatively to the grade of susceptibility; and that hey may follow at periods more remote from uch impression; but the extreme duration of this eriod has not been precisely ascertained. Seven, ight, or nine days have been viewed by many as he longest period during which the infectious manation operates its effects, in a silent or latent manner, in the frame of the recipient before it explodes in open disease. It is even possible that a longer period may sometimes be required, especially when the distemper is merely endemic or sporadic, when the dose of the infecting poison is weak relatively to the susceptibility of the recipient, or when the action of the poison is resisted by the constitution and circumstances of the patient. It is also obvious that, in this, as well as in all other infectious distempers, as will be shown more fully hereafter, persons whose susceptibility is by no means great may altogether escape, although very much exposed to infection, until some depressing agent or influence comes in aid; and determines the operation of the exciting or infecting cause, as I have more particularly explained in the article DISEASE (§ 61.).

31. *B. The period of irruption or invasion*, usually appears with a short chill or rigor, nausea, lassitude, vomiting, severe pain of the head and præcordia; continued anxiety, a sense of internal heat referred to the stomach and bowels; vertigo with a staggering walk and appearance of drunkenness. The spirits are depressed to a state of apathy; the features are pale, collapsed, sometimes turgid or bloated; the tongue is coated with a white mucous crust; thirst is urgent and constant; the skin dry and hot; and the pulse most variable, usually quick, but at one time weak, small, and irregular, at another more full and equal. The vertigo, headach, and drunken appearance of the countenance, soon pass into delirium with jactitation, restlessness, and tremor of the limbs and tendons, often passing into profound lethargy. Sometimes difficulty of breathing, pain, and oppression at the chest; hoarseness and cough; a sense of burning heat at the præcordia, and occasionally throughout the thorax; and, in some cases, slight expectoration of blood, or more copious hæmoptysis, are present from the commencement. These symptoms are often increased by the accession of vomiting, or of borborygmi, or meteorismus, or diarrhœa.

32. *C. The eruptive period* may occur after a few hours, or in the course of the second or third, or even the fourth day. After the rapid aggravation of the foregoing symptoms, stinging and lancinating pains are felt in parts of the surface, followed by the appearance of *carbuncles*, in the manner already described (§ 22.); and generally either subsequently or contemporaneously by tumours of the lymphatic glands, or *buboes* (§ 22.). These are developed with greater or less rapidity, and with an increase of all the constitutional symptoms, which present a more marked malignancy as they continue. The nervous systems of organic and animal life evince extreme depression and disturbance; and the vascular system remarkable loss of vital tone. The delirium is either furious, or resembles violent intoxication, or it sinks into a stupid muttering or typhomania, or into complete sopor. The face is lurid, or of an earthy or leaden hue; the eyes are watery, suffused, and the lacrymal carunculæ red and congested; the tongue is dark, contracted, dry, and tremulous, sometimes almost black; the voice is hoarse or altered; the speech rapid, hesitating, interrupted, or stammering; vomiting is constant, irrepressible, attended by hiccup, and the matters rejected have a putrid odour; the perspiration is cold, viscid, and most

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offensive, and the surrounding air is sickening and fœtid. The carbuncles sphacelate; the buboes either subside or pass into an ichorous ulceration; petechiæ, vibices, or ecchymoses appear; subsultus tendinum and convulsive movements supervene; and the pulse becomes soft, weak, small, irregular, or intermittent; with faintness, sinking, deafness, and loss of sensibility. These symptoms, which are often variously grouped, differ but little from those of putro-adynamic and true typhus fevers, excepting in the appearance of carbuncles and buboes.

33. *D. The period of Crisis* supervenes; but the distemper may terminate fatally with the symptoms of vital depression, and of dissolution of the vital cohesion of the tissues, just mentioned, at any period from the second to the seventh day. When it proceeds so rapidly as to terminate in death on the second or third day, the stages of its course are generally but imperfectly marked, at least according to the division of them adopted by Hildenbrand, and followed by Naumann. But when the attack is less severe, and when it is prolonged to the sixth or seventh day, a favourable change frequently occurs on the latter day. The pulse is fuller, more equal, and stronger; a general, warm, and copious perspiration breaks out; the sloughs of the carbuncles begin to separate, and the buboes assume a healthy suppuration. The alvine and urinary evacuations are also improved, although a crisis is more rarely indicated by them, than by the external surface and sores.

34. *E. The Decrement*, or cessation of the distemper is generally gradual and slow when the attack has been severe, and when the carbuncles and buboes have been large, open, and foul. When the disease has been milder the symptoms disappear more rapidly, a resolution of the buboes taking place without suppuration occurring; but in all cases where the buboes go on to the production of a morbid matter, either infiltrating the cellular tissue surrounding the diseased glands, or breaking externally, a healthy suppuration is requisite to returning health. Hence *convalescence* is more or less prolonged by the severity and extent of the external sores, as well as by the violence of the preceding constitutional affection, by the profound alteration and depression of the powers of life in all the vital organs, and by the conditions of the circulating fluids.

35. *F. The Duration* of an attack of plague varies from an hour or two to six or seven days in fatal cases. According to M. Morea, death generally occurs before seven days. When recovery takes place, the suppuration and healing of the carbuncles and buboes greatly protract the distemper, at least the early period of convalescence from it. In slighter attacks, when no foul and open sores are formed, recovery is much more rapid, and the duration of the distemper is much shorter, but of an indefinite duration, under nine or eleven days, no precise period having been remarked.

36. II. Appearances on Dissection. — M. Rigaud, lately physician to the European Hospital, at Alexandria, states the following to have been the results of his examination of the bodies of sixty-eight subjects of the plague. The exterior of the body when death has ensued rapidly and without any medical aid, is bluish and dark-violet, in large irregular patches, especially about the head, the neck, and upper extremities; the surface appearing as if rubbed over with mulberries. This discoloration, which is often absent when death has taken place slowly, is accompanied with petechiæ, varying in size from a flea-bite to that of a vetch. One or more carbuncles and buboes are found in the situations already specified (§ 22.) The usual cadaveric stiffness is present.—*a.* The membranes of the *brain* are injected with black blood. The vessels beneath the arachnoid are greatly distended. This membrane is, however, rarely thickened; it is mostly adherent, by a buffy and granular transudation, to the upper and inner parts of the hemispheres of the brain. Sanguineous effusions are observed in some cases; but more frequently the cellular sub-arachnoid tissue is infiltrated with a serous fluid, sometimes yellow, or even purulent-looking. The cineritious substance of the brain is of a deeper colour than natural; and the white substance, when sliced, shows very numerous bloody points. A little limpid serum is found in the ventricles. The choroid plexuses are of a reddish violet colour, like the lees of wine. The brain is seldom softened. The membranes and substance of the spinal chord are generally in the same state as those of the brain. The cephalo-spinal fluid is in excessive quantity.

37. *b.* The *lungs* are generally found more or less altered, but the lesions are often consequences of antecedent maladies. They are often rose-coloured on their exterior and anterior surface; but sometimes pale yellow, marbled with blue; these appearances are, however, seen only when they are bloodless. Posteriorly they are always of a deep violet; their vessels being gorged with black and thick blood. The *pleura* is always of a dark red, with numerous adhesions. Effusions of a yellowish serum in considerable quantity are frequently met with in the pleural cavities. The *pericardium* usually contains from hal a pint to a pint and upwards of serum. The *heart* seems increased in volume, and its superficial vessels are congested and well defined Spots like petechiæ are observed over the lef cavities. The right cavities, the auricles especially, are distended by black blood, sometime clotted, but always gluey. On the left side, th cavities are empty, with the exception of a very little blood in the ventricle. The substance o the heart and its inner membrane are unaltered The *arteries* are always empty; the *veins* are, o the contrary, distended, and full of black clotte blood, the jugulars more particularly. Whil the inner coat of the arteries presents no alteration that of the veins is spotted largely and irregularl as if with ink.

38. *c.* The *pharynx* and *œsophagus* are commonly natural; and this has been the case eve with the latter, when appearances of intense inflammation have existed in the cardiac orifice o the stomach. The *peritoneum* is always of a pin or bright red tinge; and the vessels are seen beneath it largely gorged with black blood. Th adipose tissue is injected and reddened, sometime darkish like lees of wine. The *stomach* is ofte distended by gas. It frequently contains a quantity of a dark viscid fluid, like a mixture of bi and putrid blood. The mucous membrane vari in colour, from pink and bright red, to a brow

bluish, or leaden tinge, and often to a bronze green. Large ecchymosed patches, and petechial spots are also observed in the internal surface. The internal coats are remarkably softened and sometimes ulcerated. The *intestines* present the same changes as the stomach, excepting the colon, which is somewhat contracted. Lumbrici, and less frequently, tæniæ, are found in many cases. The *mesenteric glands* are engorged and blackish; and the whole *glandular system* is more or less altered. The *liver* is almost always enlarged, especially its large lobe, which presses up the diaphragm very much on the right lung. Its vessels are engorged; its substance somewhat softened, but not otherwise altered. The *gall bladder* is double or nearly triple its usual size, containing a thick, greenish-black bile. Petechial spots are seen beneath its peritoneal covering. The *spleen* is much augmented in volume, softened, friable, and pulpy. The *kidneys* are engorged with blood; the ureters are arborescent, with a red hue along their entire course, or covered with black spots, or even wholly blackened, as if with charcoal or ink. The *urinary bladder* is commonly half contracted, and its inner membrane presents the same appearances as those of the stomach and intestines.

39. *d.* These changes were observed in Europeans who had died in the hospital in Alexandria, and who had been addicted to every kind of excess; but they differ but little from those found by other physicians who have observed the disease in various countries and epidemics. Petechiæ have been remarked in all the viscera, especially in the mucous surface, where also ecchymoses, and large dark spots have also been very common. The carbuncles said to have been found, by the older writers on this pestilence, in the abdominal and thoracic organs, have manifestly been those large ecchymoses or exudations of blood in the tissues, more accurately observed by recent writers. M. LACHAISE, in his description of the changes in the bodies of those who died of the Egyptian plague of 1835, states, that the whole lymphatic glandular system was diseased, internal as well as external. These glands were more or less engorged, enlarged, often softened and discoloured. The spleen was always very much enlarged, and so remarkably softened as not to admit of being handled. In all cases when black vomiting had occurred, the mucous surface of the stomach was not only ecchymosed and softened, but also ulcerated; the ulcers being very small and often numerous, and apparently the consequences of the ecchymoses, or small effusions of blood in and under the mucous or villous membrane. Red petechiæ and small rounded ecchymoses were also frequent under the serous surfaces. He adds, that all the parenchymatous organs were engorged with fluid black blood, which had frequently gone on to decomposition, causing the presence of gas which was often remarked. M. AUBERT states that he observed the ganglia of the great sympathetic engorged with blood, and presenting numerous red points externally, and internally the colour of wine lees. M. LACHAISE mentions the frequency of red points in the nerves arising from extravasations of blood in their neurilema.

40. *e.* All recent writers concur in remarking the very sensible *alteration of the blood* in this pestilence even during the life of the patient. Blood drawn from a vein, even early in the distemper, does not separate into a coagulum and serum, and there is no fibrinous portion or buffy coat. These elements remain mixed together, presenting the consistence of cream. During venesection, the blood presents, as it flows, the same dark colour at the close, as it did at the commencement of its abstraction; and it often emits a peculiar odour. After standing drops of oil often appear on the surface, and the whole mass speedily undergoes putrefaction. M. BULARD states that M. ROCHET analysed the blood in three cases. The blood was taken from three young and plethoric men, and from the third to the fifth day of the distemper. In 100 parts, there was only six tenths of fibrine, and it contained sulphuretted hydrogen gas. It was always more dense than in health. The venous trunks contained blood, presenting the same appearances and chemical constituents, as that taken away by venesection. The blood in these vessels was fluid and black, it appeared as dissolved, and often contained small oily drops.

41. III. DIAGNOSIS. — Plague is often distinguished with great difficulty from other malignant or low fevers, on the first breaking out of an epidemic, so that physicians, who have been in the habit of seeing plague patients, have been deceived in some instances. The difficulty, however, is only felt at the commencement of an epidemic, and when neither carbuncles nor buboes appear. When these are present, or even either the one or the other, then the nature of the distemper is made manifest. During the prevalence of an epidemic plague, a white chalky tongue, a quick and rapid pulse and headach, are sufficient proofs of an attack, although neither carbuncles nor buboes, nor even petechiæ are present. The septic or putrescent disposition, although greater in this pestilence than in others, is not sufficient to distinguish it in many cases, and especially early in the attack; but, when the affection of the glandular system becomes apparent either alone or conjointly with the other symptoms of malignancy, or signs of a septic tendency, then no doubt of the nature of the distemper need be entertained.

42. IV. PROGNOSIS. — The prognosis in this distemper has been more fully stated by DIEMERBROECK than by any other writer. He remarks that no dependence in general could be placed upon critical changes occurring even in the critical days; when, however, they take place on the sixth day, the disease is always fatal; and he adds, that those who are seized at new and full moon rarely recover. A seizure after a fit of anger; after terror, dread, or anxiety; and after sensual excesses, is especially to be dreaded. The commencement of the distemper during warm, humid weather, and a still or calm state of the air, in warm countries, or during the summer or autumn in colder climates; and in low, close, foul, and crowded localities, amongst a population insufficiently nourished, prone to excesses, and neglectful of cleanliness, is generally followed by a rapidly diffused and fatal epidemic. I shall treat of the prognosis with reference, in succession, to the chief functions of the economy, according to the information furnished by the most experienced writers.

43. *a. The circulating organs* sometimes fail of furnishing those indications of the result which might be expected from them; but this may be owing as much to deficiencies in the observer as to the conditions of these organs. Faintings, syncope, or marked impairment of the *heart's action*, or palpitation at the time of seizure, or soon afterwards, are generally unfavourable. An irregular, unequal, small, weak, and very soft *pulse*, during the course of the distemper; and an intermittent, small, weak, and creeping pulse, at an advanced period, are generally fatal. A rapid, quick, open, and expansive pulse at the commencement or early in the attack, is also unfavourable. An even, not very frequent, or even an almost natural pulse, cannot be relied upon as indicating a favourable result unless accompanied by other favourable symptoms. Diemerbroeck remarks that a pulse nearly approaching the natural state is deceitful; and that an intermitting pulse is always fatal. The state of the *blood*, as shown after venesection, or by the appearances of the mucous and cutaneous surfaces, and considered in connection with the heart's action and pulse, also indicates the amount of danger; evidence of serious change in this fluid leaving but slight hopes of recovery.

44. *b. The nervous systems*, especially the *organic nervous system*, often furnish evidence of the ultimate result from the beginning of the attack. In some cases the *cerebro-spinal system* is not remarkably affected even during the whole course of the malady; the intellects are not disordered, and muscular power and action are often so far retained as that the patient is enabled to walk about until shortly before dissolution; and although the pulse may have disappeared from the extremities, he can, in some instances, change from one part of the chamber to another. When, however, the powers of the mind are impaired, depressed, or otherwise disordered, at the commencement; or when violent or low delirium occur early; and when apathy, lethargy, stupor, or complete coma appear, the distemper generally terminates fatally. Tremor of the tongue and hands; convulsive movements of the extremities or other parts; contractions or startings of the tendons, generally indicate dissolution, especially when associated with delirium, stupor, or coma.

45. If all the functions which are actuated by the *organic nervous system* be remarkably depressed or otherwise disordered; if the digestive, the assimilative, the excreting, and the circulating functions are either arrested or remarkably impaired; if the vital or chemical conditions of the blood be visibly altered; and if the vital cohesion or tone of the capillaries, and of the several tissues be manifestly diminished, occasioning passive hæmorrhages, and discolourations of the surface, recovery rarely takes place, especially if these changes are very apparent. Diemerbroeck remarks that epistaxis is dangerous on a critical day, and fatal on a non-critical day. Other hæmorrhages are even still more dangerous.

46. *c.* The *tongue* often indicates the result with much certainty. When it becomes black, or very dry and contracted at the commencement, an unfavourable issue may be expected; but when it preserves a natural appearance and continues moist, or when it regains these appearances, recovery may be anticipated. Severe affections of the *throat*, or pain in this situation, even although there may be neither dryness nor aphthæ, nor tumours, or other manifest cause, often announces a fatal termination. Exudations of blood from the gums, tongue, mouth, or throat, are equally unfavourable.

47. *d.* If the symptoms referable to the *stomach* and *bowels* are severe at the commencement, and especially if *vomiting* be exhausting, frequent, or continued; if the matters ejected be black or unnatural; and particularly if it be attended by singultus, death will ensue. When, however, vomiting is moderate, and when it ceases after the evacuation of green, or greenish-yellow, or bilious fluids, a favourable result often takes place. The occurrence of *diarrhœa*, and even of looseness, especially if the motions are black, or sanguinolent, or give out a very offensive, putrid, or unnatural odour, is generally fatal. On the contrary, *costiveness*, or a natural state of the bowels, at the commencement and during the increase and decrement of the distemper, is a very favourable circumstance.

48. *e.* A free tranquil, and easy state of *respiration* furnishes just grounds of hope; but the more serious disorders of the respiratory organs are most unfavourable. A short cough, short and difficult respiration; a burning heat or pungent pain, or tightness in the thorax; bloody expectoration or hæmoptysis; and signs of pneumonia or of pleurisy, are severally indications of a fatal issue. Frequent sneezings and remarkable fœtor of the breath, or an odour of putrified flesh furnished by the expired air, are indications of approaching dissolution. Alterations of the voice, a rapid or interrupted, or very slow or stammering enunciation; inarticulate or confused speech, are all unfavourable signs.

49. *f.* The *urine* generally fails to furnish any certain indications of the result; and I can find no exact information respecting its chemical conditions in this pestilence. Diemerbroeck observes that a turbid urine was unfavourable, nevertheless some escaped who passed this urine, whilst many died suddenly or rapidly although the urine was natural, and that in some of these the symptoms did not appear dangerous. He adds, that a thick, oleaginous, brown or blackish urine, or that furnishing a brown or black sediment, was generally a very unfavourable symptom. Those who discharged blood from the urinary organs, either mixed with the urine, or distinct from it, he states died in a short time. Hodges remarks that very offensive urine is a fatal symptom.

50. *g.* The appearance of the *catamenia* during this pestilence is dangerous, even upon a critical day, and most writers view this occurrence as fatal when it takes place on a non-critical day. Hodges says that every hemorrhage is bad, but a flux of the menses is fatal. Women who are pregnant, or lying-in, or threatened by abortion, rarely recover when seized by this distemper, and they are in great danger of being attacked when it is epidemic, unless excluded from all possible medium of infection. Infants born either prematurely or at the full time, after the mother has been seized by the plague, have sometimes presented proofs of the disease having affected them *in utero*, and the distinctive characters of the distemper.

51. *h.* The *external surface* furnishes by its appearances the most certain evidence of the issue of the distemper. When a warm, genial, and general *perspiration* breaks out, no symptom assuming a worse character, a favourable result may be expected. But when the perspiration is clammy, viscid, very offensive, or cold, or even although it be general, when the symptoms are aggravated, or the patient becomes weaker, or feels a sense of sinking, then the distemper terminates fatally. HODGES remarks that " the most certain fatality of all is from such sweats as have a cadaverous smell, although there was sometimes a disagreeable scented sweat, with which they recovered, as with it exhaled the pestilential venom." (p. 144.)

52. *i.* The *glandular tumours,* or buboes, characterising this pestilence, often furnish the best evidence of the issue. The early appearance of these tumours, especially before or without febrile symptoms, is a favourable circumstance ; but it is very different if they follow the fever, or if the febrile symptoms are very severe or intense. The occurrence of these tumours below the ears or in the neck, and especially if they increase rapidly, or in the course of ten or twenty hours, or if they be soft, fluctuating, or boggy, either with or without inflammation, is always fatal ; and although some patients with tumours thus situated and characterised may not appear otherwise very ill, they die nevertheless. If, on the other hand, the tumours are hard at the commencement, tense and oblong, and increase gradually or slowly, with a moderate degree of pain, and if they continue hard during their increase, a favourable result may be anticipated ; and with more certainty if they pass on to suppuration ; or when the fever has ceased, they gradually disappear without suppuration. But if hard buboes are surrounded by a circle resembling an iris, or if they assume a dark or fiery red, or a livid or black hue, or if the buboes disappear suddenly, the fever still continuing, death generally takes place. HODGES remarks that " the more buboes there are, so that they suppurate, the better. Carbuncles are always more dangerous than buboes." (p. 140.) DR. MOREA observes that buboes in the armpits are always attended by danger, and an inflammatory affection of the eyes, with difficulty or other disorders of respiration, generally accompanies them, these and other symptoms becoming worse unless they enlarge and suppurate, when an amelioration takes place ; but if they remain stationary, or subside, death always results. (*Op. Cit.* p. 427.)

53. *k. Carbuncles* appearing in fleshy parts, from the commencement of the distemper or soon afterwards, are favourable ; but if they are seated over or very near the buboes or enlarged glands, over the spine, or on the fingers or toes, they indicate great danger. If they break out slowly there is much risk, and if they are numerous there is still greater risk. If, in the course of two or three days, they are surrounded by a red circle, they generally heal easily and soon, but if they continue to extend, without a disposition to become limited, or if they reach a great size, there is danger, or at least there will be great difficulty in healing them. The prognosis should be still more unfavourable if they are seated on the spine, or over large blood-vessels or nerves. When they disappear suddenly, or when they dry up, the febrile or other symptoms still continuing, a fatal termination soon follows. HODGES says, that " the smaller the carbuncles, and the more remote their situation from the viscera, greater vessels, tendons, and nerves, and the fewer they are in number, by so much it is the better ; and, on the contrary, when they spread like a gangrene, and are near the principal parts, as the breast or belly, and also are numerous, or livid, the fate of the patient may be pronounced desperate." (p. 147.)

54. *l. Petechiæ, ecchymoses,* or *spots* of a violet, purple, black, or greenish hue, whenever they may appear, always indicate a fatal issue. A few escape when the petechiæ are red, but even this is an unfavourable symptom.

55. *m.* Dr. CASTRO remarks that evacuations occurring spontaneously in the course of febrile diseases, especially on critical days, are favourable circumstances ; that they are quite otherwise than favourable in plague. DIEMERBROECK observes that he has always considered *issues* and *setons,* made with a view of protecting the individual from an attack of plague, as most serviceable, even although he may be seized nevertheless, for if these continue to discharge fully during an attack, the pestilential venom seems to discharge itself by these channels ; but if they dry up, or cannot discharge, during an early or more advanced period of the distemper, death will certainly take place. Of the protecting and favourable influence of *issues* on this malady, he quotes the opinions of MERCURIALI, HERCULES SAXONIA, GARNIER, HILDANUS, JOANNES HERCULANUS, and others in support of his opinion.

56. V. THE CAUSES OF PLAGUE.—This subject, in some of its most important relations, has long engaged the minds of eminent medical writers. It has occupied a portion of the attention of the legislature in this country in modern times ; and very recently it has been inquired into and discussed in the Royal Academy of Medicine in Paris. I have, in preceding sections of this article, fully examined the *causes* of the *choleric* and *hæmagastric pestilences,* and have demonstrated the existence of *infection* as their chief and efficient cause. However this may be disputed by the interested, by the prejudiced, and by the insufficiently informed, I am confident of its truth. I have written with a full conviction of the soundness of the opinions I have entertained, and with a firm belief that time will not only test, but also prove their accuracy. The inquiry upon which I am about to enter will be prosecuted as follows : — 1st. Is plague caused and propagated by infection ? 2d. Infection having been demonstrated, in what does the infectious agent consist, and by what media is it conveyed or preserved ? 3d. What are the circumstances, influences, and agents, favouring or determining the action of the infectious or pestilential miasm ? And 4th, For what period may infection remain latent in the system until its irruption in a specific form ; and how long may the infectious poison retain its powers when preserved in animal or other productions ?

57. *A. Is plague caused and propagated by infection?* Conformably with the meaning attached to the word infection, in the use which I have made of it in the two preceding parts of this

article, and agreeably to what I have stated in the article INFECTION, there can be no doubt of the proofs of the infectious nature of this pestilence being most complete, and convincing to all candid minds.' In that article I have classed plague in the *third class* of infectious maladies, and have stated the *tests* and *circumstances* proving the infectious nature of this distemper, and of others belonging to the same category. (See INFECTION, § 4. 15.) Lest I may be viewed as having espoused a particular doctrine without sufficient evidence of its truth, I shall *first* adduce a sufficient number of the innumerable facts upon record proving the infectious nature of this pestilence; and *next* inquire into the objections which have been urged against a most important doctrine as respects the best interests of the community.

58. *a.* Plague has been generally considered as both an *endemic* and *epidemic* distemper; it has been viewed as endemic in Egypt and Syria, where also it is frequently epidemic, and only epidemic after various prolonged and indeterminate intervals, in most of the countries bordering on or approaching to the Mediterranean shores, and less frequently or much more rarely in those which are further distant from them. It has been said to be non-infectious or non-contagious when appearing endemically, sporadically, or primarily; and to be contagious by some, infectious by others, and both contagious and infectious by many, only when it appears in an epidemic form. These views have been often hastily taken, and the terms in which they are expressed have been as loosely as inaccurately employed. The meaning which the numerous writers on the subject have attached to the words contagion and infection has been vague in most instances; different writers employing them with a different import, or with a different range of meaning; and even the same writer using them without either precision or distinction. From what I have stated in another article (see INFECTION) it will be seen that I have used *infection* as the generic term, and *contagion* as a form of infection, or as that infection of a healthy but predisposed body produced by immediate or mediate contact of a diseased body, or of the secretions of a diseased body, the contagious agent propagating a specific malady and perpetuating its kind. I have applied the term infectious to those maladies which are propagated and perpetuated, without contact, and by means of an animal miasm or emanation, proceeding from the bodies of the diseased, and affecting predisposed or susceptible persons with a distemper identical with that which produced the infecting miasm or emanation.

59. Taking the most extended view of *infection*, and considering it a result of whatever may contaminate the fluids and solids of a healthy body, as I have done in that article, we shall find that *contagion* is a mode only of *specific infection:* and that whilst all specific infections proceed from more or less diffusive, or more or less consistent animal emanations or secretions, which affect the system through the medium of either the respiratory or the cutaneous or mucous surfaces, contagion is infection by those secretions which act chiefly by contact with, and through the medium of, the external surface of the body. It is obvious from this, that, as the major includes the minor, so all contagions are also infections; that infection has a wider range of acceptation than contagion; and that amongst the several infectious agents, some act through the medium of the lungs, others through the medium of the external surfaces, and many through either channel, or through both, according to the circumstances or modes in which the infectious agent may be presented to the healthy frame. Thus infectious emanations or secretions from specifically infectious maladies may affect healthy predisposed persons: — 1st. When diffused in the air either directly from the diseased body, or mediately from woollen, or body or bed-clothes, which had retained these emanations for a longer or shorter period, the air thus contaminated affecting the healthy through the medium of the lungs; — 2d. When applied in a more or less consistent or tangible form to the cutaneous surface, or to the outlets of mucous canals: — and 3d. When presented to the healthy economy in either of or in both these modes. Hence some distempers, as the two pestilences already treated of, are propagated and perpetuated in the *first* of those modes only; whilst others are communicated in the *second* of those modes, as itch, syphilis, rabies, &c.; and some are transmitted in *both modes*, as plague, small pox, &c. The *first* order is simply *infectious*, the *second* is *contagious*, and the *third* is both *infectious* and *contagious*. (*See Art.* INFECTION, § 4.)

60. Much difference has existed among writers as to the country or countries in which the plague is *endemic*, or in which it is generated, or its germs preserved; and as to whether or not it is always present in few or rare instances, although not commonly observed, when it is not generally prevalent, — whether or not it is generated *de novo* in those countries, after intervals of entire extinction, or is the infectious poison always preserved by means of few or occasional cases, thereby imparting to it an appearance in those places, of a sporadic or endemic distemper. Many of the ancients, as well as writers of later epochs, as MEAD, ADOLPHUS, ARBUTHNOT, FODÉRÉ, and others, have considered Egypt to be the most productive source of this pestilence; whilst PROSPER ALPINUS, TARGIONI, and OLIVIER have believed that, although frequently observed in this country, it is generally introduced from Ethiopia, where it is generated by a hot sun from a deep and rich soil, kept almost constantly humid by the rains, a malignant miasm being produced from this source, that constantly gives origin to a malady, whose effluvium propagates and perpetuates itself. Whether originating or not in these or other countries bordering on the Levant, and whether it arises from this or other sources, there can be no doubt of the rapid spread of this pestilence from person to person, especially in certain circumstances which evidently favour this diffusion, although the exact nature of these circumstances are often not very manifest, or altogether unascertained. That this malady is propagated in one or other of the three modes to which I have just now endeavoured to assign some degree of precision, cannot be denied by any one who has perused a portion of the annals of pestilential diseases with an unprejudiced mind; but the chief difficulty is to determine the particular mode in which it is transmitted; and it is by no means a

matter of small importance, that the exact mode or channel of transmission observed by this pestilence should be ascertained, inasmuch, as upon it all protective and prophylactic measures should be based. After perusing the evidence which I shall have to furnish respecting the transmission of this distemper from person to person — and this evidence can only be, owing to my confined limits, a very small portion of that which might be adduced — the reader will readily come to a conclusion as to the channels by which this transmission takes place, even without that assistance which it is my duty to afford.

61. Dr. Hennen, who took great pains to investigate the origin and propagation of the plague in Malta in 1813, and who has confirmed the accounts of this epidemic furnished by Drs. Calvert, Faulkner, and Tully, remarks that, "it has been among medical men, I am sorry to say, that doubts have principally arisen as to the contagious nature of plague. This gross and dangerous error, in point of fact, has sprung from that most fruitful source of deception — preconceived theory; and it has been aggravated by neglecting to define the terms employed, which is altogether inexcusable, and which has exposed us to no small portion of ridicule among the better informed non-professional men who have interested themselves on the subject."

62. The signs or tests by which a disease may, with the utmost certainty, be proved to be infectious or contagious, or both the one and the other, have been fully stated in the article Infection (§ 15.). Now whoever will examine the accounts of the plague furnished by those who have witnessed its ravages, will find most convincing evidence of the following truths: — 1st, That it is most liable to attack those who approach patients affected with it, and that in proportion to the nearness of the approach; 2nd. that those who avoid all intercourse with persons affected with the plague generally escape the distemper. These are facts recognised and acted upon by all persons who have had opportunities of observing the progress of this pestilence; and there are few facts in medical history so well supported by evidence as these are, and as to which the experience of past and present times is so uniform and conclusive. A recent writer has remarked, that the most remarkable examples of the communicability of this distemper are afforded by the introduction of it into countries which had long been free from it, in consequence of intercourse with places in which it was then raging. The clearness with which this intercourse has been often traced is truly wonderful, considering the many temptations which travellers, traders, mariners, and commercial men, coming from countries where the plague is prevailing, have to clandestine intercourse, and the frequency of deception practised by illicit dealers, smugglers, and others. Of such histories there are so many on record that the difficulty is which to select; although it must appear very difficult, if the subject be viewed in a proper light, to trace the origin of an infectious malady, especially when such malady may be propagated by the poison retained, even for a very considerable period, in articles of clothing and bedding. Indeed, in many cases of the importation of plague into places remote from or even approximating the Levant, several circumstances and occurrences have taken place, proving the introduction of the infection not by one channel, article, or person merely, but by several in the course of a few days; and thus the accounts given of the origin of the distemper have varied in some instances, and have thereby apparently weakened, although actually strengthening, the evidence of imported infection. Besides, the difficulty is greatly increased as respects this pestilence, as well as others, by the circumstance of a very large number, and sometimes all, the very earliest cases being either concealed or denied, or mistaken for some other fever,—a fact of more importance than generally acknowledged in tracing the early history of an epidemic. Owing to the difficulties now adverted to, and to the fact of the plague appearing in places holding frequent intercourse with countries where it was raging at the time, the infection having been conveyed in more ways than one, several of the outbreaks of it in various parts of Europe during the 15th, 16th, and 17th centuries have been either imperfectly described or unsatisfactorily accounted for; but such is by no means the case with others, and especially the more recent. The plague appeared at Marseilles in 1720, after an immunity of seventy years. A vessel from Seyde, in Syria, arrived in that port on the 25th of May, after having lost several of the crew and of the passengers during the voyage by this distemper, and among these the surgeon of the ship. On the arrival of the vessel, the crew and cargo were landed at the lazaretto. Soon afterwards the disease attacked, in succession, another of the crew, an officer put on board to superintend the quarantine, a boy belonging to the ship, two porters employed in unloading her, then four other porters, the priest who had administered the last sacrament to the sick, the surgeon of the lazaretto, and his whole family. Notwithstanding these events, the passengers, having performed a short quarantine of less than twenty days, were allowed to take up their quarters in the town, and to carry with them their clothes and packages, conformably with the advice of the anti-contagionists of that place and time. As Dr. Gooch has very justly remarked, when passengers after a voyage of nearly four months and a quarantine of nearly three weeks, are at length let loose in a large city, their first employment is to roam about the streets; they have things to sell, and to buy, and to see. They come in contact in the streets and in the shops with persons whom they think no more about and who think and know no more about them.

63. It is not surprising, therefore, that the exact traces of the distemper should be lost, in all such circumstances; and that it should be often difficult, and even impossible, to follow the progress of it in its various courses towards the general infection of a community. Dr. Bertrand, a resident physician at Marseilles at the time, states that it is most certain that the plague was on board Captain Chataud's ship; that it was communicated to the infirmary by the merchandise with which it was freighted; that one of the first who fell sick in the city had been passenger in the ship, and had only quitted the infirmary a few days with his clothes and merchandise; that among the very early victims of the distemper were the family of a famous con-

traband trader, near the convent of the Carmes, and those of contraband traders, residing in the Rue de l'Escale and vicinity; and that the suburb adjoining the infirmary was attacked nearly at the same time as the Rue de l'Escale. I leave my readers to make the reflections naturally suggested by these facts."

64. Numerous incidents occurred during the early prevalence of the pestilence in this city, proving the channels or modes of its extension; but it is sufficient to notice one or two of them only. The Hôtel Dieu contained between three and four hundred foundlings of both sexes, besides the officers and attendants. A woman from the Rue de l'Escale presented herself at this hospital, stating that she was ill with a common fever, for in this pestilence, as in many others, the first cases were not admitted to have been the plague, and numerous misrepresentations were made respecting them; and hence the unrestrained progress of the mischief, and the loss of much valuable time, or rather the entire loss of that time, in which alone it could have been limited. She was taken in and conducted to her bed by two maid-servants. The next day the two maid-servants fell ill and died in a few hours. The day after, the matron, who had visited the patient, fell ill and died almost as suddenly. The disease spread with amazing rapidity, and destroyed all the children, with every person belonging to the house, excepting about thirty, and these took the infection but recovered.

65. An official report transmitted to Paris stated that the physicians and surgeons of Marseilles unanimously declared, "that when one person in a family was attacked and died; the rest soon underwent the same fate, insomuch that there were instances of families entirely destroyed in that manner; and if any one of an infected family fled to another house, the contagion accompanied him, and proved fatal to the family where he had taken refuge."

66. The removal and interment of the dead as the pestilence extended were amongst the greatest difficulties experienced by the authorities of this city. At first beggars and vagabonds were employed in casting away the dead bodies; but these soon were seized by the distemper, "and those who followed them in their offices soon followed them in their fate." Convicts were then supplied from the galleys to carry away the dead, and promised their liberty if they survived. The first supply amounted to 133, but these perished to a man in less than a week. A hundred were next granted, and in six days they were reduced to twelve. The population of Marseilles was calculated at the outbreak of the pestilence at about 90,000 souls; but many left the city when the distemper began to spread. Upwards of 40,000 persons died; so that, comprising those who recovered and who left the city, very few escaped an attack. But this pestilence was carried to Aix, Toulon, and various other places in Provence, in which upwards of 80,000 persons died of it.

67. Whilst the horrors attendant upon this pestilence were going on, intercourse was almost unrestrained, excepting in some places in which precautions were used to prevent communication with the infected, and which either escaped altogether, or in a great degree, according to the strictness with which the precautions were observed. When the distemper was admitted to be the plague, the galleys were detached from the shore, anchored in the middle of the port, and separated from other vessels. Three hospitals were appointed: one for the crews, the other for the convicts. In the former, those infected with the plague were placed; in the latter, those labouring under other diseases were kept. To the third, all doubtful cases were sent. The population of the galleys amounted to 10,000, yet 1300 persons only were attacked, and about half recovered. There are various ways in which precautions against intercourse with infected persons, and against the introduction of infected substances, may have been evaded without detection; but there is a very remarkable difference between the numbers attacked where no precautions were taken, and where precautions were adopted, although they were most probably partially evaded. A certificate given by the Bishop of Marseilles states that "the plague has not penetrated into the religious communities who have had no communications with persons abroad, and who have used the precautions necessary to protect them;" and another given by the first sheriff of this city states that "the families which were shut up and had not communicated abroad, particularly the nunneries, had been protected against this scourge; which was introduced into some of them by communications with strange persons."

68. De Mertens, a physician of eminence practising in Moscow, has given a full account of the plague which visited that city in 1771, after an absence of a century and a half. War commenced in 1769 between Russia and Turkey; the next year the plague appeared in Wallachia and Moldavia; and many Russians died of it in the city of Yassy. The following summer it entered Poland, and was conveyed to Kiow, where it carried off 4000 persons. At first all communication was cut off between Kiow and Moscow; but a colonel and two soldiers left Choczin, where the plague was raging, for Moscow. The colonel died on the road, but the two soldiers reached Moscow, were taken ill at the military hospital, and died there soon after their arrival. This occurred in November 1770. Towards the end of this month the demonstrator of anatomy at this hospital was attacked by this distemper, and died on the third day. The male attendants lived with their families in two chambers separated from the others; and in one of these eleven persons fell ill in a very short time with a putrid fever, attended by petechiæ in some, and by carbuncles or buboes in others, and most of them died from the third to the fifth day. The same distemper attacked the attendants residing in the other chamber. On the 22d December eleven physicians assembled, and ten out of the eleven declared the disease to be the plague. The hospital was closed, and a military guard interrupted all communication. Those affected by the distemper, with their wives and children, were separated from the rest, and the clothes and moveables of those who had died of the disease and who were still ill with it were burnt. The weather became intensely cold, and the traces of infection were lost in the hospital and in the city. The communications with the hospital were opened in February, 1771, but on the 11th of March the physicians were again con-

voked, and Dr. Yagelsky stated that eight persons had been attacked in a large manufactory of military clothing, containing 3000 persons, situated in the centre of the city, with symptoms similar to those observed in the patients in the hospital three months before. The workpeople declared that in the beginning of January a woman who had a tumour in the cheek had gone to the home of one of them, and that the disease had afterwards spread in the manufactory, and 117 persons had died of it. The manufactory was closed and guarded; nevertheless several of the workpeople escaped on the following night by the windows. Precautions were taken to prevent the spread of the distemper, and an abatement of it became manifest; but these precautions were relaxed, and the progress of the malady became rapid. "Towards the end of July the mortality amounted to about 200 daily; by the middle of August, to 400; towards the end of the same month, to 600; at the beginning of September, to 700; some days afterwards, to 800; and at length to 1000 daily. On the evening of the 5th of September the populace rose, broke open the hospitals, put an end to the quarantine, and restored the religious ceremonies used for the sick; the images of saints were carried with great pomp to the sick, and kissed by every one successively. The people, according to ancient custom, embraced the dead, and buried them within the city, declaring that human precautions were odious to the Divinity; they hunted down the poor physicians, broke their furniture, and sacked their houses. This riot lasted only a few days, but it was followed by the addition of two or three hundred to the daily mortality. Almost all the priests perished." The pestilence began to decline in October, and at length ceased with the end of the year. The mortality was estimated at more than 80,000, exclusive of that in the towns and villages to which the distemper had extended. In these the deaths were upwards of 20,000; but they suffered much less, because in most places, the inhabitants, taught by the miserable example of Moscow, readily permitted precautions to be used. Criminals were employed to bury the dead, and when these perished, the poor were hired to do it, and provided with covering of oil-cloth to protect them, but these, and the advice given them, were neglected. Most of them were attacked about the fourth or fifth day, and most of them perished. The plague was most fatal to the poor; nobles, gentlemen, and merchants generally escaping, owing to the precautions they had taken. Dr. De Mertens states that the distemper was communicated only by the touch of infected persons or clothes, and that the physicians, who only inspected the patients, and who touched neither the bodies, nor the clothes, nor beds of the sick, generally escaped, but that a number died of the surgeons and assistant surgeons who touched the patients.

69. Whilst the pestilence was ravaging the city, the Foundling Hospital afforded a remarkable proof of the salutary effects of seclusion. It contained 1000 children and 400 adults. All communication was cut off, and the plague never entered the building. One night, four attendants and as many soldiers escaped from it, and on their return were attacked by the malady; but they were separated from the rest of the house, and no others were infected. The contrast between the fate of this hospital and that of the foundling hospital at Marseilles (§§ 64.) cannot fail to strike the reader.

70. The plague raged in Cyprus from April, 1759, until June, 1760. Dr. Russell states that it was introduced by a large Turkish vessel from Alexandria, that was wrecked on the island in the month of April; and of the crew, who were saved, a great part were infected with the plague; and that, whilst numerous cases were occurring in consequence at Limsol and the vicinity, where this vessel was wrecked, a ship from Damietta arrived at Larnica and landed, on the 22d of May, infected passengers and sailors, who lodged in the houses and communicated freely with the natives. Another vessel from the same place arrived some time afterwards with infected persons on board. During the hot months of July, August, and September, little was heard of the pestilence, "but it continued lurking in these parts, showing itself only by starts," until October, when it greatly increased in those places where it had been introduced, and in the adjoining villages. The plague soon afterwards appeared at Nicosia, to which place the annual fair had drawn a great concourse of people from most parts of the island. But the nature of the distemper was concealed, and the bodies were buried during the night to prevent alarm. It increased rapidly from this time, and destroyed about a third of the population of the island. The convents and European merchants observed seclusion; and wherever this precaution was strictly observed, the distemper did not appear.

71. Dr. Russell, in his account of the plague, which raged in Syria during 1759, and three following years, states that it appeared first at Saffat in October, and had been brought there by some infected Jews, who came from Alexandria. It afterwards spread to Sidon, Acre, Latakea, and Tripoli; and prevailed greatly in these places and the vicinity during the first six months of 1760. "Jerusalem received the contagion in January, and in the beginning of March it reached Damascus; in both which places, as well as in the smaller towns and villages of Palestine, it made dreadful havoc during the subsequent months." Dr. Russell, who was residing at Aleppo, remarks that at this time an extensive commerce existed between this city and infected places, and a total inattention to the means of prevention opened many channels for the reception of the distemper. Accordingly the introduction of it soon took place; and in the following way. Three Turkish merchants, who had come in the Damascus caravan, were lodged in a public khane, near the British consulary house, and after a stay of a few days they set out from Aleppo on the 16th of May. Next day the porter of the khane, an Armenian, and his son were suddenly taken ill; and soon afterwards the brother of the porter. The sôn died on the 19th. These men had been in attendance on the Turkish strangers, and had assisted in moving and packing their baggage. Dr. Russell visited these two men on the 21st, and ascertained the existence of the plague, of which they died on the 22d and 23d. Towards the end of this month caravans arrived from Jerusalem and Damascus, in which were infected persons. These were, under various

pretexts, refused admission into the city, but they encamped without the walls, and buried several persons during their stay; but several individuals found private lodgings in the town. The pestilence began now to prevail both in the suburbs and within the city; and the cases were numerous early in June; but it did not become very prevalent, and soon afterwards subsided, although it extended to the villages scattered between the neighbouring mountains, and to various Arab tribes, and to the Bedouins, among whom it was remarkably fatal. During 1761 and 1762 the distemper continued, with varying degrees of prevalence and fatality, throughout this country. It became epidemic in these years, during May, June, and July, in Aleppo, and was most fatal in the last year; during the three years of its prevalence in Syria, the infection appeared to spread with varying degrees of rapidity in different places. Whilst only straggling cases were observed in Aleppo, it was rapid in its progress among the Arab tribes in the vicinity; and when less prevalent among these, it extended more generally among the Turkish inhabitants of Aleppo. The higher classes and the merchants, especially Europeans, used more or less strict precautions, or entirely shut themselves up; and escaped in every instance where the precautions were strictly observed.

72. Mr. Jackson, in his account of the empire of Morocco, states that the plague has visited this country about once in every twenty years; and that the visitation of 1799 was more fatal than any previously known. It first appeared in Old Fez, and was imputed to the importation of infected goods from the Levant, by some; and to the destruction of immense swarms of locusts, which had infested West Barbary during seven years, and been immediately followed by epidemic small-pox, which had preceded the plague. This pestilence pervaded the whole empire, and in many places did not leave persons living sufficient to bury the dead. Mr. Jackson resided at Mogadore during its fatal prevalence in that city. He states that the European merchants shut themselves up in their respective houses, as is the practice in the Levant, and escaped the pestilence; but that he "did not take this precaution, but occasionally rode out to take exercise." He remarks that his daily observations convinced him that the distemper "was not caught by approach, unless that approach was accompanied by an inhaling of the breath, or by touching the infected person." (p. 278.) He further adds that, during the epidemic, he took "no further precaution than that of separation, carefully avoiding to touch the hand or inhale the breath;" and he is of opinion that the plague is not produced by the atmosphere, but is "caught solely by touching infected substances, or by inhaling the breath of those who are diseased." It has been said, he observes, "that the cultivation of a country, the draining of the lands, and other agricultural improvements, tend to eradicate or diminish the plague; but we have seen countries depopulated where there was no morass or stagnant water for many days' journey, nor even a tree to impede the current of air, or a town, nor anything but encampments of Arabs, who procured water from wells of great depth, and inhabited plains so extensive and uniform as to resemble the sea." (p. 279.)

73. The plague of Malta, in 1813, is rendered memorable by the proofs of the introduction of the infection, and by the measures used to arrest it, founded on a belief of its infectious and contagious nature. The history of this plague has been recorded by Calvert, Faulkner, Tully, and Hennen, all of whom agree as to the fact of the introduction of the distemper. The pestilence had not appeared in Valetta for 137 years, and was now introduced by a vessel from Alexandria, where it was then prevailing. Two sailors had died of it on the passage, and after the arrival of this ship the captain and his servant, soon afterwards a smuggler of the name of Borg, his wife, children, and father were seized with it, and all died; then a midwife who attended the wife of Borg in the premature confinement caused by the plague, a young woman who slept in her house, a kinsman who entered her chamber and touched her body, the child of a master of a wine-house near the quarantine harbour, where, among others, the servants of the health-office who guarded the infected vessel in the harbour, and some of the guards of this vessel themselves, with whom Borg, the smuggler, had frequent dealings. Whilst the distemper was attacking in succession the above-mentioned persons, it appears by the official statements that no other individuals were affected by it in any other part of Malta. It is admitted that there was no positive evidence beyond rumour, of communications between this vessel and Borg and his family; but what evidence can be expected in this and similar cases of undetected smuggling. Rumour in such cases is often near the truth; and that it should be true in this, as to the secret conveyance of articles from the infected ship, is extremely probable. The facts of Malta having been free from plague for 137 years; the arrival of an infected vessel, from an infected port, at the principal city of the island; and the almost immediate appearance of this pestilence after the arrival of this vessel, are of themselves demonstrative of the introduction of it, without the particulars connected with the communications between the vessel and the city being proved—particulars, from their nature, and the circumstances of their occurrence, that cannot admit of proof, as being secret; and of a nature which, if detected, would have led to the severe punishment of those engaged in them. But it is not the mere introduction from a distance that proves the infectious nature of a distemper, but also the subsequent diffusion of it, and the means found to be successful in guarding against it.

74. At first the malady was confined to the crew of the vessel which came from Alexandria and to Borg's family and those who had communicated with them; but it soon afterwards appeared in the town of Valetta. At this time the medical men contended that the malady was not the plague; and those attacked concealed their sickness from fear of being removed to the lazaretto, clamoured against precautions, and did all they could to thwart them. Hence the distemper spread not only through Valetta, Floriana, and the adjoining towns, but also to many villages.

75. The efficacy of *strict seclusion* was demonstrated by some striking instances during the

prevalence of the distemper in Malta. The Augustine Convent stands near the top of one of the main streets of Valetta. When the plague appeared, the strictest precautions were used to prevent all communications with the town; but a servant went into a part of the town where it prevailed, and purchased clothes supposed to be infected. Soon after his return he confessed what he had done; he was immediately shut up, with one of the brotherhood who volunteered to attend him. Both of them were seized and died of the distemper, but no other person in the convent suffered. "When the plague was in Malta in 1675, CAVALLINO, who described it, states that all public establishments which cautiously shunned intercourse with the community, enjoyed perfect exemption from the disease; as did the prisons and monasteries, besides all the vessels in the harbour. In the late plague it was the same; the hospital of St. John of Jerusalem, the prison, and several public offices, and private houses, which early adopted, and steadily kept up, a rigid system of insulation, were not less fortunate."

76. A large building in Valetta had its ground-floor divided into seven separate apartments, occupied by as many Maltese families; and its upper stories used as a military hospital for patients affected with common diseases. During the plague of 1813, the ground-floor was penetrated by it; the inhabitants of four of these apartments were destroyed by it, and two only of each family escaped in the other three. While this was going on below, the sick tenants of the upper stories were shut in, all communication was cut off, and every individual among them escaped the pestilence, although it was raging in the houses around, and penetrating from the lower to the upper stories. Dr. GREAVES, whose house was within a few feet of this hospital, related this fact to Dr. M'LEAN, at Valetta, and led him over the hospital, but no mention is made of it by this uncandid writer and ignorant physician. I say this from personal knowledge.

77. The anti-infectionists contend, that the plague of Malta was not introduced by the ship which arrived from Alexandria very shortly before its outbreak, but from "a noxious state of the air;" and it has been shown, at other places, that they attribute the choleric and hæmagastric pestilences also to noxious states of the air; but, how is it, that this noxious air, which plays so important a part in the production of plague according to them, did not produce one of the other pestilences? We have seen that these three several forms of pestilence have ravaged the same places at different times; and, taking it for granted, that they all arise from "a noxious state of the air," as the anti-infectionists would have us to believe, in what does the noxious air producing the one pestilence differ from that producing the others? It has now been shown by numerous proofs, and many more may be, and some will be, further adduced, that, whilst the distemper was depopulating numerous houses and streets, other houses and institutions, completely surrounded by these houses and streets, remained entirely uninfected, by observing the strictest separation. If the mischief was solely in the air, how came these isolated places to escape, not only during the prevalence of plague, but also during the prevalence of the other two pestilences as shown in the appropriate places? And, moreover, how came "the noxious state of the air," causing the plague of Malta, after 137 years, the plague of Moscow, after 150 years, and the plague of Marseilles, after 70 years, to occur at such distant periods, and no indications of its existence in the intervals to have appeared? And how can the anti-infectionists prove this "noxious state of the air," this undefined, this suppositious, this airy, this baseless entity or non-entity, and account for the wonderful re-appearance of it, after so very many years just at the moment most desired to serve as an argument against the introduction of the plague by an infected vessel? And, again, from whence came the "noxious state of the air," which, according to the anti-infectionists, produced the choleric pestilence, and which had never previously existed, inasmuch as its imputed effects, this particular distemper, was not known to have ever appeared before 1817?

78. Dr. MACKENZIE resided at Constantinople and Smyrna for about twenty years, in the middle of the last century; and during that period scarcely a year passed without some appearance of the plague in one or both of these cities. He communicated his observations on the distemper to Dr. MEAD and Dr. CLEPHANE, which were published in the forty-seventh volume of the "Philosophical Transactions." The plague raged with great violence at Constantinople in 1751, and destroyed about 150,000 persons; and Dr. MACKENZIE, who was then residing in this city, remarked respecting it, that "he could see no other apparent cause of the virulency of the disease this year, beside the occasion of greater communication. In the months of February, March, April, and May last, the distemper was so strong at Cairo, as appears by letters from the English consul there, that no doors were opened for three months. In the mean time there arrived here, in May last, four ships laden with Cairo goods, which goods and men being landed, spread the infection over all the city at once, after which one conveyed it to another by contact. In the village where we lived, there died only sixty persons of the plague. The French ambassador's palace, next door to us in the village, was infected, because five of his people went at midnight to a bawdy-house, where the father Demetry, the mother, and daughter had the plague and died of it afterwards, all three; so that two of his excellency's servants were infected by them, one of whom died, and the other recovered and is still living, after taking a vomit, some doses of the bark mixed with snake root and Venice treacle, by my advice. We found this last time, and upon all such occasions, that whoever kept their door shut ran no risk, even if the plague were in the next house; and the contact was easily traced in all the accidents which happened among the Franks."

79. SAMOLOWITZ, who had extensive experience of the plague in Poland, Moldavia, Wallachia, and lastly, in the epidemic of Moscow, states that it is certain that this distemper is propagated by contact; and ORRÆUS, who was sent by the Empress Catherine of Russia to advise during the plagues at Yassy and Moscow, remarks that the most common mode of contracting the disease was by contact. When Mr. HOWARD went in 1785 to visit the chief lazarettos in

France and Italy, he carried with him a set of questions concerning the plague, drawn up by Dr. Aiken and Dr. Jebb, which were to be submitted to the most experienced practitioners in the places which he visited. On his return, Dr. Aiken methodised and abridged the answers, and the result is given in the celebrated work on the Lazzarettoes of Europe. "They all," says Mr. Howard, "in the most explicit manner concur in representing the plague as a contagious disease, communicated by near approach to, or actual contact with, infected persons or things."

80. During the war, at the end of the last and commencement of the present century, the medical officers of both the French and English armies had numerous occasions of observing the plague, and they almost unanimously concluded that it was a contagious disease. Even Dr. Bancroft, who strenuously contended against the infectious nature of the Hæmagastric pestilence, and who was present with the English army during a part of the Egyptian campaign, states that "the facts which prove the necessity of actual contact with some infected person or thing to communicate the plague, are so numerous, and many of them so notorious, that it must be unnecessary for me to enter upon a detail of them, after what Dr. Russel and others have published, and after the experience of the British army in Egypt, which invariably demonstrated this necessity, by showing that all those who avoided contact, invariably escaped the disease, whilst those who did otherwise in suitable conditions, were very generally infected. Nor was there, so far as I have been able to discover, any instance, in the French Egyptian army, of a communication of the disease without contact, though the physicians to that army, who have written on the subject, do not, I believe, positively assert the impossibility of such communication."

81. Sir James M'Grigor, physician to the Indian army in Egypt, during the Egyptian campaign, in his medical sketches of that expedition, gives the following account of the arrangements at the pest-houses, and their result:— "In the pest-houses of the army thirteen medical gentlemen did duty, who in the Indian army might be said to have had the post of honour. In order to take from our medical gentlemen, in the pest-houses, some of the most dangerous part of the duty, it was my wish to procure some of the Greek doctors of the country to reside in the pest-houses, to feel the pulses there, draw blood, open and dress buboes, &c. The most diligent search was made for those people, and very high pay was promised to them, but we could tempt none of them to live in our pest-houses: a plain proof of the opinion which they entertain of the contagious nature of the disease. The thirteen gentlemen first mentioned, were those only that were directly in the way of contagion, for it became their duty to come in contact with the infected, and seven of them caught the infection, and four died. To the atmosphere of the disease, all the medical gentlemen of the army were exposed, as they saw and examined the cases in the first instance; but, except from actual contact, there never appeared to be any danger."

82. The medical officers of the French army came to similar conclusions. Desgenettes, in his *Histoire Médicale de l'Armée d'Orient*, thus sums up his opinion on the subject of the plague:— "The plague is evidently contagious, but the conditions of the transmission of this contagion are not more exactly known than its specific nature. The dead body has not appeared to transmit it — the animal body in a heated state, and still more in a state of febrile moisture, has appeared to communicate it more easily; the contagion has been known to cease in passing from one river to another of the Nile; a simple trench made before a camp has been known to stop its ravages; and on observations of this kind is founded the useful insulation of the Franks, the practice of which has been sufficiently detailed by different travellers."

83. Baron Larrey states a similar opinion:— "But however strong may have been these affections, (moral,) their effects cannot be compared to those which resulted from the communication of the healthy with the sick, or to the effects of contact with contaminated objects. We may be convinced of this truth, by the ravages which the plague made in the year 9, (1801,) among the Fatalist Mussulmen. It were to be wished that, on the first days of the invasion of the plague, its true character had been presented to the army. This would have diminished the number of victims; instead of which the soldier, imbued with the opinion which was at first propagated, that this disease was not pestilential, did not hesitate to seize and wear the effects of his companions dead of the plague. The pestilential germ developed itself in these individuals, who often sunk under the same fate. It was only when they had gained a perfect knowledge of this disease, that many preserved themselves by the precautions which were indicated."

84. Dr. Sotira, another of the physicians of the French army, in Egypt, relates the following striking circumstance:— "In the seventh year of the French republic, about eighty medical officers died of the plague. In consequence of this mortality, an order was issued to employ Turkish barbers in the pest-houses, to dress the patients, and to undertake all the medical treatment which required actual contact. The result was, that during the next two years, only twelve of the medical officers died of the plague; but half the Turkish barbers caught it." I now arrive at —

85. *B. The opinions of contemporary writers as to the infectious nature of the plague.* — *a.* The French government, with the view of causing an alteration of the quarantine laws, lately referred the consideration of the communicability of this pestilence to the Royal Academy of Paris; and this body appointed a commission to inquire into the matter. This commission has published its report, and with it numerous documents from medical men who have served in Egypt and Syria during the last twenty or twenty-five years. Certain of these documents are answers to questions which were sent to the British consul in Egypt by the foreign minister; and others are essays on the subjects in question by various medical men attached to the army and civil establishment of the governor of that country. From these the Academy has drawn up its report; which, however, is of much less importance and interest than the papers on which it is founded. The opinions conveyed in all these papers agree as to the communicability of this distemper from person to person; they differ merely as to the modes of com-

munication and the circumstances favouring and preventing infection.* It is thus stated by the reporters, that nearly all the physicians in Egypt (there are considerably upwards of a hundred French and Italian physicians in this country) believe in the transmission of the plague by means of the emanations proceeding from the bodies of plague patients; and that Dr. Grassi, physician to the lazzaretto at Alexandria, alone espouses the doctrine of the communication of the distemper by immediate or mediately contact only, and without the interposing medium of the air; and they add that the Egyptian physicians consider that a prolonged stay in the chambers of those affected is particularly dangerous, and the more so the more that ventilation is neglected.

86. Dr. Grassi, who has written a long memoir on the dissemination of the plague, has had an experience of twenty-nine years in Egypt and Syria, during which time his opportunities of observing this pestilence, especially as physician to the lazzaretto, have been great beyond all others. He adduces numerous proofs in support of his opinion; but Dr. Clot-bey and some others contend, in opposition to him, that they would not have taken place, or in other words, the same results would not have followed the circumstances adduced, if observed at other periods, or in other places, than those of epidemic influence. The facts are so numerous and so well authenticated of the communication of the distemper, that they cannot be denied; but those who espouse the doctrine of conditional infection, as many of the Egypto-European physicians appear to do, contend that the infectious property exists only in respect of the epidemic, and not of the sporadic or endemic malady; and that if the epidemic influence did not exist, no infection would take place. According to this view the distemper cannot spread by infection without the epidemic circle, and when the infection is conveyed to a distance by persons or clothes, it cannot propagate itself unless there be existing at the time and place an epidemic influence favourable to this effect. In what this influence consists is not shown. It is not admitted to be merely a humid, stagnant, or impure air, as this state of the atmosphere is frequently observed without the distemper becoming prevalent; it is therefore believed by the supporters of this doctrine, that there must be some other superadded property, constituting, with or without the other properties of humidity, stillness, and a certain range of temperature, the epidemic influence in question; and that it is developed generally after lengthened intervals, or after terms of ten, fifteen, or twenty years, the terms being of different durations in different

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* It should be kept in recollection that French writers limit the term *contagion* to the communication of a disease from the sick to the healthy by immediate contact; and that they apply the term *infection* to the transmission of disease by miasms proceeding from the sick, and contaminating the air respired by the healthy. In many of the writings of French pathologists, "*Foyers Epidemiques*," epidemic foci, influences or centres, play a very prominent part; and, according to many, no infectious disease can extend without this epidemic centre or influence be present. Some even suppose that the epidemic influence is itself the infecting agent; and they, with many others, argue that this influence, as well as all emanations from the soil, from matters decaying or putrifying in or on the surface of the earth, and from the bodies of the sick, are severally *infectants*, without however distinguishing between each, and confirming, as British pathologists have uniformly, the word *infection* to the spreading of a disease from the sick to the healthy by means of emanations proceeding from the former, and producing and perpetuating in the latter the same disease, possessing the same property of disseminating and perpetuating itself. In this report of the Academy, as well as in some of the papers on which it is based, the "*foyer epidemique*" has a most prominent place assigned to it. If a case of plague occurs without spreading to others — if the several circumstances preventing the extension of the distemper be present or are observed — if a free ventilation of the sick, or of their effects, &c. be enforced — if the sick be not approached, and other means of prevention be observed — if those communicating with the infected be protected by a previous attack of the distemper — if the air be pure, dry, very cold, or very hot — if, in short, the circumstances favouring the extension of the malady are not present, then the occasional appearance of it (as in the instance of small pox occurring in solitary cases when it is not epidemic) is said to be sporadic or endemic; but when various filiations of the distemper are traced from the person or persons first infected, to various streets, or to distant parts of a town — when a person becomes infected in a particular house, and the attendants or friends from different parts have left him, and convey the distemper to their homes and to their attendants, and these latter to others, then, according to the reporters of the Academy and many of the French-Egyptian physicians, a "*foyer epidemique*" is kindled, and is breaking out in various places. A poor devil of the rational school of physic may have some idea of the manner in which a humid, still air, close apartments and streets, imperfect ventilation, &c. favour the concentration of an animal effluvium proceeding from the sick, and its operation on the healthy, as well as heighten the predisposition of the latter to be infected. He even admits that these conditions may so alter the electromotive states not only of the air but also of animal bodies, and of other objects placed on the earth's surface, at the particular places where they occur, as thereby to heighten the effects otherwise produced by them. But the "foyer epidemique" is beyond his comprehension; unless it means something resembling what I have now endeavoured to explain. If it is anything else, it is only a term employed to conceal an ignorance which would have been better candidly confessed. One thing cannot be disputed, and this is, that the "foyer epidemique" plays a very harlequin part; it is here, there, and everywhere, but not at the same time, at least at first. It exists in a given circumference, and not in the centre; or in certain radii, and neither at the centre nor at the circumference; and yet it admits not of recognition but by its effects. It is the supposed source of plague, of pestilential cholera, and of pestilential yellow fever — these three great pestilences being very generally attributed to this cause by our neighbours. Now as there are three pestilences, there must necessarily be, according to this view, also three different "foyers epidemiques;" for each specific malady must have a specific "foyer" for its source. Without, however, inquiring into the origin and nature of these "*foyers*," — for such inquiry is never thought of by them, it being quite sufficient to assume their existence — it must be inferred that they are most unaccountable things, seeing that they possess neither length, breadth, nor thickness, nor other material characteristics, and yet produce material effects; that they are neither recognised nor recognisable, and yet they destroy large portions of the human race; that their existence is an hypothesis, a supposition, and yet they produce ruin and devastation; that their hypothetical presence is only for a few weeks or months, and then, after many hundreds of years, never again to return, or then after short intervals, according to the manner of their reception. How very odd is their occurrence! In one year there was a "foyer epidemique," viz. that of pestilential cholera, which visited the countries of the Levant, and, amongst very many other places, Paris in particular, where the doctrine of "foyers" is so much in vogue; yet, in the following two years another "foyer epidemique," namely, that of plague, followed the one of pestilential cholera, the latter emulating the former in its destructive powers, as if enraged at the usurpation of a "foyer" never before known.—Believing that there are certain conditions of the atmosphere favouring more or less the spread of infectious diseases on the one hand, and restraining it on the other, I cannot subscribe to the all-efficient and absorbing "*foyers epidemiques*" of our neighbours, nor attempt to shelter my ignorance by a constant recurrence to a term, which either means something appreciable and determinate, as in the light in which I would view it; or which is any thing or nothing as it may suit an hypothesis, subserve a purpose, conceal a sophism, or mask a design.

countries. In tracing the filiations of this influence according to these writers, numerous and singular vagaries are usually observed, especially as respects its attachment to certain persons and places, and its aversion to others. These filiations proceed sometimes in a hop, step, and jump manner, and straight ahead; then zig-zag; now circuitously, next centrically, afterwards eccentrically; but in whatever way they shoot forth, they show a remarkable respect for certain places and persons, more particularly for those who shut them out or who keep out of their way. Now, instead of attributing, with the abettors of the all-sufficiency of epidemic influence, the oddities so remarkable in the spread of this pestilence, to this influence solely, I consider that, when viewed in a proper light, there are neither vagaries nor oddities to be recognised; but merely the communication of the infection from person to person, favoured by proximity, and a temperate, humid, and still condition of the atmosphere; and that places and persons are exempted from it, according as the former may shut it out, or be out of its way; as it is conveyed in the person or in the clothes worn by the infected, or as the latter may be protected by a former attack, or be but little susceptible of the infection.

87. Much of the scepticism, which has recently appeared in the East, as to the infectious nature of this pestilence, is to be attributed to the preconceived ideas entertained by the young French and Italian surgeons and physicians who have entered into the service of the Pacha of Egypt, and who have thought it a most distinguished feat to brave the dangers, as well as to oppose the doctrine, of contagion and infection. The experienced Dr. GRASSI states, with reference to this fact, that the champions of non-contagion disseminated an error which soon brought destruction on themselves and on many who had communication with them; that, in 1843 — a year in which the distemper does not appear to have been very prevalent, unless in Cairo — numerous instances of contagion were furnished in some of the provinces of lower Egypt, of which he adduces a few, showing the consequences of a disbelief in this property, on the part of those who ought to have known the truth and to have acted accordingly; that, owing to this cause, the plague was introduced into several regiments, the surgeons of which were anti-contagionists; and that those surgeons and many of those committed to their care were thereby sacrificed. Dr. MARESCHI, he adds, physician to the 5th regiment, fell ill and died at Mansour. He was attended by Dr. CERTANI, of the 3d regiment, and the plague commenced in both regiments. The apothecary became infected and died. Dr. CERTANI persisted in denying the infectious nature of the distemper, and purchased the carpet used by an officer in his regiment who had died of it. He slept on this carpet, but he never again arose from it. Dr. BOUTEILLE, of the 4th Cavalry, attended Dr. CERTANI, the apothecary, and his wife, who had all died of the plague, was congratulating himself on his escape, when he was attacked and died. Dr. VALENCOGNE, who had succeeded Dr. MARESCHI at Mansour, and who was also a non-contagionist, having acquired some things which belonged to, and had been used by, Dr. BOUTEILLE, would not attend to the recommendation of purifying them before using them, and he fell a victim to his incredulity. Dr. ROSSI, of the 7th regiment, was attacked by the distemper and recovered. This young physician, two years before, had written a memoir against the infectious nature of the plague; but he afterwards changed his opinion. Four apothecaries, of whom three died, and most of their families, in all twenty-three Europeans, nearly all those living in the province, were thus sacrificed.

88. Numerous other instances of the communicability and importation of this pestilence, have been adduced by Dr. GRASSI, from his own observations in Egypt, Syria, and Palestine. My limits admit not of a further notice of them; but they may be found in the Report of the French Academy of Medicine. He concludes as follows: — 1st. That the plague is a disease entirely *sui generis*, possessing characters which are proper to it, and which distinguish it from all other maladies. 2d. That it is transmissible and transportable, and consequently eminently contagious. 3d. That its origin, like that of some other contagious diseases, is unknown; that it is not reproduced *de novo;* but that its seminium is preserved in one or other province or provinces of Turkey — sometimes in one, at another time in another. 4th. That, like small-pox, it very rarely attacks those persons who have been previously infected by it; and if it does, the attack is slight. 5th. That it prevails chiefly in temperate climates. And 6th. That if it were combated and restrained in all directions, it might be ultimately suppressed, if the ignorance and fanaticism of some people would not oppose the attempt.

89. M. LACHÈZE states (*Rapp. de l'Acad.*, &c., p. 567.) that he arrived in Alexandria during the prevalence of the plague there in 1834, and that he proceeded soon afterwards to Cairo, where the distemper broke out on the 2d of February, 1835, and became remarkably destructive. MÉHÉMET ALI shut himself up in the palace of Schoubra, with 300 persons composing his suite, and surrounded it with a double cordon of troops. Three persons only were seized with the early symptoms of plague, and they were instantly dismissed. Captain VARIN, who commanded the School of Cavalry, informed Dr. LACHÈZE that 515 persons composing it were subjected to strict seclusion under his orders; that during their seclusion, they enjoyed the same diet, regimen, and exercises as before; and that in the four months, during which the quarantine lasted, no case of serious disease and none of plague occurred among them. Captain VARIN adds, that the town of Gizeh, in the midst of which the School of Cavalry was placed in quarantine, experienced a greater mortality in proportion to its population than even Cairo, in which one-third of the inhabitants died, and yet strict seclusion in that town was followed by the most complete protection. Surely, if the disease was so entirely dependent upon epidemic influence, as contended for by the anti-infectionists, it should have appeared amongst the persons secluded in this instance, seeing that they were surrounded by this, to their minds, all-powerful influence.

90. M. DE SEGUR DUPEYRON, secretary to the Superior Council of Health, (*Rapp. de l'Acad.* &c., p. 593.) states that during his several mis-

sions, he has visited nearly all the places in the East and in Africa where the plague has appeared, with the view of determining its origin in those places; that his researches have proved that this distemper has generally appeared in consequence of scarcity following too great or too low a rise of the Nile; that the occurrence of this pestilence in Europe, especially in Venice, Trieste, Livournia, Genoa, and Marseilles, before the formation of quarantines, was frequent and always connected with the prevalence of it in the Levant, especially during peace, when communication was unrestricted and frequent: that from 1721 until 1830, the plague has been imported thirty-three times into these ports, by means of vessels which have been detained in quarantine; and that of these thirty-three importations, eighteen came from Egypt: that this distemper was not constant in Constantinople until after the conquest of it by the Turks, when it became frequent, and at last almost permanent, owing to the return of numerous pilgrims from Mecca in vessels, which, with the pilgrims themselves, were often infected: that he has seen the pilgrims arrive in small crowded vessels in a frightful state of dirt and disease; but that the plague has scarcely appeared in Constantinople since 1837, when quarantine and sanitory establishments were formed in that city: and that the plague is endemic in Egypt; but that it is not endemic, although frequent, in Syria, Constantinople, and Barbary. M. Segur concludes with some apposite remarks on its contagious nature, in which he firmly believes, both from his own observation and the evidence of others. He considers that this pestilence will never be arrested in its progress, unless it be rigorously treated as contagious, until it has destroyed all those susceptible of infection, or until the temperature and state of the atmosphere become unfavourable to its further extension; and he refers to the very decided measures adopted by General Maitland, who on four different occasions — in Malta, Gozzo, Corfu, and Cephalonia — put a stop to the distemper by a strict system of separation and seclusion. M. Segur adduces numerous instances of passengers and other persons detained in quarantine in various ports, who were seized with the plague on opening their trunks and exposing their clothes to the air, the distemper extending to one or more of the health-guards. One or two of these instances is sufficient for my argument. In July, 1832, some passengers from Constantinople and Scio, where the plague was prevailing, were landed at the Lazaret of Syra. On the sixth day after their entrance they opened their baggage, and eight of them were soon afterwards attacked, and six of them died.

91. A Greek vessel arrived at the Lazaret at Venice, in 1793, from Syria and Napoli de Romana. This vessel received on board, in Syria, a supply of five sailors. Four of them left the ship in the Morea, where they brought the contagion. One only, named Apostoli, remained when she arrived in quarantine. After unloading the cargo, which was not considered capable of conveying contagion, the sailors opened their chests and changed their clothes. Apostoli was first attacked. Twenty-one were infected and sixteen died in the lazaret. Of the health-guards eight were attacked and three died. In 1818 the plague appeared in the same lazaret, on board of a ship which had only two days to complete the quarantine. A passenger who had not opened his trunk until then, was soon afterwards seized, and died in two days. His health-guard was next attacked, and also died.

92. Dr. Morpurgo (*Rapp. à l'Acad.*, p. 609.) resided eight years in Egypt, Syria, and Turkey; and was charged, in 1829, to organise the central hospital in Cairo, by the Pacha. In April, 1831, he quitted Alexandria and went to Constantinople. On his arrival there were no cases of plague in the city; but cholera prevailed. Subsequently a Greek vessel arrived from Cyprus with the plague, and the distemper soon afterwards appeared in the Greek quarter of the city. Dr. Morpurgo left Constantinople and arrived at Smyrna in April, 1832. The plague had not appeared there for several years, but the pestilential cholera had made great ravages. Soon after his arrival in Smyrna he was charged by the European inhabitants to organise a house of refuge for the poor of all nations and of all religions; and was brought in constant communication with the poorer classes. But until the month of May, 1833, he did not meet with a single case of plague; proving that this malady is not endemic in this port. During the five years that he passed in Smyrna, he observed four epidemics of the plague. The first appeared in May, 1833. The distemper was introduced by a vessel whose crew and passengers were landed and placed under tents whilst the process of purifying the vessel was proceeding. Dr. Morpurgo traces the several filiations of the infection until the cases became numerous. It would appear from his details that, during the winter months of 1834, 1835, and 1836, the distemper lurked in this city, appearing during the spring, and becoming more and more prevalent until the spring of 1837, when it became very fatal, and many of the wealthier inhabitants either fled from the city, or placed themselves in strict seclusion. During this most severe epidemic the plague made the earliest and greatest ravages in the most airy and cleanest quarter, and the latest and the least, in the closest, the most dirty, and the most miserable district. During these epidemics, or rather epidemic — for the disease was introduced and continued for four years, slumbering for certain periods, and breaking out, and prevailing more or less during others, according to circumstances, which wil be explained in the sequel — several occurrences were remarked by Dr. Morpurgo deserving notice. A Dr. Justiniani, of the Faculty of Paris, arrived at Smyrna, and saw neither contagion nor infection in the plague, or nothing else than a gastro-enterite. He was soon afterwards attacked and died in three days. The Prussian Consul shut himself up with his family, and had recourse to the strictest precautions; nevertheless, a chambermaid was attacked, and confessed, when near her end, that she had received through a window linen from her lover to wash, who lived in an infected quarter, a circumstance proving the difficulty of preserving a strict seclusion in cases even of the most imminent risk. In the most unhealthy locality of the city, where several drains and sewers meander through margins of filth, a barrack is situated containing from 1200 to 1300 troops. The physician advised

the colonel to adopt the most rigid quarantine; and it was strictly observed. Not an individual was attacked, although the distemper was raging around them: and during their seclusion they had the same food and rations as before and after. All the convents, which observed seclusion, were completely protected; as also was the College, although situated in an unhealthy locality. The Greek and Catholic sick, not infected by the plague, were received into the same hospital with plague cases, but in different wards; none of them caught the distemper, a circumstance which Dr. Morpurgo considers a strong proof of the spread of the malady by contagion, and not by infection. He concludes his communications to the Academy by stating his conviction that the plague is not peculiar to any particular locality; that it is propagated by a seminium or germ, distinct from any other, and resembling those of syphilis and small-pox; that it always proceeds from and perpetuates the same distemper; that the isolation of the sick is the only protection; and that three things are necessary to the spread of the pestilence—namely, its seminium or germ, a favourable state of the atmosphere, and susceptibility of infection.

93. Amongst the most experienced physicians who have communicated to the Academy the results of their observations, Dr. Gaëtani may be adduced. He is first physician to the Viceroy, and has resided many years in Egypt. He states (*Rapp. à l'Acad.* p. 627.), that from 1825 until 1834 he met with no case of plague in Egypt; but that since 1834 this pestilence has appeared in a great number of towns and villages of Lower Egypt, and has occurred in many of these places during the months of September, October, and November, generally sporadically or in isolated cases; that it becomes epidemic in January and February, and subsides in June; and that he has not met with the distemper in Upper Egypt, but that during the epidemic of 1835 several cases arrived at Syouth, Fayoum, Cosseir, and other towns in Upper Egypt, without propagating the malady. During the epidemic of 1835, he states that more than fifty of the principal families of Cairo put themselves in quarantine, either at the desire of the Viceroy, or from their own conviction of its necessity; and that not a case of the plague occurred in more than three or four of these families. When a case appeared in a house placed in quarantine, it was always found that some suspicious circumstance or communication had taken place. In the palace of Scherib-pacha two compartments existed, one for the men, the other for the women. In that for the men, who communicated with the city, many cases occurred, but in that of the women, which was strictly secluded, not a case was seen. At the commencement of the epidemic in Cairo, this city had a garrison of 22,000 troops, independently of 2000 invalids. These last alone were left to guard the city, and the troops were placed under tents, in an intrenched camp; and although this camp was only a quarter of a league from the city, the plague did not appear among them; whilst it carried off one half of the invalids who remained in the city.

94. Dr. Gaëtani adduces in proof of the transmission of the pestilence by clothes, the fact that there existed at Rosetta a magazine of effects belonging to plague patients. This magazine was opened after two years, and three persons were seized with the distemper, although the town was in a most salubrious state, but they did not communicate the malady to others. He believes that the effects of plague patients will convey to a distance the malady, when the circumstances favouring infection are present; that the beds, bed clothes, and body clothes of the infected are most to be dreaded; and that merchandise never or very rarely transmits the disease. He also thinks, that the pestilential miasms, during the prevalence of the malady, in a close, low, wet and thickly populated locality, may accumulate in the humid and still air to such an extent as to transmit the distemper without any nearer or personal communication; and that it is to this contamination of the air, by the effluvia of the sick, that the extension of the pestilence to houses in which strict seclusion had been observed is to be attributed; for the state of the locality, the narrowness of the streets, and the circumstances just stated, in all such instances, could sufficiently account for the occurrence, without referring it to clandestine intercourse.

95. I believe that I have now adduced sufficient evidence of the infectious nature of the plague — infectious by direct or mediate contact, or by a humid air, conveying the pestilential miasms. I might have adduced ten times more evidence of the matter; but my limits will not permit me to do that which will appear to all candid minds as altogether unnecessary. There are, however, certain topics connected with the subject that yet require further notice, in order to complete the full consideration due to it.

96. C. *The propagation of this distemper by inoculation* has been believed by some to be an important and necessary part of the evidence of the contagious nature imputed to it. But this proof is neither necessary to the completeness of the evidence required, nor is it of importance in this or in any other respect. There is almost no other febrile disease, besides small-pox and cow-pox, that admits of certain communication by inoculation. All other infectious maladies have presented only a few contingent and doubtful instances of infection by this method. As respects small-pox, cow-pox, and some chronic contagious maladies, we observe a specific contagious virus or secretion formed at an advanced stage of the malady, capable of propagating it, unless in those very dry states of the air, which is unfavourable to the propagation of all infectious and contagious maladies, when it frequently also fails of imparting the disease. If other secretions, or the blood itself, of a small-pox patient be used for inoculation, no more certain results would follow than those which have been observed to follow the employment of these fluids in attempting to inoculate the plague, scarlet fever, or typhus fever or the measles. In the case of the plague, there is no consistent or specific virus or secretion proper to and characteristic of the distemper, tha may be employed in this way, with any rationa hopes of its perpetuating the disease. The icho or discharge from a carbuncle, is merely contingent upon a local accident of the malady; th purulent matter from a bubo is equally such, an is chiefly met with during an early period o amendment; the blood of the infected can n more be expected to transmit the distemper, tha

the blood in any other infectious disease, which has repeatedly been found to fail. Even granting it possible to procure the pestilential miasm, seminium, or matter of the plague, the difficulty would still exist as to the application of it to the frame of the healthy, in that state, and to that particular organ and tissue, by which its effects would be most certainly developed. I shall have in the sequel to infer, from the great mass of evidence I have perused, a part only of which I have here adduced, that it is chiefly owing to the pestilential miasms or effluvia proceeding either directly from the diseased, or preserved in their bed or body clothes, and given off upon their first exposure to the air, and inspired by susceptible persons, that the distemper is propagated and perpetuated. A near approach, amounting almost to contact, sometimes accompanied with contact, is often necessary to this effect; contact merely will often fail, or rather it will succeed in communicating the malady only when it is attended by the inhalation of the effluvium or pestilential miasm, whether proceeding from the diseased body or from fomites. Now, how can the same effect be produced by the inoculation of fluids, which have not been proved to possess the property of perpetuating the distemper, which, reasoning *a priori*, cannot be supposed to possess this property, and which, even granting them the possession of it, cannot be conveyed to that channel, through which the observing mind must admit the infection to be principally, if not solely, admitted and transmitted through the œconomy.

97. From this it may be admitted that attempts at inoculation must be nugatory in respect of this pestilence, as well as of the two pestilences already considered; or if any attempts to inoculate succeed, their success is liable to be imputed, as it actually has been by the anti-infectionists, to the operation of the epidemic influence, and in no way to the inoculation, the persons infected being attacked altogether in consequence of this constitution of the air, and independently of any pestilential miasm, seminium, or effluvium, proceeding from the diseased and inhaled with the air by the healthy, for the existence of which seminium I, in common with other infectionists, contend. If attempts at inoculation should frequently prove futile, it must be obvious, from our knowledge of the operations of the digestive organs, that the experiments made by certain nasty fellows, in the excess of their scientific enthusiasm, in order to show the non-contagious nature of this and the other two pestilences, by swallowing the secretions and discharges of persons labouring under these distempers, must necessarily prove still more futile, inasmuch as no effects beyond nausea or vomiting could be expected from these experiments. Indeed, it is most probable that the extent of the probable or possible mischief was clearly seen, and safely, as well as most courageously attempted by these experimenters.

98. However, the attempts at inoculation which have been made require a still more particular notice. M. **Desgenettes**, finding the French troops in Egypt much depressed by their dread of the plague, attempted to inoculate himself with the distemper, but to secure himself from risk, he afterwards washed the part with soap and water; and according to his own statement, he not only used this precaution, but he employed "the pus of a bubo of a convalescent patient"— using, in fact, the matter of what had become a healthily suppurating sore. Soon afterwards, Dr. **Whyte**, an anti-contagionist, in the English army, hearing of this feat, but not of the precautions which had been taken, repeated the experiment in a much more efficient and dangerous manner. "He rubbed some matter, from the bubo of a woman, on the insides of his thighs. The next morning he inoculated himself in the wrists with matter taken from a running bubo of a sepoy." This was done on the 2d and 3d of January, 1802, and on the 6th he was attacked with rigors and other febrile symptoms, succeeded by heat and perspiration, much affection of the head, tremor of the limbs, a dry, black tongue, great thirst, a full, hard, irregular pulse, great debility and anxiety. He still persisted that the disease was not the plague, and would not allow his groins and armpits to be examined. He became delirious on the 8th, and died on the 9th.

99. Dr. **Gooch**, in his paper on the contagion of the plague, has stated that Dr. **Valli**, an Italian physician who resided some time in Turkey, made some experiments on the inoculation of the plague. He diluted the pestilential matter with small-pox matter, with oil, &c. This compound he called his pommade. If a Mussulman came to consult him for an ophthalmia, he ordered him some of his pommade to rub on his eyelids; if another came, complaining of pain in the bowels, he ordered it to be rubbed on his belly. In this murderous way he gave, it is said, the distemper to thirty persons. The Turkish government at last arrested the pharmacopolist who vended the pommade, and cut off his head, but Dr. **Valli** escaped.

100. Dr. L. **Delaporte** states, in a memoir addressed to the Royal Academy of Medicine in Paris (*Rapp. à l'Acad.* &c., p. 321.) that Dr. **Gaëtani-Bey** communicated to him the fact that a person in Cairo having persuaded several of his acquaintances that he would protect them from any future attack of the plague by inoculating them with the sanies taken from a person recently dead of the distemper, found no less than eleven who, with himself, submitted to the experiment. They, however, were all attacked, and died, the experimenter himself only escaping, but he was not altogether recovered when Dr. **Gaëtani** saw him.

101. It might be supposed that these experiments are tolerably decisive, not only of the contagious nature of the distemper, but also of the great probability of the communication of it in its most deadly form, by inoculation. Yet the anti-contagionists will nevertheless contend that the individuals thus inoculated and killed by the experiment were actually not inoculated with the distemper, but were all attacked by the epidemic influence, which alone produced the disease of which they died! This mode of accounting for the result in no less than twelve instances, although admitted to have occurred at a time when the distemper was prevalent, shows the shifts to which the supporters of this doctrine resort to evade a most conclusive piece of evidence, happily furnished by a most respectable physician, although the experiments were as happily not performed by a medical practitioner. Now, the supporters of the all-powerful epidemic influence in the propagation

of this distemper allow, that in Egypt the plague is epidemic only from February to the end of June; and as Dr. Whyte's inoculation of himself (§ 98.) was performed on the 2d of January, his infection in consequence, therefore, could not be imputed to this influence, for it had not then commenced, but to its right cause, the inoculation. Now, seeing the disease actually follows inoculation in some instances (of which I have adduced only a very few out of the many which I have seen recorded), although it fails in others, and may be expected to fail for the reasons stated when commencing the consideration of the topic, there is nothing that can be reasonably desired further to prove the *contagious*, as well as the *infectious nature* of this pestilence, according to the meaning which I have fully and explicitly applied to these terms at the setting out (§§ 58, 59.).

102. The immense importance of the various topics connected with the contagious nature of plague, will not admit of my relinquishing the consideration of this part of the subject without noticing certain of the conclusions at which the commission of the French Academy of Medicine has arrived. The necessity of making some alterations in the quarantine laws, without endangering the safety of the community, especially during the now more frequent and more rapid communications between the several ports in the Levant and the south of France, induced the French Government to refer the subject to the Academy, who appointed a commission, whose report is now before me. It is most likely that much of this report will be used by the anti-infectionists in support of their arguments, not so much for the facts and evidence which may appear to favour their views, but for the use of terms to which this commission has attached a different meaning to that which is applied to these terms in this country. In noticing, therefore, somewhat further certain topics connected with the *origin* and *propagation of the plague*, I shall make some remarks upon this laboured, but not very perfect performance.

103. *D. Of the origin of plague* nothing can be asserted with any degree of certainty. The earliest indications of its existence have been already noticed, and its antiquity shown (§ 4.); but whether or not it has always been, from the remotest period of its existence, propagated by a certain germ or seminium, *sui generis*, conveyed from one part to others, more or less distant, by persons or clothes, preserved in some one or other of the countries of the Levant, prevailing in some places, then subsiding, sometimes smouldering on with few or scattered cases, at other times breaking out into more open combustion as circumstances fanned the fire; or whether it has been produced, *de novo*, on several or many occasions, and whenever various local circumstances have arisen to generate it, are questions which have not hitherto been solved, although severally entertained by numerous observing and experienced physicians. The proposition involved in the first alternative has received considerable support from the investigations of Dr. Russell in Syria, who completely established the fact, that a *second attack* of plague amongst the thousands of cases comprised by his researches, is of much rarer occurrence than a second attack of small-pox. Having established this most important fact, which subsequent researches have fully confirmed, but which the commission has entirely disregarded and never mentioned, a very convincing proof is thereby furnished of the contagious nature of the distemper, as well as a strong presumption of the truth of that proposition; the plague thus appearing in the same category with small-pox, hæmagastric pestilence, &c., and the same arguments which were employed when discussing this question in respect to that pestilence being equally applicable to this. (See Pestilence-Hæmagastric, § 125, *et seq.*).

104. *a. The protection furnished by a first attack* being thus established, with but very few exceptions, it must be obvious to the candid inquirer that numerous occasions will occur, in the countries of the Levant, in which a very large proportion of the inhabitants is protected by a previous attack; and that the spread of the distemper will often be limited by this cause, aided by others connected with the temperature and states of the atmosphere. This fact will also explain the occasional failure of the very imperfectly informed and inexperienced experimenters among Egypto-European physicians to communicate the distemper by contact and inoculation. Thus it will be found, in the report to the Academy, that a felon having been made the subject of inoculation in Egypt, caught the distemper and recovered. Having thus earned his life, he was nevertheless experimented upon subsequently, and not being re-infected, the circumstance was adduced as a proof of non-contagion, although actually being, to the mental vision of all who can see, and duly estimate the most prominent and important truths in medicine, the strongest evidence which could be brought in aid of the opposite and orthodox doctrine. But there is every reason to believe that, as in the cases of small-pox and the hæmagastric pestilence, the infection of plague may be so mild, the febrile disturbance so slight, the pains in the glands so evanescent, and the swelling so small, as to almost escape notice, or to pass away without recollection of the disorder, and without knowledge, or even suspicion, of its nature. Indeed a very mild grade of the distemper has been described above (§ 21.), and is frequently remarked, when this pestilence has been introduced into a crowded city or place. Protection from second attacks may thus become much more numerous than actually apparent from this cause.

105. *β.* The *second proposition* involved in the alternative stated above (§ 103.), namely, *is the plague generated, de novo, whenever circumstances favourable to its generation arise?* is answered in the affirmative by the Academy. It would have been instructive, probably most beneficial, if the French commission, during the long period they have taken to consider the matter, had ascertained the several circumstances which combine to generate this pestilence, *de novo*, and distinctly stated them, before they took the proposition for granted, and proceeded to reason upon it as an established fact; the more especially as it has been controverted by the ablest writers on the distemper, and doubted by many. But the commission adopts an easier course, and without any such preliminary and fundamental inquiry, asks themselves the question, — *What is the place or places where the plague has arisen spontaneously?* And, after

taking a very round-about way of answering it, they state, without any doubt or reservation, "that the plague has been generated spontaneously not only in Egypt, in Syria, and in Turkey, but also in a great many other countries of Africa, Asia, and Europe." The spontaneity of plague, according to the commission, is thus tolerably latitudinarian, but many will doubt, notwithstanding the greatness of the authority, the wideness of the range, even if they do not dispute the accuracy, of the principle adopted. Certainly the question of the origin of this pestilence cannot be readily or easily answered, especially by one who is cognizant of the difficulties which beset it, and of what may be said for and against the doctrine of spontaneity. I confess that I cannot arrive at a positive conclusion as to the matter. There are many circumstances which favour the opinion and many which militate against it: first of the former.

106. Of all cities or places Cairo furnishes the most numerous circumstances conducive to the production of this pestilence *de novo*: a crowded population in dirty, close, and ill-ventilated chambers, especially in the Coptic quarter; narrow streets, with open sewers in many places, and abounding with filth; the accumulation of decomposing animal excretions and exuviæ; a rich deep soil, saturated with animal matter; low, close, dirty, and ill-ventilated habitations; the burial of the dead within the walls of most of the Coptic habitations; contaminated and unwholesome water; adjoining inundations; great humidity of the air during part of the year, and a temperature from 50° to 75° FAHRENHEIT, are a combination of conditions sufficient to generate a pestilential malady, or, at least, a putro-adynamic form of fever, especially when they exist in marked grades, or are aided by scarcity of food, by great humidity and stillness of the air, and probably also by a negative state of the electro-motive agency in the atmosphere and on the earth's surface. If these do not actually give rise to the pestilence, without any pre-existing germ or seminium, they may be inferred, at least, to be most influential in developing, propagating, and even in perpetuating such germ; and in giving rise to a susceptibility or predisposition of the population to be infected by it, as far as these favourable circumstances extend, and amongst all who are not protected by a previous attack or by other causes.

107. Dr. LEGASQUIE, the member of a commission which visited Egypt in 1828, 1829, and 1830, to investigate the causes of plague, and to try the action of the chlorides on the pestilential miasm or virus, believes that, although the plague existed before the sixth century, it became more frequent in Egypt in consequence of the practice of embalming the dead having been relinquished after the introduction of sepulture by the early Christians, and that it is endemic in Lower Egypt. He considers that the practice adopted for so many ages in the Coptic quarter, which is situated in the centre of Cairo, of burying the dead within the houses, exerts a powerful influence upon the health of the whole city. There can be no doubt of this, especially aided as it is by numerous other circumstances of an injurious tendency, the chief of which have been already enumerated (§ 106.), and he imputes the origin of the plague to animal decomposition; want of cleanliness, scarcity, poverty, the inundations of the Nile, ruinous state of the canals, and insufficient ventilation being only accessory causes. (*Rapp. à l'Acad.* p. 590.) The same opinion is entertained also by several of those who have communicated on the subject with the French Academy. M. DELAPORTE, in a very able memoir, attributes the development of the pestilence to the same causes; but admits that when thus produced, it perpetuates and reproduces itself — 1st, By pure contagion, or immediate cutaneous contact; 2d, by infection or internal pneumogastric contagion. It cannot be doubted that, if we admit the spontaneous generation of the pestilence on occasions when all the circumstances concur most efficiently to this effect, that the towns and villages of Lower Egypt furnish them in the most marked degree; but it cannot be also admitted that they stand alone in this respect, for many towns situated near the shores of the Mediterranean present conditions almost as favourable to the production of this effect as those of Egypt.

108. In opposition to the doctrine of spontaneity it may be contended, seeing that the circumstances that combine to generate it, according to this view, must necessarily exist in many places and towns in other countries enjoying the same range of temperature as those of the Levant, and in many cities in Western Europe during the warmer seasons, that this pestilence ought also to be generated in countries eastward of Arabia, as well as in some parts of America. Those who believe that it is propagated by a seminium analogous to small-pox, but not capable of being so long preserved as that of small-pox, are of opinion that the circumstances favourable to, as well as the occasions of, the conveyance of this seminium to the eastward of some parts of Arabia, and to the westward of Europe and Africa, have not existed; and that when this distemper has appeared, as it has on rare occasions, in some of the northern cities of Europe on the one hand, and in some of the hot countries of Africa and Syria on the other, it has always spread by the contagion and infection conveyed by persons and the clothes of the sick; but that the low winter ranges of temperature in the former, and the high ranges of the summers of the latter, have always destroyed the poisonous seminium, either by the influence of the extremes of temperature upon it, or by the loss of the power of perpetuation after a certain period.

109. That those very circumstances and occasions which would appear the most favourable to the production of this pestilence *de novo* have often not produced it, even in countries where the pestilence is met with sporadically, and is considered as being endemic by many writers, is a fact which has been demonstrated, and which militates strongly against the doctrine of spontaneity, but which supports that of a specific seminium; for, on these occasions, the absence of this specific contagious or infectious agent accounts for the non-appearance of this pestilence; other maladies, which these occasions generally produce, being the only results. Thus it is stated by Dr. ROSSI, that when the Egyptian army were in Syria they were exposed to many of the circumstances supposed to originate the

plague, and especially when obliged to evacuate the country they were crowded into ill ventilated transports. Malignant typhus, and dysentery, hospital gangrene, &c. then became most prevalent and fatal, but no case of plague occurred. This appeared to be the case especially with the regiment to which Dr. Rossi was attached, and which was not attacked by this pestilence until after its return into Egypt, when it became exposed to the infection during his absence, and, no measures of precaution or prevention having been taken, the distemper had become general throughout the corps. He sent all the infected (about 400) into the hospital, and caused those who appeared in health to bathe in the Nile, to put on clean and purified clothes, and to encamp on a dry and arid soil. As soon as one was attacked he was sent to the hospital, and thus the camp was preserved healthy, and the distemper ceased. Although the occasion of generating the pestilence *de novo* was most favourable in this instance, still it did not appear, until the return of the troops to a place where cases of the plague existed; the neglecting of precautions against infection having diffused the distemper, and the adoption of precautions having arrested it. When the pestilence was introduced into Smyrna, as shown by the authority referred to above, it appeared first in the most open and healthy quarter, and advanced the latest, and prevailed the least, in the lowest, most crowded and unhealthiest quarter; and this in a city supposed by some to reproduce the distemper *de novo*. Besides, it is fully shown by recent researches, and by the recent adoption of sanatory measures by Turkish and Egyptian Governments, that the more or less continued presence of cases of this pestilence was not owing so much to the existence of the local causes supposed to generate it *de novo*, as to the want of all precautions and quarantine regulations, and to the neglect of separating the infected from the healthy, whereby the specific infectious seminium was preserved and propagated.

110. Without, therefore, denying the frequent reproduction of the plague in Lower Egypt, by the causes stated above, still the doctrine of an original specific germ or seminium presents many considerations in its favour, and of the same nature as I have adduced when considering the origin of the Hæmagastric pestilence. According to the former view, the circumstances above stated (§ 105, *et seq.*), give rise to the sporadic or endemic cases, as they have been called, but they are insufficient of themselves to spread or to diffuse the distemper in an epidemic form, until the epidemic influence or constitution, for which certain modern writers contend — the "*Foyer epidemique*" — is actually developed. According to the latter view, the specific contagious agent produces but few, scattered and isolated cases, in certain localities and towns, as long as the circumstances unfavourable to its propagation exist, as observed in respect of small-pox — whilst the extremes of temperature, a dry atmosphere, free ventilation, absence of susceptibility in many, and cautious avoidance of crowding, and of intimate or close communication, afford protection; these straggling instances being sufficient, especially when reinforced by importations from other places furnishing occasional cases of the distemper, to perpetuate the specific agent of contagion. But when the circumstances favourable to the diffusion and operation of this agent appear, as moderate atmospheric warmth, conjoined with humidity and stillness of the air, and probably also with a negative state of the electro-motive influence, and with noxious exhalations from the soil, with crowding and close or frequent communication with the affected, then the distemper becomes more or less prevalent with the grade and combination of these and other favourable circumstances; and these alone, or chiefly, constitute the epidemic influence or "foyer," to which so much is imputed by some recent writers.

111. Now we find that the plague becomes epidemic at one year, or even during two or three successive years, in some countries of the Levant, successively appearing to a most destructive extent in one country, then subsiding, and breaking out in one or several countries; but much more rarely, or not for ages appearing in more distant countries where precautions against its ingress are taken, and never where these precautions are strictly observed. If we admit, with the anti-infectionists, that this pestilence arises from an epidemic influence alone, such epidemic influence must be of a specific kind, since it produces specific and determinate effects, and occasions neither adynamic fever, nor adynamic dysentery, nor either of the two other specific pestilences considered above; and, seeing that this pestilence migrates from one place and country to another, and is actually as eccentric in its migrations and courses as I have described it (§ 86.), the epidemic constitution to which it has been thus absolutely imputed, must necessarily be equally migratory. Moreover, as it has been most satisfactorily shown, and as sufficient evidence to demonstrate the fact has been adduced, that this pestilence may be shut out for ages from places where it was almost a yearly visitant, by strict measures of separation and seclusion; and that it may even be shut out and excluded from a house or houses, whilst all the surrounding houses are infected, how are the persons taking these precautions, I ask, enabled thus to prevent the epidemic influence to which it is imputed from occurring in the town, country, or place from which it is excluded? And if the town or place be invaded by this aërial influence, how are they able to shut it out from any house, or part, in which neither infected persons nor infected clothes are allowed to enter? The persons taking these wise precautions are admitted to be quite incapable of keeping off a single shower of rain, by all the scientific means they can use, how comes it, then, that they can prevent a most destructive epidemic constitution of the atmosphere from visiting a country, although they profess their ignorance of the nature of that constitution, excepting from its effects; and that, when they have carelessly or ignorantly admitted it, they can, as we have seen, ward it off, and prevent its ingress into any house they please? Can any thing more completely show the absurdities of the doctrine of epidemic constitution and non-infection, than a knowledge of the facts connected with the development and spread of this pestilence.

112. The truth is, that infection is introduced, however it may originate, by persons or clothes, or by both, in a town or place; and if the conditions favourable to its communication to susceptible

persons are present—if the temperature be in neither extreme, or be moderately warm; if the air be humid and still; if the houses are crowded, low, damp, and ill-ventilated, the streets narrow and abounding in filth; and if the communications be frequent and a large number of the population are susceptible, owing to their not having been previously attacked, or to some other cause, constitutional or otherwise, the pestilence soon spreads and becomes epidemic. These circumstances conjoin to constitute the epidemic constitution—the "*foyer epidemique*" of our neighbours, to which they impute the pestilence. But I contend that they are merely the conditions—the circumstances which favour the operation, spread and reproduction of a poisonous agent—of the pestilential miasm or infectious emanation produced by the infected. As soon as these conditions and occasions disappear—as soon as the temperature sinks to freezing, or rises above 75 deg. of Fahrenheit, and more especially if the air becomes at the same time dry, if high winds occur, and free ventilation in houses or tents is adopted, the infectious poison ceases to be concentrated, is more diffused in the air, and is less capable of reproducing itself, by infecting others, from its being weakened or otherwise changed, and from its ceasing to affect persons who have become, owing to these atmospheric conditions, much less susceptible of its operation, then as soon does the pestilence subside and entirely disappear; unless it be allowed to smoulder on in low, dirty, close, damp, and crowded places, furnishing a few of the circumstances favouring its occurrence, and some persons still susceptible of its action. Thus in Levantine countries, the distemper is said to be endemic or sporadic, occurs in isolated cases, and is ready to become epidemic as soon as the circumstances combine to favour its diffusion. The dose of the infecting poison in the former or favourable circumstances is large, strong, and efficient, and the recipient susceptible of its influence; in the latter, or unfavourable conditions, it is small, weak, and inoperative, and the recipient insusceptible of its impaired power. What has now been stated of the infection of this pestilence does not pertain to it only, or to two or more pestilences merely, but is true of all other maladies of a malignant and epidemic nature, especially of the two other pestilences, of small-pox, and of the other exanthemata.

113. iii. *The arguments which have been used by the anti-infectionists to support their doctrine*, hardly deserve any notice, after the ample evidence—after the undeniable facts, I have adduced, completely proving that the three pestilences here considered are infectious in a most remarkable manner, under circumstances which are fully described. As the arguments which have been used by the objectors are the same as respects these three distempers individually, I have deferred the consideration of them until all the three have been brought fully before the reader. I even hesitated to consider these arguments at all; because, when a matter is fully and irrefragably established on facts, any argument which can be brought against it—all special pleadings, however ingenious, argue either the fractious spirit of the objector, or some motive actuating him to prevent a belief in the truth. On this account, therefore, the arguments—or rather the sophistical puerilities, which have been adduced by ignorant, interested, or captious and splenetic persons, hardly deserve a notice, and only when they seem to possess an air of importance—an importance derived only from unwarranted assumptions, confident assertions, and ill-founded pretension; and, in some instances, also from the official or professional position of some of those who have ventured into the field of controversy,—and not from any solid array of facts or of inferences logically drawn from facts. But irrespective of the want of every element of sound argument, a very large proportion of the Anti-infectionists betray, as shown above, an utter ignorance of the distempers respecting the nature of which they speak with confidence, and even with disgusting pretension—and not only of these distempers, but even of others, either allied or analogous to them, of which they have incidentally taken notice. This assertion may be conceived by some, who have not had opportunities of judging for themselves in the matter, as severe or ill-founded; but it could be very easily proved if it deserved the space, which would be wasted in proving it. Whoever has perused some of the writings to which I allude, and which I have referred to, or others which I have considered undeserving of notice, with that amount of knowledge which enables him to form a tolerably correct estimate of medical writings, will readily admit the accuracy of the assertion: and the attentive reader of what has preceded, and of what has yet to be adduced, will find sufficient reason to arrive at the same conclusion:—

114. *A.* It has been argued by the anti-infectionists, that the three pestilences now considered, are not governed by the laws of contagious, but of epidemic, diseases. Now this assertion shows, even of itself, that those who make it know nothing of these laws, and still less, if less be possible, of the matters respecting which they attempt to argue. What is there known of the laws of infectious disease which these pestilences do not actually possess and present? The chief law, admitted even by the objectors, is, that contagious or infectious diseases present precise, specific, and distinctive characters. Has not the whole history of the three pestilences now considered demonstrated the possession of these very characters by them in a most remarkable manner? Is even small-pox more distinctive or specific than they are all? Is there any one at the present day, who has had the smallest amount of experience, who will not admit the special character of these distempers, unless he be blinded by ignorance or prejudice, or by both, for they are both often combined? But the anti-infectionists say, that other maladies, admitted by them to be infectious, affect a person only once in his life, but that this is not the case with the pestilences now described. Here, again, their ignorance, or their dishonesty, is most barefaced and egregious; for they should know, if they really do not know, that a second infection is even more rare, as shown by facts out of number, as regards two out of these three distempers, than even the exanthematous fevers, whose infectious nature they admit; and that opportunities have not yet been afforded, at least in Europe, to test a similar property in the third of these distempers. In truth, there should

be an end of all argument with such persons, as being unworthy of the distinction conferred by fair argument; for they will neither see, nor acknowledge, nor appreciate fairly, any fact which may be construed unfavourably to their views: but will endeavour to controvert it by mis-statements and drivelling doubts, when they find it to be otherwise unassailable.

115. Oh! exclaim these pseudo-philosophers, who wish to make infection appear a prejudice, a vulgar error, and who, in the fulness of their vanity, desire to seem altogether above every thing that can be accounted a vulgar or general belief, these pestilences are merely epidemics, observing the laws of epidemics; and are hence not infectious. Yet what do they know more of the laws of epidemics than their opponents, who admit that these pestilences are very frequently epidemic, and are mostly known as such in Europe; but who also contend, that they are likewise met with in solitary or scattered cases, in the countries which present the climate and circumstances favourable to their preservation during all seasons; and that their occurring in an epidemic form — their more general prevalence — is only the result of the existence of the several conditions and circumstances, which admit of the concentration or accumulation of the infectious miasm, which favour the development and operation of it, and which thereby promote the diffusion of infection, especially among susceptible persons, and those who have not passed through the distemper; and still more remarkably when these are collected in numbers, or are crowded in towns and cities, or are otherwise placed in circumstances predisposing them to the invasion of the pestilential emanations from those already infected. According to the non-infectionists, the pestilential cholera was considered an epidemic depending upon aërial conditions, and was hence termed epidemic cholera. The calamitous consequences of opposing a suppostitious aërial or tellurial influence, or a combination of both, — for suppositions were varied, and even numerous as to the matter, — to a manifest property of the distemper to spread from the sick to the predisposed among the healthy, like all other infectious maladies, and the confident assertions and assumptions employed to conceal ignorance, have been already beyond the power of human calculation to estimate as respects this single pestilence merely; they are still frightful and extensive, and they may even become much more so, and be indefinitely perpetuated.

116. Still the non-infectionists exclaim, these pestilences, choleric, hæmagastric, and glandular or septic, are merely epidemics, prevail only as far as the epidemic influence extends, and are the results of the "epidemic foyers." Has, however, the choleric pestilence, which has continued to prevail, more or less, for nearly thirty years in India, been an epidemic during all that time? Or has it not rather been, as I have shown, an infectious distemper preserved in that country, by the absence of all attempts to prevent infection, or to limit the spread of it, and by the circumstances of the climate, but prevailing more or less or becoming more epidemic at one place than another as occasions arose favouring its diffusion, and predisposing those exposed to it? The truth is that, when the various occasions and circumstances concur to develope lurking cases of either of these pestilences into an epidemic form, it prevails to an extent influenced and limited by these occasions and by the numbers of the predisposed within the boundaries to which infection has extended, and then subsides; sometimes having exhausted itself for want of susceptible subjects, when the circumstances favourable to its diffusion have continued without mitigation; at other times subsiding without occasioning great fatality, when these circumstances have either been but slightly favourable to its propagation, or when others have tended to arrest or limit its extension. In most countries where these pestilences prevail without attempts having been made to limit or destroy the infectious agents, they are perpetuated, by communication with the sick, and by the clothes of the infected, in solitary or scattered cases — scattered more or less profusely in some localities, and in certain seasons, than in others, — until the favourable occasions of temperature, humidity, and stillness of the air, conjoined with susceptibility and crowding of the population, have developed them into an epidemic prevalence. In other countries or climates, where the infectious agent is destroyed, or is allowed to extinguish itself by removing it from the reach o susceptible subjects, or where it dies away from the occasions requisite to its propagation being absent, the pestilence is no longer heard of for a time, until an infected person or infected clothes again introduce the distemper, which becomes more or less prevalent according as circumstances favour its spread; and thus it may prevail, then subside, extend to another place, disappear, return, and become epidemic in succession in various situations, as usually observed in respect of the plague in the Levant. The opposers of infection, — the supporters of the doctrine which attributes all the effects observed in the course of epidemic maladies to epidemic constitutions or influences merely, — to "*foyers epidemiques*," — cannot produce a single epidemic of any pestilence, the several phenomena of which can be fully accounted for by the agency or influence which they invoke, but of which they can neither demonstrate the existence, nor assign any indications of its presence, beyond the mere circumstance of the spread of the distemper from the sick to the healthy, with more or less unusual or remarkable frequency. Now the infectionists contend, that this propagation of the disease is the result of a morbid effluvium proceeding from the sick and infecting the susceptible among the healthy, all other occasions and circumstances existing at the time being only aids of this efficient cause; and they challenge their opponents to an examination of both doctrines with an honest regard to facts, more especially to those facts which are open to the scrutiny of all candid minds, and from which alone, and not from argument, the truth is to be elicited.

117. The non-infectionists contend, as a proof that pestilences are not infectious, that "they break out at a certain season, last for a certain time, and then subside and remain dormant until a favourable season returns:" whilst, on the other hand, they assert that "contagious diseases can be propagated at any time and among any number of persons;" and that "a disease depending upon a specific contagion must prevail alike in all seasons, in a pure as well in an impure atmosphere, among the rich as readily as among the poor;

and that the only influence of these adventitious circumstances would be to render the disease more or less severe." Now I have, on more than one occasion, accused the non-infectionists of ignorance of that science, with which, unfortunately for the causes of humanity, they have meddled; and some may have supposed the accusation harsh, or even ill-founded; but, can a more convincing proof of the fact be adduced, than the very arguments they have employed to support their doctrine — the very weapons which they have wielded in a conflict involving the interests of the community? Is there one medical man — one who has the smallest right to a title, which should claim respect from all well-constituted minds — who could make the assertion, contained in the latter part of the above quotation, with the least shadow of truth as regards any one disease which is either contagious or infectious? On the contrary, it is known to all, who have either observed for themselves, or read the observations of others, that all contagious or infectious maladies, propagated in the natural way, spread readily at one time, and scarcely at all at another — that hooping-cough, scarlet fever, measles, small-pox, and even rabies, are more prevalent at certain seasons, than in others, — that either of these maladies may for some time be rarely or never seen, then break out, and be more or less prevalent. There is no disease more demonstratively both contagious and infectious than small-pox, or in many respects more analogous to plague. Now let us see what was the usual mode of its appearance before it was controlled by inoculation and vaccination. Before small-pox was thus interfered with, it is well-known that it used to lie dormant, then appear, rage for a time, and then subside, like those pestilences now considered, and which have been imputed by the non-infectionists, to epidemic influences. There can be no greater authorities adduced respecting small-pox, before the introduction of inoculation, than SYDENHAM, BOERHAAVE, and VAN SWIETEN; and they describe it as appearing and running its course like epidemic diseases. SYDENHAM remarks, that "one and the same disease kills an infinite number at some certain seasons, and at another time seizes only here and there one and goes no farther; and this is very apparent in the small-pox, and especially in the plague." BOERHAAVE observes that, "this disease is generally epidemical, beginning in the spring, increasing in summer, abating in autumn, ceasing almost entirely in the following winter, to return again in the spring;" and VAN SWIETEN states, "I have seen many variolous epidemics, and they agreed in most things with the observations of SYDENHAM."

118. *B.* So much for the medical knowledge of the non-infectionists as evinced by their arguments, and on occasions when exact knowledge, and not ignorance, should have been put prominently forward. I shall next furnish an example of the "*suppressio veri*" — of the honesty of their arguments. "People are attacked," states a pillar of the non-infectious faith, "not in proportion as the inhabitants of the affected mix with those of the unaffected places; but, in proportion as the inhabitants of unaffected expose themselves to the *air* of affected places. The visits of the sick to unaffected places is [are] followed by no increase of disease; the visits of the inhabitants of an unaffected, to an affected place is [are] attended with a certain increase of sickness. On their removal from a noxious to a pure air, the sick often rapidly recover; but they do not communicate the disease to the inhabitants of a pure atmosphere." Now I can affirm, that amidst the numerous worthless statements which I have been doomed to peruse — of the multitude of medical facts or medical lies which have come before me, none has been more impertinently false than the above. The short passage now quoted conveys with its unmitigated falsehoods and bad grammar, two distinct propositions, in several ill-expressed forms: — 1stly, *That, when the people of healthy districts visit the affected districts, they take the disease not from the sick but from the air:* — *2dly, That when the sick move from an affected to a healthy district, they speedily recover, and do not give the disease to others.*—These propositions are the *basis* upon which the non-infection faith reposes; and are extended by the apostles of this faith to the three pestilences which I have been considering. I shall, therefore, bestow somewhat more notice on them than they deserve, and show — what indeed most of what I have adduced in any way connected with the subject must have already shown — that they are as baseless as the visions which haunt the imaginations of the trembling and sickly drunkard, when deprived of his accustomed stimulus. Having demonstrated the non-existence of the grounds upon which a belief in non-infection is based, this most dangerous doctrine — a doctrine pregnant with the worst consequences to the community — is consequently swept away, and entirely removed from rational minds; a belief in it being merely a matter of history, and an illustration of the progressive advancement of the human mind.

119. *a.* If, according to the *first proposition* of the non-infectionists, *those who come out of a healthy into an infected district take the distemper not from the sick, but from the atmosphere of the district,* then it follows that those who avoid the sick, or the clothes of the sick, shall be as liable to the distemper as those who approach or touch them. Now is this the case with the plague, or with any of the other pestilences I have discussed? The contrary is so notorious, as to require no further demonstration than it has received in the preceding articles; and if further demonstration be required, let a mere reference to the numerous instances of the protection afforded by seclusion in the midst of an infected population, on occasions of the prevalence of either of these pestilences, be sufficient; and a sufficient number of these instances has been adduced in the course of the preceding pages to satisfy the candid mind. Let the reader peruse the facts I have adduced proving, as respects each of these distempers, that the healthy will remain protected amidst a dense infected population — whilst surrounded by the sick and the dead, — as long as seclusion, and avoidance of all communication with infected persons or infected clothes, are observed. These facts are undeniable, and are not to be assailed by the loose statements of ignorant men, expressed in the bad grammar, and worse English, indicative of minds insufficiently informed for those investigations which are necessary to elicit the truth, and to trace its relations to matters held in dispute.

120. *b.* The *second proposition,* that *when the*

sick move from an affected to a healthy district, they speedily recover, and do not give the disease to others, has been sufficiently characterised by me above (§§ 118.), and is entirely false, as may have already appeared from what I have adduced in various places. That the infected should be less severely attacked when removed from crowded, close, low, or ill-ventilated places, to dry, elevated, and well-ventilated situations, may be inferred. It is one of the circumstances most strongly insisted upon by the infectionists, with reference to the three grand pestilences of modern times; and it has been more efficiently acted upon by them than by their opponents, as demonstrated at Gibraltar and other places. But, unfortunately, numerous exceptions to the generally good effects of removal occur; for, once the infection has taken place, — once exposure to infection of a manifest or concentrated kind has occurred — a severe and fatal grade of distemper will often be developed, notwithstanding that the removal to a pure atmosphere has immediately followed the infection. Instances proving this fact are numerous and too familiar to every experienced observer, as respects the three pestilences under consideration, to require a more particular notice than that which has been already taken of the subject. It has, moreover, been shown that a more or less elevated temperature and stillness of the air are necessary elements in the development of the epidemic prevalence, of at least two of the pestilences in question, if not of all three; and, consequently it follows, that a reduction of that temperature and free ventilation will be favourable to the infected, and will be more certainly secured by removal. Hence removals, with advantages as to temperature and ventilation, will prove more especially beneficial. But it may be inferred that a removal, even to a purer air, when the reduction of the temperature of that air is slight, will not be so manifestly advantageous as when it is much more considerable. Thus it was shown, on a very recent occasion that, when the crew of the "Eclair" steam ship, the infected and the healthy, were removed from this vessel, which, according to the non-infectionists, was the cause of the disease to all those who were not exposed to malaria in Africa, and were landed at Bona Vista, the distemper was not thereby mitigated in any degree, but continued to spread among the crew, and subsequently to the inhabitants of the island.

121. The assertion made by the writer quoted above (§§ 118.), that the visits of the sick to unaffected places are not followed by the propagation of disease, is the most outrageous and unblushing falsehood which has ever desecrated medical doctrine, or disgraced medical writings, — a falsehood, moreover, which, if believed in and acted upon, would on numerous occasions endanger the lives of the majority of the community in every civilised, or even partially civilised, country. Can such an assertion deserve the least notice, after the numerous proofs to the contrary adduced in the preceding pages? — after the instances I have referred to — and thousands more might have been mentioned if my limits could have admitted them. I shall, however, notice two, which I have just seen in the course of my reading. Mr. Howard, in his celebrated work states, that "when the plague raged in London in 1665, the infection was conveyed by means of a parcel of clothes to the remote village of Eyam, near Tidewell, in the Peak of Derbyshire. In this place it broke out in September, 1665, and continued its ravages upwards of a year, when 260 of the inhabitants had died of it." "In the surrounding fields are many remains denoting the places where tents were pitched; and tombs are still existing of large families entirely swept away by this devouring pestilence." (p. 24.) The plague is very rarely introduced into Arabia; the passage across the desert, and the state of the climate in many parts of the country, being unfavourable to the development and spread of its infection; and it is generally admitted that the pestilence has never appeared there unless when imported, as was the case in 1815, by the army of Mehemet Ali, which crossed the desert into Arabia on an expedition against the Wahabees. Dr. Babington, the eminent physician to Guy's Hospital, who came over land from India at this time, remarks, in a communication to Dr. Gooch, that the plague had then visited Yambo and Jedda, and crept down the coast as far as Gamfada, — and that each of these towns had lost nearly half the population. He moreover adds that, when he was at Milo, in the end of 1815, a vessel came into the port having one person on board ill with the plague. This vessel was ordered by the Greek authorities to quit the harbour. She put into Mitylene, where those in command being less cautious, allowed the sailors to land; several of whom had, by this time, become infected. The distemper immediately afterwards broke out among the islanders, and many fell victims to it. It is unnecessary to adduce further proofs not only of the utter worthlessness, but of the insane recklessness of the assertion, which I have now sufficiently noticed. Indeed, the full evidence I have brought forward of the infectious nature of each of the pestilences considered under this head, completely overthrows the position so rashly assumed by the non-infectionists.

122. But, as shown above, and admitted by the contagionists or infectionists themselves, the plague is not always propagated; when those sick of it, or the clothes of the infected, are removed to a place or places which is altogether healthy, or free from the pestilence. This circumstance has been fully explained; but because, like all other infectious maladies, this requires certain conditions for its epidemic prevalence, and because it is not universally diffused — because it is not widely and generally propagated on all occasions and circumstances whatever, the non-infectionists raise an argument against its infectious nature. The occasions and circumstances favouring the spread of this distemper are hereafter shown (§§ 124. 127. *et seq.*), and those preventing the propagation of it also stated (§§ 126.). That there should exist such occasions, is only in accordance with the laws of nature, and with the phenomena characterising all acute infectious maladies. The same takes place in respect of the small-pox and the rest of the exanthematic, and it is notoriously the case as regards the other pestilences. Before the introduction of inoculation, small-pox, as respects its epidemic prevalence, presented the same laws as the plague and other infectious maladies which frequently appeared in an epidemic form. Van Swieten, who saw the small-pox when it

ıs propagated only in the natural way, remarks
follows: —" I have sometimes observed large
wns to be free from the small-pox, whilst it
ged epidemically in the neighbouring villages;
d, on the contrary, some large towns univer-
lly visited by the complaint, whilst the villages
the neighbourhood remained in health, though
e inhabitants of both mixed daily with each
her. I also perfectly remember, that I once
moved two patients of mine from a place where
e small-pox raged to a large town, without pro-
gating the contagion there; and many excellent
ysicians, with whom I have cultivated a friendly
mmerce with respect to medical knowledge,
stify, that they have observed the same thing."
similar fact is mentioned by Sir JOHN PRINGLE.
e states that "the small-pox, being carried into
camp by some new raised recruits, quickly dis-
peared without becoming general, although it is
torious that other camp-diseases are but too apt
ickly to spread themselves." Dr. ODIER, in a
tter from Geneva to Dr. HAYGARTH, says: —
We have frequently inoculated at Geneva a
cat number of children in the years during
hich the small-pox was not epidemic; these
ildren have gone out every day, even after the
uption had broken out; they have been in the
reets, and in the public walks; they have com-
unicated freely with other children susceptible
the infection, and, not only the small-pox did
t spread, but there did not occur, to my know-
lge, any distinct instance of the communication
the disease from one individual to another in
e streets or promenades."

123. I have now taken as much notice of the
ief arguments of the non-infectionists as they
serve. Who will not be convinced, by what
s been adduced above, are not likely to be con-
nced of the infectious nature of the pestilences
re considered, by any thing whatever that may
advanced. I can only add, for the consider-
ion of the inexperienced and incautious, that,
ter what I have stated on the subject, with a
rfect conviction of its truth, and after the full-
t and most extended research it was in my power
bestow upon the subject, if they neglect those
easures which are calculated to prevent infec-
n, in the several circumstances in which it
ay be likely to appear and to extend — if they
t recklessly, as the numerous occurrences of
ese pestilences have presented many examples,
d despise the doctrine of infection and all pro-
ctive measures, they will open the flood-gates
an overwhelming calamity, in which they
emselves, amongst many others, may be swept
ay: or, if they should survive, they will have
account to settle with their own consciences of
small amount. At the present day, persons
e endeavouring to overturn belief in a doctrine
ost essential to the safety of the community,
d are attempting to oppose their opinions to the
ews and doctrines inculcated by the master
inds in our science, — inculcated for the promo-
n of the best interests of humanity, and incul-
ted moreover, with a perfect conviction of their
ith.

124. iii. *There are some circumstances which pre-
spose to, and others which appear to counteract,
e infection of plague*, besides those just referred
. My limits will only admit of a brief notice
them. — *a*. It has already been remarked, that extremes of *temperature* arrest the spread of this pestilence. It has long since been stated by VOLNEY and others, that the winter temperature of Constantinople puts out, but that spring and summer heats rekindle, the distemper. But it is very questionable whether or not the infectious miasm is destroyed by the cold, or is merely rendered inoperative or dormant; and although the spring and summer heats resuscitate the pestilence, it is very doubtful whether this effect is produced by the generation of the distemper, *de novo*, by the influence of a higher range of temperature upon the decomposing animal exuviæ and other materials, or whether the dormant infection is thereby rendered operative and called into activity, or even whether the infection is introduced on several occasions, and at several points, by infected vessels and travellers, and especially by the numerous pilgrims returning to or passing through this city; and that the infection spreads as soon as the occasions favourable to its extension supervene. That this last is the true reason of the prevalence of the distemper during summer in this city is shown by the almost total disappearance of it since quarantine regulations were adopted in 1839. In Cairo and other towns in Lower Egypt, as well as in some parts of Syria, where the winter temperature is much higher, the distemper becomes epidemic, or at least more or less prevalent, usually at a much earlier period of the year, generally in March, April, and May, and subsides when the temperature rises above 75 or 80 deg.

125. *b*. It is, however, not so much the temperature as the *humidity* of the air which favours the extension of this pestilence, and the former may be said to be operative only when it is conjoined with great humidity. This is evinced at Constantinople, where the air is very humid in spring and summer, owing to the influence of the adjoining seas, the extensive forests, and high ranges of mountains. In Lower Egypt and Syria, especially in places near the coast, the winter and spring are humid and rainy, and the atmosphere close and still; and although the range of temperature is not high, still the close and moist air favours the accumulation of the emanations proceeding from sporadic cases of the pestilence, or from clothes retaining these emanations, and renders those exposed to them more susceptible of their influence. When, however, the atmosphere becomes dry, whatever may be the range of temperature, the pestilential miasm loses much of its power, and the population, or those exposed to it, much of their susceptibility. It is therefore chiefly owing to the combination of heat with humidity that the former is influential in the diffusion of this pestilence.

126. *c*. The *Winds* have no mean influence in the development and spread of plague, especially in the East. At Constantinople, the north wind, called the Tramontana, which is dry and cool, prevents or arrests the progress of the distemper, whilst the Sirocco, or south wind, which is both warm and moist, favours the development and spread of the malady. High winds, especially when they are dry, remarkably diminish the infectious disposition, and restrain and arrest the propagation of the disease, chiefly by dissipating and diluting the miasms proceeding from the infected, and giving rise to freer ventilation in

crowded streets and houses. The salutary effects generally derived from placing infected troops or communities in tents, upon a dry, arid, or healthy soil, proceed chiefly from the readiness with which the winds pass under the tents and dissipate morbid emanations, or dilute them so as to render them inoperative. Dry winds also render the human constitution less susceptible of contagion. Thus it has repeatedly been observed that the Harmattan, a remarkably dry north-east wind, occasionally blowing for several days on the west coast of Africa, suspends the infection of small-pox, and that even inoculation of that disease is generally inoperative whilst it blows.

127. *d.* The *electrical conditions* of the atmosphere have been supposed to be more or less influential in producing epidemics of plague and of the other two pestilences; but the particular electrical conditions have not been shown, the negative state being most frequently accused. Very probably electricity, as it circulates through the animal œconomy and other objects on the earth's surface and passes off into the atmosphere, by its varying states and its influence upon the nervous system impairs in some cases, and increases in others, the nervous power and vital resistance of the frame, thereby rendering them more or less disposed to the invasion of infectious agents, and, as observed in respect of its influence on dead animal matter, imparting more or less of a septic tendency to the fluids and soft solids. Still the actual amount of influence of this agent on the living body is unascertained, and probably much exaggerated by many, especially by those who impute epidemics to atmospheric conditions, without admitting the efficient agency of specific infection.

128. *e. Local or endemic conditions* have been much insisted upon by some writers, and by several of those who have communicated with the French Academy on the subject of plague — these conditions, especially the accumulation of animal exuviæ, the decomposition of dead animals, incomplete modes of human sepulture, and burying the dead in vaults and crowded churchyards situated within or nearly contiguous to towns and cities; imperfect drainage and the passage of decomposing animal fluids and excretions, into cess-pools, into a low, wet and rich soil, or into canals, open drains, &c.; collections of animal and vegetable matters left to decompose in the air surrounding low, damp, and ill-ventilated dwellings, or in narrow and crowded streets; living in cellars or in close apartments on the ground, and having merely the soil impregnated with animal secretions and the fluids from animal decomposition, for a floor; adjoining marshes, estuaries, low grounds subject to inundations, ruinous and obstructed canals, stagnant waters, &c.; a deep, rich, and humid soil, accumulated for ages from the decay of animal and vegetable matter, and from the mud and slime produced by repeated inundations and evaporation by a warm sun; scarcity and unwholesome food; and the use of water contaminated by animal matter, by the decomposition of organised bodies, or by the infusoria, severally exert no mean influence in the development and spread of plague and other pestilences. It is seldom, however, that one or two merely of these conditions are found existing in a locality or town in the East, without being associated with others, or even with nearly those now enumerated; and if they be singly i jurious, as they must be admitted to be, ho much more so must they prove when associate and the emanations from them are elicited l heat, and accumulated in a humid and stagna atmosphere. It is to the combination of a numb of these, aided by moderate warmth and h midity, that many recent writers impute, as have shown above (§ 106. *et seq.*), the generati of this pestilence *de novo*, and its endemic ar sporadic existence; whilst others have maintaine in opposition to this view, that, so far from the circumstances having generated the plague, given rise to sporadic cases, or to an endem form of the pestilence, they have actually be unfavourable to the prevalence of it, when it h been epidemic, and that quarters of cities whe they have been most remarkable have suffer the least from it on these epidemic occasions. has been stated, even by the supporters of t origination of this distemper in these causes, th the Jews' quarters, and others the most filthy, a combining most of the conditions just specifie have suffered the least in various epidemics whi ravaged Cairo, Smyrna, and other towns in t East; and an argument against the accuracy their own views, as to the origin of the pestilen has thus been furnished by themselves.

129. There can be no doubt of the injurio influence of these causes, acting either singly in combination, upon human health; and of t fact of putro-adynamic fevers, typhus, adynan dysentery, and other maladies, having originat in a combination of two or more of these c cumstances, more especially when aided warmth, humidity, crowding, and imperfect ve tilation; but that they generate *de novo* this p tilence, may be disputed, as shown above (41 or even that they constitute the sole source centre of epidemic influence, during fatal pre lences of this distemper. Indeed, the precise p which these circumstances perform — the amou of influence which they severally or conjoin exert, in the generation, or in the diffusion of tl pestilence, has not been clearly ascertaine Their noxious influence has been more a matt of inference than of demonstration; and numero facts seem to show that other circumstances oft associated with these, although not necessar connected with them, are more concerned th they in the spread of the distemper; that crowdi and the close and frequent communications w infected persons, and pestilential emanations fr the clothes and bedding of the affected, and fr their persons, and the concentration of these i stagnant and humid atmosphere, are the princi and efficient agents of general infection; and tl the several local or endemic states above en merated (§ 128.) are operative chiefly in as far they concentrate or accumulate these emanatio and prevent their dilution or dissipation in t surrounding air.

130. *f. Modes of sepulture*, have not receiv due attention, especially with reference to the gen ation and diffusion of pestilential diseases. many places in Africa, especially among t Pagan and Negro tribes, and even among t Copts, the dead is generally buried in the hou or huts of the living; and as many of the dwe ings have no other floors than the earth itself,

must follow that, in the more populous and older towns, a most fruitful source of disease exists in the very dwellings of every family. This practice may be concerned in the origination or propagation of the hæmagastric and septic pestilences, especially the former; but how far it is actually so concerned, cannot easily be determined. That it is injurious to health, cannot be disputed. I believe that it is more influential in the generation and spread of pestilence than the other local causes above specified (§ 128.), especially in humid and stagnant conditions of the atmosphere, and when aided by several of these causes. It was observed during the French revolution, that the trenchings, &c., made in many burying-grounds in order to obtain nitre, occasioned malignant fevers. And M. BORRINI, secretary to the sanatory establishment at Alexandria, states, that a cemetery near the city, in which more than 500 bodies were interred, during the plague of 1834 and 35, was opened in 1837 for the foundation of an edifice, and the plague appeared in the following spring. But it is difficult to determine in this instance how far this circumstance was concerned in originating or in propagating the distemper of the following spring. Although facts have been adduced, having some reference to this matter, they have been superficially observed and loosely described. That these occurrences are productive of malignant fevers and adynamic dysentery, cannot be doubted. I have met with instances of adynamic and putro-adynamic or malignant fever, which have proved fatal as early as the sixth day, caused by the foul air emitted from burying-grounds and vaults in this city, and that foul air from similar sources in warm climates, and even in colder countries in warm seasons, and in a more concentrated form, should occasion plague, is not improbable, although not so fully demonstrated. The evidence as to the origin, *de novo*, of the specific form of pestilence now under consideration from this source, is too deficient to admit of my connecting them as cause and effect. The subject requires further investigation before either the affirmative or the negative can be admitted. There is one circumstance which may be mentioned, that, although in the great plague of London about 100,000 dead bodies were put in the ground very near densely inhabited places in London, and although they were thrown into pits, each containing many thousands, and were covered only by a shallow layer of earth, still this pestilence was not continued during the years immediately following; but a malignant typhoid, or putro-adynamic fever, caused by the effluvium proceeding from the burying-places, and an adynamic or putrid dysentery, occasioned by the water contaminated by these sources, were remarkably prevalent in London during several years immediately consequent upon the plague. Similar occurrences are recorded to have followed very fatal epidemics of plague in other cities; but their causes have rarely been recognised or even inquired into.

131. It is indeed a matter of surprise that a chief source of the most malignant diseases — a source rendered manifest to the senses in the most disagreeable manner, and so easily connected with its effects — should be allowed so long to exist in civilised countries, and more especially in this, without the least interference; but this is only one of numerous instances of the disregard of health and life by governments in which particular classes obtain the power of legislating for their own interests, and in favour of property, with a total disregard of the public health, and of the protection of human life. The loaf of bread exposed to the tempted gaze of the starving is protected from his grasp, and the miserable wretch who cannot withstand the temptation placed in his way is made the subject of the severest punishment, contrary to the Mosaic law, so conveniently adopted in other matters; whilst the interests involved in the traffic of burial vaults and grounds in the midst of crowded localities prosper by the increasing amount of mortality they produce; and whilst the proprietors are fed and made rich by the very deaths they occasion, their interests are respected by the law and by the legislature, and the murderous traffic is allowed to proceed. But this is not the only way in which the public health and human life are made the wholesale objects of commercial speculation and private gain, protected by the glorious stringency of the laws in behalf of property. The vendor of poisons, whether with the intention of destroying, or with the avowed object of restoring health, is allowed to pursue his murderous vocation not only without hindrance, but is actually more efficiently protected in the exercise of it than the educated and scientific physician, who has devoted his whole energies to the honest and salutary performance of what he professes. Both kinds of depredators on human life have obtained, by the favours of the laws and of the expositors of these laws, by the forbearance of the legislature, by the ignorance of the aristocracy, by the devotions paid to wealth to the neglect of worth, and by the state of society generally in this country, vested rights in their vocations; and, at the present day, they are encouraged by church and state, and even applauded by numbers in the community, during the unblushing exercise of their hideous iniquities —

> "Murders most foul, as in the best they are;
> But these most foul, strange, and unnatural."

132. *g.* There are few causes more accessory to the prevalence of plague than *scarcity, and unwholesome articles of food.* Insufficient and unhealthy nutriment increases the septic tendency so remarkable in this pestilence, and favours glandular enlargements. The use of tainted animal food, of half-putrid meats and fish, of unripe or injured grain, and of numerous other unwholesome articles, often partaken of during periods of scarcity or want, although not originating the pestilence, certainly increases the susceptibility to, and the spread of infection. Hence the remarkable prevalence of the distemper on several occasions when the infection has been introduced into a place subject to scarcity or famine. Fatigue, all exhausting causes, especially sexual indulgence, mental depression, dread of infection, and want of sleep dispose the system to an attack.

133. *h.* There is much difficulty in determining the *influence of sex, age, and occupation* in favouring the infection of this pestilence. Much depends upon the exposure to which each is liable during an epidemic; and this will necessarily vary in different countries and epidemics. There is no doubt of medical men and hospital

attendants, and next to them the ministers of religion, having been more frequently attacked than any other class; a circumstance altogether arising from their greater exposure to infection. All those who were employed in burying the dead, in removing and attending upon the sick, or whose avocations brought them in contact with the affected, or with their clothes, or even near to them, have rarely escaped in any epidemic of which particular accounts have been furnished unless they were protected by previous attacks of the pestilence. It is said, that the water-carriers and the oil pressers and preparers in Cairo and other Mahommedan cities generally have escaped, and that the immunity of these classes was very evident in the epidemic of 1835. Tanners, curriers, and skin dressers have been found more exempt from plague than other artisans, as shown in numerous epidemics in both Europe and the East.

134. *i.* The plague, like small-pox, spreads more *rapidly, generally, and fatally among the negro and other dark-skinned races* than among the Caucasian race. In this respect it is opposed to the hæmagastric pestilence, which attacks more especially the latter. It was observed in the Egyptian epidemic of 1835, that the negro inhabitants were attacked and died in much larger proportion than others. The natives of countries also approaching the tropics, and even of those of the south of Europe, have been considered more liable to the plague than those of the north; and persons having weak and susceptible nervous systems, and feeble or disordered digestive organs, also have been said to be more predisposed than others; whilst those who are labouring under diseases attended by purulent or other discharges, generally escape. **Larrey** remarked, that the soldiers who had been wounded, or had sores or ulcers, were not attacked so long as their wounds or sores yielded a puriform discharge, but that they were not unfrequently seized as soon as the discharge ceased. During periods of the plague in Europe, numbers of persons have had recourse to artificial purulent discharges as a prophylactic measure, and frequently with success.

135. iv. *The hypothesis of insect life as a cause of disease* has been applied to plague and other pestilences. Dr. **Holland** has discussed this hypothesis, in connection with the choleric pestilence, with great ability and eloquence (*Medical Notes and Reflections*, &c., 8vo. Lond. 1839, p. 560.), and adduced every consideration that can be entertained in its favour. Much of what may be said regarding the origin of that pestilence in this cause is equally applicable to the plague. Admitting that swarms of insects sufficient to cloud or to obscure the atmosphere may exist in it, and yet be so minute individually as to elude the unassisted vision; that the numerous infusoria &c. detected in fluids by powerful instruments is a strong argument from analogy in favour of this opinion; that these swarms of insects may be generated from the decomposition of dead animal matter, and that the circumstances which favour such decomposition may also favour other modes of existence too minute to be detected by our grosser senses; and admitting, moreover, that these insect swarms may be inhaled into the lungs, or be absorbed, they or their ova, from these and other surfaces, and occasion the most noxious and fatal effects, and that they may s travel as to explain certain courses taken by th and the choleric pestilence, still there are man facts and considerations which weigh strongl against this hypothesis. Indeed, all that has bee adduced against the opinion of the atmospheri origin of these pestilences apply equally to thi doctrine. If swarms of insects passing throug or floating in, the air, too minute to be perceive and hence capable of passing into the circulatin vessels, and there producing fatal distemper were actually capable of occasioning what ha been imputed to them in respect of either of th pestilences in question, we should expect a mor or less simultaneous affection of the population o the district through which they passed; and seclu sion or separation could not be viewed as bein more likely to protect from this cause than fron the atmospheric constitution contended for b others. It would be difficult, also, to connec what can be believed possible of such insec swarms with the several epidemic manifestations and sporadic or endemic appearances of this an the other pestilences.

136. But these insect swarms have not bee proved to exist in connection with individual case or with the epidemic prevalence of plague or othe pestilence. Those manifest and palpable swarm which have been occasionally observed in mos countries, to such an extent as to darken the air and to colour the objects on which they rested and which furnish the chief argument for the existence of those supposed to be productive o plague or other pestilence, have not been foun destructive of human life, although productive o more or less disorder. The transmission also of these distempers from one place to another, the transport of plague from the east to places in the west or north of Europe, and the various circumstances connected with the transport or appearance of pestilence in various distant, or even adjoining places, are not consistent with insect swarms existing in the atmosphere.

137. It is more probable that the material emanating from the infected, whether denominated the pestilential miasm, emanation, or effluvium, and infecting the susceptible among the healthy, either by direct or mediate contact, or by the respiration of the air more immediately surrounding the sick, actually consists of innumerable, impalpable, and invisible but living and organised existences, generated during the distemper, and thrown off as the distemper proceeds, in so minute but specific forms as not to be visible to the eye, although often admitting of recognition by the sense of smell. It is no very extravagant notion to conceive, what has the support of numerous circumstances and analogies, that during the more or less rapid effluxion of the vitality endowing the frame in this and other pestilences, the effluent vitality may associate itself with certain materials or molecules furnished by the diseased body, and thus may assume the state of organised existences, of specific form, but invisible and impalpable size, capable of infecting the healthy, and, by means of the malady they produce, giving rise to similar specific existences, thereby propagating, spreading, and perpetuating their kind. These innumerable and invisible existences, or organised swarms, whether thu equivocally generated by changes in the states of

vitality and organisation in the highest of animals, or capable of perpetuating themselves by ova, may be supposed to assume certain determinate forms in each specific pestilence, the specific characters of which may depend upon the determinate forms thus assumed, and upon the manner these forms invade and affect the organs of our frames. It might be futile to add more in favour of infection by means of organised existences or parasites generated by the diseased, although much more might be added in support of the doctrine; but we well know that in proportion as the vital energies of the frame languish or are impaired, so are the parasitical animals peculiar to each of the higher animals more numerous, swarming, and fully developed; and it is not unreasonable to infer, that as vitality apparently changes its form, its conditions, and material alliances in these cases, probably without even the intervention of ova, and merely from the effluence of the vitality of the parent, and the combination of that effluent portion of vitality which molecules of matter which it fashions into certain specific forms, and which, moreover, although thus equivocally generated, it may even endow with the power and with the organs of reproduction. Rejecting, therefore, on the one hand, the doctrine of insect swarms floating in the air and producing pestilence, as being deficient in the evidences of their existence, and of their operation on the œconomy consistently with the phenomena presented by pestilence, and believing, on the other hand, that the opinion as to the material or emanation infecting the healthy is a living and organised material, consisting of innumerable and invisible forms or existences given off from the diseased body, has sufficient analogies and other evidences in its favour, I would recommend the future investigation of this subject by means of those aids which are now so much employed in physiological and pathological researches.

138. v. *There are certain conclusions respecting the causes and propagation of Plague* at which I am disposed to arrive, after the best consideration I could devote to these matters. I believe that they are consistent with the best evidence I can obtain, and with the actual state of our knowledge. If any of them be found inaccurate, the disposition to correct them shall not be wanting.

139. *a.* The amount of evidence (as I do most firmly believe the proofs of the last century equally valid with those of the present) favours a belief in the communication of the plague by contact of infected persons or clothes. Although the contact of these will very frequently fail of producing this effect, and although the evidence on some occasions may appear equivocal, and admit of other special explanations, still the frequent infection after the contact of these, the sequence of occurrences, and the connection of sensations, conspire to the formation of a well-founded belief that the result is produced in the way usually accredited.

140. *b.* From what I have stated above, I infer that the inoculation of the plague may be effected. That whilst its accomplishment proves the contagious nature of the pestilence, its failure, for the reasons I have given (§ 96.), cannot be justly considered as disproving the contagious property; and that, although the evidence of the communicability of plague by inoculation is not quite complete, it is sufficiently so, viewing it in connection with other modes of propagation, to warrant the belief that the plague may be communicated in this way also.

141. *c.* That in addition to, and even more frequently than, the infection by contact of persons and clothes, infection is produced by the emanations or effluvia given off from the sick, and inhaled by the susceptible upon near approach, remaining near or long with the infected, especially in humid and still conditions of the air, and in ill-ventilated apartments.

142. *d.* That the pestilential emanation, or effluvium, is absorbed and retained by bedding, bed, and body clothes, more especially when these consist of animal products; and that, if these articles are shut up immediately, or soon after they have been used by the sick, and excluded from the atmosphere, they may retain this effluvium, and by giving it off upon exposure to the air, they contaminate the surrounding air, and infect the susceptible who may respire the air thus contaminated.

143. *e.* That numerous occasions may occur in which it cannot be determined, in which way, or through what channel, the infection is conveyed, although no rational doubt as to the actual communication of the distemper from one person to another can be entertained, and that in many cases where the distemper appears to be communicated by contact, the proximity necessary to this act brings the susceptible person within the sphere of infection produced by a pestilential effluvium, or emanation from persons or clothes. Hence the experiment made in 1835, in the Hospital Esbeki, at Cairo, on two criminals, who, after having put on the body clothes of two persons who had recently died of the plague, lay down on their beds, prove infection either by contact, or by the air contaminated by the clothes, which were used and respired by the subjects of the experiments, or by both modes. In these two instances, infection was manifested on the fourth and sixth days.

144. *f.* That the period during which either the bodies of the dead, or the contaminated clothes may retain the power of infecting the living, has not been ascertained, and most probably no particular period can be assigned, as it may rationally be supposed to vary with the physical and other circumstances by which either source of infection is surrounded. There can, however, be no doubt that the dead body retains the power of infection during a period of considerable duration, and that the same may be said of the clothes and bedding of the infected, when these have been excluded from the influence of air and light.

145. *g.* That however we may speculate as to the nature of the specific miasm, effluvium, or emanation propagating plague or either of the other pestilences, we only know actually that it is specific, or of a determinate kind, in each distemper; and that it is so, is an inference, the truth of which is demonstrated by its effects, and especially by the fact of its propagating and perpetuating its kind. The effects, as well as other considerations, suggest the belief of a certain grade of vitality and organisation in the material given off by the diseased, and affecting the susceptible among the healthy, and consequently of a specific conformation or constitution of the in-

fecting material in each distemper, and they favour, but by no means prove, the idea of infection by the generation of invisible living existences by the diseased, that, either directly or by contact, or mediately, or by the air contaminated by these existences floating in it, affect the healthy in a similar and determinate manner.

146. *h.* That the chief and most frequent channels of infection are the respiratory passages and organs: the air inhaled conveying with it the contaminating or infecting agent, whatever this may be, and thereby infecting the healthy, whenever this agent is sufficient in quantity or concentration relatively to the susceptibility of the person exposed; but that infection may take place in some instances and circumstances from the cutaneous and digestive mucous surfaces, although much more rarely, and merely contingently.

147. *i.* That we have no valid evidence, in respect of plague, more than as regards the other pestilences and the exanthemata, that this distemper may be generated *de novo* by certain sources, namely, by the emanations from dead animal matter, or from the exuviæ and dead bodies of our own species, although numerous circumstances favour this doctrine, whilst others militate against it, and support the opinion, that the pestilence is perpetuated by contagion and infection, during circumstances favourable to the communication of it; and that it is prevented from being extinguished by the transport of it from one place to another, its existence and prevalence in one or more places, when it has disappeared from others, furnishing the means of its return to those places from which it had entirely disappeared for a time.

148. *k.* That many of the circumstances which suggest the doctrine of spontaneity, or the generation *de novo* of the plague, on occasions of its appearance and prevalence in places where these circumstances exist in the most evident manner, remarkably favour the propagation and perpetuation of the pestilence, and, in fact, constitute the condition which has been denominated epidemic constitution influence, source, centre or *foyer;* but they require the presence of the pestilential germ or infection, whether already existing sporadically or endemically, as incorrectly termed, or being latent in certain fomites, or imported from more or less distant places, before the malady can be developed and disseminated.

149. *l.* The period of *incubation*, or the time elapsing from the moment of exposure to the infectng agent to that at which the effects become manifest, has been variously estimated. It evidently varies in duration with the concentration or amount of the dose of infection relatively to the suscepibility of the recipient. It may be so short as not to admit of recognition, as in the occasion of a cart conveying a number of bodies to the pit dug o receive them, when, upon the jolting of the cart, a most overpowering gush of foul air proceeded from the bodies which it contained, and lmost instantly struck down a person who was near it, and who died in an hour or two afterwards; and the period may extend to ten or eleven days. The period has not been supposed to be onger than this by most of those who have communicated with the French Academy of Medicine on this subject.

150. *m.* That an attack of plague protec from a future seizure, as certainly, as an attac of small-pox, or of any other of the exanthemat protects from a second infection. That this fac fully proved by Dr. Russell and others, has n been sufficiently recognised by several recent e perimenters; although it is of great importance selecting attendants on the diseased, and in o speculations as to the propagation, prevalence, an sporadic or endemic existence, of the pestilenc and as to the escape or insusceptibility of mar of those exposed to it.

151. *n.* That the occurrence of infection fro merchandise or goods, of any other descriptic than clothes and bedding used by the sick, must l very rare, as the circumstances in which these ca be infected by plague must necessarily be rare and even when clothes and bedding are contam nated, exposure for no very long period to d ventilation, especially when the air is dry and th wind is high, will be sufficient to deprive them any infectious property.

152. *o.* That the various predisposing and a cessory or determining causes of plague have n been fully ascertained, and their influence d termined further than may be inferred from wh I have stated above (§ 124. 127. *et seq.*); ar extremes of temperature, dry states of the air, ar free perflation and ventilation always either arre or restrain the spread of this pestilence.

153. VI. Mortality from Plague. — Th pestilence is probably the most fatal of any to whi the human frame is liable. At Marseilles, it w believed that above one half of those seized di of it; and in certain places and institutions, t proportion of fatal cases was even higher. Th in the "Hôpital de la Charité," 1013 cases we received, and 585 died. In the "Hôpital Jeu de Meril," 1512 persons were received, a 820 died: and in the lowest classes, the pr portion of deaths was still greater. As respe the plague of London in 1665, and all the mo recent outbreaks of the distemper in other citi and districts, there is no evidence that the mc tality has been much less, but we have no stat tical information upon which any reliance can placed. It is very generally remarked that, at t beginning of an epidemic, although the malady least diffused, it is the most fatal; that during t increase and height of the pestilence, a larger pr portion recover; and that, during the decline, t numbers attacked are much diminished, and t comparative mortality is much less. These fa may be explained on the supposition, that in t early progress of the distemper, the most p disposed to infection are first attacked, and bei the most susceptible, are the most liable to si under it; that, as the sources of infection multip the less susceptible are also attacked, but are t least severely affected, and recover in grea numbers; and that, after a certain number weeks or months, when the distemper has be introduced among a dense population in a to or city, the least susceptible only remain to infected; and, if these are attacked, they are most likely to recover, unless they are exposed a more concentrated infectious effluvium, or ha become more predisposed to a severe infecti Hence it often occurs, as noticed by Dr. Russ and others, that some persons who have been close communication with the sick, have resis

infection until the decline of the epidemic, when they have been attacked, and even died.

154. The prevalence and mortality of plague depend much upon the numbers of those, in a district where it has been introduced, predisposed to infection. If the distemper has been frequently epidemic there, or has been lately remarkably prevalent, a considerable number of persons protected from a second attack will necessarily exist. The most susceptible of plague, as in the hæmagastric pestilence, has been said to be the young, robust, and plethoric; but this is not fully established, especially as regards the rate of mortality among them, which has also been considered as high. The greater prevalence of the distemper among these persons is probably owing to the greater exposure to infection to which they are liable. The fact of the mortality being the greatest among the negro and dark-skinned races, whose frames are much less powerful than the Caucasian, would indicate a comparatively less mortality among those which are young and strong. The recent observations of the European physicians who have practised in the East, do not appear to confirm the opinions as to the greater liability of, and greater mortality among, robust and young persons; indeed, there is every reason to believe, that however susceptible such persons may be of infection, at least the proportion of recoveries is greatest among them.

155. There is no datum from which any inference can be drawn as to the influence of different modes of treatment upon the mortality of the distemper, more especially during the epidemic prevalence of it among a dense population. The varying characters, severity, and complications of the disease, must render any particular method of cure altogether unsuitable to some cases, although most appropriate to others; and thus all exclusive plans or measures must be equally successful, or rather abortive, if universally employed. It is in this distemper, as indeed in all others, most manifest, that the careful adaptation of the means of cure, and the varying and suitable combination of them to existing grades, states, and associations of morbid action, can alone have the effect of so controlling or arresting such action, as to influence the comparative rate of mortality.

156. VII. The Nature of Plague.— My views of the nature of this pestilence may be inferred from what has been advanced above, respecting the *occasions* and *causes* of its outbreaks, nd the phenomena presented by the infected. My remarks, therefore, on this topic, are merely summary of what appears to be, as well as not be, fully established respecting it.

157. *a*. Plague is a contagious and infectious distemper, according to the meaning attached to these words, both above (§§ 58, 59.), and in the article Infection, and in the favourable circumstances and states of susceptibility already fully insisted upon (§§ 124. *et seq.*); and a person who has been once attacked by it is protected from a second attack, as proved by Russell, White, and others.

158. *b*. The infection of plague may be preserved in, and propagated by the bedding, bed, and body-clothes of those who have been attacked; and the pestilence has been propagated by these means, in the circumstances and states of susceptibility above shown (§§ 124. *et seq.*), as well as by personal communication or contact.

159. *c*. Goods, or articles of trade or merchandise, not having been used by the sick, cannot be expected to propagate the distemper in any circumstances, especially if they have been exposed to the air.

160. *d*. The infectious emanation or poison, when received into the lungs during respiration, may so depress the organic nervous energy and vital power of the frame, and so contaminate the circulating fluids, as instantly to produce manifest effects, or even to destroy life in two or three hours, when this emanation is very powerful or concentrated, relatively to the state of vital resistance. When, however, this poison is less powerful, or the infection of the frame differently produced, and when the vital resistance to its morbid impression and contaminating influence is energetic, then a more considerable period is required to develop its operation and noxious effects in a manifest and specific form; but the extreme duration of that period is not precisely ascertained, although it is generally believed not to extend to above eleven or twelve days.

161. *e*. The changes produced upon the healthy by the infecting miasm evolved from the sick, are of an asthenic and septic character; and however high the vascular reaction may be, owing to the powers of the constitution—to the vital resistance opposing the poison invading and contaminating the body—there is a tendency to a dissolution of the crasis of the blood, and of the vital cohesion of the soft solids: the capillaries, the lymphatic glands, and the cellular and mucous tissues, early experiencing and manifesting the effects of these changes.

162. *f*. As the phenomena and characteristics of this distemper have been uniform during ages, and in all countries, however far apart, and wherever they have been observed, so it may be presumed, that the efficient cause is also uniform and specific, reproducing its kind on all occasions, and with the power of perpetuation *ad finitum*. The distemper being specifically the same in all ages, the cause may be also considered to be of a specific kind, and to be preserved and propagated by the successive infections produced by it, as shown above (§§ 103, 104.); and although numerous circumstances favour a belief in the generation of this infection *de novo*, or in its spontaneity, still the evidence is not conclusive on this point, and still more numerous circumstances and considerations oppose it (§§ 108. *et seq.*).

163. *g*. The characteristic changes of this malady are accompanied by various accidental or adventitious phenomena, arising out of the concentration of the exciting cause or morbid poison occasioning it, of the state of susceptibility of the recipient, and of peculiarity of temperament, constitution, and habit of body; and probably, also, out of the conditions of the digestive, assimilating, and excreting viscera at the time of infection. Hence sometimes appear, in the course of the malady, certain prominent affections, or complications, which may more or less characterise it, in addition to those which are specific and are constant. Owing to this circumstance, J. Frank and others have divided the distemper into certain *states* or *forms*, namely, the *Simple*, the *Inflammatory*, the *Gastric*, and the *Nervous*, according to the predominance of the affections corresponding with these designations. But this division is

defective, inasmuch as the most severe and most rapidly fatal cases of the distemper are not comprised in any of the above states, the patient sinking rapidly, owing to extreme and rapidly increasing depression or annihilation of the powers of life, without vascular reaction, or prominent affection of the gastric or cerebro-spinal organs.

164. *h.* It is probable, that the circumstances of locality may also modify the type or character of the febrile phenomena of plague,—that on occasions of the extension of infection to places productive of emanations from marshes, &c., and at seasons when the malaria from these sources are most abundant, the infection of plague may be attended by either an intermittent or a remittent type of fever. It has been contended, when plague has appeared in such localities, and has presented more or less of a periodic fever, that the distemper has actually originated in the increased concentration or intensity of the malaria generated in these places. But there is no proof of this actually having been the case; but every reason to believe that the distemper had been introduced, and that the existing malaria had imparted to it more or less of a periodic character.

165. *i.* Although it is admitted, that the foul air generated by the decomposition of animal substances, and of animal exuviæ, will produce continued fevers of a malignant or putro-adynamic character, especially when decomposition takes place in a warm, humid, and stagnant air; and, although it is probable that plague may be thus generated *de novo*, still the evidence of this actually being the case is not conclusive; and we are, therefore, led to infer that, as the distemper is specific or *sui generis*, so is the infectious agent or poison which perpetuates it, however it may have originated (§§ 103, 104.).

166. *k.* Although the plague presents most of the characters of a malignant or putrid fever in the highest degree, it cannot therefore be inferred to be identical with that fever, as some writers have contended, inasmuch as it possesses certain specific signs and lesions which are not present in the latter, and which do not appear in those cases of malignant or putrid, or putro-adynamic fever, which arise from infection.

167. VIII. Treatment of Plague.—The treatment of this pestilence may be said to have been hitherto altogether empirical. The great number of medical men who have, since the commencement of this century, visited the East and practised for many years in countries where the plague is most prevalent, have thrown no light upon the cure of it. The introduction of Quinine and of the Chlorides into practice, during this period, has added somewhat to the means of cure available for the distemper; but the former is merely a preparation of a substance previously in general and even beneficial use in most cases of this pestilence, and the latter has not always been employed in such modes and combinations as are calculated to show the full amount of their virtues. Even popular remedies, such as olive oil, have not received that attention from European physicians which their reputation amongst the Arabian doctors might have excited. Indeed, the perusal of accounts of the numerous means resorted to against this distemper, from the beginning of the sixteenth century down to the present day, leaves the humiliating and lasting impression on the mind, of the very inefficient and contemptible nature of most of them, when we compare what is known of the operation of these means upon the economy, with the obvious nature and remarkable severity of the changes characterising the distemper. It must be most manifest to all who endeavour to combat the changes and morbid conditions constituting a malignant disease, and who attempt to employ agents appropriately to pathological states inferred to exist, that those agents should neither be doubtful as to their operation, nor be of a trifling kind as to their effects—that they should possess energetic and determinate properties, and be employed so as to produce a decided operation; and that the activity and the combinations of the means should be directed with strict reference to the remarkable depression of vital power throughout the frame, and to the poisoned condition of both fluids and soft solids characterising this malady. But have the means employed against this pestilence possessed these attributes, or been prescribed with due reference to morbid conditions, or in those modes and combinations which could rationally admit of any hopes of a beneficial result from their exhibition? I can safely answer, that, in 99 cases out of 100, where the means resorted to have been described in connection with the states of the case for which they were prescribed, that no such hopes could be rationally entertained, and that, if any advantage actually did accrue, it was due to the efforts of nature,—to the innate vital resistance to morbid changes, and not to the agents employed. Of the treatment of plague, the most important part is that which relates to *the protection of the community from its introduction*, and *of individuals from its infection, after it has been introduced.* This will, however, be discussed in the sequel, when considering the means of protection applicable to this and the other pestilences (see Pestilences, general and individual Means of Protection from); and I now proceed to discuss *the curative treatment of this distemper.*

168. i. Curative Treatment of Plague.—I have sufficiently insisted, in the foregoing pages, on the necessity of removing all affected by malignant diseases, into a pure air, and into a large well-ventilated apartment, whenever this can be accomplished; and it is the more especially required for cases of this pestilence, and more particularly for those attacked in close, crowded, and low situations. But this removal should be effected with a due regard to the protection of the healthy, and to the limitation of the pestilence. Persons who have already had the disease should be employed about the sick in preference to others, and personal cleanliness should be strictly enforced. There is nothing which tends more, as regards not only this, but also the other pestilences, to increase the infectious property, than the use of soft beds, especially those stuffed with wool or feathers, of woollen bed-clothes, and the neglecting frequently to change the night and inner body-clothes. There is every reason to believe, that the entire disuse of bedding and coverings, consisting chiefly of woollen or other animal materials, in countries liable to outbreaks of pestilential distempers, would tend much to prevent the diffusion of infection.

169. *A.* At the commencement of an attack, *emetics* have been much recommended both by the older and more recent writers. M. Aubert

states, that, in the more benign cases, they were always followed by an abatement of the symptoms, and generally by recovery, which would take place without further treatment, but then convalescence was prolonged; that he never observed any unpleasant effects from them in any circumstances; and that, in the more dangerous cases, the progress of the distemper was often arrested for a time by them, thereby giving time to act, and the patient was not weakened by them, as by bleeding. He therefore regards emetics as most beneficial early in the disease, in all cases. M. Aubert, however, offers no remarks as to the emetics which should be preferred. But it is obvious, from the nature of the malady, that a preference ought to be given to those which are least likely to lower the powers of life, and that these should be conjoined with stimulants, or warm aromatics. Thus, *sulphate of zinc* may be prescribed with capsicum, camphor, ginger, cinnamon, &c., and *ipecacuanha* either with these, or with ammonia and aromatics. Dr. Hodges very justly remarks, that the dose of the emetic should be large enough to operate soon, and to evacuate the stomach completely; that it ought to be given only in the infancy of the distemper, and not when the stomach has been freely evacuated by the retchings which often accompany the more full development of the malady, and that antimonial preparations are not advisable.

170. *B. Blood-letting* has been considered injurious in the plague by the great majority of both old and modern writers. Sydenham, Dover, and a few others have, however, advised large blood-letting; but the former possessed not the experience of his contemporary Hodges, who strongly opposes this practice; and the disease for which Dover employed copious bleedings, was not the true plague. Hodges observes, with much justice, that "if the authority of the ancients, as well as the experience of the moderns, have any weight, and indeed if my own practice may be regarded, it is highly to be feared, from many instances, that bleeding in a genuine pestilence is not only to be suspected, but charged as pernicious." MM. Aubert and Rigaud had recourse to blood-letting in Europeans, for whom they believed it to be sometimes of use; but they considered it as generally injurious in the Arab constitution. M. Dulong states, that the violence of the fever, and the imminent congestion of some important organ, induced him to have early recourse to venesection, and sometimes even to repeat it. Generally an amendment immediately followed the operation, but it was of short duration, and he rarely obtained any signal advantage from the practice. He, however, found the application of *leeches* behind the ears when the head was prominently effected, or upon the epigastric region, when the digestive organs were remarkably disordered, to be of considerable service.

171. Massaria believed that blood-letting was beneficial in the plague of Vicenza in 1576; and he was considered by his cotemporaries as a great authority. Opinions, however, greatly preponderate against this practice; yet, in some cases, especially among the nations of northern and temperate climates, in young, robust, and plethoric persons, and in the sanguine temperament, a moderate vascular depletion, early in the distemper, may be of service, and may dispose the system to be more readily influenced by diaphoretic and restorative remedies. In cases such as these, Sydenham recommended venesection to a large amount, and even to be repeated; but, when he found the practice opposed by the patients and their friends, he confided chiefly in a moderate blood-letting, and followed it immediately by full and frequent doses of warm diaphoretics.

172. *C. Sudorifics* appear to have received the favourable testimony of almost all writers on this pestilence. Diemerbroeck, Van der Hoyde, Sydenham, Orræus, Russell, Chenot, Pugnet, Desgennettes, and many others, trusted chiefly in them, selecting those of a warm and stimulating kind.—*a.* Dr. Hodges remarks, that all authors and practical physicians agree in this, namely, to throw out the pestilential poison as soon as possible by warm sudorifics, or *Alexipharmics*, according to the nomenclature of the day. It would be of little advantage to notice the numerous and very diversified substances which he recommends for this purpose; but amongst these are to be found some of the most energetic substances, which are employed at the present day. He adds, "that recourse should be speedily had to these remedies as to a sacred refuge; and there is such plenty of them, that nature seems to have had more than an ordinary indulgence and forecast in providing them against this destructive enemy of mankind." Of these remedies, he considered the *Virginian Snake-root*, with much justice, "the most efficacious diaphoretic and Alexipharmic for expelling the pestilential poison." And the next place he believed to be due to the *Contrayerva-root*, which, as well as the snake-root, he combined with a number of other vegetables of a stimulating and aromatic nature, in every conceivable form — in powder, electuary, infusion, decoction, &c.

173. *b.* Of *Mineral sudorifics* there is none so safe and efficacious as the one first introduced into practice by Minderer, and so long known by his name — the Spirit of Minderer, or *liquor ammoniæ acetatis;* and, when given with the *ammonia* very considerably in excess, it is more to be depended upon,— more febrifuge and diaphoretic, especially in all low, pestilential, and exanthematous fevers, than any other medicine with which I am acquainted. In all these maladies, and especially in plague, it may be conjoined with the *infusion of serpentaria*, or with the *decoction of bark*, or with *camphor*, or with all these, when the powers of life are much depressed, and unable to resist the poisonous tendency of the infection on the frame: but in such cases the ammonia should be also greatly in excess, unless the urine indicates an ammoniacal tendency, when the *aromatic acetic acid* may be substituted, and it be allowed to be in excess.

174. *c.* Many years ago, frictions of the surface with warm *olive oil* was much recommended by Baldwin and others in the treatment of plague, with the view of promoting a copious sweat, which seldom failed of supervening. The practice was common in the East from the earliest times; and the oil was also taken internally with the belief of its possessing both prophylactic and curative properties. Several experienced writers are much in favour of it, and the evidence is very conclusive as to its diaphoretic operation when employed externally; but it is by no means so as its curative influence, yet even in this way it appears some-

times to have been of use. Mr. Jackson, in his account of the very destructive plague which was introduced into Morocco in 1799, recommended it to many, both as a preventive and as a cure; and he states in both characters it was eminently successful.

175. *D. Purgatives* have been found generally injurious by most writers on this pestilence. Bockel states that they were remarkably so in the plague of Hamburgh in 1565; and Palmarius, Diemerbroeck, and Russell, as well as most recent authors, have been equally decided in the reprobation of them. It is evident, however, that the moderate evacuation of the morbid secretions and excretions is not so much dreaded by them, as the disposition existing in most cases of the distemper to diarrhœa, and the difficulty of limiting the operation of purgatives to a moderate evacuation, and of preventing inordinate and exhausting discharges from the exhibition of them. It must be obvious, that the evacuation of accumulated secretions and excretions from the bowels, and the prevention of any collection of these, are most important objects in the treatment; but they should be attempted by such mild agents as are most readily controlled, and the least liable to excite irritation, in the weakened and already irritable intestinal mucous surface. It is extremely probable, that *olive oil*, when used internally as well as externally, produces a mild demulcent, or soothing, as well as laxative effect on the bowels, without occasioning an operation of an exhausting kind, or one which is not readily restrained by the other remedies usually employed against the malady. Although much employed as a popular remedy, it has not received that attention from the regular members of the profession which I think that it deserves, from my knowledge of its effects in several other diseases. Judging by analogy, and guided by other considerations, I would advise the occasional combination of the *oleum terebinthinæ* with this oil, and the exhibition of it both by the mouth and in enemata, according to the circumstances of the case; guarding, at the same time, their action by means of *aromatics*, *spices*, and small doses of *opium*, or of camphor with opium.

176. *E. Stimulants, tonics, and antiseptics* have been generally employed against plague, and are more applicable to it than to any other malady. Indeed, I much doubt the propriety of withholding them in any state or stage of the distemper whatever, even where vascular excitement appears the most violent. The vascular reaction often occurring at an early period of the malady is of that open and expansive kind, which indicates greatly reduced vital power in connection with morbid action; and it will certainly be found that no more in this distemper, than in other malignant diseases similarly characterised, can this action be subdued without restoring, as far as may be, vital power, and enabling it to resist those changes by which this action is excited and perpetuated. In fact, the same principles, upon which I insisted when discussing the treatment of the *Hæmagastric Pestilence* (§§ 178. *et seq.*), should also be adopted in this. Even in cases of the most violent vascular action, and when it may be prudent to have recourse to a moderate or full bloodletting, the stimulating diaphoretics already noticed, with full or even large doses of the *sesquicarbonate of ammonia*, or of *camphor*, or of the *sulphate of quinine* and *camphor*, should be prescribed as frequently as the urgency of the case may require. Sir A. Brooke Faulkner states that in two instances, a large quantity of *spirits of turpentine* and of *camphor* were taken by mistake, and that both recovered.

177. *a.* The remarkable loss of tone throughout the vascular system, in this as well as in the preceding distemper, prevents the vessels from accommodating themselves to the quantity of blood in the system, and creates a demand upon the heart to support the circulation by means of greatly increased action; hence, in the great majority of such cases, even a moderate bloodletting is often detrimental, inasmuch as it still further increases the loss of that due correspondence which should exist between the state of the blood-vessels and the amount of blood circulating in them, unless, indeed, the depletion be immediately followed by the exhibition of stimulants or tonics; and of those the most to be depended upon are *camphor*, *quinine*, *ammonia*, with or without the *liquor ammoniæ acetatis*, the preparations of *serpentaria*, or of *arnica*, the *hydrochloric æther*, &c. Of all these, *camphor* and *ammonia* are the most generally of service; and the former is congruous with any other remedy which may be employed; but it should be prescribed in full, or in frequent doses. The *sulphate of quinine* has been very favourably mentioned by most recent writers; but it has only taken the place of the *cinchona bark*, which was formerly much used in this distemper, with serpentaria, ammonia, and other stimulants. It will be found, that the combination of the *quinine* with *camphor* and *capsicum*, and the exhibition of all three in full doses, will prove most decidedly beneficial, especially during the earlier stages of the malady.

178. *b.* When *irritability of stomach* prevents the due exhibition of stimulants or tonics, or the retention of them, an *epithem* of warm spirits of turpentine should be applied over the epigastrium; and this will generally allay the retchings, if it be properly applied; and remarkably aid in bringing out and promoting a most copious perspiration. In this state of the distemper, which J. Frank denominates the *gastric form*, effervescing draughts are generally grateful. Dr. Russel is in favour of the use of these, but those of the carbonate of ammonia, with either the citric or the acetic acid, the ammonia being considerably in excess, should be preferred; and such restoratives and antiseptics as the circumstances of the case may suggest be prescribed, from time to time, and chiefly in enemata when the stomach still continues irritable. About a drop of *creasote* may be given with each dose of the medicines; and several drops of this substance may be added to the enemata, especially when diarrhœa is present.

179. *c.* At an *advanced stage* of the distemper, or from the commencement of the attack in cases presenting much depression and other signs of malignancy, the more energetic stimulants and tonics recommended for similar states of the *Hæmagastric Pestilence* (§§ 179. *et seq.*) may be resorted to, as being quite appropriate to these cases. Indeed, whenever vital depression is very remarkable, the stimulants prescribed ought to be such in kind and quantity as will produce an immediate effect;

and the selection of them should be guided by the previous habits and circumstances of the patient. Several of the stimulants in more general use are also *antiseptics*, and these should be given in full and even large doses, especially those mentioned above (§§ 176. *et seq.*). But they ought not to be deferred until a too far advanced period of the disease; but should be prescribed early, especially in the more malignant or septic cases, and given in decided doses and in efficient combinations. It does not appear from the recent works on plague, that the *chlorides* have been employed in it in such a manner as fully to test their efficacy; and in such combinations as are most likely to prove beneficial. The most appropriate of these is probably the *chloride of lime*, conjoined with camphor, aromatics, and opiates. The *chlorate of potash* also promises to be of service, especially when prescribed in stimulating or tonic infusions or decoctions, particularly the infusion of *cusparia*, or of *serpentaria*, or of *cloves*, or of *valerian*, or the decoction of *cinchona*, or of *senega*, or *tormentilla*, and with various other restoratives and aromatics. The *hydrochlorate of ammonia* was formerly much employed in low fevers; it is equally suitable for this malady, and it may be taken with any of the substances just mentioned, in as large doses as the stomach will tolerate, or from ten to twenty grains. Its good effects will generally be promoted by the addition to each dose of from half a drachm to a drachm of the *hydrochloric æther*. Various formulæ for the medicines recommended at this place will be found in the Appendix, more especially *Form.* 385. 387, 388. 409. 416. 431. 437. 439. and 848., which may be prescribed in quantity and frequency of dose according to the severity of the disease.

180. M. Aubert states that he gave *phosphorus* in many cases of this distemper; but it does not appear that any decided benefit was derived from it. The formula for it in the *Appendix* (428.) is a suitable mode of employing it in this disease. This physician mentions a new medicine, called *hachisch*, which he considers of great efficacy in this malady. He furnishes no information as to the nature of this substance, but states that several cases recovered by its aid, which he considered altogether hopeless before it was administered. He gave it in doses of one, two, or three drachms in coffee; and it appears to have had a stimulating and exhilarating effect.

181. *F.* At the commencement of the present century, the *affusion of cold water over the surface* was considered the most successful and most generally appropriate remedy in all fevers, especially those of a severe or malignant form. Experience has shown the very exaggerated estimate then formed of this practice. It was at that time recommended for plague as well as for other pestilential maladies; but observation and reflection have shown that, unless where the vascular reaction was high, and the heat of the surface was much increased, and at the early period of reaction, the practice was sometimes injurious, and often of doubtful advantage. I can find no evidence of its having proved of service in this distemper; although it is probable that it may, in those cases which are characterised by more violent vascular reaction, and which have, from this circumstance, been by some viewed as presenting an inflammatory character, advantageously precede the frictions of the surface with olive oil (§ 174.) that have generally been found so beneficial in bringing out a copious perspiration.

182. *G.* The very general recourse which was formerly had to *mercurials* in the cure of fevers by British physicians, more especially to *calomel*, was extended also to the plague; but the diarrhœa which is so apt to come on, in the course of the malady, restricted their use; and their effects, in any form, appear to have been equivocal. The trials, however, made of them by Mr. Stafford, as related by Sir B. Faulkner, seem to indicate that they deserve a further and a more satisfactory trial. Calomel and mercurial inunction were the means employed, with the view of producing their specific effects. They have been also recommended by Schreiber, Formay, Schraud, and others; but, as Olivier has observed, the system resists the specific effects of all mercurials in the severe cases, and the slight cases do not require a recourse to them. If calomel should be employed, it ought to be conjoined with opium and aromatics to prevent it from disordering the bowels; and even when thus combined, this effect may nevertheless ensue.

183. *H. Diarrhœa* is one of the worst symptoms which occur in the course of the distemper, and is generally controlled with great difficulty, especially when it appears at an advanced stage. At an early period, *opium*, conjoined with camphor, creasote, and aromatics, will frequently restrain it; but the more active *astringents*, conjoined with *antiseptics*, will often be required, more especially the *chloride of lime*, the *sulphate of zinc*, conjoined with *catechu* or *kino*, &c., and with opiates. These substances should also be administered in enemata.

184. *I.* The treatment which has been fully described as most beneficial in the hæmagastric pestilence is in most respects suitable to this, the several means of cure being varied according to the form which the malady assumes. Many of the distinctions, however, which have been pointed out by writers, will hardly be made out in practice; and, though they may be prominent in some cases, they will hardly appear in others. It will be sufficient for the physician to bear them in mind, to adapt his measures to the features of each case which may come before him, whether *inflammatory*, *nervous*, *gastric*, *putrid*, or *septic*, according to the views of various writers; to act upon pathological principles; and to employ his remedies conformably with their ascertained effects.

185. *K.* As to the *local treatment* of the *buboes* and *carbuncles*, little further is required than the application of poultices, fomentations, or emollients, as their states may require. When matter or other fluid accumulates, an exit should be given to it, in order to prevent the contamination of the adjoining tissues, and an healthy suppuration ought to be promoted. Subsequently the healing process may be encouraged by means of such digestive and gently stimulating applications as the case will suggest. The condition, however, of these sores will be much more efficaciously controlled by the internal or constitutional treatment than by local applications; and in most cases it will be necessary to support the powers of life, when the external lesions are considerable, in order that the process of restoration may go on satisfactorily.

186. *L.* The *diet* and *regimen* of the patient should be the same in this as in other fevers. Indeed, the diet and regimen which are suited to this pestilence are also suitable for the others, especially the *hæmagastric.* At an early period of the attack, especially when febrile reaction is considerable, and the disease assumes that form which has improperly been denominated the inflammatory, owing to the vital resistance and vascular disturbance, simple diluents and refrigerant and diaphoretic drinks are the most serviceable; but in a more advanced stage, or in more protracted cases, and where the vital powers are depressed, a more restorative diet may be allowed, as chicken, veal, or mutton broths, beef-tea, &c., which may be taken with sufficient salt and spices to render them palateable; and as the distemper advances, and vital depression increases, wine, brandy, or liqueurs may also be taken, diluted in various ways, or in arrowroot or sago. In this distemper, as well as in the hæmagastric, hock or sherry, with seltzer water, champagne, brandy in the warm infusion of black or green tea; the bitter Hungarian and Austrian wines; milk or green tea punch; the yolk of an egg beat up in brandy and water or sherry; various kinds of jelly, &c., may be severally given, according as the circumstances of the case will suggest to the physician a guarded recourse to them. There is every reason to believe that in this malady, as well as in other low fevers, the use of these and similar dietetic restoratives is often too long deferred; and that the cravings of the patient for them are very improperly unheeded. In the diet and regimen, as well as in the medical treatment, of patients in low or malignant fevers, the physician has been too often guided by prevailing theories and doctrines, instead of proceeding warily in the path of close observation and sound common sense. With these as his guides, whilst he endeavours to fulfil the intentions rationally inferred from recognised states of morbid action or of altered structure, the physician will generally act safely and efficiently; and will produce as successful results in this as in other distempers, as can possibly be produced by the limited amount of human means and of human intellect.

187. *M.* The *management of convalescence* should depend upon the circumstances in which the patient is placed, and be ordered accordingly. The chief points which require attention are the enjoyment of a pure air and due ventilation; suitable diet; and the due promotion of the several digestive and excreting functions. During this period, care should be taken that the extent of the external sores, or the amount of the discharges from them, should not exhaust the patient, or cause a too protracted recovery. The constitutional powers, in such circumstances, often require the aid of both medicinal and dietetical restoratives; and these should not be timidly withheld, or too profusely allowed. At this time a healthy atmosphere is remarkably beneficial; and as soon as the patient can bear removal to a different air, the change will prove the greatest restorative; but this must be done with due precautions and regard to the health of the uninfected.

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PESTILENCES, PROTECTION FROM. —

Having considered the three destructive pestilences of modern times, in respect of their causes, propagation, nature, and treatment, as fully as my limits have permitted me, I now proceed to notice the measures which should be taken to protect the community from them, and the prophylactic means which may be used by individuals against them. In order that the subject may receive due attention, I shall discuss it according to the following *arrangement:* —

I. PROTECTION OF THE GENERAL COMMUNITY FROM PESTILENCE.
  i. PREVENTION OR WARDING OFF PESTILENCE.
    A. *By sanatory measures having reference to the state of the locality, and to the community. — Prevention of domestic causes.*
    B. *By measures intended to prevent the introduction of pestilence from abroad. — Prevention of foreign causes.*
  ii. THE ARREST OF THE SPREAD OF PESTILENCE WHEN INTRODUCED OR PREVAILING.
    A. *When introduced or prevailing in towns, cities, &c.*
    B. *When introduced among troops, armies, or garrisons.*
    C. *When introduced into ships.*
II. PROTECTION OF INDIVIDUALS, FAMILIES, OR CLASSES.
  i. PROTECTION BY SECLUSION, OR STRICT QUARANTINE, &c. — DEPARTURE FROM THE SOURCES OF INFECTION.
    A. *Estimate of the means answering this protection. — The avoidance of infection.*
    B. *Restrictions which should be imposed on those departing from an infected locality, and when they should be imposed.*
  ii. PROTECTION BY SUCH MEANS AS MAY ENABLE THE CONSTITUTION TO RESIST INFECTION.
    A. *Medicinal Prophylactics.*
    B. *Dietetic, Regimenal, and Moral Prophylactics.*

2. I. THE PROTECTION OF THE GENERAL COMMUNITY FROM PESTILENCE. — The objects of government, in all civilised countries, are, the protection of the lives and properties of the inhabitants; the observance and advancement of religion and morals; and protection from foreign aggression. For the attainment of these objects, laws are enacted and enforced. In most of the countries of Europe, however, the last of these objects have received the greatest attention; and to it the wealth and resources of countries have been more especially devoted. The lives of the inhabitants have always attracted the smallest amount of regard from governments, legislators, and political economists; and even from those who administer the laws, unless under circumstances of peculiar atrocity. The numerous circumstances which influence the health and longevity of the community; the palpable causes which produce disease and pestilence; the acts of individuals or of companies, affecting the health or lives of hundreds or thousands of those with whom they have intercourse or concerns, or who surround them; and the multifarious modes in which avarice and the love of over-reaching directly and indirectly sap the springs of life, have never engaged the attention of most governments, and least of all, those of this country, until the magnitude of these evils, the fears of a widely spread pestilence, and the pressure from without, diverted a very small portion of that attention to them which had heretofore been entirely absorbed by the interests of parties, and the advantages of a class. Formerly, and even now, although much less remarkably, literature, in attempting to live upon the crumbs which fell from the tables of placemen and aristocratic partizans, like the parasite gull so well known to the naturalist, fed only on the offal and filth ejected by those whom she worshipped. The sufferings of the poor, the squalor consequent on want and misfortune, and the garbs necessary to the satisfactory performance of important and requisite occupations, were made the themes of poetic derision and prosaic sarcasm by the statesmen and the popular writers of the day! Yet, however foul and degraded the Georgian era of literature may have appeared in several of its epochs, science continued to advance with due majesty, and with a gracious care of the health and lives of those who had become the least cared for parts of the machinery invented for the acquisition of wealth, and who were looked upon by statesmen as the common herd, amongst which pestilence and death might freely revel, as "checks to an over-grown population." Philanthropy went abroad; but in neglecting his home most signally destroyed or enslaved the objects of his foreign care. His very enthusiasm blinded him to the effects of his actions, and diverted him from his domestic duties; but hopes of his return are to be entertained from certain measures which public opinion has enforced, and he may still promote some of the numerous reforms of our social condition that are urgently required, and remove many of the most influential causes of disease and of premature dissolution that degrade while they afflict the community.

3. i. THE PREVENTION OF, OR WARDING OFF, PESTILENCE. — It is obviously the duty of governments, however much they may neglect it, *to prevent pestilence from springing up* in the countries they profess to protect; and *to ward off the invasion of pestilence from abroad.* These are two grand sanatory intentions, the fulfilment of which the community has a right to demand from those who govern and enormously tax it. The second of these has been as efficiently and satisfactorily accomplished as circumstances allowed; but the first has been altogether neglected; and not merely neglected, but sacrificed to class interests. No efforts have been made by those who had the power, but neglected the duties which that power involved, to prevent the habitations of the living, the depositories of the dead, and the aggregations and conditions of the lower animals, from becoming the sources of disease or pestilence. The ignorant builder, who, in many instances,

could hardly write his name, was in no way discouraged from building houses and streets calculated to endanger not only the health of their inmates, but that also of the whole neighbourhood. He might erect houses and streets in any form and position — at the shortest possible distance — with the utmost disregard of ventilation, and without either drains, cess-pools, and sewers. He might favour the accumulation of animal exuviæ as much as he pleased, and in as detrimental a mode as possible to the health of all within many hundreds of yards, and no one could interfere. He might introduce disease and death amongst the whole population of his district, and, instead of meeting with reprehension from the authorities, obtain the reputation of being a spirited proprietor, and accordingly receive a portion of the mammon-worship so generally and so assiduously performed in almost every street, mansion, and house in the kingdom. The capitalist economises his means by the neglect of sanatory measures, which would necessarily involve expense, and the law protects him in doing what he pleases with his own ; but it does not deign to protect the lives of those around him from the certain consequences of his ignorance and avarice. Thus London, and most other cities and towns in the kingdom, have increased in size without the least control, or the smallest endeavour to protect the public health; but, on the contrary, with every facility to accomplish the deterioration of it — and with the strongest inducements, in the acquisition of wealth, and hence of consideration, to generate disease. These remarks may be considered over-strained ; but let the reader refer to the evidence brought before the "*Health of Towns' Commission*," and published in its reports, and he will find them inadequate to convey the opinions which the numerous circumstances and occasions there described must suggest.

4. A very able and enlightened member of that commission, Mr. J. R. Martin, observes with great justice in reference to this subject, that, "if it be the business of government to prevent and to punish crime — to secure the public peace — to enforce industry instead of rapine — and the settlement of disputes by appeal to reason instead of by fraud or violence ; — if the well-being of the subject be, in short, the main object of legislation — then would it appear the special duty of the ruling power to secure the health and the life of those who, of all others, stand most in need of its protection against the invasions of individual or corporate caprice, ignorance, or stolid avarice. Here we perceive a moral and political duty of necessity. On this subject it should ever be borne in mind that, where there is disease, there also will be found the seat of poverty and crime. Disease, poverty, and crime in their worst forms are constantly and everywhere found together. The truth then is, that misery and crime produce disease, and disease produces misery and crime, in a circle which revolves in the same calamitous monotony from year to year, of the brief existence of the masses crowded in the worst quarters of our manufacturing cities. Whilst men are in the lowest state of physical destitution, surrounded by filth, vermin, privation, and squalor of every conceivable kind — familiar with sickness and death, and strangers to every comfort — with the mind continually on the rack, or absorbed in striving against physical necessity — or with the animal spirits broken down by its pressure, how is it to be expected that obedience to the laws, and that morals, education, or religion, should find a place? How can a man whose mind is ruined even more effectually than his body — the man to whom moral degradation and physical suffering have done their worst — how can such a man be expected to give a passing thought even to such matters? The thing is impossible."

5. But, not to speak of these higher considerations, the benefits of surrounding civilisation, cleanliness and health, are not for the occupants only of lanes, courts, cellars, and houses, teeming with exhalations from the excretions and other exuviæ of the inhabitants, but extend in various ways to the inmates of mansions and even palaces — to the houses of the rich and the proud — to the dwellings and even to the persons of those who consider poverty and wretchedness the worst of crimes, and who cannot approach either the one or the other, even in the temples of the Almighty, even in the houses of that God whom they profess to worship, without dreading contamination, and derogation from their high positions.

6. *A. The prevention of the generation of pestilence or disease in a country* has been already insisted upon as a duty which the government owes the community. The neglect of it is sure to become the source of calamity, and the extent of that calamity will neither be readily controlled or soon arrested, at least on all occasions of its occurrence. In this climate, the calamities arising out of the sources to which attention is now to be directed, are generally not so prominent as in warmer countries and places, where the progression of the seasons is more regular; but if, owing to the nature of our seasons, they are less remarkably violent, they are more numerous and varied, and they can be shown to be equally destructive in their silent, constant, and unobtrusive course.

7. It must not be supposed that, because the causes of disease to which particular reference is about to be made, and has been made, in various parts of this work, and particularly in connection with the pestilences just considered, have not been proved to be the originators of any of these pestilences in this country, they are, therefore, entirely without influence as respects either the propagation of these pestilences when introduced, or the production of other not less fatal, although more prolonged, maladies. They are, in truth, amongst the most efficient causes of the diffusion and propagation of all infectious maladies ; whilst they are the principal agents in the generation of chronic and constitutional diseases, in contaminating the springs of life at their very sources, and in producing decrepitude and mental weakness in the offspring, if, indeed, the blighting influence of these agents during infancy and childhood be survived.

8. *The prevention of domestic causes of pestilence is also the prevention of epidemic maladies, and of numerous chronic and constitutional diseases.* The prevention of those causes has no further relation to the three pestilences above considered than as respects the removal of some of the chief circumstances which favour and give activity to the infection of these pestilences, on the occasions of the introduction of the infection

from abroad; but it has a much more certain, continued, and manifest effect upon the prevalence of the numerous other maladies, which, in our climate, depend upon their domestic causes, especially as they exist in large towns and cities. These causes are so evident to the senses, so disgusting to the sight, so sickening and sensibly injurious to all who come within their spheres, and so very prominently connected with their baneful effects, that it is a matter of the utmost surprise that a more enlightened attention to them, and attempts at their removal, have not long since been enforced by the legislature.

9. *All sanatory measures which should be enforced in a locality* should have for their objects — 1st. The removal of the excretions, as speedily as possible, from the habitations of the people, and the prevention of their accumulation ; — 2d. The means or method of their removal should be such as should, as efficiently as possible, prevent the escape of the gaseous and putrid emanations they emit into the atmosphere ; — 3d. That a sufficient supply of water should be provided for the rapid removal of putrid exuviæ and excretions, and for other purposes of cleanliness and ablution ; — 4th. That animal remains and excretions should as quickly as possible be conveyed to their natural and intended destination, namely, to cultivated fields and soils, with the intention of fertilizing them ;— 5th. That the bodies of the dead should not become, from the mode of sepulture, and the situation and crowded state of the places of burial, with reference to the habitations, especially in cities and towns, a source of disease to the living ; — 6th. That ditches and marshes should be removed, especially in the vicinity of animal and human habitations, by under-draining, &c. ; — 7th. That whilst the supply of water should be abundant, it should in no way be contaminated by the vicinity of burial-grounds, ditches, or marshes ;—8th. The supply of pure air, and the requisite renewal of it in all circumstances, with as little risk of contamination as possible from animal excretions or remains, — from drains, sewers, cess-pools, church-yards, ditches, marshes, &c. In proportion as attention is paid to these topics, so will the health of cities and towns be improved. But I cannot dismiss the consideration of them without further and more particular notice.

10. *a. The prevention of animal excretions and remains from accumulating*, especially in large towns, has always been attended with some difficulty, but it is a difficulty which has rarely, until very recently, been attempted to remove. Indeed, much more frequently, if not almost universally, actual provision has been made in large cities and towns for the accumulation of these excretions to a most astonishing amount, and without any intention of their removal for many years. It was proved before the " Health of Towns' Commission," that these accumulating sources of disease exist in respect of most of the houses of all cities and towns, in the form of privies attached to houses unconnected with drains, and of cess-pools, into which the soil from water-closets and privies, and the foul water used for domestic purposes, flow ; and that these cess-pools, privies, and drains exist under and around most of the best residences, and in all the worst, in and about London, and in other cities and towns, and that they have generally no communication with the common sewers and drains, but actually are allowed to accumulate until their overflowing contents compel a recourse to nightmen.

11. The inhabitants who have for so many years calmly submitted to a heavy sewer-rate, from the notion that the sewers formed by their contributions actually carried away the soil and foul water from their houses, now find that they have been deluded, legally swindled ; and that, notwithstanding the vaunted drains and sewers of the metropolis, there is no necessary connection between them and the houses, close to which they pass, even where they do pass ; that the sewers are few compared with the number of streets, and that comparatively few houses have any communication with them. Thus the contents of privies or necessaries, water-closets, cess-pools, and drains, are allowed to sink into the soil, upon which the houses are built, to poison it, and to contaminate the air within and around the dwelling, the more consistent remains being pent up, and allowed to accumulate without any outlet whatever. As these contents collect and increase, the more fluid parts filtrate through the upper layers of earth or clay, and contaminate the water supplying pumps and springs. The gaseous parts, and those which are carried off during evaporation by the air, more or less infect the air, and destroy the health in various ways, of those especially who live in the lower apartments, and particularly if they sleep in them. During warm seasons the emanations proceeding from these accumulations of animal excretions, and from the ground thus imbued with animal matters, upon and around which the dwelling stands, become almost as injurious as those generated in warmer climates and countries, to which reference has been made above, in respect of the generation of the pestilences just now considered ; and would, equally with them, promote the diffusion of the infection of those pestilences as soon as the infection should be imported. Indeed, the accumulated emanations thus arising from the aggregation of individual sources, furnished by thousands of residences, constitute that contaminated state of atmosphere which favours the propagation of the infection of these pestilences ; and the absence of these emanations or at least the comparative absence of them in country places, partly accounts for the much slighter prevalence of pestilence in these localities.

12. It is supposed that the circumstance of cess-pools and drains, containing animal matters in a state of decay, being covered over, is a sufficient protection from their injurious influence. But they are not hermetically sealed. There is a constant generation and extrication of foul gases from them ; and these gases, and the air contaminated by them, are continually passing off between the boards and crevices of the stones which cover them. In many places of this metropolis, as well as in manufacturing towns, large privies exist, used by the numerous workmen in large and crowded factories ; and cess-pools of immense extent which receive the contributions of many houses and work-shops. It is well known that the former are often not emptied for many years, but are allowed to diffuse their odours, and their baneful influence, for many hundreds of yards, in all directions ; and it is stated of the latter, that an attempt was made to empty one of them, situated

a central and crowded neighbourhood ; but after
me scores of cart-loads of soil were removed,
e rods which were employed to reach the bottom
f the depository were not sufficiently long for the
urpose, and the Herculean task of emptying it —
leansing was out of the question — was relin-
uished. It was stated also, before this commis-
on, that one of these immense reservoirs of filth
nd putrid animal matter existed immediately under
school, so that, in addition to the contamination
f the air by the congregation of a great number
f children in a confined and insufficiently venti-
ted space, there was the additional evil of foul
r constantly rising up from the poisonous sources
eneath them.

13. Much has been said of the collections of
lth, of the superficial uncovered drains, and other
sgusting states of things in former times ; and in
umerous continental and eastern cities and towns
modern times ; and of their influence in origin-
ing and perpetuating pestilence. But these
urces of mischief are readily swept away by
ins ; the emanations from them are soon dis-
pated by the winds ; and the grosser materials
e carried off and devoured by birds of prey and
e lower animals ; so that they are actually less
jurious than those accumulations of filth and
ecal matters furnished by almost every house
the towns of this country. These fæcal col-
ctions are so carefully preserved from these
atural means of purification, that the emanations
om them continue to be generated at all seasons,
d to be extricated within the very walls of the
welling, in their areas, and under the very
indows which are intended to admit fresh air and
ght. No cold in this climate is so great as to
revent the generation of noisome vapours and
ses from these sources ; whilst the warmth of
mmer and autumn increases the extrication of
em, and concentrates them in a more humid
mosphere. But it may be asked by utilitarians
d political economists, where is the mischief
hich these admitted nuisances and offences
ainst the senses occasion ? Do they produce
stilence ? We see no sign of pestilence. To
ese every well-informed physician will answer,
at there has been no pestilence — no plague —
cause the seminium or infection of plague has
t been allowed to be imported. But if it had
en imported, or were even now to be imported,
pecially during summer or autumn, all the con-
tions requisite to its devastating spread exist in
e sources now pointed out. Although protected
om this foreign scourge by quarantine laws, the
istence of which is now threatened by persons
norant of the subjects to which they relate, let it
t be supposed that these nuisances, these
urces of contamination, are unproductive of the
ost serious effects. To the question, therefore,
to the mischief they occasion, another may be
t as to what mischief, evil, or disease afflicting
e human frame, may not be imputed more or
ss to these very remarkable domestic sources.
find it much more difficult to point out a single
sorder or malady which cannot be imputed
rtly or altogether to these causes, than to enu-
erate the many which acknowledge them as their
incipal sources. Even where they are not the
ficient agents, as in the pestilences above con-
dered, they are predisposing, aiding, and deter-
ining causes. They more especially occasion sickness and death, during infancy and childhood ; and even when these epochs of human existence are struggled through ; and the various affections of the digestive organs and nervous system, and the febrile diseases, and the varied forms of debility which these causes produce, are either partially or altogether removed ; there frequently succeed a sickly period of puberty, impaired manhood and premature decay, scrofula, and tubercles in their numerous forms and seats, visceral diseases in countless variety, and mental weakness in endless forms and grades.

14. During the present warm summer (1846), I have had numerous occasions of remarking the very injurious consequences of frequenting those privies in which the fæcal matters are allowed to accumulate. Of three families, every person was attacked with adynamic dysentery, with a low or putrid form of tenesmus, and an erysipelatous state of the anus, extending to the vulva and vagina of the females. In one family, nine persons were thus attacked ; and in several other families, and on other occasions, I have traced these affections, which have often been attended by great danger, to this particular cause, — to the influence of the foul and concentrated effluvia, from long-accumulated fæcal matters, upon the mucous surface of the anus and vagina.

15. It is obvious from this, that no such accumulations of noxious agents should be allowed to exist ; that drains and sewers should be so constructed as to convey from the dwellings, as rapidly as possible, and without sinking into the soil, or evaporating into and contaminating the atmosphere, the foul materials and animal exuviæ into the main sewers ; that the supply of water should be sufficient to aid this object, and that the main sewers should be so constructed as respects their terminations, as to allow their contents to be removed by safe and suitable modes of conveyance, to cultivated grounds for the purposes of manure.

16. *b. The burying of the dead within, under, and around chapels or churches, or in large burying-grounds, situated within, or close to cities or towns*, is amongst the most serious evils of the present state of society, and of existing legislation. The emanations from these places are equally injurious with those proceeding from the sources just noticed, and are, on some occasions, as I have often witnessed, even more strikingly injurious, owing to the greater concentration of the noxious vapours and gases, especially as they emanate from the remarkably crowded burying-grounds and vaults, around and under chapels in the metropolis. And, although numerous states of ill-health and forms of acute disease actually proceed from this cause as well as from that above exposed, the most malignant putrid or putro-adynamic fever, as described under that article, have come before me, and been referred to this source by the more intelligent of those who have been thus attacked. I have, moreover, had demonstrative evidence, that cases of this fever, caused by the emanations from the vaults of chapels in this city, and terminating fatally in eight days from the period of exposure, these emanations at the moment of their impression producing most marked effects, have infected other persons, in the same house with them, with a similar and equally dangerous and fatal fever.

17. The congregation of many hundred per-

sons in a building, opened only once in the week, warmed and ventilated but partially and imperfectly on that occasion, and containing immediately beneath its floors, and surrounded by, thousands of human bodies undergoing putrefaction and decay, must necessarily prove more or less injurious to health; and still more remarkably to the health of those who may happen to inspire a portion of those irruptions of foul air which break forth at intervals from the burying-places, or which flow from the grated openings communicating with the vaults and other places of sepulture constructed under the pews of these chapels.

18. *c.* It is almost unnecessary for me to insist upon the *impropriety of allowing ditches, swamps, or marshes to contaminate the air* in the vicinity of towns, or any human habitation whatever; or to bring supplies of water from places near to these sources of disease, or to burying-grounds. Water loaded with animal matters in a state of decay, or abounding with animalculæ, and the infusoria, is most remarkably productive of diarrhœa, dysentery, mucous and adynamic fevers, or of those typhoid forms of fever which are attended by ulceration of Peyer's and Brunner's glands. The means of removing these causes are too obvious to require notice at this place; and ought never to be neglected, although no very manifest mischief may result from them, or no very remarkable outbreak of disease may occur. They, nevertheless, impair the constitutional powers of all within the sphere of their influence; induce, gradually and slowly, visceral obstruction, and numerous chronic maladies, and favour the prevalence by promoting the infection of malignant and pestilential distempers.

19. *d. Crowded apartments and assemblies, and neglect of due ventilation of these, and of the dwellings of the poorer classes,* are amongst the most productive causes of disease, and of the diffusion of pestilence, wherever pestilential infection is introduced. The residences of the poor are not merely overcrowded, but also ill-ventilated, owing both to the prejudices of many of this class, and to the situation of them in courts, lanes, narrow streets, and cellars. A free and thorough ventilation is often impossible in these situations; and, in addition to this cause of disease, and to the evils resulting from large numbers residing and sleeping in each of the several apartments into which the house may be divided, there are often superadded, the foul air proceeding from privies, cess-pools, and drains, and the other sources above described (§ 9. *et seq.*). Thus the air which is respired by persons thus circumstanced, is contaminated both by those who breathe it and by the several causes just alluded to; and in this state of contamination it is allowed, moreover, to stagnate, to become still more foul, and to concentrate more fully the emanations from the bodies of those who respire it, and from the several sources above indicated. Among persons thus placed, it must be expected that all infectious maladies will not only make rapid progress, and prevail extensively, if not generally, but assume a more malignant character than in other and more favourable circumstances.

20. It is not, however, merely by favouring the extension and malignancy of infectious and pestilential maladies that these causes act injuriously on the classes of the community more
especially subjected to them, but also by actua
generating infectious diseases, and even by i
parting an infectious character to several aff
tions which would not otherwise present it.
this way fevers are generated, and are spread fr
these original sources to the abodes of wealth a
rank — to the very families and persons of tho
by whom the wants of the lower classes w
neglected, for they could not have been unknov
and to whom they were an abomination; for,
they had been objects of compassion, they wou
have been long since considered with the intent
of devising a remedy for such of them as admit
of remedy.

21. The want of due attention to ventilation
the construction of work-houses and other pla
for the reception and medical treatment of
poor, aided by insufficient and unwholesome fo
has been no mean cause of the production of l
fevers, diarrhœa, and dysentery among the
mates of these places, but also of the prevaler
of these diseases in the vicinity. The crowd
states of these abodes of poverty and disease, a
the several other sources of disorder connec
with them, certainly do not limit their bane
effects to the places in which they exist, but
tend their malign influence on many occasions
various modes of infection, in several directio
and to more than one class of the community.
a rigid inquiry were made by competent pers
into the states of workhouses, lunatic asylu
charitable institutions, chartered and endow
schools, penitentiaries, and other places wher
constant residence or daily congregation of
number of persons or of children is required, h
few would appear unexceptionable in every
spect. In many, ventilation is imperfect or o
partial; in others, the sleeping as well as t
sitting apartments are most disgustingly ov
crowded; in most of them, imperfect ventilati
is associated with over-crowding, and not i
frequently also with foul emanations from privi
cess-pools, and drains; in some, one or more
these ills are conjoined with insufficient and u
wholesome food, and with want of due exercise
the open air; and, in not a few, all these evils a
combined, in various states according as one
several of them assume more or less promine
characters, or are moreover associated wi
neglect of cleanliness of person and of residen
&c. In what condition could the inmates of
lunatic asylum have been in, as respects all t
circumstances which contribute to health, a
especially those to which attention has been
rected above, when 112 out of 450 died in twel
months, as proved by Mr. Wakley in the Hou
of Commons?

22. *e.* There is nothing which tends more to i
jure health, and to develop scrofulous and tub
culous and other chronic diseases among childr
and young persons, *than numbers sleeping in t
same apartment.* The evil is great in proporti
to the number relatively to the size and imperf
ventilation of the chamber; but, when this is co
joined with others, as it often is, more particula
with foul emanations from privies, cess-pools, a
drains, with insufficient or unsuitable food, a
with insufficient exercise in the open air and
sunshine, the injuries thereby inflicted upon t
constitution in various forms of acute as well
chronic disease, and the malignancy and dang

nparted to infectious and febrile distempers, hen they break out in these circumstances or laces, become the most alarming, and often the ost hopeless, to which medical aid can be called. he circumstance of numbers being compelled to leep in the same chamber has been fraught with ischief, not only to the physical powers and the odily health, but also, and not less remarkably, o the moral feelings and dispositions through fe; and although most especially detrimental to hildren and young persons, it is also very seriously injurious to grown up people. What is he state of health in children in large schools and nstitutions, where, from five or six to fifty or ixty children sleep in the same apartment; the maller numbers in boarding schools, and the arge number in public institutions, as Christ's Hospital School at Hertford? The data necesary to a correct answer to this question are ot before me, but I will assert, from no small xperience of the bad effects of this, and other conitions of these schools and institutions, as favourng the development and spread of disease, that he extent of the mischief thus produced is not ven suspected by those who are most actively oncerned in their management. The evils which esult from causes connected with the arrangements of these institutions are even not seen, and when they are seen from their prominence or xtent, they are not referred to their actual ources.

23. Nor are some of the evils which may be raced to the congregation of great numbers of hildren during the day in small school-rooms much less remarkable than those above adverted o; but when it is known, as indeed it has been proved before the "Health of Towns' Commision," that these assemblages, of several hours' luration, actually take place in rooms immeliately over immense cess-pools, or in chapels teaming with emanations from the dead bodies in heir vaults, or from those putrifying around the valls, or from both productive sources, it may, vithout great impropriety, be assumed, that the visdom of man, even of him who thinks himself he most divinely inspired, is but blindness, foolishness, and presumption; and that, in his attempts o accomplish what is laudable in itself, he is acually occasioning acute disease, or contaminating he constitution during life, and occasioning, morever, that state of contamination which will be mparted to the offspring during many generations. The collection of numbers of persons in factories, he imperfect ventilation of many of them, and the modes of warming and lighting them, are not mongst the least of the evils to which the health f the working classes is exposed. Science could not render a greater service to the community than n rendering her aid to the reformation of these and similar ills, which weigh upon the physical and moral powers of the productive classes; and affect equally their health, happiness, and offspring.

24. *B. The prevention of foreign pestilence.*— The duty of government to prevent the introducion of pestilence from abroad, is as obvious as hat to prevent both the existing and predisposing causes of pestilence, and of distempers almost as fatal as pestilence, from being generated and allowed to exist at home. Whilst the former has been entirely neglected in this country, the latter has received a very proper attention. Yet, although the neglect of all domestic sanatory measures has met with little reprobation, the enforcement of the quarantine laws has experienced much opposition; and restrictions of every kind, calculated to hamper commercial speculations, have been condemned by those who consider a small pecuniary loss of greater importance to them than the contingent occurrence of a great public calamity. But, as Mr. M'Culloch justly remarks, "quarantine is not a matter in which innovations should be rashly introduced; whenever there is doubt, it is proper to incline to the side of security." In this country, we have to guard against the introduction of the three great pestilences above considered, and the risk from each, although remote, is probably almost equal. The frequent importation of plague into this and other European and northern countries, before the institution of sanatory measures; the increased risk occasioned by the very rapid communication between all parts of Europe and those places in the Levant and within the tropics, where plague and hæmagastric fever prevail, and our recent experience of the pestilential cholera are circumstances which should not be overlooked in our estimate of the probabilities of a visitation from either of these distempers, and which ought to influence those who are bound to protect the public, whilst they give every facility in their power to trade, in their deliberations and enactments.

25. In the United States, more especially in some of them, and in many of their large commercial cities, quarantine has been either imperfectly enforced, or not instituted at all, until recently. The great distance between them and the Levant, and the nature of their climate, gave them little cause of alarm as to the introduction of plague: and, until lately, the hæmagastric pestilence, so generally and destructively prevalent in the West Indies and on the coast of Mexico, and so frequently epidemic in some of their chief cities, was viewed entirely as a domestic evil, against which quarantine and other sanatory measures could not possibly prove of any avail. From 1751 until 1791, this pestilence made its appearance in New York on several occasions; but after the latter period it appeared more frequently and more destructively, as might have been expected from the increased size and population of the city and the more frequent intercourse with places where it prevailed. It even occurred during two or three successive years, and was seldom absent for a longer period than this, until 1822, when it prevailed most fatally. Since that year quarantine regulations have been strictly enforced, and the distemper has not appeared again in that city — now a period of nearly a quarter of a century — although it has scarcely been a year absent from vessels detained in quarantine, and in the quarantine hospital. (See *the Report of a Committee of the House of Assembly of the State of New York on the present Quarantine Laws.* 8vo. Albany, 1846.)

26. Can any stronger proof of the propriety of enforcing these regulations be adduced than that to which I have now referred, and which may be perused with numerous other valuable documents in the official report just named? It is well known to most physicians, that Dr. Rush, celebrated not only as a medical writer but as a

statesman, at an early period of the rising greatness of the United States of America, laboured with great zeal to prove that the pestilential yellow fever was of domestic origin. But the authors of the Report just referred to state that "this opinion was nevertheless somewhat modified before he ceased exerting a prodigious personal influence upon the mind of man: for he says, 'that it was even produced in Philadelphia from the effluvia from a chest of unwashed clothes which belonged to one of our citizens who had died of it in Barbadoes.' This influence, says Dr. MONETTE, has doubtless been the destruction of thousands; and had it not been so great in the medical community of the United States, our northern sea-ports would not have been so long subject to the pestilential visitations of yellow fever. The southern ports, still acknowledging a vassalage to his authority, and to his arbitrary dictation, through his disciples, to this day immolate hundreds and thousands of victims annually upon the altar of a blind credulity." (*Report, &c.* p. 21.)

27. Can it be possible to adduce a stronger instance than that to which this quotation refers, of the baneful influence of authority upon the minds of medical men? Or is there more satisfactory evidence required, not merely of the importation of the distemper to which it refers, but also of the necessity of enforcing quarantine regulations for the protection of the public? But the instance thus adduced by Dr. RUSH is one, not only proving the importation of this pestilence, but also showing the facility of such importation; and, when the nature of the means is considered, the great difficulty, however strict quarantine regulations may be, of preventing it through the medium here indicated. Dr. LIND states, that a trunk of clothes was brought from the West Indies into Philadelphia in 1741, containing the clothing of a young man who died of the yellow fever; and he says, that all the persons present when the trunk was opened contracted the disease, which was afterwards propagated to other persons in the city. The Reporters to the House of Assembly of New York state, that a vessel, which had arrived at New Haven from Martinico, "had brought home a chest of clothes which belonged to a sailor who died of the yellow fever at Martinico;" that it was opened in the presence of four persons named in the Report; that three of these four in a short time afterwards died of this fever; and that the pestilence was propagated from these to the town of New Haven. (See *Report, &c.*, p. 17.)

28. Now I have adduced these facts, not because they are strong proofs of the importation and infectious nature of the pestilence to which they refer, for, after what I have stated in the preceding articles, no additional facts are required, but because they furnish the strongest evidence of the necessity of quarantine restrictions, and at the same time show the great difficulty of so enforcing them as to prevent the introduction of those articles and effects which are most likely to propagate not only this, but also the other pestilences. I have not the least hesitation in maintaining, and I do so from personal observation and knowledge of the fact as respects two out of the three pestilences here considered, that there is more risk of the importation of them from body and bed-clothes and foul linen of those who have been affected with them, than from the persons of the infected, or from any other sour whatever. Every person who has seen much the communications between distant places t means of trading vessels, who has travelled muc or who has voyaged frequently in those vessel will admit the difficulty of preventing cloth and linen from being landed, and the freque neglect of exposing infected articles of this d scription to due ventilation and cleansing befo they are landed. Vessels are even not infr quently, especially in countries where the r strictions are loosely observed, allowed to contin in quarantine until the period is elapsed witho the clothes or other personal effects of individua having been opened up or aired; and not rare are these articles, more especially dirty linen, se on shore or smuggled away, without the guar either knowing the occurrence, or being able prevent it.

29. My limits will not permit me to notice tl several regulations requisite to the due enforc ment of quarantine. These regulations shoul be based upon the numerous ascertained fac mentioned in the course of the preceding ir quiries; and they should be enforced with a fu knowledge of the deceptions so frequently prac tised or attempted, in order to avoid the detentior requisite to the observance of the law. Wit highly qualified and duly remunerated healt officers, there can be little reason to dread, eith too great severity on the one hand, or too gre laxity on the other, even should much be le to their discretion. My object at this place merely to show the importance of, and necessity for, such restrictions, and to insist upon th strictest attention being given to the bed an body-clothes of all persons who may have bee infected, or suspected of being infected, wit these pestilences; for, when the numerous way by which these and other personal articles an effects may pass, from infected places and vessels, to persons at a great distance, even befor they are opened up or exposed, are duly considered, it cannot any longer be a matter of surprise, that the distempers which they propagat are so often traced with difficulty, or even no traced at all, to their several sources, and throug their several channels.

30. The propriety of enforcing quarantine regulations does not rest upon a few authoritie merely. An outcry has been raised, by person interested in their abolition, that they are supported only by those who are appointed to enforc them. What possible interest can I have in contending for them? What other interest had mos of the ablest writers who have advocated them i this and in other civilised countries, than th cause of truth and the interests of humanity Dr. J. BAYLEY, in his correspondence with th mayor of New York, after adducing numerou proofs of the importation of pestilential yellow fever into that city previously to 1822, conclude as follows: "I cannot suffer this opportunity t pass, without expressing my firm conviction, tha rigid quarantine regulations are essentially necessary to guard the inhabitants of our commercia cities against the introduction of pestilential and infectious diseases." (*Report, &c.*, p. 79.) What also say other eminent physicians of that city on this important topic? Dr. TOWNSEND, whose experience of the hæmagastric pestilence has been

obtained in New York, in the Havannah, in the Bahama Islands, in Charleston, in South Carolina, and in the West Indies, thus remarks on the crude speculations and productions of some of those who have recently written on the subject now under consideration. "The true character of the pestilential yellow fever, commencing with the monographs of the earliest writers, as Towne, Hillary, Warren, Rouppe, &c., and the not less masterly descriptions of those who succeeded them, as Chisholm, Blane, Lining, (of Charleston, S. C.,) Hosack, and a crowd of others, together with the more recent productions of Stroebel of Charleston, and Monette of Washington (Mississippi), &c., have been entirely lost sight of, to give place to the more congenial and crude speculations and misrepresentations of empirical adventurers, many of whom, with mercenary motives, designed to flatter the authorities of different governments with the delusive hope that commerce might be disburthened of every such restriction, as a relic of barbarism, have not hesitated to assert, and to disseminate on the subject of yellow fever, a tissue of heresies and errors, which every practical physician, and every common citizen acquainted with this disease, as it has prevailed in our seaports and in the West Indies, know to be without the shadow of a foundation."

31. Dr. Vache, of New York, observes, "that yellow fever has not appeared in that city for nearly a quarter of a century, and not since the present health laws have been rigidly enforced; therefore, let us not forget in our zeal for innovation and improvement, the good old maxim, 'Let well enough alone.' Admit they are, in a measure, restrictive to commerce and burdensome to the merchant; will any calm observer deny they are alike protective of his life and conducive to his interest? The pecuniary loss of a hundred years by the quarantine establishment, cannot equal the ruin and desolation of a single season of the pestilence. Who does not shudder at the memory of closed dwellings, the suspension of business, the shunned city, the quarantine abroad, and the sepulchres of hundreds, during the summer of 1822." (*Report, &c.*, p. 97.)

32. Similar opinions to these have been given by Dr. Francis, and other eminent physicians in the United States; and furnish the basis on which the Report is founded, to which I have referred, and which reached me after the chief part of the above article was put to press. These fully confirm the views which I have entertained, as well as furnish most conclusive evidence of the necessity of enforcing quarantine regulations. Dr. Francis, as well as many other eminent physicians, has shown that the hæmagastric pestilence has been imported into many places, and into the quarantine districts of the United States, when the thermometer ranged above 75°. Now, if the "Eclair steam-ship had arrived in this country when the temperature was at this elevation, or at any period during the summer of 1846, and quarantine regulations had either been neglected, or imperfectly enforced, what might have been the consequences; and what may still be the consequences if these regulations should be so far relaxed as to allow of the admission of the foul bed or body clothes of persons who have died of any of the pestilences just considered, especially during states of temperature and of the air favouring the infection of these pestilences? I fully believe that pestilential cholera was introduced into various places both in this and in other countries by foul clothes, and that there is more risk in either of these distempers being imported in this way, than by personal communication — than by the infection having been imparted in some place where the distemper prevailed, and remaining latent in the infected person for a number of days, so as to break out only shortly before, or soon after, arrival at the place of his destination. Certainly, all the contingencies of the malady — infection by close communication, by opening up the clothes of infected persons, and such articles of traffic as are calculated to imbibe infectious emanations, or are likely to have been exposed to them; the period which has elapsed from the occasions of such infection and of such exposures, and the several circumstances favouring or counteracting infection, even admitting its presence, as temperature, humidity, or dryness of the air, cleanliness, ventilation, &c., ought severally to be considered when framing regulations for warding off pestilence, and when carrying these regulations into effective operation.

33. How far it may be prudent to relax these laws in respect of merchandise, even still further than they have been in this country, cannot be stated absolutely and with confidence of perfect safety; for several articles of traffic belong to the same category as apparel and bed and body clothes, and retain and convey the poison long and far; but caution should be used in such relaxations; and the facts should not be overlooked, that the most obvious and important advantages have already accrued from the recent institution of quarantine laws in Constantinople and other places in the East, and from a more strict enforcement of them in the cities of the United States.

34. To the entire neglect of *government measures of prevention*, and to insufficiently strict quarantine regulations, the extension of the choleric pestilence throughout the countries of the east, and through Europe and America, are entirely to be imputed. The difficulty, however, of completely enforcing these measures, and the liability of evading them in all countries, particularly those which are continental, and have an extended boundary, which are thickly inhabited, particularly on their frontiers, have large and populous frontier towns and sea-ports, and enjoy a rapid and extensive commerce, either by sea or land, are so great, that numerous instances of their infraction must occur, and the chances of the introduction of the pestilence be thereby increased. These circumstances fully account for the importation of the malady into the principal towns and sea-ports of Russia and Prussia; its appearance in Moldavia, Hungary, Austria, Vienna, Dantzic, Hamburgh, &c.; and the negligence with which quarantine regulations are usually resorted to, fully explains the introduction of this pestilence into Egypt, into this country at various ports, as well as into numerous places in other countries, where stricter precautions might have reasonably been supposed to prove successful.

35. As intimately connected with all regulations of quarantine, the period which elapses from the impression of the morbid cause upon the frame, and the full development of the disease, requires some notice, but, unfortunately, sufficient

acts have not been obtained, and those which have been observed are not sufficiently precise to furnish us with exact data on this topic. In respect of plague, eleven or twelve days have been assigned as the extreme period, whilst other observers have stated fourteen days to be the longest time. Various circumstances, however, serve to show that the full development of the morbid actions constituting these diseases may take place very soon, even a few hours, after exposure to an intense degree of the exciting causes, or when the state of predisposition to become affected has been great; whilst, on the other hand, several, perhaps many, days often elapse before a marked effect is produced. As to the exact length of time which may, in extreme cases of this kind, thus elapse, I have no means of stating, especially as respects pestilential cholera and hæmagastric fever; but even taking it for granted that a few days merely will often form this period of latent or smouldering action, it becomes obvious that a person may have been exposed to a source of infection, previous to leaving an infected place, that he may travel a long distance, especially in these days of rapid locomotion, and yet not experience the disease, until some time after his arrival in a healthy situation, when he may be attacked, and thus he will introduce the pestilence.

36. The unknown duration of the interval which may elapse between the infection of the malady and its full development, must render it doubtful what should be the prescribed period of quarantine; but there can be no doubt of the propriety of regulating it according to the length of time during which persons, or vessels, have been on their passage from an infected place, provided that no source of infection existed in their course. I believe that nothing can be objected to the measures which have been resorted to in this country respecting ships; but it remains a question in what point of view articles of merchandise are to be considered.

37. That the chances of infection by articles of this description are much less than by persons may, I think, be safely taken for granted; but I still consider those articles which are most likely to have imbibed a portion of the effluvium of the affected, as made clothes, articles of bedding, furs, cotton, woollen, silken, and linen furniture, and rags, to be calculated to transmit the infection. In all cases, therefore, these should be subjected to precautionary measures, and particularly to a full exposure to the open air. It is astonishing how very long woollen and silken bed and body clothes, especially, will often retain animal effluvia when closely packed together, or excluded from ventilation. This must be familiar to every medical man who has been in the habit of continuing for a considerable time, or to be frequently in dissecting-rooms; for the animal miasm which his clothes have there imbibed will be sensibly felt months afterwards if they have been put in a close place immediately after they were saturated with the foul air.

38. That sanatory measures will succeed in averting a visitation of this pestilence, will much depend upon the nature of the frontier of a country — upon its extent — the number of populous places in its vicinity, and the nature of the intercourse between it and the infected parts. In respect of this last-named source of infection, illicit intercourse, or smuggling, is one of the most probable channels through which the disease will be communicated; and when the population is thick, and the towns large and numerous, the chances of pestilence being introduced in this way are much greater than by regular commercial intercourse, inasmuch as the latter is more or less under the control of sanatory regulations, whereas the former avoids them altogether. Besides bed and body-clothes, foul linen, and similar infected articles are more likely to be conveyed clandestinely than by ordinary commercial channels.

39. ii. Of the Arrest of Pestilence when introduced or prevailing. — When pestilence is introduced, the measures which should be taken to arrest its progress must necessarily depend upon the extent of its diffusion, upon the number and situation of the places in which it has appeared, and upon the nature of the pestilence itself. As regards the last of these, it may be premised — 1st, That the *hæmagastric pestilence* can be introduced into a country only where the temperature is above 70°; and when the air is close and humid, and the elevation not greatly above the level of the sea; that it is rarely disseminated when the situation is well ventilated, and not thickly inhabited; that frost destroys its infection, and that it attacks the human frame only once. — 2d, That the *septic or glandular pestilence* may be introduced into a country at all ranges of temperature, from 35° to 75°; that it may remain dormant in favourable circumstances at a temperature either below 35° or above 75°, although these more extreme ranges are more likely to destroy its infectious power; that a close, humid atmosphere, with the other circumstances already noticed (§§ 9—23.), favour its spread; and that a previous attack generally protects the system from a second, although not so fully as observed in respect of the hæmagastric distemper. — 3d, That the *choleric pestilence* may be introduced, and prevail in any range of temperature observed in temperate countries, although it is most rapidly and generally diffused in warm, humid, still, and sultry states of the air; in crowded situations, or where intercourse is most frequent, as in camps, barracks, transports, and ships of war; where also the other pestilences are more rapidly and universally propagated.

40. It has always been observed that, when either of the pestilences has appeared in a country, the places nearest the frontier or coast, or in most intimate and frequent communication with a previously infected part, are the first attacked. It is obvious, that when once introduced into a populous and commercial town, surrounded either by other towns, or by a dense population, the difficulty of preventing its extension is greatly increased beyond what obtains when it appears in a walled city, or in an isolated locality. For in all places depending chiefly upon manufactures, and upon commerce with distant or foreign parts, measures sufficiently restrictive to confine the malady there until it shall have subsided or exhausted itself, will be productive of so much distress, by throwing many persons out of employment, and by abridging the means of subsistence, and so injure the health of the community, and predispose to the extension of the distemper, as to induce all classes to combine to evade them, until the pes-

tilence will spread notwithstanding these restrictions. The failure, however, of such measures is not to be viewed as it has been by the anti-infectionists, as a proof of the justice of their cause, but of the impossibility of preventing communications, indirect or direct, between the sick and the healthy, in these circumstances.

41. *A. When pestilence first appears in a populous city or town thus circumstanced,* the chief measures of prevention ought to be directed to the infected habitations, as will be pointed out hereafter, and to the infected persons and things which ntroduced the distemper. Those attacked should be immediately removed, in conveyances constructed for the purpose, to an isolated hospital, devoted to them only; and suspected persons, or hose in close communication with the infected, but not yet attacked, ought to be removed to nother hospital or place of observation near to, but not connected with the former, to which all hould be conveyed as soon as they are seized. All intercourse between the inmates of infected ouses, and of those adjoining, should be prevented, or placed under rigorous restrictions; and hus the pestilence may be strangled at its birth. n all outbreaks of pestilence, the attendants, and hose employed in removing the infected, ought o be selected from those who have been attacked n some former occasion; and they should be rovided with linen, canvas, or other suitable resses; and the medical attendants ought not to ave persons infected by either of these pestilences and proceed abroad, or to visit other ersons, without changing the clothes, in which patients in pestilence were seen, for other garments.

42. If pestilence spread notwithstanding these strictions and precautions, more especially in rge towns, and a thickly inhabited surrounding ountry, more advantage will accrue from the dividual means of prevention hereafter to be oticed, than from measures which aim at that hich cannot be enforced or accomplished, namely, e maintaining a strict non-intercourse with the cinity. Where, however, this object may be tained with reasonable hopes of success, it should ot be neglected. But in a place where, besides frequent intercourse with other parts by shipng, an hourly communication by means of stageaches, waggons, canals, and rail-roads, is kept with other towns in all directions, I cannot e that quarantine or sanatory *cordons* can be ictly maintained, or regulations be enforced in ch a manner as to prevent the extension of the alady. How can various effects and articles, en those most likely to transmit the pestilence, sequestered for the purpose of purification, and t avoid all chances of conveying it? And how, pecially, are the hundred or even thousands of rsons whom their avocations daily call to adning parts, many of whom may have been exsed to infection previous to their departure, to placed in quarantine, or in observation, for a ficient time to avoid all chances of their conying the disease to the places of their destiion?

43. I conclude, therefore, that where a strict uarantine, or sanatory measures calculated to nfine the pestilence to the place of its introction, cannot be maintained, the mischief ulting from the attempt will be greater than t benefits which will arise to the community. But that, where they may be enforced, owing to the nature of the locality, the employments of the population, the distance from other towns or populous places, and the thinly inhabited state of the surrounding country, they should be adopted, notwithstanding the temporary losses or even distresses of the place thus sequestered, for the good of the few should give place to the safety of the many.

44. *B. When pestilence is introduced amongst troops, in armies, or in garrisons,* — the very best results will be generally obtained if decided measures be early resorted to, as shown by those devised by Sir W. PYM at Gibraltar. Notwithstanding the existence of Medical Boards, in this country, and in each of the Presidencies in the East Indies, there does not appear to exist any code of regulations, by which either the young and inexperienced medical officer, or the more responsible and experienced army physician may be guided wholly or in part, or which he may mould to circumstances. In 1831, Sir DAVID BARRY, whose talents were great, and sphere of observation extensive, published several suggestions on this subject, with reference especially to the hæmagastric pestilence of Gibraltar, but applicable to all outbreaks of pestilence in armies or garrisons. How far they have been adopted in garrisons or among troops liable to be infected by either pestilence, I am unable to state: but there was formerly, and I believe that there still is, in all departments of the army, more especially in the East Indies, a most remarkable neglect of sanatory or precautionary measures. Those which I have now to offer, are in several respects the same as were recommended by Sir D. BARRY.

45. *a.* When pestilence shall have been proved to exist within a fortress, garrison, or encampment, let the sick and the suspected be immediately removed without the walls, or placed in tents in dry, airy, and open places, or in hospitals, or places fitted up as hospitals, when these are more favourably situated or circumstanced, and there kept effectually separated from the healthy, unsuspected, susceptible part of the inhabitants.

46. *b.* Let the infected houses and goods be kept in strict quarantine, and purified by water, air, fumigations, and every other means that may be thought advisable; great care being taken that these expurgatory measures be executed by non-susceptible persons, or those who have been attacked by the pestilence on former occasions of its prevalence.

47. Let no time nor labour be thrown away, at this most important crisis, on cleansing drains or privies. Experience has already proved, most fully, both in Cadiz, in the great epidemic of 1800, and in Gibraltar in 1828, the perfect inutility, nay, the absolute mischievous tendency of this measure, when adopted after the pestilence has commenced, with the view of arresting its propagation.

48. *c.* Should the infection appear to spread within the territory or fortress, notwithstanding the removal of the first sick, all theories must be abandoned, and one established fact must, alone, guide all our measures, viz. *that the disease will stop as soon as the susceptible are separated from contaminated places, persons, and things.*

49. *d.* Since, however, it would be obviously impracticable to remove all the susceptible from a fortified town, or garrison, at once, when an epidemic breaks out after a long interval of public health, and when, besides a large portion of the civil population, the whole garrison may belong to this class, as was the case in Gibraltar in 1828, all the moveable sources of infection and fomites should be sent beyond the walls, and as many as possible of those capable of being affected by such sources as cannot be removed. The civil hospital of a fortified town should also be transferred, with its whole establishment, to the open ground or any situation as above (*a*) directed, to serve as a nucleus of a civil lazaretto, on the very first breaking out of pestilence. The regimental hospital also should be sent out, as the corps to which they belong happen to be attacked. No family or person after having been once contaminated should be allowed to remain an hour in a fortress or fortified town, particularly at the commencement of an epidemic, but should be removed to the places above indicated, where they should be strictly secluded or placed in rigorous quarantine.

50. *e.* Temporary emigration should be encouraged amongst the healthy, uncontaminated, and unsuspected civilians; and the whole susceptible population, civil and military, should be scattered over the open ground and adjoining country, as widely as circumstances will admit, due care being taken that the places or ground occupied by the sick, suspected, and the hospitals should not be too nearly approached. (*a*) Whenever a regiment becomes infected, it should be immediately encamped outside the town, city, or fortress, if it can be spared; but if it cannot, it should be removed to as open and as well-ventilated a place as can be obtained, and the infected instantly carried to the hospital.

51. *f.* The sanatory division of the healthy into the susceptible, and the non-susceptible or those previously attacked, naturally dictates the classification of the sick into the decidedly infected, the suspected, and the unsuspected. There should, therefore, be three distinct hospital establishments, viz. 1. The foul lazaretto for pronounced cases. 2. The lazaretto of observation, for those cases which may, or may not, turn out to be infected. 3. The free or clean hospital, for accidents or non-susceptible sick. All the attendants of the first and second establishments, medical, clerical, and others, should be kept, if possible, in quarantine.

52. *g.* The bed, bedding, and every thing personal to the sick soldier, sent to either of the two first hospitals, should follow the fortunes of their owner. If the sick man should happen to die, his effects will thus remain where they can do no further mischief, viz. in the foul hospital; should he survive, they accompany him to the convalescent depôt, and thence, after having undergone the most careful ablutions, fumigations, &c., to the suspected quarter within the fortress, on his return to duty.

53. Hospital bedding, properly so called, should be used, as in time of public health, in the clean hospital only. This, of course, implies that the bed and bedding of the unsuspected sick need not be removed from the tents, or quarters of the healthy.

54. *h.* There should be three descriptions of camps and quarters, corresponding to the hospita establishments; the foul, the suspected, and th clean, or free. These should be kept distinc during the epidemic.

55. Convalescents, from the foul and suspecte hospitals, should be returned to the fortress, afte their recovery, placed in suspected quarters, an appointed to the lightest duties at first, distinc from the uninfected, until the return of publi health.

56. *i.* The guards, and all other duties within th town and in the sheltered situations, should b reduced to the minimum consistent with the safet of the fortress; and, as soon as the original an convalescent nonsusceptible soldiers are sufficientl numerous to perform these duties, the susceptib should no longer be permitted to participate i them.

57. *k.* The epidemic sick should, as far as pra ticable, be treated in detached tents, huts, sheds, so placed and constructed as to admit the most perfect ventilation. It will not be enoug for the protection of the susceptible, nor for t benefit of the sick, that the latter be sent outsi the gates. They must be so placed as not to sheltered by the outworks, from currents of co air.

58. *l.* Should it so happen that troops in garris or otherwise in service, cannot furnish a sufficie number of non-susceptible (formerly attacke orderlies for attending upon the infected, ci attendants of that class should be employed fr the commencement.

59. *m.* In the pitching of tents, and particula in the erection of boarded sheds, as temporary h pitals, places of seclusion, observation, &c., c ought to be taken that they be not huddled closely together; and that they be so placed regard to each other, as to allow a free passage currents of air; for nothing tends more effectua to prevent and to destroy the propagation of fection than open space, and perfect ventilatio

60. *n.* The first and most important steps towa the saving of human life, on the breaking out pestilence, being the early detection of it, and firm, unhesitating announcement of its existe to the proper authorities, the chief medical office or those best acquainted with its characters, sho carefully observe and report upon all cases sudden attacks, and of malignant features.

61. *o.* When corps, detachments, reinfor ments, or armies are marching or changing quart care ought to be taken by commanding officers cause all quarters, barracks, and encampments t inspected by trustworthy and experienced medi officers, in order to ascertain their cleanlin salubrity, &c.; and, as far as possible, the stat health of the previous occupants, and the ex ence or non-existence among them of any ma nant, infectious, or febrile disease. The th pestilences above considered have severally b often propagated in this way to both troops civilians; those departing carrying with them imparting on their route the infection to othe whilst healthy troops have rapidly been infec upon arriving in the contaminated quarters wh had been relinquished to them. This shows necessity of using the most efficacious disinfec means to all quarters and barracks that are in least suspected, before healthy troops appro them.

62. *p.* When troops or detachments are upon march, care should be taken not to allow any of the men, or even of the officers, to enter towns or villages before the state of health of such town or village is inquired after by the principal and most experienced medical officer; and this inquiry should be made at the chief authorities and medical practitioners of the place. Want of attention to this, and to the immediately preceding precaution, has been the cause of the infection of healthy corps, on numerous occasions in the East and West Indies, with the pestilential cholera and yellow fever.

63. *C. When pestilence is introduced into ships, especially transports, ships of war, and emigrant vessels,* it will be most difficult, if not impossible, to prevent its extension to all susceptible persons in such vessel. Hence the necessity of the utmost precaution in preventing communication with ports in which even the suspicion of the existence of pestilence may be entertained. Trading vessels are, however, often bound to ports where one or other of the pestilences above considered is more or less prevalent, or where it sometimes breaks out during the continuance of the vessel in the port; and in such circumstances the infection of one or more of the crew generally occurs, for sailors usually frequent those places in which a pestilential malady generally makes its first appearance, or most commonly lurks, awaiting susceptible subjects, especially in regard of plague and hæmagastric pestilence, for its outbreak. Besides the infection introduced in the persons of sailors infected on shore, infection may be introduced in clothes, especially such as may have been previously worn, purchased by them and brought on board. Vessels also may be infected by incautious communication with other vessels, especially in the Mediterranean, and on the coasts of Africa and America, and more particularly with slave-ships.

64. When a pestilential malady thus appears in a vessel in port, the circumstance should be dealt with as follows: — If the vessel have been infected in the port, the distemper existing at the time in the port or its vicinity, the person or persons attacked ought to be instantly landed and taken, with all the precautions against the diffusion of the infection, to the hospital or place provided for pestilential cases, unsusceptible or formerly attacked individuals being employed for the removal, if they can be obtained. The vessel should be removed to some distance from others, and ventilation and purification resorted to. If the vessel have conveyed the disease from an infected place to a healthy port, especially during seasons and temperature which favour the propagation of the distemper, communications of all kinds ought to be strictly prevented with the infected vessel. She should be instantly placed in quarantine, in a suitable place, and health guards sent on board. The persons already infected ought to be sent to he quarantine hospital, and the susceptible non-infected removed to an observation hospital, ship, r place, and their clothes be carefully ventilated, leansed, or fumigated. The vessel and articles n her capable of imbibing infectious emanations hould be purified by non-susceptible persons.

65. The greatest risk of the introduction of estilence, and of the diffusion of it among the ew, arises from the concealment, on the part of the captain of a trading vessel, of the illness or death of any of his passengers and crew, and from the preservation of the bedding and clothes of the infected, which are often concealed and smuggled on shore; or even openly preserved and sent home to the relatives of the deceased. It has been frequently found in the quarantine ground at New York, that the hæmagastric pestilence has reappeared in vessels after purification had been, as was supposed, sufficiently resorted to. This failure of the usual means of dis-infection, in respect of these vessels, may have arisen from some articles of clothing or bedding having escaped notice or sufficient purification, or from the return of such articles to the vessel without due ventilation and cleansing; or from the circumstance of the infection having remained longer latent in the system before it developed its effects than is generally believed to be possible.

66. When the hæmagastric pestilence breaks out in a vessel within the tropics, it has usually been recommended, and practised, to proceed forthwith to a colder climate, or to latitudes in which the range of temperature is below 60°; all the usual means of ventilation and dis-infection being at the same time employed. In some circumstances this measure may be judicious. But it should not be depended upon, when the vessel, especially a ship of war, or transport, is so circumstanced as to admit of the instant removal of the infected into a quarantine or other appropriate hospital, and of the susceptible non-infected into an observation hospital or ship, and of the immediate dis-infection of the ship. The great errors, in many instances of the outbreak of this pestilence in war-ships within the tropics have been, — 1st. The non-recognition of the distemper by the medical officers; — 2d. The too frequent denial of its infectious character, and the proceeding upon that supposition; — and 3d. The neglect of measures based upon its infectious character and especially of the immediate separation of the infected, and the removal of them to the pestilential hospital, even when such removal could have been carried into effect.

67. The sending of a vessel to sea ought never to be enforced where the means of immediate separation of the sick and suspected, and of purification, can be carried out, in the place or port where the vessel lies; for by doing so, the infection of the whole susceptible persons in the crew, or among the passengers, is thereby ensured before she can possibly reach a temperature so low as to put a stop to its extension. In cases of ships of war or transports, the captain should be advised to proceed to the nearest port where these measures can be enforced, with all the precautions of quarantine, and without endangering the inhabitants of the port; and a recourse to a colder climate should not be entertained unless it may be certainly reached in a much shorter time. But the distemper may appear in vessels in such places and circumstances as preclude the possibility of reaching either a suitable port or a colder climate, within a period likely to save the crew, or at least a large proportion of them. In this dilemma, and even whilst the attempt to reach either of these destinations is being made, the resources of the medical officer, as well as of the captain, become of the greatest importance, and if wisely directed are always most advantageous.

68. In the circumstances now adverted to, every means of ventilation consistent with the safety of the ship should be enforced. The hatches and gun-ports ought to be constantly open, and wind sails carried down to the lower decks and hold. The infected should be removed instantly upon being attacked from among the crew, to a well-ventilated place upon the upper or gun-deck, and be excluded as much as possible from all persons but the unsusceptible or those who have been formerly attacked, and these latter should be made attendants on the sick. The sick berth should be separated by a bulkhead or partition, and be in the best ventilated part of the ship. A number of the crew of a ship in which I was a passenger many years ago, had been exposed to the infection of pestilential yellow fever; and as they were attacked I advised them to remain on deck under an awning, a free perflation of air existing around them. The accumulation of infectious emanations was thus prevented, and the distemper extended no further than to one only of the crew who was not exposed to infection in the first instance. The seclusion of the infected and ventilation should be rendered as perfect as possible; and all the evacuations ought to be instantly removed in covered vessels and immersed in the sea, without uncovering them until actually immersed. Various disinfecting agents, especially the solutions of the chlorides, the vapour of creasote, &c., may be employed, but they should never interfere with a recourse to every possible means of ventilation, to which they should always be subordinate in importance, as they are in efficacy.

69. II. Protection of Individuals, Families, or Classes, from a prevailing Pestilence. — When pestilence exists in a city or place, or when measures have not prevented the introduction of it, much may be accomplished by cautiously devised means either of avoiding it, or of enabling the frame to resist it. The most certain way of escape is, —

70. i. Departure from the Sphere of Infection, or strict Seclusion or Quarantine. — Departure from the infected city or place, is protective to all such as have not been exposed to the emanations from the sick, and from fomites previously to their departure. In the Levant, European consuls and merchants generally observe strict seclusion during the prevalence of plague, but the seclusion is enforced with great difficulty in respect both of persons and effects, more especially body-clothes, &c. Moreover, when seclusion is attempted in a house or mansion forming part of a street, or within the walls or limits of a town, the atmosphere around the place of seclusion may be so contaminated by the numbers of sick and dead, as to become more or less infectious to the inmates of the secluded residence; and the winds or currents of air may convey the infection into the very apartments of such residence. This circumstance fully explains the failure of seclusion in affording protection in the comparatively few instances in which seclusion has failed.

71. *A. In order, therefore, that protection may be with great certainty procured,* departure from an infected town or place should be immediate upon the ascertainment of the existence of pestilence, and before the pestilence has extended itself to many of the inhabitants; for, if it have spread far, or if cases of it have occurred in most of the quarters of a city, it is impossible to determine who is, or who is not, already infected, although not yet attacked, and the distemper may be conveyed to healthy localities in the persons or effects of those who may then depart. Indeed, this contingency has been often observed as regards each of the three pestilences in question. The same remark equally applies to seclusion or quarantine within or near an infected city or place ; for, if the seclusion be too long delayed, some one of the persons about to be secluded may have been exposed to the infectious effluvium, and be attacked several days after this precaution has been adopted, and thus introduce the distemper among the secluded party. In this case, the further extension of the malady may be prevented by the immediate removal of the person attacked, wit his personal effects, from the place of quarantine but the removal should be effected, if possible, by non-susceptible persons.

72. Those who may be unable to depart fron an infected place, or to seclude themselves, shoul carefully avoid a too near approach to any perso either in a street or in a house, and more espe cially to those who are strangers. Above all, the ought to avoid the breath or the expired air fron another person ; and they should not enter th houses or apartments of any one unless there is th fullest evidence of immunity from infection. Bu even when no risk may be anticipated, persons c articles may be in these houses at the time whic may endanger those who approach them. If an danger exist as regards the reception-rooms of house ; the danger is greater in respect of the sleep ing apartments. Great caution should, also, b exercised as respects articles of clothing, beds, an bed-clothes. During seasons of pestilence, th linen of a family ought not to be sent out of th house ; it should be cleaned at home ; and ca ought to be taken that this precaution extends t the servants more especially ; and no beds, bed ding, or clothes, more especially such as may hav been previously used, ought to be admitte Strangers, and particularly those with effect ought to be excluded as much as possible, unle they come direct from healthy and uninfecte places.

73. *B. Restrictions should be imposed on tho departing from an infected locality,* in order tha they may not convey the pestilence to the plac of their destination, and that they may be receive in these places in such a way as may least e danger the safety of the inhabitants. — *a.* Perso who appear to be already attacked, or those wh have members of their families attacked, or wh have recently lost any of their family, either shoul not depart for a healthy locality, unless the d parture be to a country residence or house, s cluded from other houses, or should be subjecte to strict quarantine before being admitted in towns, cities, or ports.

74. *b.* All persons leaving infected plac ought to obtain from the Medical Board, or Boa of Health, which should exist in all cities an large towns, certificates of the probable degree immunity from infection existing in their ind vidual cases, to be produced to the authorities the places to which they are about to procee The information supplied by persons requiri

these certificates may be verified by the messengers of the board.

75. *c.* Persons already infected, and suspected cases, instead of being allowed to depart for healthy towns, should be removed to quarantine, infected, or observation hospitals, according to the circumstances of each case; and not be permitted to endanger the inhabitants of an uninfected place until due precautions have been strictly enforced.

76. *d.* It is obvious that, if certain restrictions are requisite on persons departing from an infected place, they are still more necessary for those who arrive at an uninfected city or port; and more especially for those who come from an infected part. On these latter, a due period of observation and quarantine should be imposed, when the circumstances of the locality or town are such as admit of the restriction being duly enforced. The chief difficulty is the determination of the period of observation or quarantine in each of the pestilences in question. When persons have already passed some time from leaving an infected place before arriving at their destinations, a proportionate abridgment of the period of quarantine may be allowed, especially if no sources of infection existed at any place in their routes. In the case of a person arriving directly from an infected place not far distant, there is every reason to believe that a quarantine of fourteen days would afford sufficient protection, in respect of any of the pestilences now considered. But the clothes and personal effects of this person should be immediately opened up and ventilated.

77. *e.* In all cases, where the clothes, linen, and bedding are infected, or even suspected, disinfecting agents should be applied to them. Of all disinfectants, high ranges of temperature are the most efficacious; and the best method of employing a high temperature, with the view of decomposing the morbid effluvium retained by the bedding or clothes of persons who have laboured under pestilential and infectious maladies, is that invented by Mr. Davison and Mr. Symington, who recommend the transmission of heated air through a chamber in which these articles are suspended; the temperature of the air being raised to grades, varying from 200° to 250° of Fahrenheit. The great advantage of this method is its easy applicability to all kinds, and to any number, of objects and articles*, without injury to their textures or fabrics.

78. ii. Protection by such Means as may enable the Constitution to resist infection. — *A.* There are four facts which should be kept in recollection, as being intimately connected with the adoption of preservative measures against pestilence. — 1st. That a specific principle or effluvium, probably, of a parasitic or organic nature (Pestilence, Septic, § 137.), proceeding from the diseased is necessary to the communication of the malady. 2d. That this specific effluvium is inhaled with the air into the lungs, when a person sick of either pestilence is too nearly approached; and that the infecting effluvium invades the susceptible frame chiefly through the respiratory passages and organs. 3d. That a pre-disposition to become affected by this effluvium is requisite to infection by it, or a susceptibility of infection. In what this susceptibility consists can hardly be determined with precision in many cases, and as respects each of the kinds of pestilence, although there is sufficient reason to believe that the causes of predisposition described above, with reference to each of these distempers, are more especially concerned in producing it: and 4th, as regards two of these maladies at least, a previous attack destroys this susceptibility. Upon these facts all prophylactic measures should chiefly be based.

79. As respects the first and second of these, the measures above recommended, in order to prevent exposure to infection, are the most efficient; the great object being to avoid intercourse with such persons as are most likely to have been among the infected, and a near approach to contaminated articles. The pre-disposing and concurring causes of the distemper, as far as they are known, ought to be avoided. There is much reason to believe that whatever tends, directly or indirectly, to exhaust the vital energy, especially excesses of every kind; low and unwholesome diet; exposure to cold, chills, wet, night-dew, &c.; the use of cold fluids, of cold, flatulent, and unripe fruits, will favour the invasion of pestilential infection. On the other hand, whatever supports the energy and preserves, in their due regularity, the several functions of the frame, will render the body less susceptible of infection.

80. If at any time exposure to the night-air or to cold and moisture is inevitable, the system should be fortified against them, but not, unless when better means are not within reach, by wines or spirits; for these should be used in very moderate quantity; otherwise they will leave the system, as soon as their stimulating effects have passed off, more predisposed than before to the invasion of the

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* Messrs. Davison and Symington, civil engineers, have employed heated air, in various modes, both in currents and otherwise, and in various grades from 60° to 600°, and for numerous purposes, — for the drying and seasoning of timber, for the prevention of dry-rot, for the drying and preserving of animal and vegetable substances, for cleansing casks, and for preventing mouldiness, and the formation of fungi, and other parasitic productions; for disinfecting foul clothing, feather and wool beds, mattresses, &c.; and have obtained patents for the application of heated air to all these, and various other purposes. Their experiments prove that currents of heated air of 250° and upwards, may be passed through linen and cotton articles, for the purpose of disinfection, without injury to their textures, and that woollen and other animal productions, as feathers, feather-beds, wool-beds, hair-mattresses, cloths, flannels, &c., will not be injured by a temperature of 240°. It is obvious that the application of this method to the purification or disinfection of all kinds of bedding, and bed and body-clothes, used in hospitals, ships, prisons, &c., will be of the utmost advantage. Even to private families it will often prove most beneficial, especially in arresting the progress of infectious diseases, to transmit the contaminated beds, bed-clothes, &c., to a place where this mode of purification and disinfection is employed. On the occasion of small-pox, scarlet fever, typhus, or measles, having infected one or more members of a family, the infection being, possibly, limited to one chamber or floor of the house, and due precaution being taken so to limit it, the properly constructed, and carefully closed cart of the establishment might remove the contaminated articles to the place of disinfection, and return them in a very short time, thereby preventing the extension of the malady to the rest of the family, or to other persons by that medium which is most likely to transmit the infection. In these maladies, and still more remarkably in pestilential distempers, this method of disinfection deserves a general adoption, in respect both of its great efficiency, and of its universal applicability. When feather beds, or woollen and hair mattresses have become foul or impure, as they must necessarily become when in long use, especially in hospitals, prisons, ships, &c., this method of purification is particularly necessary. The beds used in lying-in-hospitals ought frequently to be subjected to this process, in order to prevent puerperal fevers and diseases,

infectious effluvium. Medicinal tonics, however, and those more especially which determine the circulation to the surface of the body, at the same time that they improve the tone of the digestive organs, and promote the regular functions of the bowels and biliary system, may be resorted to on such occasions. For this purpose the infusions or decoctions of bark, of cascarilla, of columba, &c. with the spirits of MINDERER, or any warm stomachic medicine; or the powdered bark, or the sulphate of quinine, or the balsams, may be taken either alone or with camphor, or with the aloes and myrrh pill, and any one of the spicy aromatics.

81. *B. Olive oil* has been much employed, both in Spanish America and in the Levant, not merely for the cure, but as a prophylactic, of pestilential distempers; in the former countries, with lime juice, in the hæmagastric pestilence; in the latter, both internally and externally for the plague. It is usually given in full and frequent doses in both distempers; and, from the information I have derived from various quarters, it appears to be deserving of a much more extensive trial in these pestilences, than it has hitherto received from European physicians. As a prophylactic it has usually been employed externally with slight friction, after coming out of the warm-bath. It is much employed in both hemispheres by the native practitioners of medicine.

82. *C. The diet* should be regular, moderate, nutritious, and easy of digestion. Whilst every approach to low living should be shunned, its opposite ought never to be indulged in. The stomach should have no more to do than what it can perfectly accomplish, without fatigue to itself, but to the promotion of its own energies. It must never be roused to a state of injurious excitement by means of palatable excitants, nor weakened by over-distension, or too copious draughts of cold relaxing diluents.

83. Care should be taken never to be exposed to the morning or night air, with an empty stomach. A cup of coffee previous to such exposures will be serviceable. The state of the bowels should be always attended to, and their functions regulated and carefully assisted; but in no case should this be attempted by cold, debilitating medicines, such as salts. The warm stomachic laxatives, or those combined with tonics, may be adopted with advantage as occasion may require.*

84. Particular attention ought to be paid to personal and domestic cleanliness. The surface of the body should be kept in its natural and perspirable state. The constant use of flannel nearest the skin will be serviceable for this purpose. Excessive perspirations ought to be avoided.

85. During the existence of either of the pestilential diseases in our vicinity, or family, these precautions are still more imperatively required. A free ventilation of every apartment ought to be constantly observed; in conjunction with fumigations, by means of aromatic substances kept slowly burning, or by the vapour of the chloride of soda or of lime. If a quantity of a very weak solution of the chloride of lime be put in a vessel, and some muriatic acid poured on it, and placed in the hall, or the very lowest parts in a house, the disengaged gas will soon find its way in sufficient quantity to the higher apartments.† The attendants on the sick should particularly observe the measures now prescribed, and ought never to bestow their attentions on the affected so near their persons, as to inhale the effluvium emanating from them, without at least fortifying the vital energies in the way pointed out; and they should carefully avoid entering upon those duties with an empty stomach, or when fatigued.

86. Besides burning warm aromatic substances, and odoriferous gum-resins, in the apartments, and in those adjoining them, in which affected persons are or have been confined, a saturated solution of camphor in aromatic vinegar, or in the pyroligneous acid, should be occasionally sprinkled on the floors, furniture, and bed-clothes. These means, with a thorough ventilation, and a due attention to cleanliness, will not only counteract the influence of the effluvium proceeding from the affected, and ward off its action even on the predisposed, but will also prevent the clothes, bedding, or furniture of the apartments of the sick from becoming imbued with it, so as to communicate the malady. They are within the reach nearly of all; and, in the event of the extension of pestilence to any considerable town or city, if care were taken to see them put in practice, under the direction of medical councils of health, one of which should be

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* Any of the following recipes may be employed for the purposes here recommended: —

No. 319. ℞ Decocti cinchonæ, ℥ivss; liq. ammon. acetat. ℥iss; spirit. ammon. arom. ʒij; tinct. capsici annui, ♏xx; spirit. pimentæ, ʒij. Misce. Fiat mist. cujus capiat coch. j vel ij vel iij pro re nata.

No. 320. ℞ Infusi Cascarillæ, ℥vjss; potassæ subcarbon. ʒj; tinct. aurantii comp. ʒiij; spirit. lavandul. comp. ʒjss. M. Fiat mist. cujus capiat cochlear. ij vel iij larga, mane nocteque.

No. 321. ℞ Quininæ sulphatis, ℈j; massæ pilulæ aloes et myrrhæ, ʒss; Extr. Anthemidis, ʒj. M. Fiant pilulæ xx. quarum sumatur una mane nocteque.

No. 322. ℞ Camphoræ rasæ, ℈j; extr. gentianæ; pilul. aloës cum myrrha, āā ʒss; pulv. capsici, gr. xv. syrupi simp. q. s. M. Fiant pilulæ xxiv. quarum capiat binas mane nocteque.

No. 323. ℞ Camphoræ rasæ, ℈j; pilulæ galbani comp. ℥ss; quininæ sulphatis, gr. xii; pulv. capsici annui, gr. xx; balsami Peruviensis, ℈j. Fiant pilulæ xxx. secundum artem, quarum capiat binas primo mane ac nocte.

Shortly before the sailing of the Niger Expedition, sent out by Government, a physician, one of the naturalists to the expedition, called upon me, he having heard that I had been in or near that part of Africa to which he was about to proceed. During our interview, I advised him to take three grains each of camphor, sulphate of quinine, and capsicum, night and morning during the period of his exposure to the malaria proceeding from the low grounds near the banks of the river, and to increase the dose to five grains of each when the exposure was greater than usual, or the malaria more concentrated. This gentleman called upon me upon the return of the expedition, to thank me for my advice, which he had followed, and he informed me that he had not experienced a single day's illness.

† Dilute one part of the concentrated solution of *the chloride of lime* with fifteen parts of cold water, and stir the mixture for a few minutes.

Place an open earthen vessel, containing a quart of the diluted solution, in the current of air entering the room or place to be disinfected, and pour into it a wine-glassful of the hydrochloric acid: perfect purification will very speedily take place. In about an hour fresh air should be admitted as freely as possible. If clothes supposed to be infected are suspended in the room during this process, they will be readily purified.

To disinfect rooms in which sick persons are confined (who would be incommoded by the above rapid mode of purification), wet a linen cloth with the diluted solution, and suspend it in the place to be disinfected: it will require renewal two or three times a day. Night-chairs, or any vessels in which putrid animal or vegetable matter has been kept, will be immediately disinfected by rinsing them with the diluted solution; a small quantity of which may afterwards be allowed to remain in them whilst in use.

To disinfect drains, sewers, and water-closets, a quantity of clean water should first be thrown down them, and afterwards one or two gallons of the above diluted solution.

formed in each district, or quarter, much good would result from them. Keeping in recollection the principle with which I set out, namely, that the exciting cause of the disease undoubtedly makes its first impression on the lungs, the advantages of those measures, from the circumstances of their being applied especially to this organ, must be obvious.

87. *D. The state of the mind* also requires judicious regulation. It ought never to be excited much above, nor lowered beneath its usual tenor. The imagination must not be allowed for a moment to dwell upon the painful considerations which pestilence is calculated to bring before the mind; and least of all ought the dread of it to be encouraged. There is a moral courage sometimes possessed by individuals who are the weakest perhaps as respects physical powers, enabling them to resist more efficiently the causes of infectious and epidemic diseases, than the bodily powers of the strongest, who are not endowed with this mental energy. Those who dread not attacks of diseases, and who yet exercise sufficient prudence in avoiding unnecessary exposure to their predisposing and exciting causes, may justly be considered as subject to comparatively little risk from them. This, I am persuaded, is particularly the case as respects the pestilential cholera, and I wish to impress it upon the minds of those whom the observation concerns. On all occasions a fool-hardy contempt or neglect of ailments, especially those affecting the stomach and bowels, ought to be guarded against, and the best medical advice be immediately procured upon the first manifestation of disorder.

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PHARYNGITIS. See Throat, Diseases of.

PHLEBITIS. See Veins, Inflammation of.

PHLEGMASIA ALBA DOLENS.

— Synon.: *Phlegmasia Dolens*, Hull; — *Phlegmasia Lactea*, Levret; — *Ecchymoma Lymphatica*, Parr; — *Anasarca Serosa*, Cullen; — *Ecphyma Œdematicum*, Young; — *Sparganosis puerperarum*, Good; — *Phlebitis cruralis*, Davis, Lee; — *Cruritis*, Hossack; — *Œdema Lacteum, Metastasis Lactis*, Auct. Var.; — *Œdème des Nouvelles Accouchées, Dépôt laiteux*, Fr.; — *Milchstreichen*, Germ.; — *Crural Phlebitis, swelled leg of Lying-in Women*; — *Puerperal tumid leg.*

Classif.: — III. Class, I. Order (*Author*).

Defin. — i. Nosolog. Defin. — *Painful and tense swelling of one or both legs, attended by fever, and running an acute and definite course, occurring most frequently after delivery.*

2. ii. Patholog. Defin. — *Inflammation or obstruction, or both, of the veins, lymphatics, and lymphatic glands, sometimes attended by inflammation of the adjoining nerves, most frequently occurring after delivery; but sometimes appearing independently of the puerperal states, and consecutively of other diseases, mechanically or otherwise implicating the veins, absorbents, and nerves of a limb.*

3. Having sometimes met with this disease in various circumstances as the sequela of other maladies, independently of the puerperal states, I have not considered it under the head of Puerperal Diseases. Whether occurring after delivery, or in other circumstances, it evidently does not present the same appearances and symptoms, in all instances; and in fatal cases the morbid changes are also not always the same. Owing to these causes, opinions have lately differed widely as to its nature, and to these opinions I shall more particularly refer.

4. I. History. — This affection was first noticed by Roderic a Castro and Wiseman; but Mauriceau first described its symptoms, and referred them to pathological states. He appears to refer many of the symptoms to the femoral nerve; but Dr. Lee supposes him to have mistaken the femoral vein for the nerve. Puzos and Levret subsequently described the disease, and considered it to proceed from metastasis of the secretion of milk. The former states that it is a painful and sometimes fatal malady, occurring frequently about the twelfth day after delivery, although sometimes as late as the sixth week. The description of Levret coincides with that of Puzos, and both refer the disease to the crural vessels; especially in their accounts of the symptoms, although they view it as proceeding from a "depôt de lait." According to Mr. Cruickshanks, Dr. William Hunter did not subscribe to the opinion of Puzos, and did not view it either as a metastasis of the milk, or as a cold of the limb, as it was considered by some. Mr. Trye published, in 1782, an essay on the disease, in which he referred the symptoms to rupture of the lymphatics as they cross the brim of the pelvis under Pou-

PART's ligament. Mr. WHITE soon afterwards published on this affection, and suggested the opinion that it depends on obstruction, detention, and accumulation of lymph in the limb, or some other morbid condition of the lymphatic glands and vessels of the part. Mr. WHITE saw fourteen cases, but they all recovered. Dr. FERRIAR next maintained that the disease proceeded from inflammation of the absorbents. In 1800, Dr. HULL published an essay on phlegmasia dolens, in which he showed that all the phenomena could not be explained by referring them to inflammation of the lymphatics only; he therefore viewed them as the results of an inflammatory state of all the textures of the limb — of bloodvessels, lymphatics, glands, nerves, cellular and muscular tissues, causing an effusion of serum and coagulating lymph; but he furnished no case in which the appearances observed on dissection supported this view.

5. It is a remarkable circumstance, as Dr. R. LEE has remarked, that nearly a century and a half should have elapsed since the time when this disease was pointed out by MAURICEAU, before the precise nature of it was attempted to be ascertained by dissection. There had been opportunities to determine the accuracy of the different opinions advanced as to its nature and origin, but these were neglected until 1817, when Dr. DAVIS examined the body of a patient who died of it; and the appearances were described by Mr. LAWRENCE. The left lower extremity was œdematous, without external discoloration from the hip to the foot, owing to effusion into the cellular tissue. The inguinal glands were a little enlarged, but pale coloured. The femoral vein, from the ham upwards, the external iliac, and the common iliac veins, as far as the junction of the latter with the corresponding trunk of the right side, were distended and firmly plugged with what appeared externally, a coagulum of blood. The femoral portion of the vein, slightly thickened, and of a deep red colour, was filled with a firm bloody coagulum, adhering to the sides of the tube, so that it could not be drawn out. As the red colour of the vein might have been caused by the red clot every where in contact with the vein, it cannot be deemed a proof of inflammation. The trunk of the vena profunda was distended in the same way as the femoral vein; but the saphæna and its branches were empty and healthy. The substance filling the external iliac and common iliac portions of the vein was like the laminated coagulum of an aneurismal sac. The tube was completely obstructed by this matter, more intimately connected to its surface than in the femoral vein; adhering, indeed, as firmly as the coagulum does to any part of an old aneurismal sac; but in its centre there was a cavity containing about a tea-spoonful of a thick fluid of the consistence of pus, of a lightish-brown tint, and pultaceous appearance. "The uterus, which had contracted to the usual degree, at such a distance of time from delivery, its appendages and blood-vessels, and the vagina, were in a perfectly natural state. There was not the least appearance of vascular congestion about the organ; nor the slightest distension of any of its vessels. Its whole substance was pale, and the vessels every where contracted and empty." (*Transact. of Med. and Chirurg. Society*, vol. xii. p. 427.)

6. An essay was read by Dr. DAVIS, on the 6th of May, 1823, to the Medical and Chirurgical Society, with the object of proving that the proximate cause of the disease, called phlegmasia dolens, is an inflammation of one or more of the principal veins within, and in the immediate vicinity of the pelvis, producing an increased thickness of their coats, the formation of false membranes on their internal surface, a gradual coagulation of their contents, and occasionally a destructive suppuration of their whole texture; in consequence of which the canals of these vessels are so much diminished, or so totally obstructed, as to be incompetent to the circulation of blood through them. He first notices a case by J. G. ZINN (*Comment. Soc. Reg. Götting.* t. ii. p. 364. 1753), in which dissection disclosed an enlarged and indurated state of the inguinal glands of the affected limb, surrounding the crural vein, and diminishing the diameter of this vessel; and next adduces the case, the post mortem appearances of which I have noticed as described by Mr. LAWRENCE; and, in addition to the cases which he had himself observed, he mentions a case communicated to him by Mr. OLDKNOW, in which inflammation of the iliac veins was present; and "the absorbent vessels and glands were slightly enlarged as high as the lumbar regions, but not otherwise affected." (p. 436.)

7. During the commencement of 1823, M. BOUILLAUD published several cases and dissections, in which the crural veins were obliterated in women who had been affected with swelling of the lower extremities after delivery; but Dr. DAVIS had been promulgating his views since the occurrence of his first case in 1817. Dr. BOUILLAUD distinctly states, in his instructive memoir on this subject, that he considers obstruction of the crural veins to be the cause not only of the œdema of lying-in women, but of many partial dropsies; and he adduces instances of this obstruction being caused both by disease of the vessel itself, and by tumours pressing upon the vessel. (*Archives Générales de Medicine*, t. ii. 1823.)

8. Soon afterwards, M. VELPEAU published some observations on this disease, and concluded as follows: — 1st, The acute swelling of abdominal extremities of women after delivery has for its cause, at least in some cases, inflammation of the pelvic articulations, or of the veins. 2d, On the other hand, the symptoms observed in the living patients are referable as much to severe lesion of the deep-seated veins, as to that of the lymphatics. 3d, At present it remains to be shown, whether or not these latter parts are really the cause of the phlegmasia alba dolens. 4th, Affections altogether different are ranged under the same name, causing confusion, and giving rise to obscurity in the writings of several physicians on the subject. Those cases adduced by M. VELPEAU, and which occurred in the Parisian hospitals, are very interesting. In all of them there were marks of inflammation, with collections of pus, in the pelvic articulations or symphyses, in the uterine canals and veins (see case 2d), in the iliac and femoral veins, and in the lymphatics and glands. The whole of the memoir, and the observations appended to it by M. ANDRAL, have not received, from more recent writers on the subject, the attention which they deserve. It should be added, that M. VELPEAU considers the inflammatory appearances, and the purulent matters found in the veins and lymphatics, to be the consequences of the inflammation commenced in the pelvic articulations

and uterine organs. (*Archives Génér. de Méd.*, t. vi. p. 220.)

9. MM. Gardien and Capuron, somewhat earlier writers than those now referred to, regarded the disease as an inflammation of the lymphatic vessels and glands; and Dr. Dewees considered it to be inflammation occupying "exclusively the white lymphatic vessels (?) of the cellular membrane of the several textures of the limb." (*Dis. of Women*, p. 489.)

10. Dr. Burns believed, and with much justice, judging from some cases which I have seen, "the nerves to be implicated in the disease as much as the veins; and that whilst both may contribute, we shall find, in different cases, one or other predominate. (*Midwifery*, p. 611.)

11. In April, 1824, I attended a case, with my friend Dr. Davies, now of Hertford, in which the symptoms indicated at the commencement considerable affection of the nerves of the limb; but those of vascular obstruction afterwards predominated. (*Lond. Med. Repository*, vol. xxiii. p. 452.)

12. Dr. Davis, to whom the honour of originating the phlebitic pathology of phlegmasia dolens belongs, considered the inflammation to commence in the iliac veins. But Dr. Lee remarks, that Mr. Guthrie suggested to him the idea of tracing the affected veins to their origin in the uterus; and that, acting upon this suggestion, the ascertained that crural phlebitis is but an extension of uterine phlebitis. That the disease thus originates, in many cases, cannot be doubted. I have myself seen such cases, and Dr. Lee has observed many others. One of my cases, not however occurring in the puerperal state, was seen also by him. But, judging from the few I have seen, and from the descriptions of cases which have been published, I cannot come to the conclusions, either that the affection is a pure and uncomplicated phlebitis in all cases, although it may be in some, or that it always originates in the uterus, although it often does so originate. My views as to the pathology of this affection will appear more precisely in the sequel.

13. II. Description. — This disease attacks much more frequently the left lower extremity han the right. It very rarely commences in both limbs at the same time; but it sometimes passes over to the other limb, when it leaves the one first attacked. It generally appears within six weeks from delivery, — most frequently between the fourth and fifteenth day; but it is not confined to he puerperal state. Dr. Lee states, that in eight of twenty-three cases of puerperal crural phlebitis een by him, the disease commenced between the fourth and twelfth day after delivery, and in the remaining fifteen, it appeared subsequently to the latter of these days.

14. i. Symptoms. — The pathognomonic symptoms of phlegmasia dolens are preceded, in some cases, by general febrile disturbance, and in others the local symptoms are the first to appear. In the former case the patient complains, from the period of delivery, of fever which continues without a manifest cause; and, in the course of a few days, the swelling of the limb appears. In other instances, the swelling is preceded by severe rigors, which recur several times. In many cases, signs of peritonitis, or of inflammatory action of the pelvic viscera or parietes, are present before the symptoms of this affection are remarked, especially in the same side of the pelvis with the affected limb; and there is often a severe pain complained of in the iliac fossa of that side. In a few cases, however, the symptoms of phlegmasia alba dolens occur suddenly in one of the limbs, without pain or any other symptom in the abdomen or correspondent iliac region. In addition to uneasiness and pain in the lower part of the abdomen, or extending along the brim of the pelvis, the patient is weak, irritable, and depressed.

15. *a.* When the disease begins in the pelvis, the *pain* soon extends below Poupart's ligament along the thigh to the ham, calf of the leg, and instep of the foot. Shortly afterwards, the inguinal region is tumified and tense — and, in a day or two, the thigh becomes swollen, tense, white, and shining. When the pain commences in the calf of the leg, the swelling is first observed there, or at the ancles, gradually extending itself up the leg and thigh. In some cases, the pain ascends from the leg along the thigh to the groin, or even to the iliac region. In rarer instances a considerable space intervenes between the situation of the pain, which, in this case, is usually felt in the inguinal region and in the leg, the thigh being exempt from pain.

16. The *character* of the pain varies greatly. In some it is merely a sense of numbness or stiffness, or a sort of cramp, or a painful feeling of tension. In others, the pain is severe, burning, or shooting; and in several it is darting or lancinating, and so violent as to cause the patient to scream aloud. The slighter or duller pains are usually constant, but the violent shooting pains are remitting. The pains follow exactly the course of the femoral vessels, the darting violent pain being especially referable to the femoral nerve. In some cases, the pain extends all the way from the iliac fossa along the thigh to the ham and calf of the leg. The whole surface of the limb is tender. Pressure at any part, but especially on the femoral vessels, and nerves, remarkably aggravates the pain. The least motion of the extremity, more especially extension, greatly increases the pain; the easiest position is that of partial flexion. Aggravation of the pain on pressure is sometimes only felt in a limited portion or spot, as in the groin, or popliteal space, or calf of the leg.

17. *b.* The *swelling* generally occurs after the pain has existed a short time — usually after a period varying from twelve to thirty-six hours. In some instances, the swelling appears nearly contemporaneously with the pain; and it usually commences in the same situation as that in which the pain is at first felt. In the majority of cases, it proceeds from above downwards, implicating successively the hip, nates, and labium pudendæ; the thigh and leg. Casper, Callisen, Fraser, and Raige-Delorme mention instances in which the swelling extended also upwards to the flank and trunk, so as to reach the upper extremity of the same side. In some cases it begins in the foot, and rises more or less rapidly until it invades the whole extremity, the nates, vulva, and iliac region; but Puzos, Levret, White, Gardien, and other writers consider the descending character of the swelling as pathognomonic of the disease. The swelling is sometimes so great, that the affected limb is double the healthy size. When it

is advanced it is generally uniform, but it is sometimes more remarkable on the inside of the thigh, and near the knee. In the early stage of the disease, and whilst the acute symptoms continue, the swelling is tense, and does not pit after pressure; it is generally at a later period that pitting from pressure is observed.

18. *c.* The *colour* of the limb is commonly a pearly white. In some, reddish lines are observed chiefly in the course of the vessels; and in others, only small red spots or points. In cases observed by Dr. Lee and M. Salgues, dark vesicles and phlyctenæ were observed; and in a case terminating in gangrene, under the care of Dr. Davies, and also seen by me, the usual discoloration of the skin in such circumstances was observed. In most instances the *temperature* of the affected limb is increased, especially on the inner aspect, and at the earlier periods; but sometimes, as Dr. Burns has remarked, it is diminished, particularly at an advanced stage. Gangrene, in the case just adverted to, was preceded for several days by great coldness of the limb. Most writers have remarked the existence of a *nodulated chord*, very painful on pressure, descending from the crural arch more or less down the thigh. This chord may be only barely perceptible, or very remarkable, from the thickening and infiltration of the cellular tissue surrounding the vessels. In some cases, it descends considerably down the thigh, and may even be detected in the popliteal space. It is not easily detected when the swelling and pain are great, and it is chiefly when the more violent symptoms have subsided that it can be best ascertained. The pain and tenderness are always greatest in the course of this chord, or in its immediate vicinity.

19. *d.* Enlargement of the *glands* in the groin, and even of those of the ham, is often observed during life, and found after death. In some cases, as observed by Casper, red lines are traced along the surface in the direction of the tumified and tender glands. The nodosities frequently found in the course of the vessels are attributable, in some situations and cases, to enlargement of the glands; and, in other places and instances, to the induration and inflammation of portions of the cellular tissue surrounding the inflamed vessels; or to thickening of the coats of the vessels, and to coagulation of the blood below the seat of obstruction. As observed, also, in the first case, in which a dissection was made after death, the tumours may arise both from enlarged lymphatic glands, and from the distension of the vein below the seat either of compression by these glands, or of obstruction by disease of the vessel itself.

20. *e.* The *constitutional symptoms* are often very remarkable, even before the local mischief is much complained of. In most cases, weakness, depression, irritability of the pulse, diminished or disordered lochia, diminution of the secretion of milk, want of sleep, and disorder of the digestive and excreting functions immediately precede and accompany the accession of the local disease. As this becomes developed, the pulse, hitherto weak, quick, or sharp, becomes rapid, often 130 or 140 in a minute, and small and feeble; the appetite is lost, the tongue is white or loaded, the thirst is increased; the bowels are confined, and the stools unhealthy, but they are sometimes loose, fetid, or bilious; the urine is turbid, and the lochia is often diminished or suppressed, or offensive. The patient is restless, sleepless, and irritable, or morbidly sensible. The countenance is generally pale, and sometimes evincing marked anæmia. There are frequently indications of disorder of the uterine organs, or of disease of the pelvic viscera or parietes. The vulva and vagina are tender; and pressure above the pubis is seldom made without pain. The os uteri is sometimes partially open and soft. At the commencement of the disease, the skin is generally hot and dry; but it sometimes becomes moist, or perspirations break out. The secretion of milk is often altogether suppressed or much diminished. In very severe cases, the febrile disturbance is not only attended by sleeplessness, but followed by delirium. In some instances in which the disease supervened in the other limb as it subsided in the first affected, the cerebra symptoms were very urgent. In two cases which were under my care, one of which was attended also by Dr. Lee, constant low delirium, followed by coma, came on; but the patient ultimately recovered.

21. ii. Terminations. — The disease may terminate variously: — 1st, *by resolution.* When it terminates in this way, the *acute symptoms* subside in the course of from twelve to twenty days generally in the order of their appearance; th pain ceases, the swelling disappears, and the us of the limb returns. As the swelling begins t subside, it pits more readily on pressure; and, i many cases, the tumours and chord, in the situations already mentioned, are more distinctly fel and in some the superficial veins are dilated, o irregularly enlarged, not only in the limb, bu also, as stated by M. Raige-Delorme, in th flank and parts adjoining. As the resolution proceeds, the constitutional symptoms subside. Resolution takes place much more gradually an slowly when obstruction of the femoral is presen The swelling then continues sometimes for months in a less degree, and thus becomes *chronic*, th patient being hardly able to use the limb. I these cases, thickening of the cellular tissue surrounding the vessel often exists, and a varicos state of the veins takes place and remains. — 2d *Suppuration*, according to Petit, Capuron, an Churchill, takes place in rare instances, generally in the tract of the large vessels, or situatio of the lymphatic glands. — This result obviousl proceeds from the inflammation of those vesse having extended to the surrounding cellular tissu and passed on to abscess. — 3d, The disease sti more rarely terminates in *gangrene*. M. Gerhar has adduced a case in which this occurred'; an Dr. Davies has published the details of anothe which was also seen by me on several occasion In this case, gangrene of the leg and foot was fo lowed by sloughing, and the parts were amputate by Dr. Davies above the knee, the thigh being the time about double the thickness of the oppo site one. As soon as the vessels were divided, th blood in the veins was observed quite coagulate A considerable quantity of serum was discharge from the surface of the stump, as soon as the le was removed. (*London Med. Repos.*, vol. xxi p. 454.)

22. 4th, *Death* sometimes takes place, gen rally owing to the severity of the several chang which supervene in the course of the diseas It may occur suddenly, as remarked by Denma

Burns, and Blundell, owing chiefly to exhaustion consequent upon previous losses of blood, and upon the violence of the constitutional and nervous symptoms, especially if the patient makes any exertion in this state, or raises herself up too quickly in bed. It most commonly, however, takes place, consequently upon the organic lesions found in the pelvic viscera and parietes, such as inflammation and purulent formations in the uterus, ovaria, and pelvic articulations, with similar changes and coagulations of blood in the iliac veins. In these cases, death is the result of contamination of the circulating fluids, and is generally preceded by a very rapid, small, and feeble pulse, by distressing feelings of sinking, by delirium, sometimes coma, and various nervous phenomena.

23. iii. Appearances after Death. On dissection, the limb is seen infiltrated with serum and lymph. Several small abscesses are disseminated through the cellular tissue, between the muscles, or one or two considerable abscesses are formed in the vicinity of the large vessels, especially in the iliac, inguinal, and popliteal regions. The sub-peritoneal cellular tissue, particularly that of the meso-rectum and iliac fossæ, is sometimes infiltrated with a sero-purulent matter. The articulations of the affected limb, and even the joints at a distance from the seat of the affection, although much more rarely, are occasionally the seats of suppuration. Purulent collections have also been found in the liver and lungs. A sero-puriform effusion has sometimes taken place in the pelvic cavity, and in the cavity of the pleura. These lesions are secondary, and the consequences of the phlebitis, constituting the chief pathological condition of the malady.

24. *A.* The researches of Dr. Davis, Dr. R. Lee, Dr. Davies, and others, have fully shown the great extent to which the *veins* of the limb, and very frequently also those of the uterus, are affected in this malady. The femoral vein is always more or less diseased. It is inflamed, its parietes are thickened, and its canal is obstructed by fibrinous coagula, in the centres of which puriform, or a brownish grumous, matter is often found. In rarer cases, a fibrinous false membrane is observed adhering to the interior of the vessel. The same changes may be traced along the profunda and popliteal vein, to most of the veins of the extremity. The phlebitis may be so general in the limb, that a puriform matter escapes from all the small veins upon dividing them. In many cases, however, the saphena remains unaffected. The same lesions as exist in the femoral vein are also generally observed in the external iliac of the same side, and often extend to the hypogastric or internal iliac. In this latter case, the veins of the vagina, of the neck and body of the uterus and of the ovaria and tubes; and, indeed, most of the branches which contribute to the hypogastric, present the usual appearances of inflammation, on the same side with that affected. In many cases, the same lesions are found in the veins of both sides of the uterine organs, but they extend not so far as the internal iliac of the unaffected side. In some instances the inflammation extends not only to the common iliac, but also to the vena cava, and in rare instances as far as the emulgent veins. M. Raige-Delorme remarks, that the alteration may even be traced to the right side of the heart; but this can be possible only in rare instances.

25. When the disease has existed in both extremities, the phlebitis in the pelvic and uterine organs extends along both hypogastric veins to the external iliacs and femoral veins, &c.; it has even been observed in the lower portion of the vena cava. It has been supposed that the supervention of the disease in the other limb, as that in the first attacked subsides, is produced by the extension of the inflammation from the common iliac of the one side, to the vena cava, and to the common iliac of the other side; but the inflammation of the uterine veins may extend to both limbs, although not at the same time, without passing to and from the vena cava. — M. Raige-Delorme refers to two cases in which phlebitis supervened in the brachial, cephalic, and cubital veins in the course of this disease.

26. *B.* The *lymphatic glands* and *vessels* are frequently also found inflamed; but where this lesion co-exists with phlebitis, it is difficult to determine which of the two is primary. They are probably contemporaneous in their development and course. In the account of the first *post mortem* examination of the disease on record, Zinn states, that the *inguinal glands* were greatly enlarged and indurated, and that they surrounded and very much diminished the diameter of the crural vein. The glands of the groin and ham are often enlarged, injected, and sometimes in a state of suppuration; but purulent matter is more frequently found in the cellular tissue surrounding them, than in the glands themselves. Raige-Delorme states that the glands in the iliac fossæ sometimes present various degrees of inflammation, which has also extended to the mesenteric glands.

27. *C.* The *lymphatic vessels* have been frequently overlooked in dissections of the affected limb. Bouillaud states that inflammation of these vessels has been ascertained in a considerable number of cases of this disease. MM. Tonnellé, Duplay, Nonat have also confirmed this view. M. Albonneau (*Journ. Comp. du Dict. des Scien. Med.* t. xxxviii. p. 10.) has recorded a case in which "the superficial lymphatics of the thigh presented a deep red colour, were enlarged and tortuous, the veins being also inflamed on the same side as high as the vena cava." Dr. Churchill remarks, that pus and evidences of inflammation are sometimes met with in the absorbents.

28. *D.* The *nerves* are probably also more frequently implicated than they have lately been supposed to be, particularly since attention was more especially directed to the veins. In the interesting case published by Dr. Davies, the symptoms, which were very violent in their accession, were referable to the femoral nerve; and M. Dugès has adduced several cases, showing that neuritis actually forms a part of the lesions observed in this disease.

29. *E.* Alterations of the *uterus*, and especially of the *veins of the organ*, have been much insisted upon by Dr. Lee as the points of departure in the succession of morbid phenomena constituting this complex malady. Although M. Velpeau appears to have been amongst the first to describe lesions of the uterus and its veins, in examinations of this disease after death, still Dr. Lee first insisted upon

the connection, and upon the circumstance of the phlebitis being propagated from the uterus or its appendages to the hypogastric, iliac, and femoral veins. Inflammation of the veins and canals of the uterus, puriform matter in them, or in the walls of the uterus; softening of the organ; membranous exudations on its internal surface; softening, dark discoloration and marks of inflammatory action, more especially at the part where the placenta was attached; puriform collections in the ovaria, &c., have been very frequently observed. Dr. Burns, however, remarks that the uterus is sometimes found quite healthy. Besides these lesions, M. Velpeau has shown that the adjoining pelvic viscera may be also more or less implicated, especially the sacro-iliac and pubic symphyses, the cartilages and ligaments of which are loosened, softened, and bathed in pus; but these lesions are not so frequent as those of the uterus and its appendages.

30. II. Causes. — *A.* This disease has not been observed with due precision in respect of its remote causes, and particularly as to those which *predispose* to the origination and extension of the several lesions recognisable during life and found after death. The much more frequent occurrence of the affection during the six weeks immediately following parturition evidently proves that the changes more especially connected with that period, are more or less concerned in producing it. The pressure which the gravid uterus exerts upon the nerves, bloodvessels, and other parts within the pelvis during the latter months of pregnancy, the violence which these parts often sustain during parturition, the sudden removal of the pressure, and the changes in the state of nervous function and of circulation consequent on the removal, altogether remarkably predispose to the supervention of the affection, especially when aided by other circumstances. But the disease may occur during pregnancy. Puzos treated three cases before the period of parturition; and in these, as well as in others met with at this period, it is reasonable to infer, that the pressure was chiefly concerned in producing it in these instances, and that uterine phlebitis was not its point of departure.

31. As far as my own observation enables me to judge, aided by the histories of many recorded cases, constitutional debility and delicacy of frame; the exhaustion consequent upon protracted, difficult, or instrumental labours; hæmorrhage during or after parturition; and anæmial and cachectic states of the system, are amongst the most influential predisposing causes of this affection. Females subject to leucorrhœa, especially during pregnancy, appear also to be more liable than others to an attack.

32. *B.* The *exciting causes* are, in the great majority of instances, those of uterine phlebitis. The use of instruments during labour, injury of the organ, the retention of portions of the placenta, the means taken to remove it; the retention of coagula, or of the lochial discharge in the uterine cavity or vagina, owing to deficient contractile power; imperfect contraction of the uterine canals and veins admitting of the retention, and consequent alteration, of their contents; the passage of the retained and altered lochia from the cavity of the uterus into the uterine veins; inflammation of, and purulent collections in, the parietes of the uterus or in the ovaria, giving rise to inflammation of the veins of these organs; inflammation of th vagina, or of any of the pelvic articulations, ar the most frequent exciting causes of phlegmasi dolens. These local conditions and changes, i the great majority of cases in which they tak place, either proceed no further, or give rise t other secondary maladies than this; but, whe the predisposition is marked, and when othe causes reinforce these, the affection will be in duced; and may occur, although in rare case even when the uterine lesions are not present.

33. There can be no doubt that, when th lochial discharge is not freely thrown off, in wea or exhausted females, or after copious losses o blood, and when morbid secretions form in th uterus or ovaria, in these states of the system ab sorption of these matters, either by the lymphatic or veins, or by both, will then take place mor readily and abundantly than in other circun stances; the matters thus absorbed inflaming th vessels and contaminating the fluids. Causes pro ducing a suppression of the lochia, or of the se cretion of milk, may also occasion the supervei tion of crural phlebitis, and even of inflammatio of the absorbents, by favouring the absorption o excrementitial matters; and thus the old doctrin of the metastasis of these secretions, although no strictly applicable to these cases, is not, in som respects, very wide of the truth.

34. Exposures to cold, wet, and to curren of air, insufficient clothing, and unwholesom heating food and beverages, especially spirituou liquors, are evidently concurring, if not excitin causes. Probably more importance has som times been attached to the influence of cold tha it deserves; but where the cold is applied directl to the limb — where the lower extremities are in sufficiently protected from it, or where the patie wears damp shoes, &c., particularly upon gettin about soon after parturition, the injurious in fluence may not be local only, but extended t several of the excreting functions; and, althoug it may not be sufficient of itself to produce th disease, it may powerfully aid the operation o other causes, or favour the extension of morb changes existing in the uterine organs, or parts i the vicinity, to the iliac and femoral veins, or als to the nerves and absorbent vessels.

35. III. Phlegmasia Alba Dolens, uncon nected with the Puerperal States. — A affection, or rather a complex disease, in ever respect similar to that now described in connec tion with the puerperal states, may occur in *wome independently of these states*, and even in the *ma sex;* but in every instance which I have seen o this description, amounting in all to nine, of whic I have taken notes, it has been contingent upo some other dangerous disease; and has presente the same changes of structure in the limb as thos which I have described above (§§ 24. *et seq.*. The diseases upon which it has supervened in m practice are the following: — Inflammation of th uterus; hysteritis complicated with dysentery cancer of the mamma (two cases); tubercula consumption; typhoid fever; iliac abscess (tw cases); malignant ulceration of the mouth an neck of the uterus, and injury of one of the uppe extremities. The injury in this last instance o the affection was soon followed by inflammatio of the lymphatics and veins; the patient, howeve recovered.

36. The case of the disease following hysteritis occurred in 1831, in a lady who had not been pregnant for three or four years. The affection commenced in the right thigh, and extended to the left as it began to subside in the right. The patient had shortly before experienced a smart dysenteric attack, which was followed by inflammation of the uterus, and for each of these she had been moderately blooded. The disease of the extremities was most severe, and was attended by dangerous constitutional symptoms. As the case well illustrated Dr. R. LEE's views of the pathology of the disease, I requested him to see her. Delirium, sopor, and great nervous exhaustion supervened, but followed the very rapid subsidence of the swelling of both extremities, which had reached as high as the flanks. She was very remarkably benefited by nervous and restorative remedies, and recovered very rapidly. I have seen her very frequently since, and as recently as the day of my writing this; but there was never any evidence of enlarged veins or swelling about the ancles subsequent to the attack; the appearances of the limbs, up to this time, now fifteen years, being in every respect the same as before.

37. In the other case there were both hysteritis and dysentery; indeed, the whole pelvic viscera appeared simultaneously attacked. This person, the wife of a publican, had never been pregnant; only one extremity was affected; but low fever, with muttering delirium, coma, and destructive inflammation of one eye, supervened, and she died; the other eye also becoming affected shortly before death.

38. In both the cases of carcinoma mammæ, the arm on the affected side was enormously swollen, painful, and tender; but not discoloured. One of the cases was that of a lady attended by Dr. YOUNG and myself. She was only thirty-five years of age; had borne several children, and was then pregnant. Great enlargement of the lymphatic glands had taken place; and obstruction both of the lymphatic and of the venous circulation obviously existed. This lady, who was far advanced in pregnancy when the affection of the arm supervened, was delivered nearly at her full time of a child about one fourth the usual weight; she died, as was expected, shortly afterwards. The other case occurred in a person advanced in age, and was in all respects similar as regarded the local disease. In neither instances was an examination after death allowed.

39. The case contingent upon tubercular consumption, of which I have notes, and which was a remarkable instance of the affection, presented, upon dissection, tubercular deposits in the inguinal glands with great enlargement; obstruction of, and coagulation of blood in the femoral and iliac veins, the centres of the coagula consisting of a grumous, soft, or pultaceous brown matter. There had been, also, diarrhœa and ulceration of the bowels; but the veins were not traced from the iliac to the ramifications to the pelvic viscera; and it was hence not manifest whether or not the disease of the veins was caused by ulceration in the lower bowels, or by the morbid state of the blood consequent upon the absorption of purulent and tubercular matters. I have seen other cases of great swelling of one or both lower extremities, consequent upon phthisis; but I have had an opportunity of examining after death only the one now mentioned. My recollections of the others are such as to lead me to infer that the obstruction in the veins of the lower extremities was the consequence chiefly of the morbid states of the blood, aided by the physical conditions of the limb — the sitting posture, and the remora of the blood in the veins, owing to this posture, and to the influence of gravitation; and that these states favoured coagulation of blood in the veins, or inflammation of their internal surface.

40. Instances of phlebitis in the course of low or typhoid fevers are not rare. I have, however, met with only one in my own practice. In this case, there was certainly no evidence of ulceration of the lower bowels. The disease of the veins is to be referred chiefly to the state of the blood, and to some local physical conditions, or causes acting locally. Drs. GRAVES and STOKES have related instances of this contingent form of the affection. They remarked that the œdema was unattended by redness, but accompanied with pain, tenderness, increased heat, and impaired motion of the limb.

41. The first case of the disease contingent upon iliac abscess occurred to me in 1821, in a groom, a patient of the South London Dispensary, when physician to that institution, and was attributed to the pressure of the collected matter upon the iliac nerves and veins, and probably, also, upon the lymphatics. A more recent case was entirely similar, and both terminated fatally soon afterwards, but inspections were not permitted. There can be no doubt of the occasional occurrence of this malady during organic changes in the uterus and ovaria, occurring independently of parturition, and more especially if these changes are attended by the absorption of morbid secretions from these organs. D. R. LEE has adduced several instances of this source of the disease. Sir H. HALFORD has recorded two cases, which consisted chiefly of inflammation of the veins arising apparently from exposure to currents of cold air; and, in one case, from such exposure being in the standing posture. Many years ago I met with a case which originated in this cause; but the patient was of a cachectic habit of body; recovery, however, took place without any unfavourable occurrence. It is not improbable that, during an impure or morbid state of the blood, connected with debility and a languid state of the circulation, the remora of the blood in the veins of the lower extremities, favoured by position or other physical causes, will occasion either partial spontaneous coagulation, or an inflammatory state of the coats of the vessel; more especially if pressure have existed on the trunk of the veins. Hence the occasional appearance of this affection in the advanced progress of many other diseases, especially of those in the course of which morbid secretions are apt to pass into the circulation, or to be absorbed by the lymphatics; and when pressure has existed upon, or has been suddenly removed from, large veins. (VEINS, DISEASES OF.)

42. IV. NATURE OF THE DISEASE. — *A.* I have already noticed (§§ 4. *et seq.*) some of the opinions formerly entertained respecting the nature of this complex affection, and stated enough to show that most of these were more or less erroneous, but chiefly in their limitation to one only of the several

morbid conditions generally present in the fully developed cases of the disease. Since the days of White, who attributed the malady to rupture of the lymphatics, most writers up to the end of the last century believed it to be an inflammation of the lymphatics. Boyer, Trye, Denman, Ferriar, and Gardien adopted this opinion, with certain shades of difference. Thus Trye considered, that the inflammation of these vessels proceeded sometimes from pressure of the gravid uterus, sometimes from an acrid matter secreted by this organ; whilst Denman supposed that it originated in the lymphatic glands of the groin; and Ferriar that it commenced in the lymphatics of the thigh. Many of the symptoms observed during life, and even part of the changes detected after death, evince that these views were not entirely without foundation. They wanted the support derived from post mortem research; and they constituted only a part of the morbid changes — they were merely a substitution of a part, and often only a small part, of the malady for the whole.

43. Much more recently, certain symptoms, attracting the notice of pathologists, and more than ordinary attention being directed to these symptoms, and to their origins, a different opinion of the nature of phlegmasia dolens was suggested, and former views were thrown in the shade. Thus Albers (Hufeland's *Journal*, &c., Feb. 1807, p. 16.) considered the disease as merely a form of neuralgia. He believed that it commenced in the nerves of the limb, and that the swelling was a consecutive lesion. That this is actually the case, at least in some cases, as in that recorded by Dr. Davies, in two or three cases seen by myself, and in others recorded by Dugès, Kruger, and other physicians, cannot be doubted. Dugès (*Revue Medicale*, t. iii. 1824); Siebold, Loewenhard (in Siebold's *Journ.* t. x. p. 352.); Hankel (*Rust's Magazin*, t. xxiv.), and Kruger (*Horn's Archiv.* t. iv. 1831), attributed the malady to inflammation of the nerves of the pelvis and thigh, or at least to a morbid state of the sensibility of these nerves, admitting, however, consecutive changes in the veins, lymphatics, and arteries of the limb.

44. Newmann and Treviranus (*Siebold's Journ.* t. xi. p. 253.), on the other hand, considered this affection as an inflammation of the aponeurosis, or fascia lata, giving rise to an effusion of serum and lymph; whilst others even supposed it to be a form of rheumatism occurring in the puerperal state, and modified by the circumstances of this state. This opinion, supported by Himly and Reuter, is equally visionary with that of Newmann.

45. The researches of Dr. Davis first established inflammation and obstruction of the veins as the principal lesion of severe cases of this malady; and the investigations of Bouillaud, Velpeau, J. Davies, Boudaut, and R. Lee, further illustrated this doctrine. Dr. Lee first demonstrated the origination, of at least many of the cases of the disease, in lesions of the uterus and the veins of this organ, in uterine phlebitis. So that the prevailing opinion in the present day is, that *phlegmasia alba dolens* is inflammation of the iliac and femoral veins, originating in the veins of the uterus, and often extending, on the one hand, to the common iliac veins, or even to the vena cava; and, on the other, to most of the veins in the extremity.

46. I believe, however, from considerable experience of the disease, in different circumstances, that phlegmasia dolens is a more complex affection than it is generally now considered to be — that it is not always at least a simple crural phlebitis — that it does not always, although very frequently it does, originate in uterine phlebitis — that it is not uniform in character, phenomena, and progress — and that it is a much more complex disease than it is generally viewed to be.

47. *B. Pathological Inferences.* — *a.* The disease certainly consists chiefly of *inflammation* or *obstruction*, or of *both lesions*, of the *femoral and iliac veins;* but these, although the chief, or occasionally almost the only lesions, are not always such. — *b.* The crural phlebitis, even when manifestly existing, cannot always be referred to the *uterus* for its origin, although it very frequently does so originate, especially in cases occurring after delivery. — *c.* The lesions observed in the veins appear, in some instances, as consequences of prolonged pressure, or of this cause and the sudden removal of that pressure, the disease originating in the iliac and femoral veins. — *d.* The affection appears to commence, in some cases, in the *nerves*, owing to the causes just assigned, the veins becoming consecutively affected, or being contemporaneously attacked. — *e.* Cases occur in which it is difficult to determine whether the *veins* or the *lymphatic vessels* and *glands* are primarily or mainly implicated, the symptoms and the lesions observed after death being referable to both systems of vessels. — *f.* The disease may originate in lesion of any of the *pelvic viscera*, or of the articulations or parietes of the pelvis; and, in such cases, it may not be limited to either the *veins* or *absorbents;* but may affect the one or the other, and extend to both. — *g.* The disease may be unconnected with lesion of the pelvic viscera, and may commence in the veins, or in the lymphatics or veins, or even in the nerves, and extend more or less to these vessels, especially when the patient has had the extremity exposed to pressure or injury, or to cold or currents of cold air, or to other injurious physical agents. — *h.* The precursory, early, and advanced symptoms, the constitutional phenomena, and the terminations or consequences of the affection, vary according as either of the parts, just pointed out as being implicated more or less, or any two or more of them, are prominently affected; the pain and nervous symptoms are more severe, the more the *nerves* are affected; the swelling, the general œdema of the limb, and the pitting on pressure, and the low or typhoid character of the accompanying fever, are more remarkable the more the disease is confined to the *veins;* and especially when it is preceded or attended by disease of the uterus, or of any other pelvic viscus or part; the hardness, tenseness, and heat of the limb; the tenderness of the surface, and its indisposition to pit on pressure is more manifest, the more the *lymphatics* and *glands* are concerned in the malady. — *i.* I have never met with a case of the disease in which the *arteries* were implicated.

48. V. Prognosis.— Although a small proportion only of those who are attacked with phlegmasia dolens terminates unfavourably, especially when the affection appears after parturition, still it

should be viewed as a serious disease, and more particularly when it occurs in the course of other maladies which contaminate the circulating fluids. But the amount of danger should be inferred chiefly from the severity of the symptoms, from what is made apparent as to the cause and origin of the attack, and from the pathological condition manifested at the commencement and progress of the case. Pre-existing disease of the pelvic viscera or parietes; evidence of inflammation of the iliac and femoral veins; the extension of the malady to both extremities; low fever and delirium; a very rapid, soft, and small pulse, are severally indications of great danger.

49. The nature and amount of disease of the pelvic viscera, preceding and attending the attack, should always be duly estimated, as well as the nature and relations of it. When disease of the veins is detected, the extension of it to the common iliac and vena cava, and consequent contamination of the blood are to be dreaded — changes which may be often prevented by judicious practice, but which, when once induced, can rarely be removed. The passage of the affection to the other limb indicates, at least, a severe lesion of the uterine or pelvic viscera, possibly even the extension of the venous disease to the vena cava. Low fever, delirium, sopor, and a rapid soft pulse, evince contamination of the blood, and the injurious influence of this change upon the brain and nervous system, and constitution. The contingent occurrence of the affection in the course of other maladies, is always a very grave or even most dangerous circumstance; but the amount of that danger depends upon the nature of the primary disease. In malignant or cancerous maladies, in tubercular consumption, and even in some other constitutional diseases, the hopeless state of the patient depends more upon these, than upon this super-induced affection, which, however, hastens the unfavourable issue.

50. VI. TREATMENT. — It is of the utmost importance to ascertain the predisposing and exciting causes of this affection; and the pre-existing pathological conditions, especially those so frequently implicating the pelvic viscera and parietes, before the indications and means of cure are adopted. Of the considerable number of cases in which I have been consulted, I have not met with one which did not occur consequently either upon large losses of blood from the uterus, or upon blood-letting, large in relation to the state and constitution of the patient. There have frequently been marked disorders of the secreting and excreting functions, and sometimes also a cachectic habit of body. In no instance have the previous health and existing state of the patient been such as to admit of venesection, or even of local depletions to a great amount. I have never prescribed the former for the complaint; and I have ordered the latter only in a moderate degree. The uterine or other lesions in which the disease often originates, the pre-existing state of the parts which are the seats of this disease, the antecedent and existing state of the patient, and the character of the pulse and other symptoms, not merely forbid the employment of general or large local blood-lettings, but warrant the adoption of restorative, and often even of tonic remedies. But the facts, — *firstly*, that the disease generally originates in states of rapidly induced anæmia, of vital exhaustion, or of vascular contamination; and, *secondly*, that both the morbid changes in which it originates, and the pathological conditions of which it consists, become more extended, and more rapidly contaminate the circulation, after vascular depletions and depressing agents, have been either altogether unknown to, or very remarkably overlooked by, the numerous writers on this complaint.

51. The chief *indications* are therefore, *firstly*, to enable the powers of life to resist the extension of the changes constituting the malady, and *secondly*, to palliate, reduce, and ultimately remove, the symptoms and lesions which already exist. These intentions should not be carried ou altogether in succession, but in great measure simultaneously; and they are most appropriate in the cases of the disease occurring after parturition. My observation warrants me in stating, that the most dangerous symptoms have occurred in those who had been most exhausted, or lost the largest quantities of blood either before or during the disease; whilst those cases proceeded most favourably, for which the above indications were prescribed. I have certainly seen cases proceed favourably after the application of leeches in the course of the crural vessels; but I doubt any actual advantage having been derived from them. Dr. CHURCHILL remarks that, "generally speaking, venesection will not be required; but if the patient be of a plethoric habit — if she have in some degree recovered her confinement, and if the disease set in with great violence, it may be advisable." (p. 426.) Now, without denying the occurrence of the complaint in these circumstances, it certainly takes place very rarely; but most commonly in opposite conditions of the patient. Dr. R. LEE states that, in all the cases he has witnessed, "there has been so much feebleness of pulse and prostration of strength," that he has not ventured to draw blood from the arm; yet he trusts for the relief of the inflammation "to the repeated application of leeches above and below POUPART's ligament;" and recommends "from two to three dozen of leeches to be applied immediately after the commencement of the disease, and the bleeding to be encouraged by warm fomentations." "Should the relief of the local pain not be complete, it is requisite soon to re-apply the leeches in numbers proportioned to the severity of the attack, and to repeat them a third, or even a fourth time at no very distant intervals, should the disease not yield." (*Cyclop. of Pract. Med.* vol. iii. p. 349.)

52. Now I believe, that "the feebleness of pulse and prostration of strength," so very justly insisted upon by Dr. R. LEE, as forbidding a recourse to venesection, equally forbid the application of leeches in the numbers at least here recommended by him. He considers the disease exclusively to consist of inflammation of the veins, and, according to his own showing, it should be treated as such. But I am confident that neither bleeding from the arm, nor applications of large numbers of leeches are beneficial either in phlebitis, or in lymphangeitis, or even in the association of both. I state this from a very sufficient experience; and I am supported in this by JOHN HUNTER, who has insisted upon the necessity of having recourse to such remedies as will prevent the extension of the disease along the vessels, and

the contamination of the blood; neither of which objects can be accomplished by venesection, nor by the application of numbers of leeches. If, therefore, leeches be applied at all in the vicinity of the pain, or near the groin, they should be few.

53. I have shown, when treating of inflammations of the lymphatics, of the nerves, and of the veins, that blood-letting aggravates them, and that even moderate local depletions produce but little benefit; and, granting that inflammation of these vessels exists in phlegmasia dolens, and even that it originates in the pelvic viscera or parts, it is to be presumed, irrespective of the results of experience, that vascular depletions cannot be more serviceable in this malady than in the uncomplicated states of either of these inflammations. The very circumstance of the inflammation having commenced in some one of these viscera, especially in the uterus, and extended to the internal iliac veins, is a sufficient proof of the impropriety of having recourse to depletions of every kind; for, whether the complaint originates in the absorption of morbid matter from the uterus, or whether it arises in the lymphatics or veins themselves, extending along their internal surfaces, both the absorption and the disposition of the disease to extend itself, will be very remarkably increased by depletions and other depressing agents. Indeed, I have no doubt of the extension of the disease to the opposite limb being caused chiefly by blood-letting and a lowering treatment. Instead, therefore, of approving the treatment usually mentioned in the works of writers upon midwifery and the diseases of women, I would advise that which my experience, since 1820, has shown to be most efficacious, not only in this disease, but also in several maladies, occurring after parturition, as well as in others implicating the circulating vessels and fluids; and which, moreover, fulfils the intentions of cure above specified (§§ 54, 55. *et seq.*).

54. Instead, moreover, of having recourse to the more decided antiphlogistic, or rather depressing, measures recommended by most of the English and French writers on the disease, I would advise the bowels to be moderately evacuated by means of a stomachic aperient (see Form, No. 266.), or of castor oil and spirits of turpentine (from three to five drachms of each), taken on milk or some aromatic water; and of an enema containing these latter substances. The same remedies should be repeated, daily or occasionally, or as circumstances require; but I have not found it necessary to have recourse to them oftener than three or four times, although I have prescribed the enema more frequently. After evacuating the bowels by these means, a pill, containing from two to five grains of camphor, and one grain of opium, should be given, and repeated after three hours; and a third, or even a fourth, dose may be given after six or eight hours, according to the state of the patient. If there be irritability of stomach, a grain of capsicum, or a drop of creasote, or both, may be added to each dose; and these will also diminish or prevent the headache usually complained of after taking opium.

55. Immediately upon first seeing the patient, and the more especially if pain is detected in the pelvic regions, either the warm *terebinthinate fomentation* should be applied, in the way so frequently advised in this work, over the hypogastric region and upper part of the affected thigh, or flannels moistened with this *embrocation* should be kept in the same situation as long as possible, covered with a warm napkin, and renewed from time to time, as circumstances may require.

No. 324. ℞. Linimenti Camphoræ co.: Linimenti Terebinthinæ, āā ℥iss; Olei Olivæ; Tinct. Opii āā ʒss; Olei Cajuputi, ʒjss. Misce bene, et fiat Embrocatio, more dicto utenda.

56. This treatment will often arrest the disease in a very short time, if it be resorted to at an early period; and, even at a more advanced stage, it will generally prevent the more dangerous symptoms, and the passage of the affection to the sound limb. If the disease be preceded or attended by an offensive discharge from the uterus or vagina, a frequent injection of a warm infusion of chamomile flowers and camphor water, with or without a drop or two of creasote, will be of service; and enemata containing spirits of turpentine, camphor, and assafœtida, may be thrown up occasionally. If the pulse be very frequent and weak, or continue in this state, after a recourse to the above means, the decoction of bark should be given, either with the hydrochloric, or nitro-hydrochloric acid, hydrochloric æther, and aromatic tinctures; or with the liquor ammoniæ acetatis, and full doses of the sesqui-carbonate of ammonia; or with the chlorate of potass and æther; and these remedies may be repeated as frequently as the case may require, and whether the swelling be abated or not, the camphor and opium being also taken as the severity of the pain and other symptoms may indicate.

57. If low fever, delirium, and other indications of extension of the disease to the common iliac veins, and of contamination of the blood be present, the decoction of bark, with the chlorate of potass and hydrochloric æther, or the alkaline carbonates and serpentaria; camphor, with aromatics and opium; the injections into the rectum and vagina above recommended; the cautious exhibition of wine, and even of brandy, with nutritious substances, as with arrowroot, the yolk of egg, &c.; and suitable articles of diet are indispensable. It sometimes happens, as I observed in a severe case, in which both extremities were affected, that the very rapid subsidence of the swelling, and consequently the rapid conveyance of the matters which had been effused into the circulation by absorption, so contaminates the blood as to occasion the most dangerous as well as alarming symptoms; the patient labouring under low muttering delirium, with sopor or coma, and a very rapid, weak, or small pulse. In this case, these symptoms did not appear until the swelling of both extremities had subsided with remarkable rapidity; they were treated as just recommended, and terminated favourably, without the least change existing in either of the limbs, shortly or long after the attack, as fully ascertained on several occasions.

58. The above treatment has been uniformly successful in the cases to which I have been called, although some of them have been very far advanced before I saw them. As I have never met with an instance of the malady that has been attended by sthenic inflammatory action, or that has occurred in a plethoric habit, or even mo-

derately robust constitutions, but in opposite states of the system, so I have not had recourse to vascular depletions. If, however, the disease should occur in the former circumstances, vascular depletions may precede the means now advised, although I believe that they are not even in such cases so indispensable as many writers have supposed, and who have most erroneously believed, that inflammatory affections are to be removed only by depletions, without duly considering that *inflammations* are various in character and diathesis, as I have shown in that article, and that they are often aggravated by a lowering treatment, and are then to be cured only by diametrically opposite means. It will be seen that I have recommended measures altogether consentaneous with my views as to the treatment of lymphangeitis, neuritis, and phlebitis, and in accordance with the sound principle laid down by JOHN HUNTER, but now so generally overlooked, namely, that in all spreading inflammations, and more especially in the inflammations of circulating vessels, the chief intention of cure should be to enable the constitutional powers to form coagulable lymph, whereby the disease may be limited, and the extension of the mischief and contamination of the system prevented; an inention to be fulfilled only by tonics and other restorative means.

59. Upon referring to the writings of the more ecent writers, especially those upon midwifery, much difference of opinion as to the treatment of this disease presents itself. Whilst DENMAN, DEWEES, BLUNDELL, LEE, CHURCHILL, RAIGE-DELORME, DAVIS, and others advise vascular depletions, chiefly, however, by leeches, and only conditionally by venesection, a small minority, mongst whom Dr. BURNS is most conspicuous, ecommend tonic and restorative remedies. Dr. BURNS remarks, that "at first we may use saline raughts; but these are not to be often repeated, nd must not be given so as to produce much erspiration. In a short time they should be xchanged for bark, sulphuric acid, and opiates, which tend to diminish the irritability. In the ast stage we may give a moderate quantity f wine. When the pain shifts like rheumatism, ark and small doses of calomel are useful. In very stage the bowels should be kept regular." *Midwifery*, p. 612.) It is evident from this, that Dr. BURNS and myself adopt the same principle r indication of treatment, and that his remedies, s far as they are stated, are the same as those I ave advised.

60. Much difference of opinion also exists as o the *local treatment* of the affection. I have ready noticed (§ 55.) what appears to me the ost important part of that treatment. *Blisters* ere recommended to be applied to the limb, imediately upon discovering the complaint, by Mr. SANKEY; and were considered by him as a pecific. He advises "the first to be applied to e calf of the leg, as the pain is generally most vere in that part, and there is less fear of its not ealing than if applied lower. If required he peats the blister every two or three days, not at e same place, but higher or lower, according to e seat of the pain." (*Edin. Med. and Surg. ourn.* vol. x. p. 402.) Some difference of opion has been expressed respecting this practice. r. DEWEES disapproves of it, and Dr. CHURCHILL expresses himself favourably as to it. I have seen blisters employed only in one case, and I was led to believe them to have acted favourably, by procuring copious discharges of serum and of a sero-puriform matter, and thereby preventing or diminishing absorption and the extension of the disease along the vessels.

61. When the more acute symptoms have been subdued, and when the accompanying fever is either abated, or does not assume a severe or adynamic form, gentle support may be afforded to the limb by a slight flannel bandage drawn gradually tighter; and the *embrocation* prescribed above (§§ 55.) may be employed as a liniment, with gentle friction of the surface, if no abrasion of the cuticle have followed the application of it in the mode previously advised. As the disease subsides, a tonic, or at least a restorative, treatment is still generally required, with due attention to the state of the bowels; and a light nutritious diet — chiefly, however, of farinaceous articles. The best aperient in this state of the disease is that consisting of equal parts of the compound infusions of gentian and senna, with some neutral salt and an aromatic tincture (see *Form.* 266.). If the swelling of the limb continue, the supertartrate of potash may be given with the bi-borate of soda, or the latter may be taken in any aromatic or tonic infusion in *small* doses, so as not to disorder the stomach.

62. As convalescence advances, change of air, warm salt water bathing, and subsequently sea bathing may be recommended. But in this, as well as in the early periods of ailment, due attention should be directed to the uterine functions and discharges; and the treatment ought to be varied accordingly, and after due examination of the state of the uterus. At an advanced period of convalescence the preparations of iron, especially the compound steel mixture (mist. ferri comp.); or the muriated tincture of iron, with the compound tincture of camphor, are generally most serviceable: but much of the management of the patient should depend upon the circumstance of each case, upon the contingencies which may arise, and upon the complications observed in the course of the complaint.

63. *The local states of disease, described above* (§ 35.) *as either closely resembling, or being identical with, the affection now treated of*, should be viewed closely in connection with those upon which they occasionally supervene. They can hardly be treated apart from the original maladies, and in some instances they will be but little benefited by any treatment whatever, especially when they occur in the course of malignant and consumptive diseases. In other circumstances, the treatment must depend upon the nature of their exciting causes and existing pathological conditions; the *indications* being to remove them, and to enable the system to oppose their progress, or entirely to overcome them; intentions which will be best fulfilled by the means already recommended.

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PHRENITIS. See BRAIN AND ITS MEMBRANES — INFLAMMATION OF.

PHTHISIS. See TUBERCULAR CONSUMPTION.

PICA. See APPETITE — MORBID STATES OF.

PILES. See HÆMORRHOIDS.

PITYRIASIS. — SYNON. — Πιτυριασις, from πιτυρον, bran; — Πιτυρώδεις, *furfurosi, quibus assidue furfures in capite gignuntur*, Galen; — *Alvarati*, Avicenna; — *Porrigo*, Celsus, Lorry, J. Frank; — *Tinea furfuracea*, Sennert; — *Tinea porriginosa*, Astruc; — *Furfurisca*, Gilbert; — *Pityriasis*, Vogel, Willan, Bateman, &c.; — *Lepidosis pityriasis*, Young and Good; *Teigne, dartre, dartre furfuracée*, Fr.; — *Hautkleic, Schuppen, kleiengrind*, Germ.; — *Dandriff, Scurf.*

CLASSIF. — II. ORDER. — 2. GENUS (Willan).
III. CLASS. I. ORDER (Author).

1. DEFIN. — *A chronic, non-contagious, superficial affection of the skin, attended by the production of minute white scales in great abundance, frequently on patches of irregular form, variable dimensions, and of a very light or dull red colour.*

2. I. DESCRIPTION. — *Pityriasis* may occur in any part of the cutaneous surface, sometimes on several parts in succession, and most frequently in certain parts in preference to others, but very rarely over the general surface. The patches are often attended by slight heat, pruritus, and tingling. The scales are thrown off soon after they are formed, and are re-produced with great rapidity. They are generally small and micaceous; in some situations, and in the more inflammatory states they are large and lamellar; and in others, especially in the non-inflammatory, or at least when inflammatory action is least manifest, they are minute, pulverulent, or measly.

3. THE VARIETIES OF PITYRIASIS, according to WILLAN, are the *rubra*, *versicolor*, and *nigra*. But RAYER and WILSON divide the complaint into *general* and *local*, subdividing the latter according to its situations, and consider the varieties *versicolor* and *nigra* of WILLAN as not properly belonging to this affection, but to those affections which consist chiefly of alterations of colour. *Pityriasis*, however, may be *simple* or non-inflammatory, and *associated* or consequent upon an erythematous o superficial inflammation of the skin. I shall, therefore, view it in these phases, the former o which has been overlooked by the writers jus named; retaining also the varieties rejected b RAYER. As the local forms of this eruption ar the most commonly observed, I shall conside them before I notice the more general affection the occurrence of which is comparatively rare.

4. i. LOCAL PITYRIASIS. — This complaint, according to the situation and grade of the inflammatory action attending it, has been variously denominated and described by writers since the day of GALEN and CELSUS down to those of WILLA and J. FRANK. Hence different meanings hav been attached to the term pityriasis, and hav occasioned no small amount of confusion. Th more precise descriptions of CAZENAVE, WILSON RAYER, and others, have in great measure removed this evil; but there still remain a fe omissions to supply, and imperfections to remov even in the accounts which they have furnishe *Local Pityriasis* may be non-inflammatory o *simple*, and inflammatory or *complicated*; and i either form it may present, in some cases, shad of colour different from those usually observe even independently of any decided evidence inflammatory action in the part — facts not su ficiently adverted to by some recent writers o the complaint. The *varieties* which I shall noti are the following: — *Pityriasis capitis, simpl et associata; P. palpebrarum; P. labiorum oris; P. palmaris et plantaris; P. præputial et pudendalis; P. versicolor; P. nigra.*

5. *A. Pityriasis capitis* has been too generall viewed as an inflammatory affection, and describe as such. That it most frequently possesses th character, especially in adults, cannot be disputed but it is occasionally, even in this class of patient devoid of every inflammatory appearance. — *a. Pityriasis capitis simplex* is frequent in i fants and old people, and rarely observed in t middle-aged and young. Its presence is indicat by innumerable minute white scales, which a rapidly produced and thrown off. They are thi white, and dry, and at first adherent at one si and free at the others, but are very readily d tached. Upon removing them the surface presen no inflammatory sign, but on the contrary has dull, indolent appearance, and is without any visib capillary vessels. The exfoliation and reprodu tion of the cuticle proceed with various degrees rapidity, and furnish, accordingly, quantities these scales, which collect near the roots of t hair, and fall out upon scratching the part, combing the hair. This form of the complaint not attended by any, or but a slight, itching, whi is chiefly owing to the presence of the accumulat scurf. It is observed chiefly in those of a da complexion, or with black or dark-brown ha and of a delicate constitution, or disposed to di order of the digestive organs.

6. *b. Pityriasis capitis rubra* or *complicata* most common, especially in the young and middl aged. Its occurrence is indicated by a number

minute scales, appearing in some part of the scalp; usually of a white, whitish grey, or yellowish grey colour; very thin, especially at their edges, and perfectly dry. They are often imbricated in children, but in old persons they are scattered irregularly. Their formation is often so rapid that, although they may be all detached by the comb, they will collect in nearly equal quantity in a day or two. When they thus accumulate the patient cannot scratch his head, or even arrange his hair, without detaching numbers, which fall upon his clothes in the form of a white mealy powder. When the scales are small, they are generally of a pure silvery white; but when they are larger they assume a duller, or even a darker hue. Upon separating the hairs and removing the scales the scalp is found to be dry, rough, reddened, and shining in spots or patches. In very chronic cases the surface is often of an opaque, greyish white; the cuticle appears to be thicker and coarser than natural. The scales are generally larger and thicker in this variety than in the former, and sometimes they attain a diameter of five or six lines. They occasionally form by their union a thin layer, especially in children, extending over a considerable portion of the scalp, being thickest at points where they are most abundantly evolved.

7. The most frequent seat of pityriasis is the scalp; and when partial, or in patches, it is most commonly seen about the coronal and squamous sutures, whence it may extend to the temples, forehead, and to the eye-brows. The itching atending the eruption is often annoying, causing he patient to scratch the part and to loosen howers of scurf. When the affection is of long tanding, and is attended by much superficial inlammation, or where it is much irritated by cratching, it is often followed by the evolution of czematous vesicles, and eczema auriantacea is eveloped from the admixture of the scales of pityiasis with the eczematous discharge.

8. This complaint may continue for many months, or even for many years, especially in the ged; and may appear also in various parts of the ace and body. When it is approaching a favourble termination, the scales are not formed so raidly, and at last they cease to be produced; the kin, however, remains for some time of a light or ull red or yellowish red, and slightly shining. But often appears in a different part, or extends or is ggravated after errors in diet, especially after verloading the stomach, or after taking spirituous quors or fish, more especially shell-fish; and it ay thus ultimately abate and be exasperated for long and indefinite time.

9. *B. Pityriasis palpebrarum* may exist alone; ut it most frequently commences in the eyeows, or is an extension of the eruption in the alp. It is apt to occasion the loss of some of e eye-lashes, and to give rise to chronic irritaon or inflammation of the conjunctiva. It is to distinguished from psoriasis in this situation by e smallness and thinness of the scales, and the ythematous appearance of the patches when the ales are removed.

10. *C. Pityriasis labiorum et oris* differs in nothing om the red variety of the complaint, excepting e situation. When affecting the lips it is apt to confounded with psoriasis; but it differs from s latter in appearing as red stains, and not as palar elevations, followed by thick squamæ. To the red stains succeed a general redness and continual desquamation of the epithelium of the lips, and occasionally of the cuticle of the adjoining skin. Desquamation of their transparent laminæ, resembling the dried healthy epidermis, proceeds along the lips, the laminæ becoming detached first at the edges, and adhering longest in the centres. The lips are tender, heated, and tumid; the epithelium is yellow and thickened; and then cracks and is detached as just stated, a new epithelium being formed under that which is about to fall off. This new cuticle in its turn becomes yellowish and cracked, and ultimately is detached, and thus the affection is perpetuated. It is different from the slighter and more transient affection, much resembling it for a short time, that follows exposure to cold and various acute diseases; and is a most obstinate complaint, at one time nearly disappearing and again returning even in a worse form than before, and with considerable swelling of the lips. M. RAYER remarks that he met with this variety in two great talkers who were frequently biting their lips. The epidermis of the external surface in the immediate vicinity often undergoes a similar redness and desquamation, although the affection is sometimes limited to the epithelium.

11. An affection of the *internal surface of the mouth*, closely resembling that of the lips, has been described by M. RAYER, and a few instances of it have been seen by myself. It consists chiefly of redness, tenderness, heat, and protracted desquamation of the epithelium of portions of the surface of the tongue and gums, and the internal surface of the cheeks, and in rare cases of the whole surface of these parts. In all the cases I have seen there has been more or less serious chronic disorder of the digestive organs.

12. *C. Pityriasis præputialis* and *P. pudendarum*. The *prepuce* of the male and the *labia majora* of the female are sometimes the seats of a superficial chronic inflammation, giving rise to exfoliations of the epithelium, and to an increased secretion of the follicular fluids of these parts, especially in persons who are subjects of pityriasis capitis; and occasionally even the external surfaces of the parts now named are also similarly affected; generally, however, to a limited extent. These affections are usually ameliorated or aggravated by the states of the digestive organs; and sometimes they entirely disappear for a time, and again return. They are always obstinate.

13. *D. Pityriasis palmaris* and *P. plantaris* are varieties which were confounded with psoriasis affecting the palms and soles, until distinguished from it by M. RAYER. This eruption commences in these situations as small red spots or stains of irregular outline, which spread and soon acquire a yellowish hue. The epidermis thickens, dries, and cracks, and is constantly peeling off in foliaceous lamellæ; the exfoliation sometimes extending to the fingers and nails. Attention to this state of the eruption at the commencement will readily determine its nature; for psoriasis begins with papular elevations, the summits of which are soon afterwards covered with dry, thick squamæ of a dull whitish colour. Pityriasis of the palms or soles is attended by painful tingling and tenderness, and increased heat, which become so much increased when the patient is warm in bed as often to break his repose.

14. *E. Pityriasis versicolor* appears in the form of continuous patches of various size, covered by a furfuraceous desquamation. It is characterised by a varied yellowish or yellowish brown discoloration of the cuticle, which even continues for some time after the cure of the complaint. It occurs chiefly on the neck, chest, shoulders, and abdomen, and rarely on the face. It is distinguished from the ephelides by the furfuraceous desquamation, and from other cutaneous affections by the peculiar pale yellow or yellowish-brown hue of the cuticle. It is as obstinate to remove as the other varieties already mentioned. In the instances of brownish discoloration, the scurfiness of the surface is often but slight; the discoloration being more deeply seated than the cuticle, and evidently existing in the rete mucosum, as remarked by WILLAN. In some cases, however, the discoloured cuticle is exfoliated, leaving the new cuticle of a red hue, as in the more common states of the affection. Mr. PLUMBE mentions instances in which no sensible elevation was perceptible to the finger when passed over the discoloration, although a dry cloth forcibly rubbed over it detached films of delicate cuticle, leaving the surface underneath tender and inflamed.

15. *F. Pityriasis nigra* is of rare occurrence. Dr. BATEMAN describes it as commencing in a partially papulated state of the skin, and terminating in a black discoloration, with slight furfuraceous exfoliations. It appeared chiefly in the extremities, and in the fingers and toes. MM. CAZENAVE and SCHEDEL state that numerous instances of this variety were observed in Paris in 1828 and 1829. The furfuraceous desquamation appeared on a deep black surface. The affection occurred in two distinct forms. In the one the epidermis was the seat of discoloration, and if detached a red surface appeared beneath. In the other, the epidermis was transparent, and the cutis vera was the part discoloured. Dr. A. T. THOMSON remarks that the affection which prevails in Mexico, termed the *pinta*, or *blue stain*, appears to be a variety of pityriasis nigra. "It commences with slight febrile symptoms, which last a few days only; and on subsiding leave the face, breast, and limbs covered with yellowish areolæ, which change to a blue, and, in advanced stages, to a black colour. The skin assumes a rough and scaly appearance, and exhales an offensive perspiration." *(Bateman's Synop. of Cut. Dis. by A. T. Thomson,* p. 77.)

16. ii. GENERAL PITYRIASIS. — *a.* This is a rare state of the complaint, and is much more rarely met with in a *simple* or *non-inflammatory form.* Yet I have seen a very few instances in persons of a dark complexion, with the limbs much covered with hair, of a furfuraceous exfoliation of the cuticle, proceeding with remarkable rapidity, and followed by as quick a removal of it in several parts of the body, but especially on the outsides of the thighs and near the joints, appearing in one part as it subsides in another, without any apparent redness of the surface either before or after the exfoliations. The scurf which is detached consists of very minute silvery white scales, which the slightest friction detaches in great numbers. These evidently proceed from exfoliation and rapid production of the epidermoid scales, either independently of inflammatory action, or in consequence of so slight a grade of it as hardly to be observed; and depend more upon the production and nutrition of the epidermis than upon increased vascular action. In the very few instances I have seen, the scalp, lower parts of the face, arms, and lower extremities were chiefly affected.

17. *b.* The *inflammatory state* of general pityriasis is oftener seen than the foregoing; although very much less frequently than the local varieties. It is a most obstinate affection, and is generally complicated with disorder of one or more of the abdominal viscera. The eruption is preceded by itching, tingling, or pricking in the surface about to be its seat. When closely examined, superficial erythematous spots or patches may be detected. The heat of the surface is increased, and the part is slightly tumid. The inflammatory blush diminishes, and even shortly afterwards entirely disappears within a few days, so that this variety of the affection, if not seen early, may be mistaken for the non-inflammatory form. The epidermis then cracks, becomes less adherent, and desquamation commences. The scales thrown off vary in their appearances with the seat of the eruption and the grade and duration of the inflammation On the insides of the limbs they are usually small micaceous, and pulverulent. On the outer surface of the extremities they are much larger, and ofter vary from three to six or seven lines in diameter They consist of foliaceous lamellæ, which continu to adhere by their centres or extremities for a considerable time after they are partially detached and thus they appear as loosely floating on th surface. When removed, especially by friction the parts affected are of a rose colour, and slightl tumid. When the accompanying pruritus impel the patient to scratch the part, the surface exude a yellowish serous fluid, similar to that observe in moist eczema; and when this takes place to considerable extent, the diagnosis is thereby rendered obscure. Behind the ears, about the axillæ bends of the arms, groins, wrists, and insteps, th inflamed surface assumes much of the appearanc of intertrigo — is rough, moist, and chapped in th direction of the natural folds of the skin. On th breast and abdomen the desquamation occurs i much larger lamellæ than on the back. On th olecranon and patellæ, and especially on the palm and soles, where the cuticle is much thicker tha on other parts, exfoliation takes place in large and thicker laminæ than elsewhere. On the fac and scalp the scales are much more minute an powdery.

18. Pityriasis, particularly the more gener states of it, is attended by much pruritus; but th sensation is most annoying when the eruption recent, and the inflammation considerable; ar the enjoyment, if not the relief, experienced fro scratching is the greatest; but it is generally fo lowed, when indulged in, by painful smarting, as to disturb the rest. It is very rare that tl more general states of the eruption are seen wit out the scalp being affected also. In all cas where this part is implicated, the *hair* is not a fected or changed for a considerable time, or un the disease has continued long. It then gradual changes to grey, and becomes finer, softer, a weaker; ultimately it gradually falls out; b baldness is rarely the result, unless in aged pe sons, although it is generally thinner in protract cases.

19. *c.* The *course* of general pityriasis varies in individual cases. It often appears in one place as it subsides or disappears from another, and is always a most protracted complaint. The scales become small and pulverulent, when it is subsiding or is still lingering; and large and foliaceous, when it is recent or has been irritated, and the inflammation considerable. The surface is red and moist in this latter case, and pale white, or slightly yellowish, in the former. When the eruption is most acute, or is exasperated, especially on the lower extremities, and in these even when the redness under the scales is hardly perceptible, tumefaction of the affected parts is very common, owing more probably to the thickening consequent upon the irritation, than to the state of the subjacent cellular tissue. The hair covering the limbs is much more readily lost during the eruption, than that of the scalp.

20. *d. Associations.*—I have rarely, or perhaps never, met with an instance of this eruption, whether *local* or *general,* without being *associated* with disorder of the digestive functions. In most instances there is chronic dyspepsia, often with torpor of the liver, and sometimes with indications of chronic inflammation of the mucous surface of the stomach or bowels, or of both. Flatulence is often also complained of; and in females, dysmenorrhœa, in some amenorrhœa is not infrequently also associated with it. Fever seldom attends the local or partial states of the eruption, but it sometimes appears during the more general and severe forms, or when exasperated by external irritation or a stimulating diet.

21. II. DIAGNOSIS. — The scurf seen on the foreheads of very young infants, and that on the scalp of aged persons, are not always exfoliations of the epidermis, but rather the incrustations consequent upon the state of the cutaneous secretion and neglect of cleanliness. Very slight attention, however, will enable the physician to distinguish these cases. M. RAYER remarks, " that the scalp and extremities of some adults, and especially aged persons, are occasionally affected with an habitual exfoliation of the epidermis, which differs essentially from pityriasis by being attended by neither redness, heat, nor any other morbid sensation." Now this is the condition which I have denominated *simple,* or *non-inflammatory,* pityriasis, and stated to consist of a morbid or excessive exfoliation of the epidermis. It is often attended by slight itching, and slight friction will readily induce an inflammatory blush of the surface, indicating increased irritability of the vessels of the rete mucosum, and generally also by disorder of the digestive organs.

22. The exfoliation of the cuticle in pityriasis differs from that which takes place in all the varieties of *psoriasis.* For in this latter eruption the cuticle is thickened, rough, dry, and of a dull white colour; and the red patches always rise above the level of the surface, whilst those of pityriasis are not at all prominent. In psoriasis also the inflamed surface, even when deprived of the squamæ, remains dry, whilst that of pityriasis exudes a serous fluid. In the former, the integuments are not swollen and painful, excepting in *psoriasis inveterata,* and in it only to a limited extent; whilst in the more acute or inflammatory states of the latter, they are often painful and swollen over a large extent of surface. The heat and pruritus in pityriasis also are much more troublesome than in psoriasis. The same circumstances also distinguish pityriasis from the *leprous form* of psoriasis, with this distinction in addition, that the leprous variety generally assumes a circular form, and heals from the centre to the circumference. The detachment of the cuticle in *ichthyosis* is not preceded by redness or morbid sensation of the skin; and the desquamation following chronic *lichen* and *eczema* is preceded by papulæ and vesicles.

23. III. PROGNOSIS.—Pityriasis is one of the most obstinate affections of the skin; more especially the more general forms of it. Even the local varieties are difficult to remove, and often return again and again, especially after errors in diet, and during disorder of the digestive organs. Of these latter varieties, that affecting the lips and mouth is the most rebellious. The duration and extent of the affection, and the association of it with internal disorder, as well as the nature of that disorder, should all be duly considered before an opinion as to the probable effect of treatment is given, and before the means of cure adopted. In all severe and complicated cases, more especially where the eruption is more or less general, and the digestive and respiratory mucous surfaces affected, the removal of the complaint is a work of time, and is not to be accomplished without effecting a change in the constitution by diet and regimen.

24. IV. CAUSES AND COMPLICATIONS. — The causes of this eruption are often obscure; and are more rarely local than constitutional, or such as affect the digestive organs, and through them the state of the constitution. Local irritants, the use of combs, or hard hair-brushes, the kind of soap used, and the operation of shaving, have been usually considered as exciting causes; but I believe that they are much less concerned in producing this affection than the following, namely, too full or rich living, improper or unwholesome diet; the frequent use of pork, bacon, and dried, smoked, or preserved meats, or of shell-fish; prolonged and repeated irritation of the gastro-intestinal surface, by these or by other articles of an indigestible kind; drinking cold fluids when perspiring; a morbid condition of the gastro-intestinal secretions; torpor of the liver, and a disordered state of the biliary and pancreatic secretions, exhausting discharges, and anxiety and exertion of mind. There can be no doubt of either or several of these causes being the most efficient in causing a return of this eruption in those who have been before attacked, and in aggravating all the symptoms in those who are already affected. The more general forms of the eruption are often associated with dyspepsia, flatulence, and chronic inflammatory action of either the pulmonary or the gastro-intestinal mucous surface, or even of both.

25. V. TREATMENT. — *A.* The *local varieties* of pityriasis generally require the utmost attention to cleanliness, and soothing and emollient applications. — *a.* When the *hairy scalp* is affected, with the more severe forms of this eruption, the hair should be cut as short as possible, and the dried exudations and squamæ softened by means of poultices and the vapour-douche, the latter of which should be continued for some time, and alternated with alkaline or emollient lotions. If there be much redness and heat of the surface

with serous exudation, leeches ought to be applied behind the ears, and the calomel ointment (one drachm of calomel to one ounce of ointment) rubbed over the inflamed surface once in the twenty-four hours, after carefully washing the surface with an emollient soap, such as camphor or palm oil soap. At the same time the bowels should be freely evacuated, the abdominal secretions and excretions duly promoted, and the cutaneous exhalations increased, by means of purgatives, alteratives, and cooling diaphoretics.

26. Due attention ought also to be paid to *diet*. The stomach ought never to be overloaded, and the quantity of animal food should be very much diminished, if it be partaken of largely, or even more than very moderately. Pork, bacon, veal, fish, particularly shell-fish; dried and smoked meats, and all other articles of food which are apt to occasion, or to aggravate, indigestion and gastro-intestinal irritation, ought to be avoided, and farinaceous articles of food and fresh vegetables substituted for the meat dishes which are relinquished; avoiding, however, all pickled, acid, acerb, and acrid articles whatever.

27. *b.* These means will generally remove the more recent cases of the eruption; but the more *chronic states* are often but partially relieved by them. I have considered that this and other cutaneous eruptions, which are attended by the exposure of a considerable portion of the inflamed surface to the action of the atmosphere, especially of the oxygenous portion of it, are aggravated by whatever tends to increase that exposure, either by removing the exudation and scales formed upon this surface, or by preventing their formation, and the protection they afford until a healthy epidermis is formed beneath them: and therefore, instead of advising various deterging lotions, usually recommended, I have directed the surface to be covered, when the accumulated scurf and scales have been removed, with some albuminous or gummy application which may completely exclude the air from the affected part. The albuminous portion of egg, the solution of isinglass, or of gum acacia, or of tragacanth, will answer this purpose sufficiently.

28. *c.* In those cases which are attended with flatulence, acidity, and a predominance of the uric acid or urates in the urine, and indeed in most of the forms of this complaint, a sufficient quantity of magnesia and precipitated sulphur may be taken, every night, to procure a free evacuation of the bowels in the morning; and be continued for a considerable time, observing due precautions as to diet and regimen, and attending to cleanliness. The variety of pityriasis capitis which attacks adults, and especially the aged, and is attended with little or no inflammatory action, requires chiefly attention to cleanliness, to diet, and regimen; and the removal of those symptoms of indigestion and gastro-intestinal irritation, which are so frequently observed to attend this eruption. In these cases, the alkaline carbonates, taken in gently tonic infusions; the nitrate of potash, or the hydrochlorate of ammonia, in small doses, with emollients and vegetable bitters; or these with the hydrocyanic acid, will often be of service. The bowels should also be regulated by means of magnesia and sulphur, as just advised. In these cases, dyspepsia and gastro-intestinal irritation are generally associated with debility; and we shall in vain endeavour to remove the former if we neglect the latter, or to remove the eruption if we overlook these complications.

29. *d.* Mr. E. Wilson advises, after the inflammatory action is removed, some weakly stimulating application to the surface, such as alkaline lotion, consisting of a drachm of liquor potassæ to half a pint of emulsion of bitter almonds, or camphor spirit, or a weak solution of the bichlorate of mercury. A solution of two or three grains of bichloride of mercury, in half a pint of emulsion of bitter almonds, he considers best suited for patches on the face; and the zinc ointment for pityriasis palpebrarum, præputialis, and pudendalis. The vapour bath or douche, with the white precipitate ointment, are recommended by Rayer for pityriasis palmaris and plantaris. In these varieties, I believe that the recently prepared calomel ointment, and due protection of the surface affected in the way just advised (§ 27.), will be found preferable to the means directed by these writers.

30. *B. The more general states of Pityriasis* are very frequently complicated with an inflammatory or congested state of the digestive or respiratory mucous surfaces, or with disorder of the abdominal organs; and hence the necessity of having a strict reference to these associations of disorder during the treatment. — *a.* If the patient be young, robust, or plethoric, venæsection to a moderate amount, and even the repetition of it, will be necessary, especially in recent and acute cases. Sometimes these complications appear not until the pityriasis has been of some duration; but in these blood-letting may not the less be required. Still the circumstances of the case ought to be taken into account; for this form of the eruption occasionally appears in persons exhausted by mental exertion and anxiety; and for these relaxation and a complete change of habits and modes of living are required. Temperate mucilaginous baths; due regulation of the bowels; cooling diaphoretics, especially the liquor ammoniæ acetatis, spiritus ætheris nitrici, potassæ nitras, or the ammoniæ hydrochloras, taken in emollients or demulcents; the nitro-hydrochloric acids, taken internally, or applied externally, and a farinaceous, demulcent, and vegetable diet are the means which deserve the greatest confidence.

31. *b.* If the bowels require assistance the repeated use of the magnesia and sulphur, as above advised (§ 28.), will be found most serviceable in this and in other forms of the eruption. If they become relaxed, ipecacuanha with any of the preparations of opium, or with the tinctura camphoræ composita, and a frequent recourse to mucilaginous baths, and to applications of albumen, or of solutions of gum, &c., over the more inflamed and denuded surfaces, will prove most beneficial. In this as well as in most other forms of the eruption, the preparations of *arsenic*, or even of *iodine*, are not so serviceable as in some other scaly affections, particularly when dyspeptic symptoms or gastro-intestinal disorders are present. But cases occasionally occur, in which they are very advantageously taken immediately after a meal; and when thus administered they will not induce or aggravate these symptoms.

32. Mr. Wilson remarks that the local affection " is to be treated by emollient baths, fomentations,

alkaline baths, and opium to lull the pruritus." Dr. A. T. THOMSON advises a lotion, consisting of one drachm of the solution of potash; one drachm of the dilute hydrocyanic acid, and seven ounces of the mixture of bitter almonds, to be applied to the affected surface in order to quell the pruritus. I cannot quite approve of these means of cure, for the reasons already assigned (§ 27.), especially of the more detergent substances employed, and am not surprised at their frequent failure. The treatment recommended by BATEMAN will be found more successful than that now noticed, namely, a combination of antimonials with decoction of woods, and warm baths. And when the irritability of the skin is not very great the application to the parts of an astringent lotion containing alum, or the di-acetate of lead, or a lotion containing borax. Emollient lotions and baths, containing also the sulphuret of potassium, are often useful. Mr. ERICHSEN advises them to be aided by an ointment of white precipitate of calamine, or of the oxide of zinc.

33. *c.* The *Harrowgate* and other *sulphureous waters* are often of use in all the varieties of pityriasis. In a remarkably severe case of the general form of the eruptions in a married lady, about the period of the cessation of the menses, which was under my care, a prolonged course of these waers, following an active course of medicine, effected a complete and permanent cure. The discoloured varieties of the eruption, described by WILLAN and BATEMAN, and but rarely met with, require the same treatment as that advised above.

34. In most instances, especially the more chronic and general states of this eruption, comparatively little benefit will accrue from any method of cure, if the state of the digestive organs and the diet and regimen of the patient be neglected. For in this, as well as in all other chronic diseases of he skin, a complete and enduring cure can be obtained only by a change in the constitution, brought about by a suitable diet and regimen, and habits of life. What the diet, regimen, and habits ought to be cannot be stated with precision, s they should be partially accommodated to the circumstances of individual cases; but in general those in which the patient has indulged before and during the commencement of the affection require change. Abstemious and regular habits should be adopted, avoiding rich, indigestible, and heating articles of food, and stimulating beverages, and substituting farinaceous and vegetable substances, as far as may be prudent. Mental exrtion, and anxiety should also be avoided as much as possible; exercise in the open air ought to be regularly enjoyed; and sexual indulgences restrained within due bounds.*

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PLAGUE. See PESTILENCE, SEPTIC or GLANDULAR.

PLETHORA. See BLOOD, EXUBERANCE OF.

PLEURA, DISEASES OF.

— SYNON. — Πλευρὰ vel πλευρον, pleura, the membrane covering the internal surface of the ribs, according to the ancient meaning; now the membrane covering the internal parietes of the thorax, and reflected over both lungs. — *Pleure*, Fr.; *Brustfell, rippenfell*, Germ.

1. I shall consider at this place those diseases which commence and are seated chiefly in this membrane; but the consecutive changes to which the pleura is liable will also receive due attention. *Inflammations of the pleura* will be first discussed, and next the *other organic lesions*, which either commence in, or consecutively implicate this membrane will be treated of; occasional reference being made to associated affections and diseases of the LUNGS (*see that article*) and of other connected and adjoining organs.

INFLAMMATION OF THE PLEURA.

— SYNON. — *Pleuritis*, πλευρῖτις, πλευρῖτις νοσος, morbus laterals, the side disease; — *Morbus pleuriticus*, Celsus; — *Passio pleuritica, Morbus costalis, Pleuresis*, Auct. Var.; — *Febris Pleuritica*, Hoffmann; — *Pleuritis Pulmonis, Pleuroperipneumonia*, Auct.; — *Pleuritis*, Vogel, Sagar, Boerhaave, &c.; — *Pneumonia pleuritis*, Cullen; — *Cauma pleuritis*, Young; — *Empresma pleuritis*, Good; — *Inflammatio pleuræ*; — *Pleurisie*, Fr.; — *Brustfellentzündung, Seitenstich*, Germ.; — *Pleurite, pleurisia*, Ital.; — *Pleurisy*.

CLASSIF. — I. *Class*; 2. *Order* (Cullen). II. *Class.*; 3. *Order* (Good). III. CLASS. I. ORDER (*Author in Preface*).

2. DEFIN. — i. NOSOLOG. — *Acute pain in the chest, aggravated by inspiration, commencing with chills or rigors, followed by increased heat, a hard and accelerated pulse; short, dry cough; and by difficult, short, or disordered respiration.*

ii. PATHOLOG. DEFIN. — *Inflammation, commencing in or implicating one or more parts of the pleural expansions, attended either by more or less of a consistent albuminous exudation, false mem-*

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[*] I have at present under my care a case of General Pityriasis in a man, of great extent and severity. He has tried courses of the solution of the iodide of mercury and arsenic, of the sulphur and vapour baths, and the Harrowgate and Leamington waters, without benefit. He is about fifty years of age, has lost an arm, is of a full habit of body, and has lived freely. A severe diet, chiefly of farinaceous and vegetable food, sponging the surface with cooling lotions, exercise in the open air, and a course of alterative medicines, were prescribed for him, but as yet the benefit derived is only partial, the restricted diet and prescribed regimen not having been observed. The great difficulty in the treatment of this and other diseases of the skin, is to convince patients of the necessity of observing a strict regimen, or rather to secure their faithful and continued adoption of the diet and regimen prescribed.

brane or adhesion, and by a fluid effusion, varying in their characters with the varying states of different cases; causing pain, symptomatic fever, disordered respiration, dulness on percussion, and alteration of the respiratory sounds.

3. *Pleurisy* has been mentioned by Hippocrates and Celsus in several places, and more distinctly by Galen; but Aretæus was the first to describe it with precision, and with reference to the treatment. Cœlius Aurelianus, Alexander Trallianus, and Paulus Ægineta have also treated of it at considerable length. All these writers have viewed the disease as seated in the pleura lining the ribs, or external parietes of the chest. Modern physicians, who agreed with the ancients in limiting the malady to the pleura, did not also agree with them in believing that it was confined to this portion of the pleural surface, but that it was seated, with, probably, much greater frequency, in the pleura reflected over the lungs and other parts. Whilst Boerhaave, his commentator Van Swieten, and others contended for the separate and distinct affection of the pleura, Sydenham, Hoffmann, Triller, and Morgagni believed, that the pleura and the substance of the lungs were generally both implicated, and that the one could rarely or never be inflamed without the other being also attacked. Hence *pleuro-pneumonia*, or pleuro-pneumony, was used to designate inflammation of these distinct structures. This latter view was followed by Cullen, Portal, the Franks, and many others. Nevertheless it is now fully demonstrated by *post mortem* examinations, as well as by the physical and rational symptoms during life, that inflammation may commence in, and be limited to, the pleura in some cases, and may be equally confined to the substance of the lungs in others; although in, perhaps, a still more numerous class of cases, it may originate in the one and extend to the other, implicating either of them more or less, as I have fully shown when treating of *inflammations of the lungs* (see Art. Lungs, §§ 73—75.), and as the researches of Laennec, Andral, Louis, Cruveilhier, Williams, Forbes, Chomel, and Stokes also have fully demonstrated.

4. It has been fully shown by Dr. Stokes that the superficial description of many anatomical writers has given rise to incorrect views as to the connection between the pleura and the parts over which the pleura is reflected. Instead of this membrane being connected to these parts simply by means of a subjacent cellular tissue, it has interposed, between it and these parts, a thin but dense fibrous membrane, which entirely envelopes the lungs, and forms a strong capsule for these organs. Dr. Stokes remarks, that this capsule, in the healthy state, though possessing great strength, *is transparent*, a circumstance in which it differs from the fibrous capsule of the pericardium, and which has probably caused its being heretofore overlooked; and that it is always more perceptible in disease implicating the pleura and subjacent tissues when they are more or less hypertrophied and rendered opaque. "This fibrous tunic invests the whole of both lungs, covers a portion of the great vessels, and the pericardium seems to be but its continuation, endowed in that particular situation with a still greater degree of strength, for purposes sufficiently obvious. It covers the diaphragm, where it is more opaque, and in connection with the pleura lines the ribs, and turning forms the mediastina, which thus ar shown to consist of four layers, two serous an two fibrous." (p. 460.) This conformation o the investments of the lungs and adjoining part is interesting in a physiological and pathologica as well as an anatomical point of view. It establishes an additional analogy between the lung and the parenchymatous and glandular organs o the abdomen, which have their fibrous capsules and illustrates the general law of the constant association of serous and fibrous membranes, as w see in the arachnoid, pericardium, peritoneum tunica vaginalis testis, and the synovial capsules Considered pathologically, Dr. Stokes adds, i may explain the pain of pleuritis and pleurodynia and the rarity of perforations of the pleura, so remarkable when considered in connexion wit the frequency of ulcerations of the lung, whic constantly approach so close to the surface as t be bounded by the fibro-serous membrane alone "In pleuritis, with effusion, its existence ma assist in explaining the binding down of the lung and its corrugated appearance after the remova of the effusion." It may also be the seat o ossifications of the pleura — indeed, there can b little doubt of this being the case.

5. Notwithstanding this structure of th thoracic linings, we find that the cavities ar capable of considerable dilatation, and that th mediastinum yields much more than is generall supposed, before the pressure of intra-thoraci accumulations. Hence, in empyema, or i pneumo-thorax of the left side, displacement o the heart, as Dr. Stokes has shown, occurs lon before the intercostal spaces are obliterated, o even the diaphragm depressed. It is not improbable, however, that the strength of this fibrou tissue varies in different persons; indeed, wit respect to the pericardium, the greatest differenc of strength exists, for in some subjects it is dens and opaque, whilst in others it is nearly transparent.

6. *The varieties or states of Pleuritis* ar numerous; and they have been variously denom nated and arranged, according to the views o those who have described them; and to the var ous morbid relations they furnish.—(*a.*) Cons dered with respect to the character of its *progre* and *duration*, pleurisy may be either *acute* o *chronic:* and (*b*), both the one and the other ma also be either *attended by pain* or *without pain* — may be *open* or *latent.* (*c.*) In relation to i *extent*, pleurisy may be *partial*, or circumscribe to a portion only of the pleura of one side, o much more extended on one side, but still *singl* or it may exist on both sides, or be *double.* (*d.* As regards the characters of the *pathologic* *changes* attending it, pleurisy may be *dry*, *a* *hesive*, or *pseudo-membranous*, or it may b *effusive*, *serous*, *sero-puriform*, or *purulent.* (*e.* In relation to the *causes* and *circumstances of i* *occurrence*, pleurisy may be *primary* or *consecutive*, or it may be *spontaneous* or *traumatic.* (*f.* In respect of *antecedent disease*, it may be cons quent either upon other diseases of the chest, o upon constitutional maladies, more especially th eruptive fevers. (*g.*) Pleuritis may, moreove be *simple* or *complicated*; — it may be *simple* fro the commencement and continue so, or it ma become complicated in its course, — and it ma

be *complicated* from the beginning, or it may be consequent upon the malady associated with it; thus it may be associated with *catarrh, pneumonia, bronchitis, tubercles, pericarditis, diaphragmitis, hepatitis, rheumatism,* &c.; (*h.*) Pleurisy may be even characterised according to the *states of the system* and *the diathesis,* and the circumstances in which it occurs: thus it may be *sthenic,* or *asthenic,* or *bilious,* or *typhoid,* or *malignant,* or *cachectic,* or *puerperal.* (*i.*) It may, lastly, be *true* or *false.*

7. Having premised these remarks, I shall first notice the *causes* of Pleurisy, and afterwards describe the principal *forms* and *states* which this disease assumes, with their *terminations,* their *diagnosis,* and the *appearances on dissection,* concluding with the *treatment* which appears most appropriate to each of these states.

8. I. THE GENERAL CAUSES OF PLEURISY. — Pleurisy occurs in all *ages* and in both *sexes* — in infancy and childhood as well as in adult age; and in this latter somewhat more frequently than in old age. It is much more frequent in males than females, probably in the proportion of 5 to 3, and owing to the greater exposure of the former to the exciting causes. It is most prevalent among persons much exposed to the vicissitudes of season and weather, and those actively engaged in out-door occupations, more particularly such as require physical exertion. It is met with somewhat oftener in those of a sanguine temperament, and robust or plethoric habit of body, than in others; but this may admit of some doubt. It occurs more frequently in winter and spring, than in the other seasons, and in this it accords with pneumonia, both these maladies occasionally becoming so prevalent in those two seasons as to be almost epidemic. Nevertheless pleurisy may be more than usually prevalent also during summer and autumn, as it manifestly was during the spring and summer of 1846, during which seasons, however, there seemed to be a tendency to inflammatory affections of serous membranes, and these often of an asthenic character.

9. *A.* The *various circumstances which predispose* pleurisy are not determined with precision. There can be no doubt, however, that previous disease of the respiratory passages or substance of the lungs, or the actual presence of these and eruptive fevers, are the most frequent and influential. To these may be added the arrest of accustomed discharges, and the suppression of cutaneous eruptions and of painful affections, before the constitutional derangement of which they are the external manifestations is removed, for there are often predisposing causes, although they may not actually excite or determine this malady, other causes commonly following upon these, and determining the morbid action to the pleura or other serous membranes.

10. *B.* The most influential *exciting causes* are certainly exposure to cold in the numerous modes of its application, &c., and external injury.—*a.* The vicissitudes of season, of temperature, and of other atmospheric conditions, have a marked influence on the prevalence of this disease. It is generally supposed, that cold and dry states of the air occasion pleurisies more frequently than cold and humid states. This is probably the case, but it is not demonstrated, nor is it easily demonstrable, as there are generally numerous other circumstances which should be taken into the account. There can be no doubt, however, that cold applied to the surface of the chest, or the cold generated by currents of air passing over this part of the body, or even over other parts, and damp or wet clothes upon either the trunk or the extremities, more especially when the surface has been perspiring at the time, or shortly before, are frequent causes of pleurisy.

11. *b. Injuries or other mechanical causes* are frequent and sufficiently manifest, especially fractures of the ribs, penetrating wounds of the thorax, and contusions. I believe that the influence of the last of these has often been under-rated, and that contusions and superficial injury even of a slight kind have occasioned pleurisy more frequently than has generally been supposed. In some states of the constitution, by no means recognisable previously, superficial and painful injuries, such as severe burns, scalds and lacerations of the surface, are followed by inflammation of the pleura; and in some instances the injury may have been so severe as to have its effects propagated to the intercostal muscles, and thence to the costal pleura; but, in other instances, this explanation can hardly be entertained, although the frequency of pleurisy subsequently to such injuries fully justifies a belief in the sequence being that of cause and effect, whilst nervous communications, connections, and influence sufficiently account for the phenomenon.

12. *c.* The *pathological causes,* or antecedent diseases, require some notice in relation to the occurrence of pleurisy, more especially as the most frequent appearances of this malady are of this description. The common supervention of pleurisy upon general and lobular pneumonia, upon tubercles in the lungs, the rupture of a tubercular cavity, or tubercular perforation of the lung, and upon other organic lesions of this organ, is well known. But it is not always sufficiently recollected, at least it has not been sufficiently noticed by authors, that pleurisy is often consequent upon inflammations of the liver, of the diaphragm, and of the pericardium; and still more frequently upon rheumatism. Pleurisy may either follow or co-exist with these, and more frequently with inflammation of the liver and diaphragm than is generally supposed. It may also follow partial or general peritonitis, and become the most dangerous part of the complicated malady. It is well known that diseases of the mamma, more especially the malignant maladies of this organ, often extend to the pleura, and occasion one of the worst forms of pleuritis; and pleurisy, generally with effusion, is one of the most unfavourable consequences, and not the least unfrequent, of inflammations of the veins and of the lymphatics, of punctures or the inoculation of morbid fluids during dissections, and of organic diseases of the kidneys.

13. *Eruptive Fevers* are among the most frequent pathological causes of pleurisy, this disease commencing either during the acme of the eruptive fever, or during the subsidence of the eruption, or even during the period of convalescence. When the pleurisy appears during the acme of eruptive fevers, it may be manifest, or be marked by the other phenomena, or be latent, and be detected only after death; and it may be similarly circumstanced when occurring at any period after the decline of the eruption. In the first instance,

the concomitant pleurisy is to be imputed to the morbid poison in the circulating fluids, that has affected the pleura in addition to the external surface, and indeed other surfaces of the body. In the later appearances of pleurisy in connection with, or subsequent to, an eruptive fever, it may be inferred that the morbid condition of the circulating fluids had not been removed by the changes which had taken place on the cutaneous surface, and by the other emunctories, but that it was still sufficient to implicate the pleura, especially if exposure of the surface, in its existing state of susceptibility, favoured determination of the circulation to internal parts. Moreover, the cutaneous function is often not restored for some time after eruptive fevers; hence the blood retains much uneliminated materials, which act injuriously upon serous exhaling surfaces, and often inflame them: and this evil and its consequences are always developed or aggravated by exposures to cold, even of the most evanescent and slightest kind, during the early periods of convalescence from these fevers. Besides, the sympathies existing between the skin and serous membranes, already insisted upon (§ 11.), are also to be taken into the account when speculating on the connections of inflammations of these surfaces.

14. The *puerperal state*, more especially the first month after delivery, is not an unfrequent cause of pleurisy; inflammation of the pleura occurring then either in a simple form, or associated with peritonitis, or with pneumonia, or with phlebitis, &c. In this particular state there can be no doubt of the disease being caused, in great measure, by the condition of the blood consequent upon the absorption of morbid matters from the uterus, and even in part from the digestive canal, aided probably, in some cases, by suppression or interruption of the eliminating or depurating functions of the skin, kidneys, and intestinal canal. In many instances, also, of puerperal fever, more especially of the adynamic and malignant states of that disease, pleuritis appears both as a complication or prominent local lesion, and as a consecutive malady; and thus pleurisy, appearing after parturition, may be viewed as resulting from analogous changes to those which occasion it in connection with eruptive fevers, erysipelas, and some other diseases of the skin, namely, from the states of the circulating fluids, aided by interruption or suppression of the actions of the skin and other emunctories.

15. II. DESCRIPTION OF PLEURISY. — i. THE STRUCTURAL CHANGES CONSTITUTING PLEURISY. — It will be advantageous briefly to notice those changes in the pleura constituting this disease, in the earlier stages, and which exist in all cases, in a greater or less degree, however early treatment may arrest their progress. These changes are identical with those characterising inflammations of the *peritoneum*, and hence it will be unnecessary to do more than to notice them briefly. It is probable that, at the very commencement of the inflammation, there is a diminution of the serous exhalation that usually moistens or lubricates the pleura in the healthy state. This being the case, the friction between the opposing surfaces would be increased: but this condition would soon be followed by an exudation of lymph, or of an albuminous serum, which would assume various forms with the intensity and continuance of that inflammation, and the habit of body and vita powers of the patient. The pleura, more especially in its subjacent or more fibrous layer, and the connecting cellular tissues, becomes more vascular, more opaque, and somewhat thickened at least, subsequently; and the lymph effused more copious. The liquid or lymph poured out consists o serum — an augmentation of the serous exhalation — and of a material of nutrition, the albuminous the coagulable, or albumino-fibrinous portion If the inflammation continue, even for a shor time, the exudation of these materials, in variable proportions in different cases, proceeds rapidly and gives rise to changes depending much upon the proportion of the latter material contained in the serous fluid. In its smallest proportion, the coagulable material is held in solution by the effused fluid; and, when withdrawn from the body, it gelatinises upon cooling, the liquid mass assuming a jelly-like appearance. When the coagulable portion is more abundant, it forms films or coats of lymph upon the surface of the membrane; and this deposition is generally the more considerable, and the more disposed to speedy organisation, the more acute the inflammation, the more plethoric and robust the patient This coagulated lymph thus forms the false membranes, and the substance of the adhesions so frequently formed between the surfaces of the inflamed pleura. But the false membranes may exist with or without adhesions, the existence of adhesions depending much upon the quantity of the fluid effusion between the pleural surfaces This effusion, especially when considerable, will generally gravitate to the most depending portions of the pleural cavity; and there, especially, it will tend to keep the pleuræ separate. But if the upper portions of the pleura be inflamed, they will more readily adhere, unless the fluid be very abundant. If the pleura be inflamed only in their lower expansions, a small quantity of fluid will be sufficient to keep them apart. When the lymph effused on the inflamed surfaces becomes organised it forms a false membrane; and if the lymph cover opposite surfaces, adhesions, through the medium of these membranes, often become firm or permanent. When the liquid effusion is small, or even considerable, various adhesions may be formed, and vary in number, appearances, and extent, in connection with the effusion; or partial adhesions, co-existing with false membrane, may exist without any, or with very slight, effusion. In more prolonged cases, and in various other circumstances, which will appear in the sequel, various consecutive changes are observed in the pleura, and in the matters effused in its cavity; but these will be more fully noticed hereafter.

16. ii. THE SYMPTOMS AND SIGNS OF PLEURISY. — *A.* OF SIMPLE ACUTE PLEURISY — or STHENIC ACUTE PLEURISY. — This, as well as other inflammations, generally commences with chills or rigors, the continuance and severity of which are generally in proportion to the severity of the attack. The rigors are either preceded, or accompanied, or followed — for no precise order of procession of their symptoms is observed — by pain or stitch in the side, aggravated by inspiration and cough. To the rigors succeed heat of surface and the usual phenomena of sympathetic inflammatory fever, which vary with the

constitution, idiosyncrasy, and vital power of the patient. The respiration is short, frequent, someimes nearly forty in a minute, superficial, and anxious. Inspiration is interrupted, or, as it vere, cut short, by the lancinating pain. Cough s dry and suppressed. The chest, on percussion, urnishes a dull sound on the affected side ; and, t the same time, there are diminished motion nd sound of respiration, with other morbid signs, n that side. The accompanying fever is atended by nocturnal exacerbations, with more or ess manifest remissions. From the fifth to the ninth day the fever subsides, either with or withut critical changes. The pain of the side abates, nd with it the feeling of oppression or tightness, nd expectoration and respiration become more asy. Still the local changes, evinced by perussion and auscultation, remain, and often connue for a considerable period ; and even, to a ertain extent, during life. But more commonly hey gradually disappear, and the patient recovers ealth and strength. Dulness on percussion is he sign which is the last observed, the breathound returning often long before the dulness enrely disappears. These phenomena result from he several products of inflammation collected in he cavity of the pleura, that are generally removed during the period of convalescence. This iew of the symptoms of pleurisy requires, however, a more particular examination, in respect oth of the diagnosis and of the treatment.

17. *a. The pain or stitch in the side,* characristic of this state of the disease, indicates a ore or less developed period of it. This pain is harp or lancinating, often severe, recurs at each spiration, and prevents the dilatation of the orax, thus confining inspiration within certain mits. Its seat is most frequently under the pple, at the margins of the lateral attachment the diaphragm. It has been asked, to what this pain owing? M. Cruveilhier answers is question by referring it to the friction of the stal pleura over the pulmonary pleura, which believes to be greatest at this situation. ut I doubt the existence of much friction tween these surfaces ; and believe, that the in is to be imputed chiefly to the stretching the inflamed fibrous layer of the membrane uring inspiration, and to the development of its orbid sensibility by this act. The pain may be lt in other situations besides that now menned. It may exist at any part of the affected le of the chest. It may even extend to the mbar region, or to the lower margins of the bs and down to the crest of the ilium ; and it may ist in the mammary and sub-sternal regions, and e as high as the margins of the third or second , extending even to the shoulder. The pain ries as to intensity and duration : it may be rmanent or temporary, remittent or intermittent. may be so intense as to threaten suffocation or phyxia, either from attempting to move, or ing to the inability to dilate the chest. This, wever, is most remarkable in extreme cases, d in those of *double pleurisy* (§ 61.). In other tances the pain is comparatively slight, and is t chiefly during a full inspiration, or upon ughing or sneezing, &c. In some cases, the in extends over nearly the whole of the side, d is increased upon pressure, especially on the ercostal spaces, upon percussion, &c. I have seen also the pressure of the stethoscope endured with difficulty, and a certain degree of puffiness or œdema of the side or of the external parietes. In a case of pleurisy consequent upon hepatitis, very recently under my care, this external œdema and tenderness were very remarkable. I have imputed these phenomena to inflammation of the costal pleura, and to the external propagation of several of the local changes, especially excited vascular action, increased sensibility, and serous infiltration to the sub-cutaneous cellular tissue. Moreover, the pain may be entirely absent, or may exist in a situation which may not suggest the existence of pleurisy : and hence the disease has been called *latent Pleurisy,* which will be considered hereafter (§ 49.).

18. *b. Respiration* is short, interrupted, superficial, and very frequent. It may even reach fifty in a minute. The frequency of respiration is generally in proportion to the severity of the pain, which checks the dilatations of the chest, and creates a necessity for an increased frequency of the act. In these cases, a sudden attack of cough or sneezing almost threatens asphyxia ; but I cannot agree with M. Cruveilhier that asphyxia ever occurs under these circumstances, unless in double pleurisy, when much effusion has taken place. Great frequency of respiration may, however, exist independently of pain ; but, in this case, there is generally considerable effusion. Hence this state of respiration, although no pain is complained of, should always induce a suspicion of the existence of pleurisy. When the remarkable acceleration of breathing is caused by the effusion, then attacks of cough, sneezing, &c., may be followed by fatal asphyxia, but this issue more frequently supervenes without either of these contingent causes having occasioned it.

19. *c. Cough* most frequently attends pleurisy ; but it is short, dry, and suppressed, owing to the pain it causes. It sometimes, however, brings up some bronchial or tracheal mucus, and when pleurisy is complicated with catarrh, then the cough is much more severe and distressing, and often attended by a copious expectoration of the sero-mucous fluid of catarrh. Occasionally the catarrhal symptoms are not developed until the acute stage of pleurisy is subsiding, and when a free, abundant, and copious expectoration then takes place, it may be viewed as being critical ; but when the sputum is viscous, adheres closely to the vessel, is rusty or streaked with blood, it may then be considered an indication of the extension of the inflammation to the substance of the lungs, and to the minute bronchi.

20. *d. Immobility of the thorax* on the affected side has been considered characteristic of pleurisy ; but this is the case only to a certain extent, and is not to be depended upon, for in many severe cases it is difficult to see much difference in the degree of motion of both sides, or of different parts of the same side. Besides immobility is often caused by pain, which may exist in the side independently of inflammation, as will appear hereafter.

21. *e. Decubitus* is most frequently on the back during the acute stage of pleurisy ; sometimes it is upon the sound side, and rarely on the affected side as long as pain is considerable ; but when effusion has taken place, and the acute stage has passed away, the patient can lie only on the back or

on the side in which the effusion exists. Indeed, in all chronic cases of pleurisy, or whenever effusion into the pleural cavity is great, the lung on the sound side only remains capable of performing the respiratory functions, and it necessarily requires to be unembarrassed during the discharge of these functions, either by position, or any other circumstance.

22. *f. The Fever*, attending pleurisy, may precede, for two or three days, the local symptoms, or accompany them. It generally subsides before these symptoms disappear for a longer or shorter period. The heat of surface varies considerably, but generally it is co-ordinate with the strength and hardness of the pulse, and is increased towards evening or night. The fever is seldom perfectly continued; it is generally slightly remittent; sometimes more manifestly so. It is much less frequently intermittent, although the latent form of the disease often presents complete morning or daily intermissions. The pulse is hard, concentrated, or constricted, and more or less accelerated, whilst in pneumonia it is full and developed. Hardness of the pulse was considered by Baglivi as the most distinctive symptom of pleurisy. The concentration and hardness of the pulse are generally remarkable in proportion to the acuteness of the pain. When effusion takes place, or is considerable, especially about the third or fourth day or later, the febrile symptoms subside, or remit more decidedly, and sometimes the pulse intermits. These phenomena may be referred to the influence produced by the effusion upon the functions of the lungs and heart, and consequently upon the blood itself. The least mental or physical agitation, however, occasions great acceleration of the pulse in these cases, and a febrile exacerbation returns at night.

23. Although the sharp pain in the side, catching and restraining every inspiration, and rendering deep breathing or coughing almost intolerable; the short breath and short dry cough thereby caused; the hard and quick pulse, heat of skin, &c., are often characteristic of pleurisy; yet acute inflammation, and its most important consequence, copious effusion, may have existed for many days in the pleura, without this array of symptoms. Even effusion may have taken place to a very great amount without either disturbing the respiration very sensibly, or even rousing the sensibility of the parts, if it have proceeded gradually or slowly. On the other hand, the *physical signs* are more to be depended upon than those symptoms which have been now considered. And, although they do not indicate the intensity of the inflammation, they seldom fail in announcing the presence, and most serious consequences of it. I shall therefore analyse these signs in the order in which they commonly appear.

24. *B. Physical signs of Pleurisy.*—*a. Diminished motion* is usually observed as already stated, and is at first to be imputed to the pain; but, as pain may exist independently of inflammation, this sign cannot be depended on. The sound of respiration is also diminished in proportion as the movements are restrained in the parts affected with pain.

25. *b. A sound of friction*, or a creaking sound, is sometimes heard during the movements of the chest. This is ascribed by Dr. Stokes, M. Reynaud, and others, to a defective lubrication of the opposite pleural surfaces during the early or cipient stage of inflammation — to a *dry pleuri* Dr. Williams ascribes this sound to the preser of lymph, and believes that its production is voured by the lung being partially distended pushed against the walls of the chest during spiration. It is most apt to occur where the lu is confined by adhesions or false membrane, partially distended by tuberculous or other de sits. This sound is commonly heard about middle parts of the chest. It generally ceases soon as effusion into the pleural cavity is nounced by percussion; but in the dry pleuris may continue for a long time. Dr. Willia remarks that, in three cases in which the sound heard a few days before death, the pleura w thinly coated with a few small patches of s granular lymph; and that on gently rubbing lung upon the costal pleura a friction-sound v produced by the patches, but by no other part of pleura. The pleural inflammation and effus were very slight in these cases.

26. *c. Dulness on Percussion*, at the most pendent parts of the affected side, is present wl effusion has taken place; but there may also some dulness on percussion of other parts, or wh a considerable effusion of lymph, or false me brane, is interposed between the opposite surfac The effused fluid collects in the lowest part of cavity, floating to some extent the lung upon and hence the dulness in that part. As, howe the vesicular and peripheral parts of the l yield more readily to pressure than the tubula more internal parts, the fluid mounts up, as accumulates, between the lung and ribs, and casions more or less dulness, which is then tinctly heard if the percussion be gentle and rupt. But in all cases the sound should compared with that emitted by corresponding p on the sound side.

27. *d. Diminished sound of respiration*, with minution of the extent of the motions of resp tion, necessarily result from the accumulation fluid in the pleural cavity. The breath-soun more and more weakened and shortened as effus proceeds; and is ultimately abolished in most pa excepting those about to be noticed. This si as well as that preceding and those following may be modified, or rendered less distinct, by hesions previously existing between the pulmon and costal pleura.

28. *e. Ægophony*, or the modification of vocal resonance so denominated, occurs when dulness on percussion and diminution of the spiratory sound reach the middle regions of chest. The vocal resonance is heard more tinctly than usual in those regions, "and i superficial, as if produced in the spot, separat from the oral voice; and it is changed to a sn bleating, trembling note, which so much resem the voice of a goat, that Laennec termed it æ phony. This modification of the voice is he most distinctly between the third and sixth r which corresponds with the situation of the mid sized bronchial tubes; about the spine it is ge rally mixed with more of a common bronchoph from the larger tubes at the root of the lu The liquid interposed between the lung and parietes of the chest renders the voice more aud in the above situation, by condensing the tissu the lung, and thereby making it a better condu

f sound. The layer of fluid thus interposed, beig thrown into vibration by the sound propagated om the bronchial tubes, transmits the voice to ie ear of a tremulous and wiry character, or imarts to the voice, heard upon auscultation in this tuation, this particular character. The high or harp tones of the voice are best transmitted in his way. Hence ægophony is most evident in oys, women, and children with high voices. In ersons with a bass voice it is more commonly mited to the inferior angle of the scapula, or ear the spine; and it then approaches nearer to ronchophony from its being seated in larger ubes.

29. As the liquid increases, the ægophony beomes weaker, more distant, and loses much of its remor; the sound much resembling a small deep-eated voice, or a silvery echo of the original. his is owing to the amount of effused fluid, and o the compression of the lungs and tubes; and, when these are much increased, the sound ceases ltogether. It has not been ascertained, what uantity of effusion is sufficient to produce this ast effect. Dr. Williams thinks that much sound f the voice is not transmitted when the layer of erum exceeds an inch in thickness. If the ægohony continue stationary for several days, it may e inferred that the effusion is moderate, and ireases very slowly — which is a favourable sign. But it is often very transient; and cases often do ot come under treatment until the pleuritic effuion has become too great to give rise to ægohony. Former and existing adhesions, however, nodify this as well as the other physical signs. When ægophony is most distinct it is often acompanied with bronchial respiration, especially between the scapulæ, where, also, there is a good eal of common bronchophony with it. Indeed, egophony is merely the bronchial voice modified y transmission through a layer of fluid; and hence t may be changed into bronchophony by causing he patient to change his position so as to allow he fluid to gravitate to a different part of the avity. Hence, also, ægophony and bronchohony often present mixed and doubtful states, which do not admit of easy distinction, although hey differ sufficiently when their respective characters are well marked. The former may be tated to be a *tremulousness* of the voice when it is uperficial, and an echo-like smallness when it is leep-seated; whilst the latter may present several other varieties.

30, *f. The diffused vibration of the voice,* which is isually felt by the hand applied to the chest, is generally intercepted and prevented by effusion nto the pleural cavity. M. Reynaud first pointed out this sign, and showed, that the vibration caused by the voice pervading the common tissue of the lung, and transmitted to the parietes of the chest, is muffled and destroyed by a layer of fluid nterposed between the lung and the parietes, although ægophony may be heard at the same spot, the vibrations of the latter being too fine to be felt by the hand. When dulness on percussion s caused by solidification of a portion of the lung, he vocal vibrations are transmitted with unusual orce from the tubes to the walls of the chest, and hence the opposite effect occasioned by the fluid nterposed becomes an important diagnostic sign, n regard of these lesions. Partial adhesions, however, of the lungs to the costal pleura may very materially interfere with these phenomena; for there may be even more vibrations than usual felt at the adhering parts, or where the lung is pressed close to the walls of the chest; and, on the other hand, there may be solidification of the lung, and fluid or other obstruction in the bronchi may prevent the fremitus of the voice from being transmitted through them; or more or less fluid may be interposed between the solidified lung and the walls of the chest.

31. *g. Ægophony and all sounds of the voice cease* throughout the affected side, as the liquid effusion increases, excepting within two or three inches of the spine; or where the lung may adhere to the walls, which frequently happens at the upper parts of the chest. The sound of respiration is not heard in all the parts of the affected side, except the interscapular region and under the clavicle; but it is much weaker in these parts.

32. *h. Enlargement and immobility of the affected side* may always be detected when the effusion is considerable. This side is first seen to be larger than the other at the end of expiration; it not diminishing equally with the sound side, especially at its lower region. The difference between the sides may be rendered more evident by encircling the chest by a piece of tape, and by fixing it at the spine and sternum; when the tape will slacken and tighten with expiration and inspiration more evidently on the sound, than on the diseased side, which latter remains more fixed in proportion to the amount of effusion, and degree of distension. As the effusion augments, the enlargement of the side becomes the more obvious to the eye during the respiratory act, the want of symmetry being apparent in whatever position the side is viewed from; but the amount of difference should be ascertained by measuring the chest horizontally with a piece of tape. Having made the tape, or ribbon, to meet at the middle of the lower end of the sternum, it should be taken at the precise point of its crossing the spinous processes of the vertebræ, and the difference of length between the two sides will give the amount of enlargement; recollecting, however, that the right side of an adult is about one-third of an inch larger than the left.

33. *i. Displacement of the parts and organs bounding the effusion* becomes more and more manifest as the amount of fluid increases. Laennec, and many after him, have remarked that the intercostal spaces on the side of the effusion do not present their usual depressions; and that they are sometimes, especially in chronic cases, equal with the surface of the ribs, or even more prominent than they are; but this sign is hardly perceptible in acute cases, unless in the more asthenic states, and when the patient is thin or emaciated. In such cases, Dr. Williams has noticed an evident fluctuation, which, however, is a rare occurrence. The smoothness of the side, from the yielding of the intercostal muscles and consequent obliteration of the spaces, as well as the yielding of the diaphragm, and the pushing before it of the viscera of the upper regions of the abdomen, are remarkable when the effusion is great, and are ascribed by Dr. Stokes to paralysis of these muscular parts, consequent upon the inflammation of their serous linings. "The true explanation," he remarks, "of the protrusion of the intercostals and diaphragm will be found to

be, that they are affected by paralysis following inflammation of a contiguous structure—that their contractile powers are lost, and that hence they yield easily to a pressure, which in their healthy state (as in vesicular emphysema, in hydrothorax, and the first stage of pleurisy) they effectually resist." (p. 464.)

34. Displacement of the organs more immediately adjoining the effusion, especially that of the heart and of the liver, is one of the chief indications of the existence and of the amount of liquid effusion into the pleural cavity; and was first noticed by Dr. Stokes and Townsend. When effusion is considerable in the left side, the consequent displacement of the heart renders its recognition easy. In this case the pulsations of the heart are felt and heard most distinctly under or to the right of the sternum, or as low as the epigastrium, instead of between the cartilages of the fourth and sixth left ribs. If the effusion be on the right side, the liver is pushed down much below the margins of the ribs, and its position is easily traced by percussion and by the touch. It may even be pushed so far as to form a tumour in the abdomen, and hence lead to a serious mistake in the diagnosis, if the symptoms and signs referrible to the thorax be not duly investigated. When effusion in the right cavity is very great, the heart may also be pushed further than usual to the left, and it may be felt beating to the left of the nipple, or even below the axilla. The mediastinum may also be displaced by a copious effusion, so that a dull percussion sound will be given out over nearly the whole of the sternum, and even for half an inch beyond it upon the sound side, owing to the mediastinum being pushed to this side by the effusion, which thus occupies the space behind the sternum. The dulness on percussion in these cases is most evident below the juncture of the second rib with the sternum. The above displacements may also be caused by air in the pleural cavity, but in this case the tympanitic sound would be present instead of dulness.

35. *k. The motions and sounds of the healthy side*, especially when compared with those of the affected side, indicate either no sign of disease, or an increase of the signs of healthy action, owing to the increased work performed by the sound side. This side moves more fully and rapidly than usual, and the respiratory sound is so loud in it as to resemble the respiration of children.

36. *l. Old, or even recent, adhesions* very remarkably modify the physical signs of pleurisy. When the adhesions are loose, or are stretched by the effused fluid, so as to form bands traversing the effusion, or cells filled with fluid, the lung may be thereby kept at a moderate distance from the parietes of the chest, and ægophony would thus be continued as long as this state continued. Where the adhesion is extensive and close, fluid poured out in the vicinity will compress one part of the lung, and stretch and ultimately compress the part adjoining, in or near the place of adhesion. Thus, as not infrequently observed, adhesions may be found in the upper regions of the chest, and the fluid effusion in the lower parts may be so great as to press the lungs against the upper portion, and there occasion a loud bronchophony and bronchial respiration transmitted from the large tubes by the adhering dense column of lung; and thus the case may be mistaken for one in which cavities exist underneath this situation; but the prominence o the intercostal spaces, the dulness on percussion the enlargement of the side, and the displacemen of parts as above described (§§ 32, *et seq.*) wil readily distinguish its real nature.

37. In rarer instances, the pleura of the upper and posterior parts of the lung may be affected and that of the inferior portions may be adheren to either the diaphragm or lower walls of the chest. In these, the lung will be pressed, by effusion into the upper and posterior parts, agains the anterior or other portion of the walls of the thorax, according to the seat of effusion, and to the manner in which the fluid is bounded by the adhesions or false membranes; and the sounds wil be tubular, loud, or clear, or otherwise vary, with the part of the lung thus pressed to the sides o the chest, and with the proximity of the larger bronchial tubes; and a more or less loud bronchophony will also be heard.

38. *C. Consecutive changes in Acute Sthenic Pleurisy.*—If inflammatory action subsides in consequence either of the treatment or of the effusion which takes place, *absorption* of the fluid and of the lymph usually results, and the compressed lung expands under the efforts of respiration in proportion as absorption proceeds. The signs evincing the increased effusion gradually disappear; and ægophony and the sound of respiration return in the situations, generally the upper parts of the chest, where they were last heard. With the return of these, the side assumes its natural appearance, and a gradual improvement takes place of the sound on percussion. In modern cases, as Dr. Williams remarks, the fluid is absorbed before—indeed long before—the lymph or albuminous matter is removed; and when the pleural surfaces covered with this matter come together, a rubbing or rustling sound is sometimes heard, which soon ends in the adhesion of these surfaces by bands, or by more continuous false membranes. If these false membranes are formed after the fluid has been removed, and the lung has recovered its full expansion, they are adapted to its free motions, which are not materially interfered with by them. Hence adhesions are often formed, which are lengthened in the lower parts of the chest, where the lungs descend somewhat as the ribs rise, and which are short in the upper parts, where the lungs more closely follow the movements of the parietes.

39. In severe cases, the inflammation continues after the effusion has become abundant; and not only increases or perpetuates the fluid effusion, but also throws out "albuminous matter in various conditions, which by its present qualities or subsequent changes may produce a variety of prejudicial effects, all tending more or less to interfere with the restoration of the organs to a healthy state." These consequences arise from the continued or unsubdued inflammation, whether it has been imperfectly treated, or entirely neglected; and they furnish strong proofs of the value of the physical signs, which are never absent, and which rarely fail to point out the existence of these consequences. They will come more appropriately under consideration under the heads of *Chronic Pleurisy* (§§ 63, *et seq.*).

40. *D. Terminations of Acute Sthenic Pleurisy.*—The most frequent terminations of this form of pleurisy are—1st, by resolution,—2d, by passing

nto the chronic state, — and third, by fatal as-hyxia. — *a. Resolution* may be complete, the ffused fluid and the false membranes being ab-orbed, cellular adhesions being the only traces eft of the disease; or it may be incomplete. In his latter case, the fluid effused is absorbed, but he false membranes remain, undergo changes, nd occasion phenomena, which will be noticed when the *second* of these terminations are con-idered. — *b. Death by asphyxia* may occur in the most severe cases, either in double pleurisy, or in he single state of the disease when the effusion is apid and very great; but this termination is much more frequent in pleurisy than in pneumonia. t is, moreover, very rare in the acute stage and imple form of the disease; it occurs chiefly in the hronic stage, and in the more complicated states.

Before I proceed to describe the changes ob-erved in the pleura and in the matters thrown ut on the surface of this membrane after inflammation of it, I shall first notice the several states r forms of pleurisy which differ from that which as now been described, as being the more common type of the disease. Certain of these, indeed, iffer from that just considered in very little urther than in the seat or limitation of the disease, r in the stage, period, or continuance of it; and ence the necessity of considering them all in close onnection.

41. ii. DRY PLEURISY — the *Pleurisie sèche* of NDRAL. — *a.* This *state* of the disease deserves otice chiefly because it has been particularised by Dr. STOKES and M. ANDRAL; for it can hardly be onsidered a distinct *form*, but rather as being articular periods, of pleurisy modified more or ss by peculiarity of constitution and by the grade inflammatory action. Dr. STOKES remarks that is term may be applied to that form in which othing is effused but lymph. The characters of is state in general are, that the constitutional nd local distress is comparatively slight, that or-anisation rapidly advances, that the sound is ear, or nearly so, on percussion, the phenomena accumulated effusion being wanting, and that e friction signs are evident. Dry pleurisy occurs, ccording to these writers, as an original and un-omplicated disease, or as consecutive of fever, ysipelas, or diffuse inflammation. It may be sociated with or succeed to any of the diseases the lungs, or occur as a complication of cardiac hepatic disease. The circumstances in which I ave met with it, in the least equivocal form, are ther associated with, or consequent upon, acute eumatism, acute hepatitis, and pneumonia.

42. *b.* The *physical conditions* of dry pleurisy r. STOKES believes to occur in two stages of the dinary disease; namely, in the earliest periods efore effusion takes place; and in the latter ages, when the liquid effusion is absorbed. In e first case, the duration of the friction phenomena depends on the rapidity of effusion; in e second, on the vigour of the constitution which fluences the process of organisation. At the ommencement, pain is often felt in or near the uation of the inflammation, but it soon subsides. he characters of the friction-sound, generally on afterwards heard in the situation of the pain, e various; but this sound always conveys the ea of two rough or dry surfaces moving unin-rruptedly upon each other. It accompanies in-iration and expiration, but it may be absent during ordinary breathing; and yet become manifest on forced respiration. In some instances the rubbing sensation is felt by the patient for a long time, but the sound may often be heard long after he ceases himself to feel the obstruction. Dr. STOKES states, that the friction-sound in the early stages of the simple disease, or immediately after the absorption of an empyema, is often accompanied by a rubbing sensation, perceptible to the hand. Like the former sign, this may be absent during ordinary breathing, but become manifest when the patient inspires deeply. In the progress towards cure, this is the first of the physical signs to subside; it is apparently connected with the least organised state of the effused lymph.

43. The duration of the friction-sound, depending upon the absorption of the fluid and the rapidity of organisation, varies remarkably in different persons; it is comparatively short in the young and robust; while in the feeble and cachectic it may continue without changing, especially when the disease is consecutive or complicated, longer than a month. It is rarely heard, or continues but a short time, at the commencement of pleurisy, attacking the cachectic, or complicating febrile maladies. When, however, it follows the absorption of an effusion, it may continue from several days to some weeks. It is heard most distinctly over the middle parts of the chest. The friction is rarely heard when the dry state of pleurisy is consequent upon pneumonia with hepatisation of a considerable portion of the lung. It is more distinct when the pleurisy is consequent upon, or complicated with, acute hepatitis. When pleurisy is associated with pericarditis, the rubbing-sounds seem double, but the combination of that caused by the action of the heart, with that following respiration, often causes a confusion, which requires attention and practice to distinguish and duly recognise.

44. *c. The causes of the friction-sounds* have been differently stated by pathologists. These sounds, variously modified with the nature of the case, have been heard in certain states of inflammation of the pleura, pericardium, and peritoneum; and, as they have not been heard in those states which are attended by a copious liquid effusion, but in that in which an unorganised lymph is presumed to exist on the surface of the inflamed membrane, so they have been viewed by M. RENAUD, Dr. CORRIGAN, and Dr. STOKES as being caused by the presence of this lymph in the situations where these sounds are heard. Still this cause admits of doubt; for the *creak*, or *leather-creak*, admitted to be one of these friction-sounds, is rather to be viewed as given out by the membrane itself in certain morbid states of it, than by the friction of the opposite surfaces when covered by unorganised lymph. The fact, however, of Dr. CORRIGAN having produced the sounds in question by rubbing two portions of the inflamed membrane one upon the other, may appear conclusive of this point; still I believe the matter still to require further examination.

45. *d. The existence of dry pleurisy*, it should be mentioned, even as a *stage* of pleurisy, has been doubted very recently by a no less distinguished pathologist than Professor HASSE. He remarks, that the attempt has been made to reckon the progress of pleurisy by defined stages: first, the period of dry inflammation, which is of shorter or

longer duration, and comprehends all the changes observed in the pleura and sub-serous cellular tissue (see § 112.), but without, as is supposed, any serous effusion. Now, he adds, that he has never encountered this dry stage as described; having always, even at the very outset, found the serous fluid somewhat, however slightly, augmented in quantity, and marked by its deep yellow tinge and its increased consistency. There were, likewise, present those greyish or yellowish points, the initial and quickly expanding rudiments of membranaceous formations. "The so-called *dry pleurisies* of ANDRAL (*Clin. Med.* 4mo edit. t. iv. p. 405.)," he continues, "are therefore probably to be understood in a comparative sense only—effusion too scanty to be detected by physical signs during life. Such a ground of distinction is, however, obviously opposed to the strict principle of pathological anatomy." The second stage has been viewed as eminently that of effusion, which, although not confined to any one period, is not sufficiently copious and characteristic to constitute a secondary and distinctive stage, until the original inflammation has become thoroughly developed. But to divide the period of effusion into two stages, and thus to attempt to discriminate between the development of liquid effusion on the one hand, and of coagulable lymph and adventitious membrane on the other, are discordant with the process which gives rise to these productions. The third period has been considered to be the organisation of the plastic exudation. This, however, does not take place at any particular stage, nor is it a process to which every form of plastic effusion is necessarily subject. It would be difficult to reconcile, in this arrangement, those pleuritic exudations, which exhibit traces of organisation after the first twenty-four hours, with those in which the organising powers has been ineffectually exerted for weeks or months. Whilst, therefore, this division might seem justified in some instances by the procession of morbid phenomena, it would in others be quite inapplicable. It would probably be preferable to consider the secondary changes in pleurisy according to the degrees of intensity of the primary inflammatory act, and to the rapidity with which they ensue upon this act.

46. *E. Pleurisy as above considered*—whether it be attended by little or no liquid effusion at an early stage, by a rapidly increasing and abundant effusion, or by more or less organisation of the exuded lymph—generally presents *a sthenic character*, more especially when it occurs primarily, and in a previously healthy constitution. It then, particularly in the young, robust, plethoric, or sanguine temperament, is accompanied with highly inflammatory symptoms, local and constitutional; runs its course frequently with great rapidity, and evinces a greater tendency to the organising or formative process, even although effusion to a great extent may rapidly supervene. The sthenic character may also exist, although in a much less marked degree, in more delicate or even in lymphatic subjects, especially when the disease is primary, but it is then attended by much less fever, and less severity of local suffering, the symptoms more nearly approaching the state of the disease next to be noticed. The sthenic character may likewise be evinced in pleurisy consecutive of, or complicated with, pneumonia, hepatitis, pericarditis, or acute rheumatism, in all which, although it sometimes as sumes more or less completely, or approache to, the asthenic character, the sthenic is mor frequently observed, unless in the aged, the de bilitated, and cachectic.

47. iii. ASTHENIC PLEURISY. — *Pleurit Nervosa*, RICHTER;—*Cachectic Pleurisy.*—Th form of pleurisy is generally met with in persor who have been debilitated by previous acute chronic diseases; in the cachectic, or those sul ject to some constitutional vice; in persons whos constitutions are broken down by intemperance an dissipation, and more especially in the course other maladies in which the circulating fluids a contaminated either by the absorption of morbi matters, or by interruption of any of the elimina ting or depurating processes. It thus not i frequently supervenes in the course of, or durin convalescence from, typhoid or adynamic fever exanthematous fevers, puerperal fevers, erysip las, organic changes in the kidneys, phlebiti diffuse inflammation, or spreading and diffu suppuration, and consecutive abscesses. In a these, effusion is more or less rapid, the d stage hardly or not at all exists, and albumino exudations either are not formed into membran and adhesions, or do not become organise unless a change is produced during the cour of the disease in the states of vital power a of vascular action. Indeed, in the majority cases of asthenic pleurisy, the albuminous porti of the exudation is more or less mixed with t serous fluid, the fibrinous or fibro-albumino character not being present.

48. This form of the disease is seldom attend by acute or painful local symptoms. It is g nerally *latent*, and often effusion is far advance or has long existed before the disease is detecte It is rarely a primary affection — is most fr quently associated with some other disorder, structural change. It is sometimes very sudd in its occurrence, and indicated at first by t shortness and frequency of respiration, by the po tion of the patient, and the sinking of the powe of life, rather than by local distress or pain, by febrile symptoms, which, if they be prese are usually of an adynamic character. T state of pleurisy, as may be expected from nature and the circumstances in which it appea is always removed with great difficulty, or n removed at all, especially if copious effusion h taken place before it was detected. It may s pervene, in the course of the maladies just me tioned (§§ 47.), and escape detection until d section after death discloses its existence, althou attention has been directed to its continge appearance, especially when the effusion h been small, or when it has taken place short before death. I have thus met with it in the la stage of malignant or infectious puerperal feve in open cancer of the mamma, confluent sma pox, &c. I have seen albuminous exudatio covering the pleura in some of these cases, b the serous effusion was abundant, and the me branes formed by these exudations evinced indication of incipient organisation.

49. iv. LATENT PLEURISY. — *Pleuritis O culta*, RICHTER. — The term *latent* has be applied to pleurisy when it takes place witho pain in a situation where it can be referr to the pleura. And this state of the disease

more frequently associated with the *Asthenic*, than with the *Sthenic character* — or in other words, Asthenic pleurisy is much more frequently latent than Sthenic pleurisy. M. Cruveilhier supposes that this state of the disease is more frequent than any other. The numerous instances of adhesions between the opposite surfaces of the pleura found on dissection of cases, in which no symptom of pleurisy had been complained of, appears to justify this opinion. Still we often hear of instances of pain in the side ascribed to pleurodynia, or to rheumatism of the intercostal muscles, where a more accurate examination may have detected pleurisy. Besides, pain is often present for a time, and either overlooked or forgotten, or ascribed to some other than the real cause.

50. *Latent Pleurisy* may be either *acute* or *chronic*. In its latter state, it will be noticed hereafter. It may be either *primary*, or *consecutive*, or *associated* with some other disease. Pleurisy may be latent in either of two ways, owing — 1st, to the absence of all pain whatever; — 2d, to pain being felt in some part remote from the thorax, and suggesting the existence of disease in some other quarter. This *second form* of latent pleurisy has hitherto not been noticed by writers; but I have met with several instances of it, and recently with three cases which were primary and uncomplicated. In all these, the pain was referred to the iliac region of the same side, no pain being felt in the chest, at any part, upon a full inspiration, or when coughing, although it was excited in that remote situation. In most cases of latent pleurisy there are chilliness, thirst, heat of skin, especially in the trunk, dryness of the general surface; and as effusion becomes copious shortness of breathing, with more or less difficulty or oppression upon the least exertion. This form of pleurisy often affects children and old persons, and in both classes of persons, it is frequently associated with catarrh or influenza. Indeed, so often s this complication met with in these subjects, that careful examination of the chest should be made n all cases of severe catarrh or influenza affecting them.

51. v. Partial Pleurisy.— Circumscribed or partial pleurisy may occur *primarily* or *consecutively* of other diseases, but much more frequently n the latter than in the former state. Circumscribed or limited pleurisy may also be attended ither with *adhesions* only, or with *effusion*, adhesions owever, of various extent also existing in the atter class of cases. — *A. The adhesive form of artial pleurisy* is very frequent, and is commonly onsecutive of tubercular formations in the lung, f either of the forms of pneumonia, and of inflammatory irritation of any kind in the vicinity of he part of the pleura becoming thus affected. It a very usual consequence of tubercular depositions, softened tubercles or cavities, when either approach to the surface of the lung; the pulmonary pleura then becoming inflamed, and throwing out lymph which agglutinates it to the opposite ostal or diaphragmatic pleura, most frequently to he former at its upper regions. The pleuritic ffection is in these cases often slight, but it is eldom latent to the close observer. It is generally ndicated by more or less pain, uneasiness or tenderness, in or over the part affected; by a feeling f constriction or tightness, by frequent superficial breathing, and by diminished motion of the ribs in that situation; somewhat increased dulness on percussion, increased pain or uneasiness upon stretching or exerting the adjoining muscles, and a greater intolerance of a strong percussion over the part, than in any other place, are often also present. The pain is sometimes sharp, evanescent, and even so slight or brief in duration as hardly to be noticed or recollected. This form of partial pleurisy is often salutary in its effects, in respect of the tubercular malady, of which it is so generally a consequence, inasmuch as the adhesions between the opposite pleural surfaces prevent ulceration and perforation of the pulmonary pleura, and the escape of the tubercular matter into the pleural cavity. Although this state of the disease is sometimes latent, it is less frequently so than has been stated by some writers, it being rather overlooked, owing to the slightness or evanescence of the symptoms just mentioned.

52. *B. Partial Pleurisy with Effusion* is much less frequent than the foregoing.—(*a*). It is commonly a consequence of a more general state of the disease, in the course of which adhesions have taken place between the opposite surfaces in one part, and effusion or even suppuration in another. In some instances, the pleurisy attacks a person who has previously been the subject of this disease, and in whom adhesions of greater or less extent already exist; and this subsequent attack affects merely that portion of the pleura which is non-adherent; the adhesions limiting the extension of the inflammation, and bounding the liquid effusion, or purulent formation. Partial pleurisy accompanied with liquid or puriform effusion, may occur in any situation; but its nature can seldom be ascertained with any degree of certainty during life.

53. (*b*.) The above observation applies to *interlobular pleurisy*, or inflammation, and its consequences affecting the opposite surfaces of two corresponding lobes of the lungs. This particular form of partial pleurisy is rarely primary, but is generally consequent upon the more general state of the disease, or upon tubercles in the lungs or pneumonia. The *vomicæ*, so often said to have been found in the lungs, have very probably been puriform collections, between the opposite pleural surfaces, circumscribed by adhesions, in this and the preceding states of partial pleurisy.

54. (*c*.) The question has been put by M. Cruveilhier, whether or not a *costal pleurisy* can exist independently of a *pulmonary pleurisy*, or the latter exist without the former? Bichât believed that it could not, and contended that the inflammation always extended from the one surface to the other continuously, or without any interruption at the non-adherent parts. I am convinced, however, that this is not the case, unless in the asthenic or spreading form of the disease; but that the inflammation originating in either surface is followed by an exudation of lymph which acts as an irritant, when brought in contact with the opposite surface, and inflames this latter; and thus inflammation, or adhesion, or even effusion, are often developed in the opposite surfaces without the continuous extension of the morbid action over the intervening non-adherent or unaltered part of the membrane.

55. It has been supposed by some writers that inflammation of the pulmonary pleura is not attended by pain; and that pain is felt only or

chiefly when the costal pleura is implicated. This opinion has been considered to derive much support from the different anatomical connections of the two portions of this membrane. This distinction, however, is by no means determined; further and more precise observation is required before an opinion can be given respecting it.

56. (*d.*) *Costo-pulmonary pleurisy* may be attended by liquid, or sero-albuminous, or puriform effusion or collection, limited by adhesions to a smaller or larger space, as shown above (§ 52.). The circumscribed purulent collections — the *empyema necessitatis* of various writers — sometimes met with, and that point externally, are of this kind.

57. *C. Mediastinal Pleurisy.* This form of circumscribed pleurisy has been considered, as far as the subject admits of consideration, in the article MEDIASTINUM. It is unnecessary therefore to add more at this place than to remark, that inflammation may originate in that portion of the pulmonary pleura in contact with the mediastinum, and extend to this latter, forming adhesions between them, and giving rise to liquid or puriform effusion, which may be bounded by these adhesions. In cases of considerable duration, the liquid collection may assume puriform and encysted appearances. The exact nature of these cases is seldom accurately ascertained during life; for they are most frequently secondary and complicated with pneumonia, or with tubercles in the lungs, or even with pericarditis. The symptoms of this state of the disease, as far as they are known, are the same as those stated in the article MEDIASTINUM (§§ 3. *et seq.*).

58. *D. Diaphragmatic Pleuritis* is of frequent occurrence, especially in the course of inflammations of the liver and peritoneum, and even, although much more seldom, of the liver and of the spleen. —(*a*). This form of pleurisy may be consequent upon either acute or chronic disease of these parts, especially upon the former. I have at another place (see LIVER, §§ 41. *et seq.*) remarked upon the not unfrequent extension of inflammation from the liver to the diaphragm and diaphragmatic pleura, and even also to the costal and pulmonary pleura: and, although this occurrence is sometimes met with in connection with abcess of the liver, it also not unfrequently takes place in the course of sero-hepatitis, or in cases of inflammation of the superior serous surface of the liver, and of partial peritonitis in the superior abdominal regions. I have met with several cases of acute sero-hepatitis in which the inflammation rapidly extended to the pleura, the disease consisting, during the great part of its course, of hepatitis complicated with pleuritis.

59. It is very rare, however, unless in cases of this kind, that is, in those consequent upon inflammaiton of some one of the abdominal viscera, that pleurisy is limited to the diaphragmatic pleura; and even in those, it soon extends more or less to the pulmonary or costal pleura of the same side as that on which the viscus first attacked is situated. This mode of extension is not, however, always observed; for, in a case at this moment attended by me, but which I did not see at its commencement, there are chronic hepatitis, with tenderness in the region of the liver, effusion into the peritoneal cavity, and pleuritic effusion into the left pleural cavity, the heart being pushed towards the right side of the chest.

60. (*b*). The *symptoms* of Diaphragmatic pleuritis differ but little from those of the more usual states of pleurisy. Generally, however, when this portion of the pleura is more especially affected, there are acute pain, augmented by inspiration, by physical efforts, by vomiting, or even by the eructations of flatus, and seated at the base of the thorax on either side, or about the attachments of the diaphragm to the thoracic parietes; anxiety, difficulty of breathing, or orthopnœa, the patient being obliged to sit up, with the trunk of the body bent forwards; an anxious and distressed expression of the features; sometimes nausea or vomiting, and singultus; and considerable symptomatic fever occasionally with delirium. When effusion is considerable, or collections of sero-puriform or purulent matter are present between the base of the lungs and the diaphragm, this latter is pressed downwards, and considerable fulness, with dulness on percussion is observed in the hypochondrium of the affected side, and thus the semblance of an enlarged live or spleen may be occasioned. When the liquid collection is completely circumscribed between the base of the lungs and the diaphragm, the diagnosis is usually difficult. The anteceden symptoms, especially pain or stitch in the side with symptomatic fever, ushered in by rigors, wil indicate the nature of the disease. Complicated cases, however, may occur, in which the diaphragmatic pleura is affected on the one side, and th peritoneum, or some infra-diaphragmatic viscus or the other, and be attended by great difficulty o ascertaining the exact seat and extent of mischief but a careful examination of the physical sign and the symptoms during the progress of the disease, and a due recollection of the fact that inflammations not unfrequently extend from on side of the diaphragm to the other, especially from the peritoneal, to the pleural surface, will ofte aid the physician in his diagnosis. In some case of diaphragmatic pleurisy of the right side, excessively acute pain along the margins of the righ side; short anxious respiration, jaundice, protrusion of the liver downwards by the fluid effuse between the diaphragm and lungs, and muc symptomatic fever, were the most prominer symptoms.

61. vi. DOUBLE PLEURISY.—*a.* Pleurisy rarel attacks both sides of the chest at the same time an in a primary form: but instances of this doubl disease occasionally present themselves, especiall in a secondary form, and consecutively of adynamic, or malignant, or of exanthematous fevers, (erysipelas, or of those states of constitution whic have already been noticed as imparting an asthen character to pleurisy, more particularly morbi states of the circulating fluids. In double pleuris both sides of the thorax are not always affecte to an equal extent, nor are the inflammatory products always the same, in respect either of th effusion, or of the more consistent exudation. Or or other may be much more abundant in one sid than in the other, and even be otherwise modifie or different; and very generally the patient carried off, either by asphyxia, or by the effe upon the powers of life occasioned by the exter of lesion, before effusion has taken place in bo pleural cavities to a great amount, or before th false membranes which may have been exude has presented any advancement towards organis tion.

62. *b.* The *symptoms* and *signs* of double pleurisy in most instances readily evince the extent of the disease. In some cases, however, there is difficulty in determining—1st, the existence of pleurisy; and 2d, its presence in both sides of the thorax. When effusion takes place, then the bronchial respiration, ægophony, and the obscurity of the sound, can leave no doubt as to the nature of the disease. The sound emitted on percussion is attended by greater difficulty, because the means of comparison are wanting. Pain is not always a certain symptom, as it may be wanting in either side, although the amount of disease may be even greatest in the side where it is not felt. Generally, however, the history of the case, the state of respiration, the positions of the patient, and the constitutional symptoms, viewed in connection with the physical signs, will indicate the extent of the malady. This state of pleurisy is much more dangerous than the ordinary forms; indeed the patient may be carried off by it, aided by some other associated complaint, before the more advanced lesions have supervened, and even before the amount of effusion, or the character of the symptoms had admitted of the recognition of the full extent of the malady.

63. vii. CHRONIC PLEURISY. — EMPYEMA. — Pleurisy assumes every grade of severity, of activity, and even of duration. It may be most acute, as respects the degree of suffering, and the rapidity of its progress; and it may be most latent in its character, and slow in its course, and in the progress of the successive changes attending and consequent upon it. Between the extremes of these, the intermediate grades of morbid action and duration, and shades of character are innumerable. *Chronicity*, therefore, in respect of pleurisy is, perhaps, more of a conventional term, than as regards almost any other malady. The *chronic state* of this disease is commonly consequent upon the acute, when this latter has been either neglected or improperly treated; but it is also sometimes primary, or rather the advanced or prolonged state of a pleurisy which has commenced in a latent and silent, perhaps, also, in a slight or sub-acute form, and has continued thus to advance until the amount of effusion has given rise to phenomena such as have been described above (§ 30. *et seq.*), and as could not be neglected any longer by the patient or overlooked by the physician. Chronic pleurisy may even be an *intercurrent* malady, or supervene secondarily in the course of some other disease, although not so frequently as acute pleurisy. Thus it may occur in the course of chronic disease of some contiguous viscus, as of the lungs, liver, spleen, peritoneum, stomach, &c., or of malignant affections of the mamma, or diseases of the skin, &c.; whilst the acute states of pleurisy most commonly occur in the course of malignant or adynamic, exanthematous, and other fevers; or of inflammation of adjoining organs. Chronic pleurisy may thus, as well as in other forms of succession, be *complicated* with some other disease: indeed, it frequently becomes thus associated from the very circumstances of its duration.

64. Chronic pleurisy, in the state of full development, is attended by great effusion of fluid; and to this condition, whether it be the consequence of a violent attack, or of a sub-acute, or of a latent state of the disease, the term *empyema* has been given, although the composition of the fluid effused is often very different from pus; it being more frequently serous, sero-albuminous, or sero-puriform, or sero-sanguineous, as will be more fully shown in the sequel.

65. Although I agree with Dr. WILLIAMS that the transition of the acute to the chronic state is so indefinite, and the symptoms of the recent disease sometimes have so little of an acute character, whilst that of a long duration occasionally manifests so much greater an intensity of irritation, that the terms acute and chronic would seem to be less applicable to pleurisy than to other inflammations, still I cannot consent that the distinction in question should be altogether set aside. I readily, however, subscribe to the circumstance that much of the difficulty connected with this distinction is to be ascribed to the anatomical relations of the pleura: this being a shut sac, it is liable to have its acute inflammations rendered chronic by the retention of the inflammatory products; and the chronic state is equally liable to be excited into an acute state by the irritating and distending influence of these products, more especially the fluid products. Still differences in character or form, in connection with duration, are very apparent in many cases, — in the prevalence of high inflammatory fever, severe local suffering, and rapid progress in some; or in the absence of fever, or in the existence of hectic or remittent fever, with but little or slight local suffering or discomfort, and slow progress or long duration in others, — in the sthenic character of vascular action and vital power in many, — in the asthenic condition of both action and power in some, — and in the varying grades of pain, of irritation, and of sympathetic disturbance in all. These differences can hardly be described in all their phases of existence as they are presented to our view in practice: but they require to be pointed out in such a way as will most remarkably fix our attention, and render them safe guides in devising our indications and means of cure.

66. *Effusion* being the characteristic condition of *chronic pleurisy*, as well as of the advanced state of the most frequent form of *acute pleurisy*, it follows, that all that has been stated above with reference to the latter (§ 24. *et seq.*) is equally applicable to the former. The disease, whether denominated acute pleurisy with effusion, or chronic pleurisy with effusion, or empyema, — or whether or not the liquid be purulent, or sero-albuminous, or of any other description hereafter to be noticed,—is attended by the same local and physical phenomena and signs, however much the states of vascular action, of vital power, and of constitutional disturbance may differ, in each case, with its duration and progress. *Chronic effusion*, even to the extent of compressing the lung, and displacing the mediastinum, and even the diaphragm, may exist without distressing constitutional symptoms, which may either have subsided, or, in fewer cases, never existed. Dr. STOKES truly remarks that, if we separate the *physical signs*, we find nothing characteristic in the general symptoms alone. Hectic may or may not be present; and no characters of the cough, expectoration, respiration, decubitus, or, with a single exception, the appearance of the patient, are sufficient to distinguish this from other diseases of the lung. This exception is the dilatation of the side and intercostal spaces. But if, in addition to

the symptoms of pulmonary irritation and obstruction, as shown by cough, shortness of breathing, dyspnœa, increased by exertion, or by lying on the affected side, and by a sense of fulness and oppression referred to one side, which is often œdematous, the physical signs of fluid accumulation, compression, displacement, &c. be also present, we may safely diagnosticate the disease.

67. In certain cases, the general symptoms are nearly wanting. Instances are not rare of persons with copious effusion of considerable duration, to be without fever, pain, or local distress; to look tolerably well, and to have good appetites; to lie nearly equally well on either side, and even to pursue their usual occupations, when these are not laborious. The physical signs are hence of the utmost importance in chronic pleurisy; indeed, of greater value in this than in any other thoracic disease. Most cases of bronchitis, of pneumonia, and of phthisis can be at least recognised, as Dr. Stokes remarks, without these aids; but such is not the case with pleurisy; and it is fortunate that its physical signs are more simple, numerous, and striking than those of any other of the complicated diseases of the lung.

68. When chronic pleurisy is not accompanied by much fever or pain, the patient may not be obliged to keep his bed. He complains only of shortness of breathing on exertion; and he often pursues his usual occupations. He merely believes himself indisposed, and considers that he is not the subject of serious disease, until the pallor and emaciation of his features, the general loss of strength and flesh, the coldness of the extremities, the short suppressed cough, the frequent and short respiration, increased on the least exertion or mental emotion; the loss of appetite, the rapidity of his pulse, especially during evening exacerbations, of hectic; and the inability of lying on any other than the same side, attract his notice, and direct the attention of the physician he consults to the nature of his complaint. These symptoms having suggested the seat of the mischief, an examination of the chest readily discloses its nature and extent.

69. *B.* The *physical signs* of chronic pleurisy are those already described (§ 26. *et seq.*) as evincing extensive fluid accumulation in the pleural cavity; but they become, with several of the general symptoms, much modified by the duration of the effusion, and by the changes in the pleura and lung. The state of the liquid effusion also modifies the course and phenomena of the disease; and hence it is necessary to notice briefly those changes which thus influence the character of the malady. When pleurisy has continued for some days, alterations take place not only in the more consistent exudation, but also in the fluid effused. These alterations depend much upon the diathesis of the patient, and the states of vital power and vascular action; and although some of them may be inferred to be present by the symptoms and signs during life, yet others are, owing to their nature, incapable of being indicated until disclosed after death.

70. (*a.*) In healthy, young, and robust persons, lymph of a highly organisable quality is thrown out upon the inflamed surface, of greater or less thickness, with a serous effusion; and this lymph, forming a layer, or false membrane, over the surface, although diminished by absorption, becomes more dense as it is organised, and thus restrains the expansion of the lung, and impedes the absorption of the accumulated serum. In cases where the membrane is less dense or thick, the expansion of the lung and the absorption of the fluid may proceed, especially when vital power is not defective, until ultimately the fluid is removed, and the lung acquires very nearly or altogether its natural expansion. In this case adhesions, cellular, partial, or otherwise, may form, and the functions of the lung not be materially impeded (see § 115.).

71. (*b.*) In other cases, by no means different from the above, or varying only in the states of vital power and vascular action, and generally of a less active inflammation and more prolonged duration, organisation proceeds slowly, and the false membrane is of a more dense and rigid nature. Consequently the lung is prevented from expanding, even although the fluid effused be partly or nearly altogether absorbed. In many cases, especially in those of considerable duration the false membrane covering the lung shrinks or contracts in its superficial extent, in the manner stated when describing the changes consequent upon peritonitis, or like cicatrices after burns of the skin, and thus not merely prevents the expansion of the lung, but actually compresses this organ still more closely. In more chronic cases the membranes formed on the pleura assume a state of cartilaginous induration, or become more or less extensively ossified, or they may be cartilaginous in parts and ossified in others. These changes often coexist with the shrinking just noticed, and are to be ascribed in part, in some cases at least, to the irritation produced by the effused fluid on the surfaces enclosing it.

72. (*c.*) In some cases, when the vital energy is insufficient to enable the inflamed surface to throw out a readily organisable lymph, the exuded matter assumes a curdy appearance, o greater or less thickness, almost solely albuminous, and presents much less of a fibrinous character than in the foregoing cases; and the fluid part of the exudation is turbid, or contains loose shreds or pieces of albumen (see § 116, 117.). In some instances a false membrane of some density i found covering the inflamed surface, but it is imperfectly organised, or presents no traces of organisation. In other cases, a coating of albumen, withou adhesion or organisation, covers the pleura, the fluid effusion being turbid, serous, or sero-albuminous, or otherwise changed or coloured, according as colouring particles of the blood may be exuded. This class of cases is more frequently of much shorter duration than the foregoing classes, are always asthenic, and are more closely allied to the acute asthenic form of the disease (§ 47.), being more prolonged instances of tha form.

73. (*d.*) The albuminous or nutritive matte may be thrown out in a more diffused form wit the serum; or the formative process, characterising so frequently inflammations of serous surfaces may be still less exerted, and a puriform, or sero puriform fluid only be produced. It is probabl that, in some instances, when the immediatel preceding state (§ 72.) of the disease is muc prolonged, the sero-albuminous exudation ma pass into a puriform or sero-puriform state. Th purulent state of the effused fluid appears mo

frequently in the most chronic cases, but it also is sometimes observed in the most acute, and is that to which the term *empyema* is strictly applicable. It depends rather upon the state of vital power, or the diathesis of the patient, in connection probably with the condition of the blood, than upon the duration of the disease. Dr. Williams very justly remarks, respecting this state of the disease, that "the solid matter is thrown out in a disintegrated state, utterly insusceptible of organisation, and diffused through the fluid in flakes or particles, forming a mixture more or less resembling pus, which is the fluid or empyema. Although in many instances this is the result of a more chronic form of pleurisy than that which forms lymph, and owes its persistence and tendency to increase to the want of vitality in its solid matter, yet we do meet with cases of empyema which arise from very acute forms of inflammation. In these instances the fluid is more trictly purulent, the solid matter being in the form of globules, like those of pus; and seems to be the result of what may be called a suppurating diathesis, in consequence of which all the albuminous products of inflammation tend to assume purulent character." It should be remarked, lso, that the continued access of air will cause he inflamed pleura to secrete pus instead of coagulable lymph; this membrane being similarly nfluenced by this cause to other tissues. Whenver pleurisy is consequent upon perforation of he lung, the effused fluid is always purulent.

74. (*e.*) The other lesions which are continently associated with chronic pleurisy, especially e tuberculous, schirrous, encephaloid or funoid, and melanotic, generally proceed from their espective constitutional taints: they will receive ue consideration hereafter.

75. It is obvious that the above states, into hich the lesions of chronic pleurisy may be diided, are not precisely defined in all cases; but at instances occur, owing to changes of vital ower and vascular action in their course, in hich intermediate conditions, or transitions from e state to another, may be found on close examination. The truth is, that, in many instances, en after the acute action has subsided to the ronic state, the retained effusion, owing to the ature and combination of the several elements, ay rekindle an acute or subacute state of action, keep up a continued irritation, which cannot il of producing a varied series of changes not ly in the false membranes, but also in the eura itself and the subjacent tissues; and that e effused fluid, as well as the surrounding strucres, both natural and adventitious, will consequently undergo changes varied in numerous ays, although most frequently presenting the neral features now pointed out, and those about be more minutely described (§ 118. *et seq.*).

76. In some cases the condition of lesion, in spect both of the more consistent exudation and the fluid accumulation, may be predicated durg life from the indications of vital power and scular action furnished by the patient. The *st* and *second* of these conditions (§ 70, 71.) are nerally attended by a more sthenic state or thesis; by less failure of constitutional power, d a stronger grade of vital resistance. The *rd* (§ 72.) is accompanied with more marked henia, — with greater depression of vital energy and resistance than the first and second, — with more or less of a cachectic appearance, or of a morbid condition of the circulation. The *fourth* (§ 73.) of these conditions, or that to which the term *empyema* is more strictly applicable, is generally attended by hectic of a marked character, by night perspirations, and often by various pulmonary symptoms in connection with physical signs of accumulation of fluid in the pleural cavity.

77. When we reflect upon the effects consequent upon the retention of the products of inflammation in the pleural sac, — upon the constricting action of the organised false membranes on the lung, — upon the irritation caused by the nature of the fluid effusion, and the consequent resuscitation of inflammatory action in acute or subacute states, extending more or less to the parenchyma of the lungs, — upon the influence of constitutional diathesis and taint upon the states of vascular action and adventitious productions, — and upon the numerous contingencies, intrinsic and extrinsic, moral and physical, to which the patient is exposed, we may readily infer that chronic pleuritis, if not soon remedied, must necessarily be followed by further alterations, not only of the adventitious formations, and of the consistent and fluid deposits in the pleural cavity, but also of the lungs, bronchi, pericardium, and parietes of the chest. These successive alterations all tend to impede absorption, and thereby to perpetuate the disease; and are the most important lesions which *complicate* the advanced course of the more unfavourable cases of chronic pleurisy. Nevertheless, absorption does take place in many instances — sometimes even in prolonged cases, especially when vital power and resistance are tolerably maintained, and when the consecutive lesions, or *complications*, about to be noticed are not developed.

78. C. *Signs of absorption of the Effusion.* — (*a.*) Many of the cases of acute and sub-acute pleurisy recover without contraction of the side or depression of the shoulder, such as will be noticed hereafter; but, in these cases, the effusion is more or less rapidly absorbed. It is, however, comparatively rare for the fluid to be removed, in the more chronic cases, without these changes in the appearance of the affected side being observed. When the lung is bound down or constricted by the false membranes, as stated above (§ 71.), or when it is so condensed by long-continued pressure, or by the extension of inflammation to its parenchyma, as no longer to be capable of expansion, the removal of the fluid accumulation by absorption necessarily occasions, owing to the atmospheric pressure, more or less contraction of the affected side, which, instead of being enlarged beyond the size of the healthy side, now gradually becomes smaller — sometimes very remarkably smaller, than that side. The contraction appears at first in the upper part of the chest; the shoulder being depressed, and, with the whole side, much more fixed than the sound side, which presents the full development and active motions of respiration. As the diseased side contracts, the ribs approach closer together, and sink lower; the scapula is more prominent, and nearer the spine; and the sternum and spinal column are somewhat curved, so as to be concave on this side. Whilst the upper parietes of the

diseased side are thus pressed inwards, the lower walls are similarly affected; the diaphragm is carried upwards, and with it the liver, or the stomach and spleen, according as either side is affected. In cases where the absorption has proceeded far, or has taken place long previously, more especially in children and young persons, the healthy lung becomes so expanded or developed from its augmented function as to press the mediastinum over into the affected side, and thus even to prevent a still greater contraction of the side from occurring. Cases are not very rarely seen in which the heart has been thus pushed either to the right side, or drawn upwards to the left, owing to the two causes of absorption of the effusion in the side towards which the heart and mediastinum are drawn, and of expansion of the lung in the sound side. In cases of this kind, the displacement, instead of being the result of liquid effusion, or of a collection of air or gas pushing these parts to the sound side, is caused by the removal of fluid from the affected side, in the manner now pointed out. In a few instances, as remarked by Dr. Stokes, the contraction is confined chiefly to the lower portion of the side, the shoulder not being materially depressed. In those instances, occurring in young persons, in which the sound lung becomes much expanded, the deformity often is much diminished in process of time.

79. M. Laennec has insisted strongly on this termination being most frequent after what he terms the *hæmorrhagic pleurisy*, or that state of acute pleurisy in which the fluid effusion is very great, and more or less tinged with blood-globules, and which often becomes chronic owing to the slow removal of the fluid. Although contraction of the chest is most apt to accompany the cure of the most severe cases, or those in which the effusion has been the greatest or most prolonged, yet it is by no means confined, as Laennec supposed, to those cases which he denominated hæmorrhagic, or even most frequently consequent upon these; for, as Dr. Forbes has remarked, it is a common consequence of the removal of all fluid effusions of considerable duration, and of purulent collections in the pleural cavity; "and, if other evidence were wanting, we have it in the analogous contraction in chronic pneumonia and phthisis."

80. In some instances the contraction consists chiefly of a flattening of the anterior portion of the side, causing more deformity than diminution of size. In others, the affected side approaches somewhat to a triangular form, "the base of the triangle corresponding to the mesial line, and the apex to the centres of the ribs." One of the first signs of absorption with contraction is the increased prominence of the inferior angle of the scapula. Dr. Stokes thinks it likely that the paralysis of the intercostals and diaphragm, which he believes to accompany pleurisy, has an immediate effect in producing the subsequent contraction, by preventing the expansion of the side.

81. The condition of the side of the chest changing thus from that of dilatation, consequent upon the effusion, to that of contraction caused by the removal of the fluid, it may be supposed that the transition from the one to the other will not be indicated by the form of the chest; and this is really the case in some instances, although in th majority the transition is not uniform, but partial More frequently the contraction commences a the upper part of the thorax before the dilatatio and displacement have entirely disappeared at th lower. An irregularity of the shape of the af fected side is hence often observed during th removal of the effusion by absorption, the uppe parts being unusually contracted or depressed whilst the lower are more or less bulged or di lated. This appearance assists in the diagnosi between consolidation of the lung and progressiv absorption of a pleuritic effusion, for which thi latter may be mistaken.

82. But the effusion into the pleural cavit may not be to the extent of filling this cavity; i may be partial only, or limited by adhesions an false membranes, as above described (§ 52.) In these cases of partial adhesions, the wall of the chest cannot so contract as to accom modate themselves to the vacuities caused by th removal of the fluid. Sometimes slight or irregu lar contractions may take place; but the space are chiefly occupied by a partial rising of th diaphragm, and expansion of the healthy lung o both sides; and most frequently a portion of th more consistent or albuminous contents of th effused fluid still remain, presenting a curdy c semi-solid state, which is probably ultimatel removed when the patient permanently rec vers.

83. *b. The auscultatory signs* furnished by a sid contracting after chronic pleurisy are of impor ance, inasmuch as during the progress of the co traction the disease may be mistaken for chroni pneumonia, or consolidation of the lung, or f tubercular disease of this organ, or even for e largement of the liver. In many cases, esp cially when the effusion has been copious and long duration, the sounds of respiration and pe cussion continue permanently imperfect, eve although the fluid may be completely remove and they are universally more or less impaire for months after the attack. They thus corr spond with the diminished motion of the affecte side, and are owing to the same lesions. D Williams correctly states that an improveme is generally indicated first in the upper part the chest, and near the spine. With the return a weak respiratory murmur, and slight resonan on percussion, some degree of vocal resonan may also accompany the removal of the fluid the upper parts of the chest, "amounting to lo bronchophony, often accompanied with a remar able *buzz*; in other parts being merely the di fused vocal fremitus, according to the size of t bronchial tubes, and the degree and permanen of their compression." In some cases of th kind some of the physical signs may mislead, attention be not paid to all these signs, and to t history of the case; for, as remarked by D Stokes and Dr. Williams, if at the first time w see a patient with the above signs, and he happ to have bronchitis, we may be induced to belie that the resonance of the voice and the dulne are caused by consolidation from recent infla mation of the lung, or from tubercles; but th error will be prevented by attending to the histo of the case and the appearances of contractio The dulness on percussion of the contracti side is owing both to the falling inwards of t

thoracic parietes and to the absence of air in the compressed lung. The physical conditions of the lung and of the walls of the chest are much changed in this state of the disease; for both, especially the former, owing to the loss of their resiliency — the lung being constricted by false membranes, and compressed by the effusion, and thereby in great measure deprived of air; and the parietes of the thorax being insufficiently antagonised against the pressure from without by the much-diminished supply of air to the lung — are incapable of furnishing not only the usual sounds on percussion, but also the true indications of their existing states, unless by a strong pressure of the fingers which are the media of percussion against the walls of the chest, and by varying the force, direction, &c. of the stroke.

84. Recovery from chronic pleurisy, with contraction of the chest, is more or less complete according to the reduction that has been made in the size and functions of the lung by the previous lesions. The recovery is rarely so complete in persons advanced in life as in the young. In children, placed otherwise in favourable circumstances, and in young persons, recovery is often not only complete, but little or no inconvenience is caused by the contraction, which sometimes diminishes, especially in growing persons, owing to the increased development of the healthy lung. Some individuals, who have their sides contracted from the state of the disease, have continued to enjoy good health, and to pursue active occupations. Laennec has alluded to a distinguished surgeon in Paris, who had his side remarkably contracted by pleurisy in his youth, and yet enjoyed excellent health, and was in the habit of lecturing twice a day without inconvenience. In most instances thus occurring in young subjects the contraction is not excessive, and the respiratory murmur is not altogether abolished. But in a greater number of cases, particularly those occurring in advanced life, contraction of the chest occasions such an habitual shortness of breath and tendency to palpitation as to incapacitate the subject of it from active exertion. Persons thus circumstanced also experience distressing dyspnœa, and otherwise suffer most severely from slight bronchial attacks, from catarrh, and febrile affections. Dr. Williams very justly remarks, that before the system becomes accommodated to the abridgment of respiration which this lesion produces, and even afterwards, under unfavourable circumstances, there is an enfeebled or cachectic state of the whole frame, in which various trains of disorder may arise; and unless care be taken to counteract them by the means most favourable to the general health, scrofulous or dropsical disorders may be engendered, and develope new mischief in the respiratory organs or elsewhere. Although, therefore, contraction of the side of the chest may be viewed as a mode in which pleurisy may be cured, "it is one of the least favourable kind, and liable to many detracting circumstances."

85. *D. Empyema.* — In those cases, in which the effusion is not removed by absorption, or in which the morbid secretion or effusion equals or preponderates over absorption, the accumulated fluid is productive of changes ultimately of a fatal tendency, if it be not evacuated either by a spontaneous perforation of the pleura, or by an operation. The persistence and character of the accumulated fluid are to be ascribed rather to the continued inflammation and change of structure of the pleura than to any other cause. The nature of the matter effused, its purulent character more especially, also favours the accumulation or impedes absorption. Something also may be imputed to a congested state of the lung, to tubercular infiltration, or to consolidation of its structure. When the circulation through the heart or blood-vessels is obstructed, the cause of increasing fluid accumulation is more manifest.

86. *a. The signs and symptoms of empyema* are nearly the same as those already described in connection with very copious liquid effusion into the pleural cavity (§ 26. *et seq.*). In this, however, the more chronic state of disease, the accumulation of fluid, proceeding more slowly, generally is greater, and is attended by a more marked displacement of the walls of the chest, and of the viscera more immediately adjoining them. Although the more urgent symptoms have in great measure subsided, particularly fever, dyspnœa, and pain, yet the enlargement of the side, and the displacement of the parietes, are often the more remarkable. The slow increase of the accumulation, the prolonged pressure, and probably, as Dr. Stokes contends, the paralysed state of the muscles bounding the effusion, favours the greater amount of fluid collection in this class of cases than in most others. The duration of the disease, the side which is affected (more frequently the left), the nature of the associations or complications, and the temperament and diathesis of the patient, modify both the extent and the phenomena of the accumulation, more especially the extent of enlargement of the side and visceral displacement. There is no certain indication usually furnished of the purulent nature of the fluid. When rigors or chills recur, with hectic, a soft open pulse, perspirations, or even when these last are very prominent, there is great probability of the fluid being purulent; but these symptoms may be either but slight or nearly wanting. Protrusion of the intercostal muscles is considered by Dr. Stokes and Dr. H. Roe as more especially diagnostic of a purulent state of the secretion.

87. *b.* When the fluid is purulent, *ulceration* and *perforation* may ultimately attack the pleura at some point, and permit the fluid to be evacuated in a direction, according to the seat of the ulceration — either through the lungs, the walls of the chest, or the diaphragm; causing parts through which the evacuation takes place to be involved and more or less affected. Generally the perforation of the pleura is consequent upon excavations in the layer of organised or semi-organised lymph coating this membrane; and sometimes death occurs before the perforation has become complete, or even proceeded further than this false membrane. When, however, the pleura is perforated, the structures external to the ulcerated point in the pleura also become inflamed and ulcerated, and the accumulated matter makes its way in the direction of the ulceration, often burrowing between muscles or tendons, and even causing caries of the adjoining bones, as the vertebræ, ribs, or sternum.

88. Laennec and Hasse considered the perforation of the pulmonary pleura and discharge of the

matter of empyema by the lungs and bronchi, of more frequent occurrence than perforation of the walls of the chest. Dr. WILLIAMS doubts this, according to his own experience; and I think with good reason, as regards the whole parietes of the chest — costal and diaphragmatic. When the matter is discharged by ulceration through the lungs and bronchi, there is generally a violent fit of coughing, resembling or accompanied with vomiting, and attended by a copious expectoration or evacuation of it; the efforts, together with the quantity discharged, threatening suffocation; but remarkable alleviation of all the symptoms, and diminution of the evidence of dilatation and displacement, are the results. Dr. TOWNSEND describes the ulceration through the lungs and bronchi, in these cases, as being preceded by the formation of a gangrenous eschar, which is detached, the fistulous passage being lined with a false membrane, which prevents the matter from infiltrating the substance of the lung, and conducts it to the air-tubes (see § 125.).

89. When the ulceration of the pleura commences, and proceeds in a situation favouring the pointing of the matter externally, a soft fluctuating swelling is felt at some part of the chest; and it may generally be presumed to communicate with the pleural cavity by its becoming tenser during expiration, and softer during inspiration, or by a sort of fluctuation caused by coughing. Dr. WILLIAMS remarks, what I have also seen in several instances, especially in children, that the matter not uncommonly burrows under and between the muscles and integuments of the chest, and points at several places, and at a distance from the perforation of the pleura. He has seen abscesses connected with empyema point in three cases under the pectoral muscle, once in the right hypochondriac region, and once close to the spine. That in the hypochondriac region had been mistaken for an abscess of the liver: in this case it was found after death that there were three perforations of both intercostal muscles and diaphragm; and between the layers of the latter the matter passed to the margins of the ribs, and there spread under the integuments, communicating with the other perforation between the ribs. In a case of empyema in the son of a medical friend, aged about six years, the matter was discharged near the margins of the right false ribs, and the boy recovered, and is now well, at the age of fifteen.

90. The superficial abscesses consequent upon perforation of the pleura are sometimes tender and painful; but they are occasionally also neither the one nor the other. They are generally slow in their progress to the formation of an external opening; usually spreading between the muscles and integuments, and causing a diffused or puffy tumour. When an opening is at last formed, there is a more or less copious discharge of matter, that recurs from time to time, especially during a forced expiration, or during coughing. "Sometimes air is drawn in through the orifice during full inspirations, and the next jets of matter issue with greater force, occasionally mixed with bubbles of air." After air is admitted into the diseased cavity, the pus, which was at first inodorous, generally becomes in a few days more and more fœtid, and exhales the odour of sulphuretted hydrogen. With this change in the discharge, or rather as a cause of this change, the constitutional symptoms assume an asthenic and irritative character. The pulse is much more accelerated; is quick and irritable; soft, open, and sharp; and the skin is alternately hot or burning, and bathed in a colliquative perspiration. The bowels become irritable; and general depression and asthenia, with irritative fever and rapid emaciation, soon carry off the patient.

91. The matter of empyema may be discharged by a fistulous opening, either uninterruptedly or at intervals, with more or less temporary relief. The recurring discharge may exist for weeks, often for months, and, in rarer instances, even for years; the patient occasionally recovering, but much more frequently sinking from the extent and nature of the disease. Recovery is oftener seen in the young than in persons even moderately far advanced in life; and when it is likely to take place, the discharge soon becomes less, and either does not present, or loses its fœtid character. The external opening closes and the side becomes contracted, as already described (§ 78. *et seq.*), respiration partially returning in some portions of the chest.

92. *D. The terminations of chronic pleurisy* may be readily conceived from what has been already stated. The *duration* of this state of the disease varies from six weeks to a year, or even much more, when it terminates either in *recovery* or in *death.*—(*a.*) *Recovery* often takes place after a gradual *absorption* of the effused fluid and of the albuminous exudations, or after the organisation of the latter into false membranes. This mode o termination is evinced by the signs mentioned above, and by the depression and contraction o the affected side (§ 78.).—(*b.*) *Recovery* much more rarely occurs by the evacuation of the accumulated fluid through a *perforation of the pleura* and a fistulous opening, either in the lungs and bronchi, or in the thoracic parietes (§ 88.).—(*c.*) *Death* is frequently caused — 1st. By the general exhaustion and hectic attending the disease, especially when the accumulated fluid i puriform, or when the substance of the lungs i consolidated or tuberculous: in these cases the patient sinks in the same manner as in tubercula consumption; — 2d. By the sudden asphyxia o the patient: in these, sudden attacks of dyspnœa almost amounting to suffocation, sometimes are complained of, at intervals, before the fatal seizure these attacks often occur during the night, and may return almost nightly. Death may take place very nearly as suddenly as from disease o the heart, and may be thus mistaken for death from this cause, if the history of the disease be not known or ascertained.

93. III. COMPLICATIONS OF PLEURISY.—*Pleurisy,* in either of the states described above, is very frequently a *primary* and *simple* disease. But i is also often *associated* with inflammation of an adjoining tissue or organ, or with some othe lesion or malady. In this *complicated state,* i may be either the *primary* or the *secondary* disease; the exact condition and succession being of importance in respect both of the prognosi and of the treatment. I will therefore notic some of the more frequent complications of i observed in practice; and, in some instances, mere notice is all that is necessary, as the suggestion of the associations which the disease so ofte presents will put the physician on his guard

when he will not fail of detecting it.—*a.* Pleurisy in any form, but more especially in the acute, is often associated with *inflammation of the substance of the lung*, forming *pleuro-pneumonia*, described in the article Lungs (§§ 73—75.), or *pleuro-pneumonitis*, *peripneumonia*, or *peripneumony*, of various writers. It is unnecessary for me to notice this complication further at this place, than to add, that the inflammation, in these cases, most commonly assumes a sthenic character, although the asthenic state is occasionally also met with; and that, although both diseases, or rather the inflammation of the two different structures, may be coëtaneous as well as coexistent, yet the pleuritic is more frequently consecutive of the pulmonic affection, than the pulmonic is of the pleuritic. This may be owing, in great part, to the nature of the tissues, and of the connection existing between them; but it is more probably owing to the general tendency of inflammations of parenchymatous organs to extend to the periphery.

94. *b.* Pleurisy, either in a simple form, or associated with pneumonia or with bronchitis, is one of the most important complications of *exanthematous* and *continued fevers.* When it is the complication or associated local affection in these constitutional maladies, it is always acute, unless when it appears in the course of convalescence rom either of them; and it presents the same characters or diathesis, in respect of vascular action and vital power, as these possess; but the *sthenic*, in its various grades, is the most common, especially if it supervene at an advanced eriod of the fever, when the vital energy is depressed or exhausted, and when the circulating uids are morbid or contaminated. Whenever the breathing is very short and frequent, with or without cough or pain in the side or chest, in these diseases, then this complication should be suspected, and a careful examination be immediately instituted, as the progress of the local mischief is generally rapid when it occurs in the course either of these, or other constitutional maladies.

95. *c.* Pleurisy, generally of an adhesive form, and of chronic duration, very frequently accompanies *tubercular consumption*, and chronic *tubercular pneumonia.* This pleurisy is generally the consequence of the irritation or chronic inflammatory action occasioned by the tubercular deposits in the lungs, especially when these exist near the surface, or when the tubercles soften in that situation, and are followed by cavities. In these cases the pulmonary pleura becomes implicated in the inflammatory action in the immediate vicinity, throws out lymph on its free surface, which excites a corresponding morbid action in the opposite part of the costal pleura, and forms ose and firm adhesions between the lung and alis of the chest. This state of chronic or subacute pleurisy is most frequently observed near e summits of the lungs or upper regions of the orax; is most commonly attended by adhesions, without fluid effusion; or, if such effusion occur, it soon absorbed (see §120.). In some cases, however, tubercles soften, and cavities form, near the rface of the lung, and perforate the pulmonary eura at the nearest point to them, without giving se to adhesion to the opposite surface. In these, id effusion often takes place before the perfora-on is completed, and air passes into the pleural cavity, giving rise to the lesion denominated *pneumathorax*, which is fully considered in another place. The association of pleurisy with tubercular consumption is more fully considered in the article on this latter malady.

96. *d.* Pleurisy is sometimes complicated with *pericarditis.* Generally the pericarditis is of the dry form, in which it has been remarked in several instances by Dr. Stokes. In two cases, to which I was called shortly before death, the previous history of which was not precise, but which were considered and treated as very acute cases of pleuro-pneumonia, the *post mortem* examination disclosed the association of pleurisy with pneumonia and pericarditis. In both these cases there were considerable effusion, with shreds and pieces of lymph, into the left pleural cavity and pericardium, the diaphragmatic pleura being much affected. Dr. Stokes remarks, that where the pericarditis is of the dry form, the symptoms are not so violent as in that with effusion. He has observed this complication in cases of acute pleuritis, and in two instances of very chronic empyema. In the latter cases, the usual symptoms of pericarditis were altogether wanting; and no new suffering marked the invasion of the disease, which was discovered only by auscultation. The observations of M. Broussais apply chiefly to cases of this complication, with copious effusion into the pericardium; in which there are generally pains in the præcordia, with great anxiety and want of sleep. The patient sits bending forwards, with his head resting on his knees; and yet, notwithstanding great concentration of the pulse, there is a tendency to fainting, and almost complete absence of fever. (*Traité des Phlegmasiæ Chroniques*, t. i.)

97. *e.* Although pleurisy is more frequently *caused by*, than *associated with*, *acute rheumatism*, still this complication is occasionally observed; the still further complication with endocarditis or pericarditis being also met with in rare instances. This very complicated state of disease has been seen by me in children, between eight and thirteen years of age, in three cases, in all of which it was recognised during life, and ascertained by inspection after death.

98. *f.* The complication of *hepatitis*, especially of inflammation of the convex surface of the liver, with pleurisy, is by no means infrequent, and supervenes chiefly in the course of the acute form of hepatitis. It occurs also in the chronic form, especially when an abscess of the liver is passing through the diaphragm, either into the pleural cavity, or into the lungs and bronchi, adhesions having been formed between the opposite surfaces of the pleura. This form of the complication is noticed in the article on the diseases of the Liver (§§ 141—145.); but I have seen cases of chronic hepatitis, not connected with abscess, that have been associated with empyema of the left side, the heart being pushed over towards the right side. I am at this time attending a female, in Brook Street, aged between thirty and forty, who, according to the history of the case furnished me, appears to have been attacked by sub-acute hepatitis, attended by suppression of the menses, and followed by ascites, and by chronic pleurisy of the left side, with effusion, displacement of the heart, and dilatation of the thoracic parietes. I was recently requested, by Mr. Sims, a surgeon who had

practised in India during many years, to see a lady, aged about fifty, who was the subject of a most acute attack of hepatitis, to which rapidly succeeded dry pleuritis and pneumonia of the right side. In this very remarkable case, the symptoms and signs of hepatitis, of diaphragmitis, of diaphragmatic pleurisy, and of pneumonia with rusty expectorations, were distinctly recognised by Mr. SIMS and myself. The patient recovered, and is now quite well.

99. *g.* Pleurisy may also be consecutive of, and complicated with, *peritonitis,* especially partial peritonitis of either of the superior abdominal regions. I have seen several instances of acute asthenic pleurisy, with abundant sero-albuminous or sero-sanguineous effusion, complicating the several varieties of puerperal fever, and puerperal peritonitis and phlebitis; but, in these complications, the pleurisy was generally latent, death having taken place before obvious dilatation of the side or displacement of organs occurred: indeed, in most of these cases, the pleuritic complication was double, although the fluid effusion and other lesions were much greater in one side than in the other; the amount of effusion in either side not being so great as to compress the lung in a remarkable manner.

100. I was lately called to a gentleman who had just arrived from the Azores with ascites, consequent upon repeated attacks of *peritonitis;* pleurisy, with effusion, having also supervened, and proved the more immediate cause of death. Upon examination, the appearances described in the article PERITONEUM (§§ 88. *et seq.*) were found, the adhesions being numerous, very long and thick, and the serous effusion very abundant. Some of these adhesions were round, as large as the first or second finger, with serous or polished surfaces, and formed cylinders, the external layers of which were organised and dense, and two or three lines in thickness, the interiors being loose and cellular, yet containing very much fatty matter, or rather consisting almost entirely of adipose tissue. A turbid serum was found in considerable quantity in the left thoracic cavity, in smaller quantity in the right, and adhesions, cylindrical or nearly so, stretched through the effused fluid, from the pulmonary to the diaphragmatic and costal pleura, in several places, and presented similar appearances to those in the peritoneal cavity; the thicker and the more cylindrical adhesions having organised serous surfaces, and celluloadipose centres; but the adipose matter was not so abundant in them as in the peritoneal adhesions.

101. *h.* In most of the complications above mentioned, the pleuritic inflammation is secondary, or consecutive of that with which it is complicated, unless in some cases of pericarditis. But in the course of many cases of chronic pleurisy, or empyema, complications may occur, and render still more dangerous, or even fatal, this already dangerous disease. This is more particularly the case when the fluid accumulation in the pleural cavity is of a purulent kind. In these especially various alterations take place in the surrounding structures, caused both by the nature of the accumulated fluid and by the mechanical influence of it. The substance of the lungs, the bronchi, the pericardium and the mediastinum, are either more or less implicated by the early stages of the pleuritic inflammation, or are consecutively irritated, inflamed, or otherwise changed by the nature and quantity of the effusion. Consolidation or atrophy of the lung often results; chronic pericarditis with adhesions to the heart sometimes takes place; the bronchi undergo various changes, and are often inflamed; the vessels of the lungs are altered, pulmonary phlebitis even occasionally supervening; and the vertebræ, or even the ribs sometimes becoming caries. In addition to these effects the actions of the heart and large vessels are impeded or disordered; whilst the blood becomes morbid, owing to the greatly impaired function of the lungs, and all the vital actions consequently languish.

102. IV. PLEURISY IN THE DARK RACES.—Pleurisy is very often met with in the Negro and other dark races, particularly when they pass into high latitudes and cold regions; and in these circumstances it is very frequently associated with pneumonia, tubercular consumption, bronchitis, &c. *Acute pleurisy* in these races is frequently latent, most commonly presents asthenic characters, and is generally attended by copious serous, sero-sanguineous, or puriform effusion. Hence, unless the shortness of breathing, acceleration of pulse, short cough, and debility with rapid exhaustion after slight exertion, usually attending the early stages of the disease in these varieties of the species, attract due attention, acute pleurisy will rapidly pass to its ultimate period, or may terminate fatally before its existence is ascertained. — *Chronic pleurisy* is also frequent in these races, especially when they migrate to colder than their native climates. It often then assumes the purulent form, and is generally complicated with pulmonary tubercles. Pleurisy both in acute and chronic states, frequently with effusion in the former state, and often with adhesions in the latter, is not an unusual complication of pulmonary tubercles in the dark races, especially after change of climate and exposure to cold, — and is very commonly either latent or masked by the symptoms caused by the bronchitic complication which is also frequently present.

103. V. PLEURISY IN INFANTS AND CHILDREN —Pleurisy is met with in children of all *ages;* but it is most frequently seen, especially in an uncomplicated form, in children upwards of five years of age. Before that epoch, it is rarely unassociated with pneumonia, and even also with bronchitis; pleuro-pneumonia being the most common state of disease. In children, as well as in adults, pleurisy is much more frequent in male than in female children. In this class of subjects it is frequently consecutive of pneumonia and of eruptive fevers, either as a complication of those fevers, or as a sequela of them during some period of convalescence. Indeed there is a remarkable disposition to the supervention o pleurisy, or of pleuro-pneumonia, during the whole period of convalescence from these fevers, more especially until the healthy functions of the skin are entirely restored. In other respects the *causes* of the disease in children are the same as those o adults; but, as shown when remarking on the prevalence of *pneumonia in children* (see LUNGS, INFLAMMATION of, §§ 122. *et seq.*), these causes act more injuriously, and their effects, whether in the form of pneumonia, of pleurisy, or of pleuro-pneumonia, are the more to be dreaded the

younger the child which becomes the subject of them.

104. Pleurisy in children is most frequently single, as in adults. MM. RILLIET and BARTHEZ state that, in the uncomplicated state, pleurisy is somewhat more frequent in the right than in the left side; whilst the complicated states occur more frequently in the left. This, however, does not agree with my experience; as I have found, in children as well as in adults, pleurisy in every form more frequent in the left than in the right side of the chest. As to the products of inflammation of the pleura, false membranes, and serum more or less turbid, are most commonly observed in this class of patients, and the false membranes are most extensive and most generally found in the pulmonary pleura, and least abundant and frequent on the diaphragmatic pleura.

105. The accession of pleurisy is not always attended by rigors or chills, especially in young children — never in infants; and the *decubitus* in them especially, is not much different from the usual. Sometimes decubitus on the back, with the shoulders raised, is preferred. In young children and infants especially, when associated with pneumonia, as pleurisy usually is, little or no fluid accumulates in the pleural cavity, although lymph is thrown out. The infant is restless, cries constantly, especially when moved or held erect; the skin is hot and dry; and the rubbing or creaking sound is heard on auscultation; the respiratory movements of the affected side being diminished. During the acute or early stage of the disease, in older children effusion, although abundant, seldom causes dilatation of the side: this symptom is rarely observed until the disease has become chronic, and then it is often remarkable and attended by pallor, enervation, debility, night perspirations, and loss of appetite. If the fluid be not absorbed or evacuated by an operation, death ensues, after one, two or more months, the patient being in a state of complete marasmus. In the case of a young relative of my own, pleurisy, followed by empyema of the right side, occurred at the age of eight years, and the matter was evacuated externally by a fistulous opening as described above (§ 89.) He perfectly recovered; and the functions of the lung and the size of the side are now natural.

106. The *complications* of pleurisy are most to be dreaded in children; more especially when pleurisy occurs in the course of eruptive fevers, or of pneumonia or hooping-cough. In very young children, and in infants, this disease, whether simple or complicated, and more particularly when associated with pneumonia or bronchitis, or when developed in the course of hooping-cough, is very frequently fatal; and in infants it may terminate fatally, by causing suffocation in twenty-four hours. In older children, especially when uncomplicated, pleurisy even in the more acute forms, is much more disposed to assume a chronic form than in the very young, in whom the more prolonged states of the disease are rarely seen.

107. VI. THE STATE OF THE BLOOD IN PLEURISY has recently received attention; but more as regards its chemical constitution, than as respects its sensible appearances. Formerly, and with much better reason, these appearances attracted the chief, and indeed no small attention; for they furnish very important information as to the states of vital power and of vascular action characterising the disease at the time when the blood is abstracted; and they moreover aid the physician in forming his diagnosis—still more in giving his prognosis— but most of all in determining his indications of cure, and in selecting the means of fulfilling them. Yet this important source of information is neglected, and the particular mode of studying the conditions of the blood in disease that actually furnishes the smallest amount of useful information to the practical physician is that which now attracts attention, although this very small amount cannot possibly be ascertained by the practitioner at the only time when it can prove in any way advantageous, whilst it causes the neglect of that knowledge which instantly furnishes the most important pathological and therapeutical indications.

108. *A.* The *appearances* of the blood, especially of the coagulum, vary remarkably in pleurisy, according to the states of vital power and vascular action.—*a.* In the *Sthenic acute form* of the disease, the blood taken from a vein generally presents the buffy coat and a firm coagulum, the quantity of fibrine being generally about double the proportion observed in health. If the first bleeding has been early in the disease, the blood will generally present a firm and rather large coagulum, but frequently be neither cupped nor buffed, or but slightly so, although a second venæsection, performed only a few hours afterwards, will present these appearances in a high degree, a third depletion also presenting them, but in slighter grades. However, nothing can with certainty be affirmed as to the effects of a second or third depletion, as much will depend upon the quantity of blood taken away relatively to vascular fulness and action, and to the powers of the constitution; but commonly the proportion of the coagulum to the serum, or of blood-corpuscles becomes diminished, whilst the fibrine may be increased in the second blood-letting, but diminished in a third and fourth. In these cases, as well as in pneumonia and acute rheumatism, the quantity of fibrine is generally great in proportion to the degree of fever, pain, and sthenic action, whilst the blood corpuscles, or hæmato-globulin, is diminished with the quantity of blood taken away. In fat persons, especially, the serum often assumes a whitish or milky hue after repeated venæsection, owing to the fat absorbed and conveyed into the blood. (See Art. BLOOD, §§ 84. 96—108.)

109. *b.* In the *asthenic*, *cachetic*, and *latent states*, as well as in most instances of chronic pleurisy, the appearances of the blood are still more various than in the sthenic form: but in many instances they furnish important indications of cure. When vital depression is very remarkable, and vascular tone impaired or exhausted, the coagulum is either soft or the blood coagulates imperfectly, although the quantity of fibrine may be greater than in health; and a large soft coagulum is often imperfectly separated from the serum. In many of these cases the blood presents much of the appearance described in the article BLOOD (§ 94.); but I have so rarely seen blood taken from a vein in these states of the disease, that I am unable to add more from my own observation, as to the appearances of the blood in these circumstances.

110. *B. Analyses* of the blood in pleurisy have been made by ANDRAL and GAVARRET, who found that the quantity of fibrine was increased to very much more than double the natural quantity; and that the increase was greatest in the most acute and most febrile and painful cases, and was the least in the chronic and non-febrile. BECQUEREL and RODIER analysed the blood of five men attacked with acute pleurisy, and found the fibrine much more than double the healthy proportion, whilst the albumen and blood corpuscles were somewhat diminished; but the results of the observations of the physicians above mentioned are in no way precise, nor are the changes very remarkable, excepting only as respects the quantity of fibrine; the proportions of the several constituents of the blood depending much upon habit of body, sex, and constitution of the patient; upon the state, grade, and form of the disease; upon the states of febrile action and vital power; upon the stage of the malady, and the quantity of blood previously abstracted. Let the candid and practical reader peruse the accounts of numerous analyses of the blood made by German and French chemists and pathologists, especially those made with a view of showing the composition of it in pneumonia, pleurisy, rheumatism, erysipelas, &c., and he will find, according to the summaries of these analyses given in SIMON's Animal Chemistry applied to Physiology and Pathology, with the additions by Dr. DAY, the very slight differences, or even the sameness, of the results, as regards these and some other diseases. Having obtained the full amount of knowledge he possibly can derive from these sources, let him next endeavour to apply it to practical purposes; and if he can do so, with only one-tenth of the advantage which may be derived from attention paid to, and an acquaintance with, the sensible appearances and properties of the blood, he will be much more fortunate than I can credit.

111. It is very justly remarked by VOGEL, that it is very difficult — indeed impossible — to draw any certain conclusions from the statements of the above-mentioned and other observers, respecting the changes of the several constituents of the blood, or the causes of these changes. In fact, our whole knowledge of the chemical constitution of the blood in both health and disease is most unsatisfactory, and the statements of different writers vary so widely, that it is impossible to deduce any general laws from them. And I may add to this opinion of this able pathologist, that writers on the chemical constitution of the blood in disease have shown only how very little information they are able to give upon the subject; and that little evinces its insufficiency even for the purposes of either a theory or a hypothesis, and its almost total inapplicability to any practical purpose. It is, therefore, to the old fashion of observing the sensible changes and states of the blood, and of connecting these changes with the states of vital power and of vascular action upon which they manifestly depend, that we must recur with any hopes, in the present state of our knowledge, of practical advantage.

112. VII. THE PATHOLOGICAL ANATOMY OF PLEURISY. — *A*. The earliest appearances of inflammation of the pleura are similar to those which I have described as being observed in inflammation of the PERITONEUM (§ 81. *et seq.*), and consist of a congested state of the capillaries, which are congregated, here and there, beneath the still transparent membrane. The red colour produced by these vessels, at certain points, deepens and becomes more diffused. These points are somewhat prominent, and, although scattered and distinct at first, they soon enlarge and coalesce. Patches and streaks are also observed, either darker than the rest, resembling small ecchymoses, or of a pale red hue, as if from imbibition. The pleura now becomes dull, and loses its polish and smoothness. The redness spreads and becomes more and more uniform. Soon afterwards the rudiments of adventitious membrane may be perceived. The spots originally reddened by repletion of the capillaries, present little, dull, whitish or yellowish points, which rise above the surface in the form of flat granules, and ultimately coalesce. The pleura, as HENLÈ has shown, consists of several layers of superimposed cellular tissue, more and more closely attached to each other, the free surface being a thin layer of epithelium cells. Blood-vessels penetrate all these layers, excepting the exceedingly delicate epithelium membrane formed by these cells. The inflammation therefore is not seated, or does not commence, in the epithelium membrane, but in the subjacent cellular layers; this epithelium being thrown off at an early period of the disease. Whilst these changes are proceeding in the pleura, the layers of cellular tissue connecting the pleura to the subjacent parts are more than usually vascular, and are more or less infiltrated with a yellowish, semi-gelatinous fluid; but this implication of the external cellular tissue is only occasional, or exists chiefly at the commencement, and is removed as effusion or other advanced changes take place. In rare instances only are alterations of the pleura and of the subjacent cellular structure observed to proceed, *pari passu*, with each other, more particularly as regards the costal pleura.

113. Consequent upon the changes now described, especially upon the greyish or yellowish points mentioned above, which are the initial and expanding rudiments of the consistent or membranous effusion, a slight, sometimes a much more abundant exudation of serum is also observed. When the progress of the inflammation is soon arrested these products are inconsiderable; but more frequently, and when the disease proceeds but little further, the pleura is found as far as the inflammatory injection extends, to be lined by a very thin layer of plastic exudation, forming a delicate membrane, mostly opaque, which veils the inflammatory redness underneath it. The liquid effusion contained in the pleural cavity consists of a small quantity of a yellowish limpid fluid, or of a more abundant collection of a turbid, or of a reddish or mahogany-coloured serum, containing delicate flocculi. HASSE supposes that upon the condition of the thin adventitious membrane covering the pleura depends the length of time requisite for the absorption of the fluid; and that the more heterogeneous the quality of the former, the greater will be the impediment to the absorbents acting upon the latter. However, there are other circumstances besides the state of this membrane, which will either impede or accelerate absorption of the contained fluid, and it can hardly oppose any great obstacle, as it either

nters into organic union with the serous tissue, r else it is gradually dissolved in the fluid.

114. When the inflammation either continues nabated, or steadily, and gradually, or more or ess rapidly encreases, the morbid products accumulate in proportion, exhibiting at the same time he most manifold differences. These differences lepend more or less upon diathesis or peculiarity f constitution and temperament, upon the grade f inflammation, upon its character and the degree f tone or of vital power attending it, and upon he state of the blood itself. The German and rench pathologists, more especially Hasse and ndral, whilst they describe these differences vith much precision, take insufficient note of the everal pathogenic conditions upon which they ertainly depend more or less; although it is very lifficult to assign these differences or states of the nflammatory products in this disease to any one r more states of the system or of the circulating uids, inasmuch as these products evidently unergo various changes after their accumulation nd during their retention, and, moreover, the tates of vital power, of inflammatory action, and f the blood attending their exudation and collecon, soon change and become very different when hey are retained for some time; these states being ather the consequences of the accumulation and etention of these products, and of the changes hese products have undergone, than the causes of he differences or peculiarities they present when ey become the objects of examination. To say, herefore, that variety of character in the products f inflammation of the pleura "is entirely founded n individuality," as some pathologists have conended, is to confess ignorance under the mask of term. That the varieties observed are chiefly be referred to the states just enumerated will e confirmed by more close and precise observaion, although the difficulties of ascertaining the lependence of certain alterations upon determinate tates of vital action, whilst the products of these tates cannot be immediately examined, I am still lisposed to believe. The exact appropriation of he several varieties of these products to the pahogenic states which produce them can hardly be xpected, seeing that both the causes and the ffects are the subjects of continual change; but n approach to it may be made sufficiently close or all practical and useful purposes.

115. *a.* The product of pleurisy, most simple, nd most frequently observed, is a transparent ellowish jelly or lymph, and which is effused vith great rapidity and in considerable quantity when the inflammation is intense. It is partly liffused in layers between the pulmonary and ostal pleura, and partly subsides to the lowest art of the pleural sac in pellets or flakes surounded by a small portion of fluid. This gelainous exudation or lymph consists almost exlusively, and often in nearly equal proportion f the fibrine and serum of the blood, the latter nost frequently predominating, with a very little olouring matter, attracted here and there to the nflamed surface. It is *susceptible of organisaion throughout*, and blood-vessels form in it with urprising rapidity. Hasse met with a case in vhich pleuritic pains occurred twenty hours beore death, and found, at the corresponding art, this gelatinous lymph, in which delicate essels were observed shooting from the borders. This product soon adheres to the surfaces of the pleura where they approach each other, and a very few days suffice to produce an extensive cohesion between the two. The rapid growth of vessels gradually confirms the union, and the aqueous portions of the effusion soon being absorbed, the formerly separate surfaces now adhere by means of a soft vascular and cellular layer or false membrane. The disease often terminates thus favourably, without the function of the affected part being materially or permanently disturbed. But the inflammation, having given rise to these changes, either partially or fully, and being nearly extinguished, may be rekindled, and the incipient adhesions may be stretched, or torn away, or even dissolved by the fluid poured out during the consecutive attack, and various other changes produced in the products previously formed, as well as other more novel deposits may take place.

116. *b.* The pleuritic exudation or lymph is not always of this organisable kind, or so germane to the organism, owing to a depraved habit of body, to the state of vital power, and most probably also to the condition of the blood. Without, however, ascribing the difference to these states, Professor Hasse believes that ingredients very often enter into the composition of the pleuritic effusion which, either form too early consolidation, or, from some peculiarity of character, render it less susceptible of consolidation. These substances he considers as being far less easy of assimilation, and, acting as foreign bodies, serve to embarrass the surrounding parts. Adventitious membranes of this kind, and which are only *conditionally susceptible of organisation*, appear not to form so rapidly as those just described. They generally consist of several either homogeneous, or else distinctly different layers, largely investing and firmly adhering to the pleura. Their consistence resembles that of a hard-boiled white of egg. They tear easily, and present when torn a fibrous-like texture. The colour of these plastic or albuminous masses is mostly of a yellowish or dull white; but they occasionally vary greatly, passing to a faint red, or into a violet or mahogany tint. The tinge is sometimes equable, but is also occasionally irregular, or patched, or streaked, or different in the layers or surfaces. These membranes are always opaque: their free surface is usually paler and softer than that adhering to the pleura, and is usually villous or reticulated. The cavity of the pleura contains, in addition to this false membrane, a considerable quantity of a slightly turbid or flocculent fluid, or a light brown or reddish liquid, bearing some relation to the quantity and character of the false membrane. When there is a more complete development of blood-vessels in this membrane, there is also a smaller amount of fluid; and where, on the other hand, the organisation of the membrane is imperfect or arrested, or when the consistent product is merely that of an unorganised coagulum, the fluid effusion is relatively more abundant, and, as Hasse supposes, with great probability, much less likely to be absorbed. It is not unlikely that exudations of the latter kind are liable to various changes during their retention, causing further alterations in both the more consistent and more fluid parts, preventing or retarding the organisation of the

false membrane, and the absorption of the liquid. In these cases the disease is prolonged, and does not terminate favourably until the adventitious membrane has become organised and the fluid absorbed. But in those cases, in which these results do not take place, the constitutional efforts caused by the morbid products, and the vital efforts made to resist the extension of the changes which these products occasion, produce a febrile or hectic state of the frame, which acts upon the local lesions, and these again react upon the constitutional disturbance until the vital functions are at last arrested. When the effused matters are much altered during retention, or assume a more morbid or irritating quality, even the partial absorption of them causes hectic of a more or less acute or rapid kind. Absorption of such matters is so constantly attended by hectic and emaciation, that Dr. Hodgkin, with much reason, regards the absence of these symptoms as evidence of its non-existence. It often does not proceed steadily, but remains stationary, until some intercurrent disease, in no way connected with the pleuritic malady, accelerates its progress.

117. *c.* When plastic matter or albuminous lymph is exuded in a very short period, by the intensity of the inflammation, *it does not enter into organic union* with this membrane, with which it is only loosely agglutinated, owing either to its rapid coagulation, or to the constitution of the exudation, or to the state of vascular action in the pleura. The coagulum then generally assumes the form of a honey-combed false membrane, or it presents imbricated layers; or it merely consists of irregular flocculent layers, whence scattered filaments run across the cavity of the pleura, whilst others shoot from the free surface, and give an irregular villous appearance to this surface. These plastic exudations are generally soft, opaque, and of a pale yellow hue. Along with the matter forming these depositions, a considerable quantity of liquid is also effused, which is sometimes tinged with the colouring matter of the blood, imparting in such cases its tinge to the whole morbid product. The more solid part of the exudation surrounds the more liquid portion, and forms an envelope for that portion; and being unorganised, and interposed between the fluid part and the pleura, prevents the absorption of that part. In these circumstances the disease becomes chronic, if death does not soon ensue; or assumes the form of *empyema*.

118. *d.* The *purulent or empyemic* form of effusion may be the result, as Hasse observes, either of a high degree of inflammation at the outset, or of the introduction of external air reacting on the inflamed serous surface and its product, during the progress of the disease. But may it not also arise from consecutive changes in the vascular action of the inflamed membrane, and in the effused fluid independently of the admission of the external air? I believe this to be the case in some instances. Suppuration of the pleura, however, is most marked where *pneumothorax* with violent inflammation follows the bursting of an abscess, or of a tubercular cavity into the pleural cavity. (See Art. Pneumothorax.) In this case the pleura soon becomes dull and of a dingy gray, and secretes a thick tenacious, puriform fluid, covering the surface of the membrane, and collecting in the most depending portion of the cavity. In some instances a pure liquid pus is very abundantly formed, and is often mingled in various proportions with coagulable substances, especially with a very soft, thin puriform, false membrane, which are either deposited upon or slightly adhere to the pleura, or which are mingled with the purulent fluid, in the form of pellets or flakes. Unless the pus find a ready outlet, or become sequestered within false membranes, this state of the disease soon terminates fatally.

119. *e.* Owing to the circumstance of the pleura being inflamed in different degrees, in different portions, or to the occurrence of a succession of attacks, or to the recrudescence of a subsiding inflammation, *several of the kinds of morbid produc* above described are often met with in the same case. The most various combinations both o consistent exudation, organised, organisable, and unorganisable, and of liquid effusion, are thus sometimes seen in the same subject. Hasse justly remarks that pus, at whatever period it may be generated, stamps all other substances effused with its own impress. Plastic organisable exudations are thus liquified and converted into pus; tha which is coagulated turns yellow, becomes putrescent and flocculent; and, in like manner, resolves itself, partially at least, into pus. This statement in fact confirms the view which I have entertained above (§ 73.) of the not infrequen conversion of other and more chronic states o pleurisy into that of a purulent or empyemic form independently of the admission of the externa air.

120. *f.* The *tubercular form* presented by the pleuritic products is one of the most important, and occurs chiefly in the scrofulous diathesis, and when tubercles at some one period of their developmen exist in other organs, especially in the lungs. As the tubercular constitution changes the plastic products of nutrition in particular structures, even in the circumstances of ordinary health, or cause the cytoblastemata of tubercle to be secreted conjointly with normal elements in these structures so does it exert the same influence in the formative processes consequent upon inflammatory action When pleurisy occurs in this constitution, and gives rise to the organisable or first form of produc described (§ 115.), there are seen, either simultaneously with the incipient formation of vessels or earlier, dull points as large as pins' heads, scattered through the gelatinous effusion; and thes points ere long change into granules. In the second form of false membrane (§ 116.), tubercle likewise often appear in the shape of white, fla granules, distinct both in colour and consistenc from the rest of the mass. These granules ar inaccessible to the vascularity which soon pervades the organisable product. Professor Hass remarks the existence of these granules, even th plastic substances deposited from purulent effusion, but he has never met with them in the adventitious deposits which are not susceptible c organisation (§ 117.). In pleurisy, as well as in other diseases, the characteristic influence of tubercles is exerted; for, by acting as substances alie to the organisation, they keep up irritation, an the continued secretion of fluid and consisten matters; and they impede or frustrate the function of absorption. A portion also of these effect may be imputed to this particular diathesis, an to the circumstance of tubercles in various stage

f growth being generally also present in other rgans, more particularly in the lungs.

121. *g.* The *sanguineous state* of the products f pleurisy was particularly noticed by **Laennec.** 'he various grades of reddish colour imparted to leuritic exudations by the colouring matter of the lood have already been slightly mentioned. anguineous colouration of the fluid effused is nost frequent in the tubercular states of pleurisy. t is only in rare instances that the blood itself xudes into the pleural cavity in this disease; and vhen this occurrence takes place, little clots are ound at the bottom of the collected serum, or leposited between false membranes. Instances f the entire effusion consisting of pure blood are nentioned by **Andral** and **Hasse**; but these hould be referred rather to hæmorrhage into the leural cavity than to inflammation of the pleura. ven when blood is effused into this cavity it will ecessarily produce inflammation; and hence, in ases where pure blood, or clots of blood, are ound in this cavity in connection with inflammaory products, it may be difficult to determine that hese are not the products of an inflammation exited by a primary hæmorrhage into the pleural ac, effused blood generally causing inflammatory ction in the tissues surrounding it.

122. *h.* The spontaneous evolution of a *gaseous luid* from the products of pleurisy has been beeved in by some pathologists, and denied by thers. The question at issue is, whether or not hese products may become so decomposed during e life of the patient as to form a gaseous fluid. Ve know that this effect is not unfrequently oberved after death. Dr. **Hodgkin** doubts the ossibility of it during life, and **Andral** and **Iasse** appear very nearly to agree with him; r, in instances which occurred to them, in which as seemed to have been spontaneously evolved om these products, they admit the possibility of me perforation of the pleura to have existed, lthough they failed to detect it. Although e exuded matters, fluid as well as more constent, may long remain either unchanged, or ut slightly changed, as long as the vital energies re not very much impaired, yet when these nergies are very far reduced, the products of inammatory action are either insufficiently, or no nger controlled by them, and various changes ust ensue. Some of those changes may be scribed to endosmosis and exosmosis; others to e states of vascular action and of absorption; d a portion even to incipient putrefaction; but eath usually occurs before this last proceeds far. he ulterior changes of the more fluid matters fused in pleurisy are as yet not fully ascerined, especially with reference to the different ades of vital power; and the question as to the ontaneous evolution of gas from these matters, the most unfavourable circumstances of the sease, and when vital power is remarkably reuced, still remains undecided.

123. *i.* The most important change that takes ace in the gelatinous and more consistent proucts of pleurisy is their *vascular organisation.* his process has been explained in two ways. **öllinger** and others have supposed that the udation, possessing a derived grade of vitality om the surface producing it, has hence the wer of producing a movement of its molecules, transforming these into blood-globules, and of developing canals for their circulation independently of any connection with the blood-vessels of the surrounding tissues; the circulation in the false membrane becoming connected with and subject to that in these tissues only subsequently, and by slow degrees. This theory has not been supported by accurate and direct observation, and it has only the remote and loose analogy of the incubation of the egg to support it; a process which possesses elements entirely wanting in the organisation under consideration. The other explanation is more obvious, and admits of visual demonstration. It has been observed by **Hasse**, **Kiernan**, **Hodgkin**, myself, and others, in various stages of its progress; and it may be briefly stated, that, wherever vessels had formed in adventitious membrane, they proved to be continuations of the branches ramifying in the serous coat, having penetrated the false membrane at numerous points, and then branched out in a stellate manner, or having formed into partly divergent, partly parallel, fascicular groups. In those false membranes which are less organisable, or only conditionally so (§ 116.), the descriptions of **Laennec**, **Forbes**, and **Gendrin** show that a multitude of little red elevations appear on the serous membrane, like clusters of protruding vessels. These elevations impress corresponding pits in the adhering surface of the false membrane, and upon the surfaces of these pits appear little arborescent or stellate extravasations of blood. By degrees these arborescent extravasations become more strongly marked, and assume the appearance of vascular ramifications. **Laennec** states that these ramifications present an outer and softer layer, formed by desiccated blood; and that this layer encloses a small whitish chord of coagulated fibrin, apparently hollow in the centre, and pervious to the blood-stream. These thick-walled canals gradually change into the natural coats of the vessels, which, pursuing their course, thus seek to traverse all the organisable portions of the false membrane. Professor **Hasse** remarks, that some plastic substances are possessed of so little power of attraction over the capillary vessels of the inflamed pleura as neither to form these little vascular prominences, nor to occasion the little stellated extravasations on the new membrane. These heterogeneous formations go on irritating the pleura until another false membrane is thrown out, which, acting as an intermediate vascular link, establishes something approaching to vegetative reciprocity between the two; and, being itself devoid of nerves, obviates morbid irritation.

124. *k.* Whatever does not sooner or later become assimilated or organised, — whatever is not converted into vascular cellular tissue, or is not removed by absorption, remains perfectly isolated and encysted, and may, in some instances, be retained for years, without occasioning any serious symptoms. When the more fluid parts have been absorbed, the more solid constituents remain, forming a pap-like mass of the consistence and aspect of moist cheese, or of imperfectly coagulated white of egg. "Previously to this, the effused product usually sinks to the most dependent part of the cavity of the pleura, so that the above mass accumulates into a layer more or less thick, between the two firmly adhering and thick-

ened pleuræ, posterior to the inferior lobe of the lung." When tubercle enters into the combination, and the case does not prove rapidly fatal, it is occasionally met with as a residue of the aggregate morbid product, in small scattered portions included betwixt the pleuritic adhesions. In such cases, various consecutive changes sometimes take place, which will be noticed hereafter.

125. *l*. When the fluid, instead of being removed by absorption, makes its way out of the pleural cavity, the lung is the part most frequently perforated; and it is the superior anterior portion of the organ which is most commonly the seat of perforation. HASSE states that this does not take place where the lung has suffered compression, but where it has continued to expand, — in the majority of cases, at the inferior surface of the upper and middle lobes. Such portions are commonly attached by old adhesions to the costal pleura, and form an arch over the effusion. The effusion presses against this arch, until some point of the substance of the lungs and of the pleura softens, gives way, and allows the fluid to escape through the bronchi. The perforation may, however, take place at the inferior lobe, or at the base of the lung, especially when protected from compression by old adhesions, and remaining partially pervious to air. These perforations are rounded or oval, are smooth at their edges, and seldom exceed two or three lines in diameter. They are generally single. The parenchyma in the vicinity of the perforation or fistula is generally in a state of grey hepatization, or of complete purulent softening. This change is usually fatal; but ANDRAL and HEYFELDER have met with instances of recovery.

126. The passage of empyema through the diaphragm is very rare. ANDRAL and MOHR have adduced instances of this occurrence. In these, the fluid, after perforating the diaphragm, pushed down the peritoneum before it, thereby preventing effusion into the peritoneal sac. In one of MOHR's cases, the diaphragm was perforated near to the spine, and the pus descended behind the peritoneum, along the psoas muscle, causing abscesses and fistulous openings in the thigh, extending as low as the knee. GENDRIN mentions a case in which the fluid made its way into the anterior of the mediastinum. Escape of the effusion through the thoracic parietes, presents a better chance of escape for the patient than the foregoing. The chief cause of the spontaneous evacuation of the fluid of empyema through the bronchi and thoracic parietes being so often fatal, is the influence of the external air upon the diseased pleura and upon the walls of the fistula, especially upon the substance of the lungs. The purulent secretion soon becomes remarkably fœtid, and the air which passes into the cavity is soon deprived of its oxygen. DAVY found the air in pneumothorax to consist of 0·92 of nitrogen, and 0·08 of carbonic acid. The fluid of empyema generally evolves the odour of phosphuretted and sulphuretted hydrogen.

127. *m*. The *state of the lungs*, in cases where the pleural cavity is surcharged with effusion has been described by several modern writers. The lung of the affected side suffers the most, as may be expected: its compression being commensurate with the increase and ascent of the fluid, until it can no longer expand, and the air can scarcely enter the partially compressed bronchia tubes. When the lung is free from adhesions, i is pressed upwards and forwards, and, finally o all sides towards its roots, when the bronchi an blood-vessels penetrate. It then occupies th least possible space, in front of the vertebra column; is flattened and shrivelled; its differen lobes are mostly adherent; the parenchyma i inelastic, devoid of crepitation, and almost bloodless; and generally without tubercles. When however, tubercles are developed in the cours of chronic pleurisy, or are advanced, havin previously existed, a thing by no means rare, the are not found in the most compressed portions o lung. The bronchial tubes are usually foun loaded with a whitish tough mucus. Where adhesions exist, these generally preserve a portio of lung more or less expanded, the bronchi the remaining partially pervious to the air; and tubercles are not unfrequently seen in the partiall expanded portions of lung.

128. The mode in which compression of th lung presents itself in those cases, in which adhesion between the opposite surfaces of the pleur exist, has been described by MOHR (*op. cit* p. 127.). Out of forty-three cases, six of whic were double, the compression and displacemen of the lung were once in the direction from above downwards, — four times from behind, forwards — four times from before, backwards, — fou times from within, outwards, — thirteen time from below, upwards, — and twenty-three time from without, inwards.

129. *n*. The *appearance* and *structure* of th adhesions formed between the lung and costa pleura, and between the lobes differ: but the may be referred to two kinds: — *First*, the cellular, in which the opposite surfaces are equall united, by means of a dense cellular tissue and, *secondly*, the filamentous or band-like separate bridles or bands, having a smooth serou surface, passing between the two pleural surfaces These bands appear identical with the serou membrane, whose product they are, and int which they directly pass. They are often supplied with blood-vessels of considerable size; an they consist of densely stratified cellular tissue with an investment of epithelium cells: and the sometimes contain, as remarked by LAENNE HASSE, and myself, a considerable portion of fa within this texture, more especially in their centres (see above, § 100.). As shown by BECLAR DUPUYTREN, VILLERMÈ, and others, these adhesions may remain during life without occasioning any sign of disease; but I have met wi cases, in which their existence and situation hav been inferred, and the inference has proved co rect, as shown by dissection, years afterward They may even disappear in the course of tim In the latter case, the chords lengthen, becom thinner in the middle, and ultimately rupture nothing excepting a whitish, rugose thickening the pleura remaining.

130. The adhesions following and compl cating tubercular disease of the lungs are differe from those observed in primary pleurisy. The commence at the apex and gradually descen closely following the course and extension of th tubercular disease. Professor HASSE conside these adhesions as being less the result of decide inflammation, than of a chronic irritation, limite

n degree, and kept up by the proximity of the ieterologous product. The result is complete lending of the pulmonary with the costal pleura, vith lardaceous thickening and degeneration of he serous structure. Owing to this intimate usion, the intercostal vessels push branches into he diseased substance of the lung. In favourble circumstances to the development of inflamnation, the slight irritation, causing the insenible, or nearly insensible, adhesion of opposite ortions of the pleura, may amount to actual nflammation, rapidly spreading over the pleura, nd throwing out diverse products, generally vith tubercular matter, and passing into chronic leurisy. MOHR calculates the complication of leurisy with tubercular diseases of the lungs to e fifteen cases out of twenty; and this appears) be near the truth.

131. *o.* It is comparatively rare to find pleuritic esions simultaneously in both cavities. HASSE tates that of thirty-five fatal cases, he found ine double cases; and in five of the nine one sac vas implicated in a minor degree. He considers oth sides of the chest to be almost equally prone) the disease, with this difference that pleurisy f the left side is both more likely to prove fatal ı the acute stage, and more apt to pass into a hronic state; but he adds, of the thirty-five ases just mentioned, sixteen were of the left side, nd ten of the right, the other cases being double. f fifty-six cases observed by MOHR, the left side as the seat thirty-seven times, and the right neteen times. The experience of Dr. H. ROE nd Dr. HUGHES also shows a much greater freuency of the disease of the left, than of the ght side; and the cases which I have seen, since y attention has been directed to the matter, so evince a much greater frequency of pleurisy the left side. In 1846, I met with four cases the disease in this side in succession.

132. MM. RILLIET and BARTHEZ state, that nple pleurisy is more frequently met with in the ght, than in the left side in *children*: but that eurisy complicated with pneumonia occurs tener in the left; whilst the simple and complited cases united are more frequently seen in the ft than in the right. Of all the products of inmmation in this class of subjects, these phyians found that false membranes were the most equent, and these were sometimes the only sion; next to these was a turbid serum, a purulent id being the most rare.

85 cases, false membranes were present in 79.	In the right pleura only, 27. In the left only, 38. In the two cavities, 14.
the 79 cases in which there were false membranes, they existed alone or with redness only, 28 times.	In the right pleura only, 14. In the left alone, 13. In both, 1.

133. VIII. THE DIAGNOSIS OF PLEURISY reires only a very brief notice, after the full descripns which have been given above of the symptoms, ns and consequences of the disease. — *a*. The eatest difficulties as to diagnosis present themves in cases occurring in *children*, and in *adults* en the physician has not observed the earlier ges, or when the pleurisy is latent, and the quantity of fluid effused is not great. In infants and children under four or five years pleurisy is most frequently associated with pneumonia; but, after that age, it is often primary and uncomplicated. During *infancy*, pleurisy is detected with great difficulty; but it should be dreaded when the patient is seized with violent and constant crying or screaming, restlessness, hot and dry skin, dry, short cough, and the appearance of increased suffering upon being raised to the erect posture. Upon inspection of the chest, the side affected does not move so freely as the other during respiration, and auscultation detects a rubbing or creaking sound, which usually continues longer than in adults. In very young children there are generally also signs of pneumonia, especially crepitation, associated with these, and occasionally there is evidence moreover of bronchitis. In older children pleurisy is also often complicated with pneumonia, and, in rarer instances, with pericarditis; but, in these latter, acute rheumatism is generally also present, or it has immediately preceded the thoracic complication. The chief difficulty, however, is in distinguishing pleurisy from pneumonia, and in ascertaining during life the existence of the association of the two diseases. The former usually commences in children with dry cough and acute pain, soon followed by a bronchial respiration, inspiration being attended by a metallic sound, whilst the respiratory sound is rarely much impaired, unless the disease is advanced. Change of position aggravates the symptoms. The febrile symptoms generally abate from the fourth to the seventh day; and previously the rubbing or creaking sound is often heard, especially before effusion has taken place; but this sound may also be present when the lung is implicated. In this latter case, there are generally also crepitation or sub-crepitation, accompanying bronchial respiration and mucous expectoration, which, in older children, is often copious, and even tinged with blood. When the lungs are thus also affected, the febrile symptoms are usually more severe, and continue until the 7th, 8th, or 9th day, before they abate.

134. *b.* In the earliest stage, the pain of pleurisy may be mistaken for *pleurodynia*, or nervous pain in the side; for the absence of any distinctive physical sign at this period, unless in such cases as may furnish a rubbing or cracking sound, leaves us without proof of the existence of the disease, excepting that which may be inferred from short dry cough, heat of skin, hardness or sharpness of the pulse, and other febrile symptoms, and these may be very slight, or insufficient to indicate the nature of the malady. But not only may these be so slight as to be almost wanting, unless occasionally towards evening, but pain itself may be wanting or be so situated, and so slight unless in motion or on exertion, as to render the disease entirely latent, as stated above (§ 49.), until the effusion is so considerable, as it usually is in a short time, in these cases, as to develop the physical signs (§ 24.).

135. *c.* Pleurisy may also be mistaken for *consolidation of the lung*, and this latter for it. This mistake is most likely to be made, when the pleurisy is attended by a moderate amount of effusion, the walls and contents of the chest not being displaced. This lesion of the lung generally in-

creases the vocal resonance of the affected side, whether heard or felt by the hand, and allows some sound of respiration, which is generally of a bronchial character, to be heard; and it thus may be distinguished from this state of pleurisy. "Partial pleurisies confined by adhesions," as Dr. WILLIAMS justly observes, "are less easily distinguished, because, where the lung is adherent, there may be as much bronchophony and respiration, as in cases of consolidation; but on examination, these will be found to be more circumscribed than in the latter case, all sound being absent in other parts, which further present the signs of enlargement or displacement of the heart, liver, or mediastinum, with fulness of the intercostal spaces, generally more remarkably than usual. A similar irregularity in the shape of the chest will serve to distinguish pleurisy in the progress of cure by contraction of the chest, from the case of a consolidated lung." (*Op. cit.* p. 122.) Although I admit the truthfulness of these remarks, as respects many cases, yet others will occur to which they do not apply, and in which they cannot assist the diagnosis. They apply chiefly to the more developed and well-defined cases; but to others not so characterised, and to those which are more complicated, they will furnish but slight aids. Indeed no precise statements can be offered as to the diagnosis of several states of pleurisy attended by adhesions, partial effusions, and alterations of the substance of the lungs, as none apply sufficiently to these ever varying states to mark them with precision. The physician's accuracy of diagnosis, as regards them, will depend much upon the attention with which he has watched the course of the disease, and upon his acumen in detecting, and his sagacity in comparing and estimating signs, symptoms, and almost imperceptible and evanescent phenomena.

136. *d.* Chronic pleurisy is liable to be confounded with *tuberculous disease of the lung*, for some of the signs of both maladies are somewhat similar, and the constitutional symptoms and affection are often alike. Indeed, the one may pass into the other, or both may be present. There never is, however, the same amount of dulness on percussion and absence of respiration in the latter malady as in chronic pleurisy; whilst the enlargement of the side and displacement of the viscera, attending pleurisy with very copious effusion and empyema, never exist in phthisis. The puriform state of the expectoration often observed at an advanced stage of chronic pleurisy, should not mislead the physician, for this appearance of the sputum occurs in the last stages of most diseases of the chest, and is an attendant upon a sympathetic chronic bronchitis which gradually supervenes in their advanced progress, and is independent of any actual disease of the substance of the lung.

137. *e.* Protrusion of the intercostals may be looked upon as the surest sign of *empyema*; for it rarely accompanies a very copious and non-purulent effusion in the acute stage, whilst it is generally present when the fluid is purulent, although actually smaller in quantity than before it assumed this character; this sign indicating rather the kind of fluid than the quantity, as justly insisted upon by Dr. STOKES and Dr. H. ROE. It should also be recollected, that a small effusion into the right cavity may, when the patient is examined in the sitting or standing position, be mistaken for an enlarged liver — or the rising of this organ high in the thorax, or this latter may be mistaken for the former; whilst the presence of a considerable quantity of fluid in the left side may not be detected, owing to an inflated stomach having pushed the diaphragm before or behind it or to the small quantity of fluid interposed between the parietes and the inflated organ, admitting of a clear sound upon a strong percussion, although a dull sound may be given out by a very gentle percussion. The absence of the vibratory thril produced by the voice, and the decubitus, generally on the affected side (§§ 30. *et seq.*), will further determine the seat of effusion.

138. At an advanced period of empyema a copious expectoration of purulent matter may occur, and may lead to the inference of the existence of a pneumonic abscess, or of a tubercula cavity, or at least of chronic bronchitis, of the uncompressed lung. Instances of this kind have been noticed by ANDRAL, STOKES, and MAC DONNELL, and upon dissection no such complication could be detected. But true pulmonic abscesses are comparatively rare, and are not accompanied with copious expectoration. The last writer jus named very justly infers that purulent expectoration, in empyema, although attended by quick pulse, sweating, emaciation, and other hecti symptoms, is indicative of tubercular or pneumoni abscess, unless attended by unequivocal physica signs of these lesions; but, on the contrary, it is t be regarded as the consequence of an effort of th constitution to get rid of a large collection o purulent matter, by one of the ordinary emunctories.

139. It should, however, be kept in recollectio that the lung of the sound side often experiences in the course of empyema, congestion of the mucous membrane of its bronchi, or fully develope bronchitis, often passing into chronic bronchitis In such cases, the accession of chills, rigors, fever increased difficulty of breathing, with the physica signs of bronchitis, generally indicate the complication, which in various degrees is a frequen consequence of the increased determination o blood that takes place to the sound lung, owing chiefly to the compressed and impermeable stat of the lung of the affected side.

140. When a circumscribed purulent collectio forms on the left side and advances externall ("the *empyema of necessity*" of French pathologis (§§ 52. 56.)), it may, owing to the pulsations o the heart communicated to it, be mistaken for thoracic aneurism, or even for a malignant tumou in that situation. Mr. MAC DONNELL has pointe out this circumstance, and has published som interesting cases illustrative of this form of empyema, which he denominates "*pulsating empyem of necessity.*" It may be distinguished fro *thoracic aneurism*; — (*a.*) by the history of th case; — (*b.*) by the dulness extending over th whole side, the pulsation being felt only in th external tumour; — (*c.*) by the absence of thril and of bellows-sound, and (*d.*) by the extent an nature of the fluctuation. It cannot be mistake for *encephaloid*, or other malignant disease, if th progress of the disease, and the existing phenomen have received even tolerable attention. The absence of a persistent bronchitis, of a dark expe

toration resembling black-currant jelly, and the absence also of a varicose or enlarged state of the veins of the surface, and of œdema of the side affected, will assist the diagnosis.

141. It was shown by me in 1815, and on subsequent occasions in 1820, 1824 (*see Med. and Phys. Journ.* vol. xliv. p. 530., and Notes to Richerand's Physiology, p. 626.), long before the subject was noticed by Tiedemann, Gmelin, Liebig, and others, that, when the functions of the lungs are in any way impeded, the liver often performs a vicariously increased function, thereby preserving the blood from the impure or morbid state into which it would otherwise pass. This increased function of the liver is very generally remarked in the course of empyema. But, in addition to increased function, there also not unfrequently supervene congestion, and more or less enlargement of the liver, owing to the difficult or impeded circulation of blood through the lungs, and the equally impeded return of it from the hepatic vein. This enlarged, or at least congested, state of the liver, in most cases of empyema of any considerable duration, should not be overlooked, or mistaken for a partial empyema of the right side, which, however, it may accompany as well as empyema of the left side. The enlargement of the liver from congestion, or from impeded and impaired function of the lungs, generally supervenes to the vicariously increased action of the organ, and is observed chiefly in the more chronic cases of empyema.

142. *f.* The diagnosis between pleurisy with ffusion and *hydrothorax*, and between empyema nd this latter, is by no means easy, unless the istory of the case be well known. The circumtance of hydrothorax being generally consequent pon disease of the heart, upon a far advanced age of disease of the lungs, especially congestive neumonia, œdema of the lungs, &c. or upon the ast stage of other forms of dropsy, as ascites, anarca, &c. is sufficient to prevent any difficulty in he great majority of cases, to which the term ydrothorax is strictly applicable. Yet passive fusion may occur, although in comparatively re instances, either in one or in both lungs, and e distinguished with difficulty from the asthenic nd latent forms of pleurisy, more especially when he passive effusion is confined to one side of the hest, which is seldom the case when altogether dependent of inflammation of the pleura. When ropsy of the pleura, however, is caused by disase of the lungs, it is then generally confined to he same side as the affected lung, or is greatest n that side.

143. In most cases, the chief differences that an be observed between chronic pleurisy or emyema and hydrothorax, are, that the dilatation of e intercostal spaces is comparatively slight in ydrothorax, whilst protrusion of them or of the aphragm is not observed in this latter. Dr. rokes imputes this circumstance chiefly to the thological state of the pleura and the adjoining uscles, and to the puriform character of the fused fluid; but something may also be imputed the amount of effusion, which is rarely so great either pleura in pure hydrothorax as in pleurisy, nd hence a change of sound, varying with the sition of the patient, may generally be recogsed in hydrothorax, unless the passive effusion is nsequent upon the existence of several old pleuritic adhesions. Dr. Stokes adverts to the following diagnosis between empyema and hydrothorax, as given by Hippocrates and noticed by Laennec: — "You shall know by this that the chest contains water, and not pus, if, on applying the ear during a certain time on the side, you perceive a noise like that of boiling vinegar;" — and remarks that, when we consider the conditions of the lung in empyema and hydrothorax, the diagnosis of Hippocrates seems much more accurate than Laennec has admitted. In empyema the lung is but rarely affected, and no râle is heard, "no sound of boiling vinegar;" whilst hydrothorax rarely occurs without more or less of œdema or congestion of the lung; so that, the presence of liquid in the chest being admitted, the occurrence of râle would indicate hydrothorax rather than empyema.

144. IX. Prognosis. — The prognosis of pleurisy depends upon the form, state, and progress of the disease; upon the previous health and age of the patient; upon the rapidity and amount of the effusion; and upon the duration of the malady, in connection with the treatment which has been employed. The sthenic forms of the disease occurring in previously healthy persons, and brought early under treatment, although serious in their consequences, and therefore requiring a most watchful attention, generally yield to judicious treatment, especially when employed promptly, or before effusion into the pleural cavity has become abundant. If, however, pleurisy have been neglected, or improperly treated; if it have attacked a cachectic or broken-down constitution, or assumed an asthenic form; if it have been latent, and hence existed for some time before it was recognised; if it have supervened upon disease of the lungs, heart, liver, or peritoneum — more especially upon tuberculous deposits in the lungs, it is a most dangerous, and, in the latter circumstances more especially, even fatal malady.

145. When the disease attacks a person who has been exposed to depressing agents — to cold, humidity, insufficient nourishment, and anxiety of mind; when the effusion increases rapidly notwithstanding the employment of judicious means of cure, — when it appears in the scrofulous diathesis, or affects the pleura of both sides, or is attended by purulent expectoration, emaciation, or night sweats, or when the constitutional symptoms assume the hectic character, — when debility increases, and the urine becomes scanty, or œdema of the extremities supervenes, — and especially when these very unfavourable symptoms advance or continue for some time, the danger should be considered as very great, more particularly in the latter circumstances now enumerated. The prognosis in the complicated, the chronic, and the empyemic states of the malady is always very unfavourable, but more especially when occurring in the debilitated, the cachectic and intemperate; the amount of danger being generally extreme, when the disease has for some time resisted the usual remedies, or when the constitutional powers give way.

146. In those cases of empyema, in which the matter finds its way through the lungs or external parietes of the chest, although the danger is great, still recovery may take place if the vital influence be not much impaired, if hectic symptoms be not developed, and if extensive disorganisation be not

present. The strength, constitution, and age of the patient, in connection with the other circumstances of the case, should guide opinion as to the result. In the great majority of instances, however, the spontaneous evacuation of the fluid affords only temporary relief, the subsequent discharge and the hectic fever ultimately sinking the patient. The prolonged retention of the matter, and the consecutive changes in the lungs and parts adjoining the fluid collection, before a spontaneous discharge can be effected, generally sink the constitutional powers, and prevent a restoration of the lesions which have taken place, which are, however, usually too extensive to admit of restoration under any circumstances. Those cases in which the discharge is procured by operation admit of a much more favourable prognosis, especially when the operation has not been too long delayed, or until the alterations of the lungs and adjoining organs and parts are not rendered too great to admit even of a partial removal; but in these cases the result much depends upon the peculiarities of the case, and the circumstances under which the operation is performed.

147. Acute pleurisy seldom proves fatal merely from the amount of the effusion, until it is passing, or has passed, into the chronic state; and even then, so rapid a termination is met with chiefly in the cachectic, and in cases of double pleurisy, or when previous disease exists in the lungs or some other viscus. The rapid accumulation of the fluid, however, is a very unfavourable occurrence in any circumstances of the case, as it indicates great defect of constitutional power, and an inability to effect its removal. An opinion of the result cannot be formed correctly in any case of the disease, until the more acute symptoms have subsided, or until the effects of the means usually employed for this purpose become apparent; and then the issue depends much upon the age and constitution of the patient. When the sounds of percussion and respiration return, however gradually, and the other symptoms and signs disappear, a doubt need not be entertained of a favourable result, especially if the lungs furnish no indication of disease.

148. X. Pleura-pneumonia—*Pleuro-pneumonia* — *Pleuro-pneumonitis* — *Peripneumonia* — *Peripneumony*, &c. — or the association of inflammation of the pleura with that of the substance of the lung is so frequent, that these distinct diseases have been very often treated of as one, and with the belief that the one does not occur without the other. This, however, has been shown not to be the case, although they are frequently conjoined, as I have shown above, and when treating of inflammation of the lungs (see Art. Lungs, §§ 73. *et seq.*). The intimate connection subsisting between inflammations of the pleura and of the pulmonary parenchyma, and the frequent complication of these diseases, lead me further to remark, that *pleura-pneumonia* presents itself in practice in *three states*, which present certain differences in their progress, according as either tissue is prominently affected: — 1st. *Pneumonia* associated with slight pleurisy; — 2d. *Pleurisy* complicated with slight pneumonia; — and 3d. *Pleura-pneumonia* properly so called, in which the two affections seem nearly equal in degree.

149. i. *Pneumonia associated with slight pleurisy.* — In those cases in which inflammation of the lung reaches to the pleura, in any point, lymph is thrown out upon the free surface of that portion of pleura; but in persons of a previously healthy constitution, the lymph effused is usually in small quantity, forming a false membrane, which extends no further than the portion of pleura covering the inflamed or hepatised portion of lung immediately underneath. If the disease be of the sthenic character, or if it be unconnected with cachexia, constitutional vice, or a contaminated state of the circulating fluids, the inflammation, thus extending to a portion only of the pulmonary pleura, does not spread over the surface of this membrane, although the lymph thrown out will frequently excite a corresponding irritation or inflammation of the portion of the costal pleura with which it comes in contact, and thereby give rise to adhesions between the opposite surfaces. If the pneumonia and consequent hepatisation occupy a portion only of the lung, the effusion on the serous surface is only slight, consisting of a sero-albuminous, or sero-puriform exudation. But if nearly the whole lung be affected, then there is often little or no effusion, a very thin or imperfect false membrane only being seen on its serous surface, which is thicker along the edges and in the interlobular fissures, and in some other points when the inflammation had first reached this surface. This is a very common form of *dry pleurisy* complicated with pneumonia; and in this complication the pleurisy is merely contingent upon the pneumonia, and scarcely at all modifies the severity or progress of the primary disease. M. Laennec remarks that it would be very difficult to distinguish this particular complication from a pleurisy with copious effusion, if the patient had not been seen before this period; the absence of the thoracic resonance is here as complete as if the whole surface of the lung were covered by a pleuritic effusion, while the stitch in the side commonly attending the extension of the inflammation to the pleura would further induce the belief that the disease was simple pleurisy. When, however, the lung is completely hepatised without any attending effusion into the pleural cavity, there is always a strongly marked broncophonism in different points, and particularly toward the summit and root of the lung — a sign which never exists in the same degree, or over the same extent, in pleurisy or pleuro-pneumonia. If the patient have been seen from the origin of the disease, the diagnosis is much more easy. If the disease be pneumonia, crepitation will have been heard previously to the complete cessation of the respiratory murmur; and the gradual diminution of the resonance on percussion, and the supervention of a friction o rubbing sound, as described when treating of the *dry form* of pleurisy (§§ 42. *et seq.*), will leave no doubt of the nature of the affection. In pleurisy the loss of resonance is very rapid, and exists, i the lungs have been previously healthy and without adhesions, over the whole of the affected side Œgophonism, moreover, is always perceptible a least for one or two days.

150. ii. *Pleurisy complicated with slight pneumonia.*—If the pleuritic attack be severe, and the effusion so rapid and abundant as suddenly to compress the lung, it is not uncommon for inflammation of some points of the pulmonary substance to occur, particularly in the lower lobe. These points sometimes remain distinct and of small ex-

tent, constituting one of the varieties of *lobular pneumonia*. The pulmonary inflammation is here much modified by the pleuritic effusion, as I have shown in the article Lungs (§ 73.), and it rarely extends much further than a few lobules, and still more rarely advances to suppuration. This complication can only take place early in the attack, and before the effusion and consequent compression of the lung have become very considerable; as a lung greatly compressed is hardly susceptible of inflammation, the *symptoms* and *signs* of this complication are described in the article now referred to (§ 75.).

151. iii. *Pleuro-pneumonia properly so called.*— The association of an inflammation of the whole or part of the pleura, with considerable effusion, and of a severe pneumonia, is not so frequently met with as either of the two complications just noticed. M. Laennec remarks that pleurisy conjoined with pneumonia does not increase the danger of the latter; on the contrary it lessens the danger as above stated, by compressing the lung. On the other hand, the pneumonia at first augments the danger of the pleurisy, which is rarely fatal in the acute stage; but it favours a more rapid absorption of the effusion, by preventing this from becoming as copious as in simple pleurisy, the inflammation rendering the lung less compressible. Hence pleuro-pneumonia, *cæteris paribus*, may be regarded as less dangerous than either simple pleurisy, or simple pneumonia.

152. Pleuro-pneumonia is recognised by the union of the signs of pleurisy and of pneumonia; and some of these signs are even more permanent in this complication than in either of the simple affections; for they mutually impede and retard each other's progress when these inflammations are conjoined. The crepitation on the one hand, and he œgophony on the other, are thus often heard up to the period of convalescence. In cases of his kind, œgophony is seldom simple; it is perceptible only at the root of the lung, around the ower angle of the scapula; and, from the vicinity of the large bronchial trunks and the density of he pulmonary substance, it is usually combined with marked bronchophony. This conjunction of hese two signs, Laennec has likened to the queaking of Punchinello.

153. XI. Treatment. — i. History of the Treatment of Pleurisy. — (*a.*) Amongst the seeral means advised by the older writers for the cure f pleurisy, *bloodletting* was considered of the first nportance; but there are various circumstances which have been noticed in connection with it, by hese writers, that deserve a brief notice. Hipocrates advised bleeding "ad deliquium animi." Aretæus insisted upon the necessity of early and epeated venesection, but cautioned against carying it so far as to produce syncope. He disnctly stated the nature and seat of the disease; nd remarked that it was either sporadic or epiemic. Aëtius was the first to point out some of he conditions which indicate the impropriety of aving recourse to bloodletting, and imputed hese conditions to indigestion and crudities of the tomach. Cælius Aurelianus and other Mehodists advised bloodletting, but condemned the ractice of carrying it to the length of causing syncope. Alexander Trallianus seems to have een the first to advise local depletion for this isease, according to the manner of cupping then in use. Avicenna, and other Arabian physicians, generally had recourse to venesection and cupping, and the rest of the antiphlogistic plan.

154. The question as to the greater efficacy of bleeding from the same side as that affected in pleurisy, or from the opposite side, was agitated at a very early period. The Greek and Latin authorities were divided in opinion as to this question. Hippocrates, Galen, and Celsus, advised bleeding from the arm of the affected side; whilst Aretæus, Aëtius, and Cælius Aurelianus directed it from the opposite side. The discussion was carried down by the Arabians, who, however, generally bled from the arm of the unaffected side; and by the writers of the fifteenth, sixteenth, and seventeenth centuries, some of whom, as Amatus Lusitanus, Vesalius, Trincavelli, Ruland, Saillans, Wipacher, Rodriguez, Bertin, and others, discussed the subject as one of the utmost importance.

155. Other circumstances, of greater moment than this, were at last noticed in connection with bleeding for pleurisy, by Sydenham, Callisen, Baglivi, and others, who insisted upon the injurious tendency of bleeding in cachectic and asthenic states of the disease, or when the blood did not present a buffed or cupped appearance. Mursinna, Stoll, and many recent writers, have likewise cautioned against bleeding in these cases, as well as in those which present a putrid character, or a bilious in connection with an asthenic diathesis; and have likewise warned the inexperienced against repeating venesection, or carrying it too far merely because the blood was buffed — a caution of no small importance.

156. There can be no doubt of pleurisy being much more prevalent at some seasons or in certain years than at others, and thus assuming according to the circumstances of season or locality more or less of an *endemic*, or an *epidemic* form; and there is no less doubt of the character of the disease varying remarkably at different periods, and in distinct localities; it being, in one or the other, of a much more phlogistic and acute form, than in the rest, or assuming even an asthenic or latent character. And hence, indeed, may arise the fact that bloodletting and other parts of the antiphlogistic treatment have been advised with very different degrees of boldness by different writers. We find that, since the days of Galen, prejudices existed in Rome against large bleedings in this and other acute diseases; and these were very probably well-founded, in respect of that and all other large cities in ancient times, as they are as regards this city and other large towns at the present day. The opinions of medical writers are too generally based upon the narrow or peculiar circumstances of their own practice, either previously to or at the time of their writing; and all have neither the inclination nor the time to acknowledge the change of opinions which further experience and more diversified opportunities have occasioned. We find that Dover, Cleghorn, Huxham, and many others, advised very large, prompt, and repeated venesection; and that Riverius, Le Mercier, Stoll, and Sims, recommended that it should be performed in both arms at the same time. A more enlightened experience, and more diversified opportunities of observation, have now demonstrated that this practice may have been appropriate in many of

the circumstances in which these writers had recourse to it; but that there are other circumstances, in respect not only of the individual, but also of the season, locality, and epidemic constitution, which render it altogether unsuitable and injurious; whilst there are certain conditions of the disease which I have endeavoured to point out, that require very different or even opposite measures. In the more doubtful circumstances of the case, or when the propriety of bleeding from the arm, or of the repetition of such bleeding, admits of dispute, the application of leeches to the side, as advised by **Zacutus Lusitanus**, **Schmucker**, **Sarcome**, and **Hufeland**, should be resorted to.

157. (*b.*) *Emetics* were formerly much resorted to, but they are now but little employed for the cure of pleurisy. They, however, have had the sanction of **Riverius**, **Ruland**, **Blegny**, **Mursinna**, **Morgagni**, **Wright**, **Stoll**, **Tissot**, **Ackermann**, and **Schelhammer**; and I can add that, when they are discreetly prescribed, they are important aids in the treatment of most of the forms of the disease. They should not be exhibited until after bleeding has been resorted to in the more phlogistic cases. They will often relieve the dyspnœa and oppression attending the stage of effusion, and promote absorption, when judiciously selected and associated with other means which are suited to the circumstances of the case. — *Purgatives* are much less beneficial than emetics in this disease. Very active purging is seldom requisite, unless when there are accumulations of excretions and morbid secretions to remove; but it is always necessary freely to promote the secreting and excreting actions of the abdominal viscera. Conformably with this principle, *diuretics* are generally beneficial, especially at an advanced period of the disease, or when effusion has taken place, and when conjoined with cooling diaphoretics or other appropriate measures.

158. (*c.*) *Mercurials*, especially calomel, in full or even very large doses in the more acute cases, with antimonials, or opium, or with both, according to circumstances, are often, in this as well as in other inflammations of serous membranes, of the greatest advantage. They have been much recommended by **Lind**, **Wright**, **Finch**, **Hamilton**, and others, and the experience of recent writers has confirmed the statements of their predecessors. The active exhibition of calomel, either alone or in the combinations now mentioned, is even more necessary in the early stages of pleuritis than in those of pneumonia; and, in the more advanced stages, or when effusion has taken place, either this or some other mercurial preparation, conjoined with diaphoretics, or diuretics, and aided by external rubefacients and derivents, is of the greatest benefit. I have often given the bi-chlorate in small doses, either thus associated, or with other tonics and alteratives, as cinchona, sarza, &c. with marked benefit, at an advanced stage of the disease, and more especially of the latent and asthenic forms.

159. (*d.*) *Antimonials* are not so beneficial in pleurisy as in pneumonia, yet have they long possessed a high reputation in the former disease, and have been much confided in by **Agricola**, **Millar**, **Brocklesby**, **Belfour**, **Laennec**, and many others. Of these preparations the kermes mineral and tartar emetic have been most employed, although the empirical powder of James, and others, have also been prescribed with advantage. The kermes mineral was recommended by **Von Mertens**, **Bang**, **Sims**, **Montral**, **Colombier**, &c. in doses of one fourth or one third of a grain given every two or three hours, whilst the tartar emetic was adopted by **Callisen**, **Millar**, **Belfour**, **Laennec**, and numerous modern writers. Antimonials have rarely been confided in alone for the cure of pleurisy, but have usually been prescribed in aid of vascular depletions, and for the reduction of vascular action and the promotion of perspiration; the substances most beneficially conjoined with them being mercurials, opiates, and other sedatives, or cooling diaphoretics and diuretics, more particularly the solution of the acetate of ammonia, or of the nitrate of potash, and the nitric æther or the spirits of nitric æther.

160. (*e.*) Opium and other narcotics have been used by several writers, but generally in combination with other medicines, according to the stage of the disease and circumstances of the case, and with the intention of allaying pain, and of promoting the operation of the substances with which they were conjoined; as with calomel by **Hamilton**, to determine the constitutional operation of this medicine; with ipecacuanha and nitre by **Dover**, to determine the diaphoretic action of these substances, or with diuretics to ensure their operation on the kidneys. Opium was much praised by **Kortum** for pleurisy; and certainly, in conjunction with calomel or other mercurials, and with an antimonial preparation, or in the form of Dover's powder, as I have advised it in other inflammations of serous surfaces, it is of great service, especially after bloodletting in the more phlogistic cases; and with alteratives, or diaphoretics, or mercurials, &c. in the more advanced stages.

161. (*f.*) Of other medicines which have been resorted to in pleurisy, there are few which deserve a particular notice. *Camphor* has been much praised by **Baglivi**, **Grimm**, **Tissot**, **Gruelmann** and **Schelhammer**, especially in conjunction with nitre. I have prescribed this medicine very often in the more asthenic forms, and in advanced stages of the more sthenic stages, of the disease, and frequently with great benefit, but generally with a mercurial alterative, or other substances, according to the circumstances of the case. *Ammonia* was employed by **Chalmers**; **Hoffmann's** *æther*, and other stimulants, by **Tissot**; and *benzoin* by **Hoffmann**; but they are serviceable chiefly in asthenic forms, and contingent conditions of the disease. I may add, that *aconite* was recommended by **Gebel** in combination with an antimonial medicine for the rheumatic form or complication of the disease, in which form also *arnica* was much used by several German writers.

162. (*g.*) The *inhalation of warm vapour* was advised for pleurisy by **Hippocrates**, and of numerous forms of warm medicated vapours, by modern writers. I however much doubt their efficacy, unless as adjuvants, in this disease, in which, as well as in peripneumonia, this practice should not be overlooked, especially in cold and dry states of the atmosphere. In these circumstances of weather and of disease, I have had re-

course to it on numerous occasions. In a case attended in 1826 by Dr. T. GORDON, Sir J. ANNESLEY, and myself, the vapour of boiling water was introduced into the apartment, and within the curtains of the bed, by means of a tube leading from a boiler on the fire of the room.—As to the use of *medicated vapours*, I need add nothing to what I have stated respecting bronchitis (see Article BRONCHI, § 98. *et seq.*), as much of what I have there advanced is applicable to pleurisy as well as to pneumonia and bronchitis, and to most of these complications.

163. (*h.*) *Demulcent and oleaginous medicines* were very generally employed by both ancient and modern writers, in expectation of obtaining a soothing effect from them, as regarded the pain and the cough of pleurisy, and as a vehicle for more active substances. *Linseed oil*, and *decoctions*, and *almond oil*, were chiefly thus prescribed by SYDENHAM, LANGE, SPINDLER, and others, and were often associated with *camphor*, *opium*, and other sedatives, by GILIBERT, DE HAEN, KORTUM, and numerous more recent authors. Many other demulcents and mucilaginous preparations have been used, as the *decoctum althææ*, &c., but they require no further notice at this place.

164. (*i.*) Numerous *external means* were advised for pleurisy by most writers, from HIPPOCRATES to this time. *Warm fomentations* of various kinds, and both humid and dry, were much employed; and even *topical cold*, by evaporating lotions, or by means of ice or snow, as advised by BARTHOLINUS, was even resorted to. Of this latter but few modern physicians will form a favourable opinion, although certain analogical facts may be adduced in its favour. *Sinapisms*, and other rubefacient applications to the side affected were advised by CELSUS and others of the ancients, as well as by the Arabian and modern writers; and they are certainly of more or less benefit, according to the knowledge by which a recourse to them is guided. The most beneficial rubefacient, however, which can be employed, the most appropriate to all circumstances of the disease, and the least liable to be injurious in any, is the *spirit of turpentine*, in the form either of epithem, or of liniment, or of embrocation, or conjoined with oil, or camphor, ammonia, and oil with opium; and repeated or renewed according to the effects produced, and to the peculiarities and complications of the case.

165. (*k.*) *Vesicants* over the part affected were recommended by AMATUS LUSITANUS, CONRADI, BROCKLESBY, GARDANNE, GRIMM, THOMANN, DE HAEN, TRALLES, and ENGELHART. But they should be prescribed only after bleeding in the more sthenic or phlogistic cases; be large, and repeated even oftener than once in the more chronic states of the disease; and be aided by mercurials, diuretics, and alteratives, according to circumstances. The propriety of applying them over the affected part, especially when there is reason to suppose that the costal pleura is inflamed, and when the patient is thin or emaciated, may be reasonably questioned. In these circumstances, I have generally directed them to be applied, either more or less below the seat of pain, or on the opposite side. In the more asthenic and chronic forms of the disease, a repetition of them, generally in quick succession, in different parts of the thorax, are often of great service, PLUMMER's pill, with ipecacuanha and opium, being given at night, and small doses of the iodide of potassium and liquor potassæ with sarsaparilla being taken during the day. The repeated application of *moxas* to the affected side has been a common practice from the earliest ages in eastern countries, and has been frequently had recourse to in Europe by modern physicians with considerable advantage in chronic cases of the disease. In these cases, as well as during convalescence from acute attacks, I have often prescribed a large plaster to be kept applied upon the affected side, consisting either of the emplastrum ammoniacum cum hydrargyro, or of a combination of this with the emplastrum picis compositum.

166. ii. TREATMENT ADVISED BY THE AUTHOR.—The *intentions of cure* are nearly the same for the several forms of pleurisy, although each form requires a more or less marked modification of the plan and of the means by which these intentions are to be fulfilled. The *first* object is to arrest the progress of the inflammation; the *second*, to promote the removal of the products and the consequences of the inflammation; and the *third*, to enable the constitutional powers to resist, in the more chronic cases, the injurious influence of the structural changes produced, and if possible to counteract or overcome them.

167. *A.* IN STHENIC ACUTE PLEURISY, the obvious indication is to arrest the progress of the inflammation by the means recommended for other inflammations of this character affecting other serous tissues, namely, by *bloodletting* to an amount which the age and constitution of the patient, the hardness of the pulse, and the duration of the attack will suggest. If the patient be robust, if the disease has not advanced so far as to give rise to great effusion, and if the pulse be hard and inspiration painful, general bleeding should be promptly resorted to and carried sufficiently far to relieve the respiration, and to make a decided impression on the pulse, without however producing full syncope, for the reasons stated in the Article BLOOD (see §§ 64. *et seq.*). Contemporaneously, or nearly so, with the bloodletting, a full dose of *calomel*, *antimony*, or *ipecacuanha* and *opium* should be given, taking care that the dose of the antimony or ipecacuanha should not be such as to occasion vomiting. The effect of these I have so frequently shown to be such as will promote the good effects of vascular depletion, and often prevent the necessity of repeating this measure, that I need not here recur to the subject. If, however, pain on inspiration or when coughing, or hardness of the pulse, should return, bloodletting ought to be repeated, and the other medicines just named again be exhibited after the operation. In some cases, more especially if the patient be not very robust or be not plethoric, *local depletion*, by means of *cupping* a short distance from the spine, or of *leeches* near the part, may be employed *in place* of the second venæsection; and, in more robust and plethoric persons, *after* the second bloodletting, if the pulse should rise, and the febrile symptoms increase. The application of leeches should be followed by a succession of warm poultices, or several folds of warm moist cloths or flannels, covered by dry napkins.

168. It will generally be requisite to give some *purgative medicine*, in order to keep down febrile

re-action, and derive the circulation from the seat of disease. But this medicine should not interfere with the effects of those just recommended, and therefore it ought not to be given until some hours afterwards; and, during its operation, care should be taken to prevent the free perspiration, usually produced by the medicines previously given, from being checked. The purgative operation may be further promoted, if it be required, by *enemata*, more especially such as contain the oleum terebinthinæ, or may be left to them alone, particularly when the bowels are not confined. In addition to the means now advised, suitable *diaphoretics* should be given at short intervals. The most generally appropriate are those which consist of the liquor ammoniæ acetatis, spiritus ætheris nitrici, and either the vinum antimonii tartarizati, or vinum ipecacuanhæ, with camphor water. To these may be added other medicines, such as digitalis or hyoscyamus, or both, as circumstances may suggest; or a preparation of colchicum may be substituted for the antimony or ipecacuanha, but its operation should be carefully watched.

169. In this form of the disease, and more especially if it have made considerable progress before it came under treatment, the repetition of the calomel with James's powder or with ipecacuanha and opium becomes necessary. The frequency of their exhibition should depend upon the dose prescribed and the urgency of the case. I have usually directed full or large doses, particularly of the calomel or opium, at intervals of six, eight, ten, or twelve hours, and the saline medicine, mentioned above, to be taken in the intervals, until the gums indicate a slight affection, or the evacuations assume a green or very dark hue.

170. The above treatment will generally accomplish the first intention, and the latter part of it partly fulfil the second. But it may happen that, when we have happily arrived thus far, exposure to a current of air, or some untoward circumstance, may occasion a *relapse*, or a *recrudescence* of the disease; and the physician will then propose to himself this question, — Ought general bloodletting now to be resorted to, or should local depletion be confided in? In this state of the case he will duly consider the amount and effects of the previous vascular depletions, the duration of the disease, and the probable amount of effusion, the existing states of the pulse and of respiration, the pain and other symptoms in connection with the age and constitution of the patient, and decide accordingly. But, if a due estimation of all these prevent him from venturing upon general bloodletting, he will decide in favour of the application of leeches, the number varying with the exigencies of the case; and he may even see occasion to repeat them, and to follow them with the warm poultices and fomentations already advised (§§ 167.).

171. In order to prevent the further progress of the disease and its consequences, as well as to remove its more immediate results, additional means are often required, more especially after the inflammatory or acute symptoms are reduced. At first the *turpentine epithem* may be applied over the affected side, or folds of warm flannel moistened with this substance, or with embrocations containing a large proportion of it (see Form. 295. *et seq.*). These may even suffice, and prevent the necessity of having recourse to other means; but if they do not produce a decidedly beneficial effect in the course of twenty-four or thirty-six hours, or little more, they should be replaced by a large *blister*, which will generally produce its effects in about six hours, when it should be removed, and the part be covered with a large warm bread-and-water poultice. This ought to be frequently renewed. It will rarely fail to procure a free discharge from the blistered surface.

172. If the disease has made considerable progress, or if the effusion is considerable, it wil generally be requisite to keep up a slight mercuria effect on the gums and to repeat the blister either over or near the part. But in no instance should the blisters, or the vesicating tissues employed in their stead, be applied longer than six or eight hours; they should be then replaced by warm poultices which will cause them to rise, and prevent the inflammation produced by them from extending below the integuments. In some instances, particularly in those which have proved most obstinate, and when no mercurial effect has been produced, I have directed the blistered surface to be dressed with the mild mercurial ointment, or with this in part; and have generally seen benefit derived from the measure. If the disease be not cured by the above treatment — a contingency which generally arises from some complication or pre-existing affection, or from the advanced progress of the malady before it came under treatment, or from a constitutional vice, as the scrofulous or tubercular — it then assumes the *chronic form*, to which attention will be more particularly directed in the sequel.

173. *B.* THE ASTHENIC AND THE LATENT STATES OF PLEURISY (§§ 47—50.) are often advanced to a more or less copious effusion before they come under treatment; and for this reason, and still more from the state of the disease, they rarely admit of general bloodletting, unless they are seen at a very early stage, and the asthenic diathesis is not very prominent. An intimate knowledge of morbid actions, conjoined with close observation and an experienced recourse to remedial agents, can in no circumstances be more advantageously evinced than in the course of treating these and the preceding forms of pleurisy — in determining, in the sthenic, how far to carry, and how often to repeat, vascular depletion, and in the asthenic and latent as to the propriety of adopting this practice, and as to the manner and the extent of carrying it out when it is determined upon. It should entirely depend upon the state of the pulse, the age and constitution of the patient, and the progress of the disease, whether a moderate bloodletting or leeches be prescribed. Cases may occur when both may be required, and others where neither is admissible, owing to the depression of vital power and the great amount of fluid effusion, which had taken place before the disease had come under treatment.

174. In these states—in those in which vascular depletions have been practised, as well as in those in which they are inadmissible — recourse should be had, in a prompt and efficient manner, to alterative and diuretic remedies. If the effused fluid be not inferred to be of the puriform character —a state of the effused fluid, very rarely observed in an early period even of the asthenic and latent forms of the malady — calomel should be given with opium and small quantities of camphor,

twice or thrice a day; the infusion of digitalis, with the nitrate of potash, the spiritus ætheris nitrici and oxymel of squills, being taken in the intervals in doses which the peculiarities of the case will suggest. The digitalis will be more certainly beneficial if it be given at first in as large doses as may be prudently exhibited, each dose after the second or third being diminished. The terebinthinate epithem or embrocation should at the same time be applied over the affected side, and be renewed according to the effect.

175. In cases of longer duration — when the disease has existed two or three weeks—and when the quantity of fluid effused is considerable, acute or inflammatory symptoms having subsided, the treatment should partly depend upon the means which had already been employed. If the patient be seen for the first time, the internal and external remedies just now mentioned should be resorted to; but if these or similar agents have been employed without avail, the pilula hydrarg. chloridi comp. with the pilula scillæ and digitalis may be given night and morning, and two or three doses of the iodide of potassium in solution with the spiritus ætheris nitrici, or some other diuretic, in the course of the day. Blisters should not, at the same time, be overlooked; they may be repeated according to circumstances, in the manner already recommended, in order to obtain their most beneficial effects, and to secure a free discharge from them. They are certainly beneficial, but not to the extent stated by some recent writers. In some instances I have prescribed the *iodide of mercury* internally with small doses of squills and digitalis with seeming advantage; and in others directed the *iodide of lead* to be used externally in the form of an ointment, according to the following formula, a small piece of it being well rubbed over the affected side every night, or both night and morning, the side being covered afterwards by a piece of flannel: —

No. 325. Plumbi Iodidi, ʒj; Unguenti Hydrarg. mitioris et Adipis præpar., āā ʒvj. Misce bene, et fiat unguentum.

176. The effects of iodide of potassium in this disease are very uncertain. In some I have found it very serviceable, in others of doubtful advantage; and in a few I have considered it prejudicial. I have employed it in dropsical diseases of all kinds for very many years, since the time of its first preparation, and can therefore say, from considerable experience, that its effects should be carefully observed, in the asthenic and latent forms of this disease; for, in some of the more extreme of these, it may prove, as I have found it in two or three cases, distressingly depressing, although given in very small doses. In these cases the iodide of iron, taken in syrup of sarza, may prove more serviceable, especially when aided by the continued application of the emplastrum ammoniaci cum hydrargyro, or by a plaster consisting of equal parts of this, and the emplastrum picis comp. In most cases of the disease, these last means will prove of great service, in promoting the absorption of the fluid, during early convalescence, or when the fluid is partly removed. At this period, change of air — especially to a mild, pure, and dry air, or to the sea-side, in a sheltered situation, and suitable diet and regimen — avoiding vascular excitement, yet sufficiently supporting the powers of life, should always be recommended.

177. It is not unusual to observe, in the more asthenic cases of pleurisy especially, an abundant and rapidly increasing effusion, occasioning the greatest distress, and even threatening the dissolution of the patient, by its pressure on, and displacement of the lungs, heart and large vessels, notwithstanding a judicious recourse to internal and external means. When this result is met with, more especially in very delicate, or scrofulous persons, or in the asthenic and latent states of the disease, the remedies already noticed having proved inefficacious, no further time should be lost before recourse be had to *paracentesis thoracis* — to the removal of the fluid through an opening made in the parietes of the chest. It is obvious that, as soon as the medical treatment proves itself inefficacious, this operation should be resorted to, for delay will diminish the chances of success from its performance. As this operation is also required in the chronic states of the disease, more especially for empyema, it will be more particularly noticed hereafter.

178. *C.* Partial and double Pleurisy (§§ 51—62.) require but little modification of the treatment already advised, which should be adapted to the peculiar features of individual cases. Where the symptoms are acute, and at the same time of the *sthenic* character, the antiphlogistic means should be employed accordingly, and with due reference to each feature of the case. When they partake more of the *asthenic* form, the measures mentioned in connection with it then are requisite. It may be remarked, that while partial pleurisy more generally presents the former character, double pleurisy commonly possesses most of the latter, and especially requires prompt and efficient treatment, which, however, is in no way different from that which has been already advised.

179. *D.* Chronic Pleurisy and Empyema.— *a.* If the disease have become chronic before treatment has been employed, then the duration of the disease, the amount and probable nature of the effusion, and the urgency of the symptoms, will suggest the measures which should be adopted. If the malady have become chronic, owing to the failure of the means resorted to, or to the constitution of the patient, or to both causes conjoined, as usually observed, the question may still be entertained as to what may be further tried. In the former circumstances, if the indications above stated (§§ 137. *et seq.*) as to the purulent nature of the effusion be not present, and if the duration of the disease have not been above two or three weeks, then the internal and external treatment advised above (§§ 174—177.) may be tried — promptly and efficiently — before recourse shall be had to *paracentesis thoracis*. If however protrusion of the intercostal spaces, hectic and other symptoms indicate a puriform state of the pleural collection, no time should be lost before resorting to this operation. In the latter circumstances referred to, especially when the treatment has been judicious — no appropriate and efficient means having been overlooked, the operation is equally required, whatever may be the nature of the fluid collection, although, perhaps, it may be more urgently called for when indications of a purulent character are present; for where these indications exist, no other means will save the patient. The several writers who agree in the propriety of having recourse to

this operation—especially Larrey, J. P. Frank, Laennec, Forbes, Bell, Elliotson, Williams, Davis, and H. Roe—advise its performance when the effusion proceeds so rapidly as to threaten the life of the patient, or when it either increases or remains stationary under the use of the means already recommended, although the dyspnœa may not be urgent, or the danger immediate, for the continuance of the morbid collection and the compressed state of the lungs may prevent this organ from recovering its functions. Dr. H. Roe justly remarks, that "for empyema paracentesis should always be performed the moment the nature of the case is ascertained. For serous effusions occurring in persons of scrofulous habits, or very delicate health, after pleuritic attacks, for the cure of which the necessary treatment has either failed, or been neglected, paracentesis will generally be required." (p. 208.)

180. *b.* There are certain *conditions* requisite to the success of the operation. It is most important that it should be performed before either the vital powers of the patient are too much reduced, or the thoracic viscera have undergone serious organic lesions. It is chiefly when the lung still possesses the power of expanding after the pressure upon it is withdrawn, that a cure can be effected without deformity of the side. If, however, the operation be delayed until the lung has become atrophied, condensed, or bound down by adhesions, so as to be incapable of expanding sufficiently to meet the ribs, either the vacuum will be rapidly refilled with fluid, or the shoulder will be depressed and the side contracted. This last change seldom occurs immediately after an operation, although it takes place gradually and to a great extent when the fluid is absorbed. The reaccumulation of the fluid will, therefore, be most likely to occur, when the lung is incapable of expanding sufficiently after the operation. When this is the case, a space must necessarily intervene between the surfaces of the pleura, and either the fluid is thereby prevented from being drawn off during the operation, or it is replaced by atmospheric air, which is always injurious to the pleural surfaces and occasions a more puriform, and often an offensive renewal of the effusion, and the aggravation of both the local and constitutional symptoms; exhausting and ultimately destroying the patient. These consequences sufficiently show the propriety of an early recourse to the operation, but they are not satisfactory reasons for the neglect of it altogether, as urged by those who object to the performance of it.

181. When the operation is performed sufficiently early, even in the most rapid and urgent cases of empyema, the removal of the puriform collection allows the lung to expand, and the upper portions of the pleura to come in contact, and ultimately to adhere; and the adhesion gradually extends as the fluid is removed, until the opposite surfaces become agglutinated; and a cure is thus effected by the obliteration of the cavity throughout, or nearly so. In order to secure this desirable result, it would be most important to determine, were it possible, the exact period when the operation ought to be resorted to—when an operation would prevent the accession of those changes which usually become irremediable. It is manifest that, when indications appear of a puriform state of the collection, no delay should occur: and that, in many cases, it mig be of advantage to ascertain, by means of the e ploring needle, the exact nature of the effusio If it be found that the fluid is serous, then Dr. I Roe believes, that we may wait till the end of tl third week, in hopes that medical treatment m cause absorption: and, if it does not, that t operation should not be longer deferred; for l considers, and I think justly, that the operati should not be postponed to a later period, lest c ganic changes in the thoracic viscera may becon irremediable, and that it is therefore better that should be performed too soon, than that this ri should be incurred by delay. Cases are record of patients who had been tapped successfully f pleuritic effusions of several months' duratio but there was no proof that the lungs expanded their full dimensions in those cases, and that t recovery was complete. Dr. Roe states, that case has occurred to him, in which the patie was *perfectly cured* when the operation w delayed until five or six weeks from the co mencement of effusion. The non-expansion the lung in these circumstances has always giv rise to the introduction of more or less air into t cavity, in the cases which have come under n observation, however carefully the exclusion of had been attempted: and the patient has usual sunk from a re-accumulation of a fœtid purule secretion, or survived with a considerable loss lung.

182. *c.* The *operation* being manifestly necessar in the circumstances now stated, and its perforr ance not admitting of delay, the *manner* and t *situation* in which it is most advantageous performed requires some consideration. T *situation* in which the opening into the chest shou be made has been pointed out by Laennec, and has been generally adopted by later authoriti He recommends the space between the fifth a sixth ribs, a little behind the digitations of the se ratus major, as being the most dependent point the horizontal position, generally the freest fro adhesion, and the seat of the greatest quantity fluid. In this situation the operation was pe formed in all the cases recorded by Dr. H. Roe

183. The *manner* of performing this operati has recently received due attention. Former surgeons advised operations implicating sero surfaces with a perfect indifference to the acti of the air upon those surfaces. But the injurio action of the atmospheric air upon serous shut cavities especially, and indeed upon oth surfaces or parts denuded of their epithelia, or s parated from their natural connections, is no acknowledged by every enlightened observe This is evidenced by the inflammatory irritatio terminating, in weak or unhealthy constitutio particularly, in offensive purulent discharges, a acute hectic fever. Of the *three* following mod of performing *paracentesis thoracis*, the one whic should be adopted may be inferred from what have just stated. According to one plan, an i cision is made into an intercostal space, the flu is evacuated at once, and the wound left ope Another method is to make an opening into t pleural cavity with a trochar, to keep the wou open by introducing a canula, or a catheter, gum elastic tube, by which the fluid is to pa off gradually. The third mode consists in maki an opening by a trochar or otherwise, and allo

g as much of the fluid to flow out as will escape ithout admitting the air, and in immediately losing the opening. This last method is that hich I would recommend from observation of e results of these several methods, and for the llowing reasons: —*Firstly.* When the air, even small quantity, comes in contact, either with e pleural surface, or with the false membrane rmed on this surface, the state of morbid action nd the fluid secreted are still further removed om the natural and healthy conditions, and renered more injurious to the œconomy, and much ss capable of restoration to states compatible ith the continuance of life. *Secondly.* The connued access of the air will give rise to the thickning of the false membrane, and thereby prevent e lung from expanding, whilst it will render the ecretion at first purulent and afterwards offenve and irritating to the surfaces containing it, nd consecutively most contaminating to the cirulation and whole frame. *Thirdly.* The operaon performed so as to prevent the introduction of e air, although often required to be repeated, at ccessive periods, closing the wound carefully in e intervals, admits of the gradual agglutination f the opposite surfaces of the pleura, does not terfere with the contingent absorption of the emaining fluid, and is compatible with the connued recourse to medical treatment appropritely to the peculiar features of the case.

184. I agree so entirely with what Dr. Villiams has stated as to the manner in which is operation should be performed, that I here dopt his recommendation: — "The spot for the troduction of the trocar should be determined ith due reference to the physical signs; carelly avoiding every part where, or near which ere is sound of respiration, voice, or not perfect ulness on percussion. A projection or fluctuaon of an intercostal space give greater eligibility a spot; and these circumstances present themlves most frequently at the inferior lateral parts f the chest, from the third to the seventh rib, here also the soft walls of the chest are as thin s any where. In all cases it is a proper precaution pass a grooved needle first, as recommended by r. T. Davies; for this at once determines the ressure of the fluid, its quality, and the thickness f the walls which contain it at that spot." The pper margin of the fifth or sixth rib offers most ommonly the most favourable situation, avoiding f course the immediate vicinity of the known rteries and nerves, and especially of the heart, ith reference to displacement, &c. "The paent should be lying on his back, inclining to the ffected side, and not more raised than is necesary to the state of his breathing. The skin hould be drawn aside, so that the puncture rough it may not, after the trocar is withdrawn, orrespond with that of the pleura, but form a alvular orifice. The trocar should not be pushed further than is necessary to clear the parietes, ut the canula may be pushed further after the tilette is withdrawn, and its sides should have everal holes in them. As soon as the stilette is ithdrawn, steady pressure should be applied by bandage, or by the hands of an assistant, to epress the shoulder and sides, and to push up e diaphragm on the affected side, to promote he flow of liquid and to prevent the introduction f air through the orifice during any sudden or forcible act of inspiration. For the same reason, during a fit of coughing, if there appear any tendency to intermission in the stream of fluid, the orifice should be closed by the finger. The pressure should be steadily increased as the liquid flows; and if the stream should stop, a probe may be passed through the canula to clear it of clots of lymph or other obstructing matter; but if still no more flows, a compress, or if the liquid is purulent a large poultice should be placed on the orifice; and then, and not till then, the pressure on the walls of the chest may be discontinued. The result will be, that the walls of the chest, expanding by their own elasticity on the removal of the pressure, will draw air into the compressed lung, which, being thus inflated, will begin to resume its part in the function of respiration and circulation, and will thus promote the absorption of the rest of the fluid, and improve the condition of the whole system. Even if the fluid should reaccumulate, the temporary expansion of the lung will have served to restore its natural properties, so that when another quantity of fluid is again withdrawn, the organ will be better prepared for a restoration of its functions." (p. 28.)

185. Performed in the manner thus judiciously advised by Dr. Williams, the operation is free from risk, and will seldom fail to give relief. If the collection be purulent it will often be necessary to repeat the operation several times; but if it be serous, one tapping, which will more or less expand the lung, will often be sufficient to give a turn to the disease, the complete removal of the effused fluid being effected by nature, aided by appropriate remedies. When the fluid is purulent Dr. Williams recommends the injection of warm water with the view of displacing it; but instead of doing this with a single tube, it should be done through a double-tubed canula, the tube for injection being cautiously carried two or three inches into the chest, whilst the evacuating tube is merely long enough to pass through the walls. If warm distilled water be then thrown in by a syringe through the longer tube, it will drive the matter off through the shorter tube, and in this way the morbid secretion will be displaced by water, which is much more likely to be absorbed. If, after repeated evacuations there be no apparent disposition to the expansion of the lung or contraction of the chest, and matter continues to be secreted, the writer now quoted advises a recourse to medicated injections, "such as a very weak solution of nitrate of silver, or chloride of soda." I have no experience of medicated injections in these circumstances; but I see no reason against a cautious recourse to them. The pleural sac may be treated, in these cases, as an abscess; and, if the discharge be unhealthy, we should endeavour to correct it, and to promote the healing of the diseased surface by such means as are found beneficial in analogous circumstances. When the discharge is fœtid, it may be washed out, in the way just advised, by antiseptic injections, especially by chlorinated solutions, or fluids containing creasote. "The same practice may be advantageously pursued when the matter has pointed, and opened spontaneously, leaving a fistula which may remain open for months or even years. Dr. Townsend mentions the remarkable case of Dr. Wandelstadt, who had been tapped thirteen years before, since which time the wound had remained open

and discharged daily from half a drachm to four ounces. The diseased side was much contracted and did not move on breathing, yet he could blow the flute, walk fast, and actively perform his professional duties."

186. I believe that the Hippocratic method of evacuating the fluid at successive times, preventing the access of air, and closing the orifice in the intervals, is the best, because it gives the lungs time to expand, and prevents those changes in the inflamed membranes, and in the products of inflammation still retained in the pleura, that the admission of air would certainly produce. The practice of leaving the orifice open, and especially of leaving a canula in it, is attended by this mischief, namely, that the free access of air to the cavity either rekindles the inflammation of the pleura, of which the effusion had in great measure caused the resolution, or changes the character of the inflammation still remaining from an adhesive to a suppurating form, and ultimately even decomposes the matter which is formed. I have generally observed, when the access of air was allowed, that the fœtor of the discharge was most manifest in two or three days, and that all the constitutional and even the local symptoms were aggravated.

187. Several recent writers, who have advocated the propriety of operating in the circumstances already stated, have not sufficiently recognised the importance of excluding the air; and have considered that, because it has been shown by the experiments of Nysten and others, that air introduced into the cavity of the healthy pleura is removed in a short time by absorption without manifest detriment, no injury need be expected from its admission after this operation. But circumstances are different as regards these experiments and the operation for this disease; besides, what has been inferred from *à priori* reasoning and from analogy, has been proved by the experience of several candid observers, namely, that, although air may not affect a serous surface, when only temporarily brought in contact with this surface, it will certainly influence it, if allowed free communication with it; that, when this surface is inflamed already, the admission of air aggravates, and changes to an unfavourable form that inflammation; and that the air acts also injuriously upon the products of inflammation — both the consistent and fluid, changes their characters, decomposes them, and renders them more contaminating to the surrounding tissues. To prevent the injurious influence of air, it has been recommended to perform the operation under water, and whilst the patient is immersed in a warm bath. In certain circumstances, and more especially in the more prolonged cases, this expedient deserves attention and even adoption.

188. Some writers have advised fluid injections into the pleural cavity, with the view of expelling both the diseased effusion and the air which may have been introduced; and it is not improbable, that pure or distilled water, of the proper temperature, thus introduced, the orifice being accurately closed afterwards, may have a beneficial effect, and be absorbed, although the morbid fluid was not absorbed, owing to its nature. If this measure were adopted, it should be employed in such a manner as to wash out the morbid matter as entirely as possible; and the fluid allowed to remain should not be so much might prevent the lung from expanding, if it sti possessed this power. Of the success of medicate injections in these cases, the evidence is not su ficiently conclusive. Dr. Williams states, that S P. Crampton used with success an injection of weak solution of chloride of lime; but all stimu lating injection must necessarily increase or per petuate the inflammatory action in the surface and thereby prove an obstacle to the expansio of the lung, and to the attainment of the en proposed by the injection, namely, the arrest the effusion and the adhesion of the opposit surfaces. In some instances, however, the in jurious effect may not result, whilst the benefici effects may follow; and, therefore, such injection may be cautiously resorted to after other mean have failed, and in the circumstances hereafter t be noticed (§ 189.). In this state of the disease and on occasions which the experienced phy sician will duly appreciate, he will agree wit Celsus in considering that the "Anceps remedium melius est quam nullum."

189. In order to obtain the re-expansion of th lung, so much to be desired after the operatio for empyema, and at the same time to increas the discharge of the accumulated fluid, it ha been advised by Laennec and others to apply cupping-glass with an exhausting syringe ove the puncture. Some advantage might accru from this expedient, if carefully performed; bu it is not unattended by risk, both from injuring the lung by forcibly expanding it, and fro allowing air to rush in through the opening, upo removing the exhausting apparatus. If thes dangers could be sufficiently guarded against the expedient might prove of service. The latte might be prevented, and the former could hardly be considered so great as to prevent a cautious recourse to it.

190. *D.* The Complications of Pleurisy necessarily involve the same principles of treatment as have been above developed. — (*a*) The most frequent complication, namely, that with *pneumonia*, forming *pleuro-pneumonia* (§§ 93. 148. *et seq.*), requires very nearly the same treatment as I have recommended for either of the diseases when occurring simply, due regard being paid to the existing diathesis or states of vascular reaction and vital resistance. In this complication, however, and more especially when the sthenic character is manifest, the preparations of *antimony*, especially tartar emetic, are more frequently beneficial, than in uncomplicated pleurisy; but they should be exhibited after bloodletting, and in the manner advised for pneumonia (see Lungs — Inflammation of, § 96.), or in conjunction with calomel and opium as above prescribed (§§ 167. 169.); the other internal and external means advised for these maladies being employed as the circumstances of the case will suggest.

191. (*b.*) When pleurisy complicates *eruptive* or *continued fevers* (§ 94.), then the Treatment must necessarily depend upon — 1st, the character or state of the fever, — 2d, The period of the fever at which it occurs; and 3d, The states of vital energy and vascular action characterising it. In these complications, the *asthenic* diathesis should generally be suspected unless the character of the prevailing epidemic constitution and of the existing symptoms indicate the contrary, and the

lan of cure suggested above for the asthenic or achectic forms of pleurisy (§§ 47. *et seq.*) ought herefore to be entertained with such modification s the features of individual cases may require. It ery frequently happens, that the local disease is ither not detected in these circumstances, or proeeds so insidiously and latently as to elude even lose observation, until it has advanced far, or iven rise to considerable effusion, and can admit nly of the curative means which have been aleady recommended for the latent, the advanced, r the chronic states of the malady as the case may e (§ 173. *et seq.*). In these complications I have een great advantage derived from the terebinhinated epithems or embrocations, and the other xternal remedies mentioned above (§§ 171. 175.).

192. (*c.*) The partial, adhesive and chronic tates of pleurisy which so generally complicate he advanced stages of *tubercular consumption* § 95.), fall more legitimately under the treatment f that malady; but I may here remark, that the leurisy which thus supervenes is not always atended by tubercular deposits, either upon the leura or in the false membrane; although it is ometimes thus accompanied, more especially in he scrofulous diathesis, and in persons who have een exposed to depressing agents, as anxiety of ind, insufficient nourishment and clothing, and eprivation of air, exercise, and sunshine. In hese circumstances also pericarditis may further omplicate the malady and present a tubercular haracter (§ 96.). In both these forms of comlication, the friction sound is often heard on ausultation, and then the nature of the mischief may e inferred with tolerable certainty, especially in he circumstances just stated. The treatment annot be expected to be satisfactory in these ases, some of which are attended by either more r less anæmia or cachexia; but life may be proonged for a very considerable period, even if it ay not be saved, by a judicious recourse to chabeate preparations, more especially to the iodide f iron with sarza, alternating this course with ery minute doses of the bichloride of mercury rescribed in tonic decoctions or tinctures, &c.

193. (*d.*) In the complication of pleurisy with *epatitis* (§ 98.), and in that with *peritonitis* (§§ 99, 00.), the associated malady usually presents an cute character, which may pass into the chronic rm if not promptly and actively treated. In ese complicated states of disease, the means hich are most serviceable are not materially ifferent from those advised for the acute form of ither of these uncomplicated diseases. It is enerally of great importance to bring the system nder the influence of mercury before effusion kes place or proceeds far, — and this may be one by either the internal or the external use of e mineral, or by both modes, according to cirumstances. In a case of remarkable urgency, which I was recently called, a large blister as applied somewhat below the seat of suffering, fter bloodletting was carried as far as appeared rudent; free vesication was promoted by warm oultices; and, after the cuticle was removed, e mild mercurial ointment was applied, and overed by a warm bread-and-water poultice. he most beneficial results were soon afterwards bserved, and the patient rapidly recovered. In ese complications, the terebinthinate epithems nd embrocation, advised above (§ 171.), are often of great service, when judiciously employed and aided by the additional means which the state of the case will suggest.

194. In some of the complications of pleurisy just noticed, *paracentesis thoracis* can furnish only temporary relief; in others it may be most beneficial, whilst in a few it cannot be attempted with any sufficient prospect of advantage. It is not merely the complication which ought to be considered, but also every circumstance connected with the case, and more especially those connected with the primary malady, of which the pleuritic attack is the consequence. When this operation appears at all admissible, in any of these associations, it should be resorted to as early as possible; for the several lesions mentioned above (§ 101.) may soon be caused by the pressure of the effused fluid, and further complicate a disease which an operation promptly performed might have removed.

195. *E.* IN THE DARK RACES (§ 102.), pleurisy should be treated as I have advised for the asthenic and complicated forms already considered. Whether it assumes an *acute* or a *chronic* character in these races, I have always seen it more or less latent, complicated, and consecutive, more especially of tubercles of the lungs, — tubercles having been found also on the surface of, or below the pleura, or in the false membranes after death (§ 102.). When the effusion is great, paracentesis should be early employed. The few cases of this disease, which I have seen in these races, have not been so much benefited by treatment as the natives of cold or temperate climates: but this was partly attributed to the unfavourable circumstances in which they were placed, and to the influence of a temperature and climate different from that to which they are suited by their organisation.

196. *F.* PLEURISY IN INFANTS AND CHILDREN (§ 103.), requires the same measures as I have advised for adults, due reference being had to age and to the susceptibility of the influence of certain remedies connected with infancy. In this class of subjects, pleurisy is most frequently consecutive and complicated, and the treatment should be prescribed accordingly. For very young children especially, some remedies which are most beneficial for adults with this disease should either not be employed at all, or with great caution. The chief of these are opium and other narcotics, tartar emetic, and blisters; but calomel may be given freely without risk, with small doses of James's Powder, vascular depletions being promptly employed, and to an extent which the circumstances of the case will warrant. The terebinthinate epithem or embrocation will prove of great service, and will be attended by no risk, unless the utmost neglect be evinced. If the application of a blister be considered advisable, with the view of obtaining a discharge from the external parietes of the chest, it should not be continued longer than three or four hours, or until slight redness of the surface is caused by it, when a warm bread-and-water poultice should be applied, which will usually produce vesication without subsequent risk, if due attention be paid to the case.

197. In the acute stage of the malady, the treatment now advised, aided by diaphoretics and diuretics, should mainly be trusted to; but, as the chronic stage advances, and particularly as effu-

sion increases, the iodide of potassium may be prescribed, with liquor potassæ and some preparation of sarza, or with the addition also of a diuretic; the terebinthinate liniment, or a liniment containing the iodine of lead, or iodine of potassium, being occasionally applied to the side, or the emplastrum ammoniaci cum hydrargyro, or equal parts of this plaster and of the emplastrum picis comp. If the patient evince a marked debility, or cachexia, anæmia, or constitutional vice in the chronic stage, the iodide of iron should be given in the syrup of sarza, and change of air, especially to the sea-side, be recommended; the external applications just mentioned, or the frequent sponging of the surface with warm salt-water, or with a tolerably strong solution of bay-salt in warm water, or the use of these alternately, being also resorted to. If effusion be considerable, especially if the patient live in a large town, change of air to the country, aided by suitable alterative and diuretic medicine, will generally remove the disease, unless it have become complicated, or the vital powers be very depressed, and the constitution cachectic.

198. Treatment, judiciously directed, is generally much more efficacious in this class of patients, than in persons advanced in age, or even in adults; and the more serious consequences of the disease, as empyema, with or without fistulous opening, should not be considered hopeless, unless complicated disorganisation exists. Whenever the effusion appears to be puriform, no delay in resorting to paracentesis thoracis should take place in children, more than in adults; and in the former especially, it is hardly ever too late to perform this operation, particularly when the effusion is of this kind.

199. iii. DIET AND REGIMEN.—It is almost unnecessary to add anything on this topic, as it must be evident, that both the diet and the regimen should be strictly antiphlogistic, during the acute stage, more especially when the disease presents a sthenic character. As effusion advances, or becomes chronic, and especially if vital resistance be weak, it will often be necessary to support the powers of life with such means as will the least excite vascular action or accelerate respiration, and at the same time tend to increase the natural secretions and excretions. This becomes the more requisite in the scrofulous diathesis, or when the effusion is puriform, and attempts to discharge and prevent the return of the effusion are being made. But there is no aid to a judicious treatment that deserves more general adoption, than change of climate, especially to the sea-side, to a mild air, and to a dry situation. A person who is recovering from pleurisy should guard, both during convalescence and for a long time afterwards, against currents of cold air; against wet, cold, or damp feet; and against errors in diet; and he ought more especially to avoid standing upon cold stones, or floor-cloth, or in damp places. His shoes ought also to be changed after walking, immediately upon returning home.

200. XII. STRUCTURAL CHANGES OF THE PLEURA NOT NECESSARILY ARISING FROM INFLAMMATION.

CLASSIF. — IV. CLASS. — II. ORDER. (*Author in Preface.*)

1. DEFIN. — *Lesions of the pleura not necessarily depending upon, although frequently associated with, inflammatory action, but often arising fro diathesis, or constitutional vice or contaminatio and seldom attended by distinct signs, althoug their presence sometimes may be inferred from tl history of the case, and from various local and g neral symptoms.*

201. i. DESCRIPTION.—I have so fully describe those lesions of the pleura resulting from inflan mation (§§ 112. *et seq.*), that I cannot further ac vert to them than to briefly notice some of the associations with those alterations about to be co sidered. Certain lesions which I shall point o doubtless originate, in most cases, if not in al in inflammatory action; but they subsequentl undergo changes, which may be referred to morbi nutrition, this nutrition giving rise, either *to a tran formation of the tissue to one of a different natu — to the transition of this tissue to another differe from it, but not foreign to the œconomy, or to tl production of a structure altogether adventitious the healthy frame.* It is thus that we perceive, a consequence of pleuritis, and owing to the stat and grades of action, and to the conditions of tl constitution, cartilaginous or ossific deposits transformations of the pleura, in some cases; an in the course of this disease, owing to constitution vice, tubercular deposits either beneath the pleur or in the albuminous or fibrinous deposits, or fal membranes on the free surface of this membran The former lesions most probably originate in i flammatory action, or irritation, the morbid nutr tion proceeding as this action subsides; but th latter lesion is either co-ëtaneous with the inflan mation, or excites it, or is a consequence of it, i the scrofulous or tubercular diathesis. The lesio more immediately as well as remotely conseque upon inflammation of the pleura have been d scribed above (§§ 112. *et seq.*), with the exception *gangrene, ulceration,* and *perforation* of this mem brane, of which I proceed to take further notice.

202. *A. Gangrene of the pleura* occurs onl on very rare occasions, and chiefly as a con sequence of either gangrene of the subjacent lung or abscess of this organ, or external to the cost pleura. A sphacelated state of the pleura ma also occur in an advanced stage of chronic pleu risy or empyema in the form of gangrenous ulcer as remarked by LAENNEC, BARON, and CHOMEL but this is very rare. Gangrene of the pleura i generally limited to a small space, and presen the appearances of irregular patches of a brownis green, livid or very dark hue, that softens, ulcerate and passes into a dark-greyish, dirty and irregula surface, exhaling a fœtid odour. Around thes patches, indications of inflammatory action, wit certain of the more usual consequences of thi action, are generally observed.

203. *B. Ulceration and perforation of the pleur* are not infrequently met with, and are noticed, es pecially as regards their chief consequences, unde the head of chronic pleurisy, and in the Articl PNEUMATHORAX. They may take place under variety of circumstances, especially when the commence, as more frequently is the case, in th attacked surface of the pleura, perforation pro ceeding from this surface inwards. In cases c abscess, or of tubercular softening and ulceration or of gangrene of a superficial portion of the lung softening and ulceration of the pleura covering thi portion thus supervene, and sometimes go on t perforation. Hæmorrhage from injury or diseas

of a blood-vessel, or pulmonary apoplexy, may cause rupture of the pleura, at the nearest point to the seat of effusion. Either ulceration or perforation, or rupture of the pleura, may likewise be caused by abscess seated in some place external to this membrane, as an abscess of the lungs, liver, &c.; or by hydatids, cysts, tumours, aneurisms, and njuries of any adjoining structure or part. In all hese circumstances, the perforation commences in he attacked surface, and advances into the pleural cavity; but it may proceed from within outwards: but this is very rarely the case unless in general or partial empyema, when the matter is evacuated either through the lungs or at some part of the thoracic parietes, as already described (§§ 87—92.).

204. *C. Effusions into the cavity of the pleura.*— Those which depend chiefly on inflammatory acion have been described above (§§ 115. *et seq.*), nd have been shown to consist of serous, serolbuminous, albuminous, or plastic products, which nay undergo various changes, of puriform matter, nd more rarely of a sanguineous, or sero-sanguieous fluid. Those which take place independntly of inflammation are simple serous or watery ffusive hæmorrhages, and the passage, owing generally to perforation or rupture of the pleura, of aseous fluids, or of purulent, gangrenous, tuberulous, or cancerous matters into the cavity.

205. (*a.*) *Watery effusions*, or *passive serous effuions*, require no further notice than they have lready received, when treating of *dropsy* of the leural cavity, they being usually independent of isease of the pleura itself (see *Art.* Dropsy, §§ 58. *et seq.*).

206. (*b.*) *Hæmorrhagic effusions* into this cavity, r *Hæmathorax*, may proceed from a hæmorrhagic orm of inflammatory action implicating this memrane, characterised by deficient vital powers, and morbid state of the blood itself; or from loss of one of this surface and of the capillaries ramified o it; or from this state conjoined with an hæmorhagic tendency, or from rupture of an aneurism, r injury or disease of some vessel adjoining or nvolving the pleura. In the former states the ffusion, whether altogether sanguineous, which is ery rarely the case, or sanguineo-serous, is an xudation from a greater or less extent of the leural surface; this surface being more or less oncerned in causing the effusion. In the latter, his surface is generally healthy, the blood-vessels ubjacent or adjoining it being principally affected. When blood is effused into the cavity of the pleura, nflammation is usually thereby produced; and enerally with a rapidity according to the quantity nd purity of the blood effused, the resulting pheomena varying with the condition of the patient, nd circumstances in which he is placed.

207. (*c.*) The effusion of *gaseous fluids* into the avity of the pleura is considered in the Article Pneumathorax, and of *purulent collections* I ave already treated. *Tubercular* and *cancerous roductions* often form within the pleura; but they lso appear external to it, as well as involve its tructure, as will be shown in the sequel. The assage of gangrenous, carious, ichorous, or other norbid products, from disorganisation of an adjoinng part, into the cavity of the pleura, may likewise ccur in the manner already stated; but, when this akes place, inflammation is thereby rapidly exerted hroughout the serous surface. Simple *cysts* and *ydatids* are rarely or never formed within the pleural cavity, and are rarely developed externally to it, or, at least, in such situations as allow them to find their way into this cavity.

208. *D. Cartilaginous and osseous formations*, or transformations of the pleura are not very rarely met with. In some instances, these changes appear to exist immediately under or external to the pleura, or on its attacked surface, the membrane retaining its natural structure and polished surface. In others they seem more entirely to involve the pleura, as if arising from thickening and induration of this tissue, and advancing through the fibro-cartilaginous state to osseous transformation; and in some cases they are confined entirely, or in part, to the false membranes or adhesions formed on or between the pleural surfaces. They evidently result, as noticed above (§ 201.), from a state of chronic inflammation or irritation that has passed into morbid nutrition, the fibro-cartilaginous condition being intermediate between simple thickening with induration and ossification. They have been found of various grades of thickness, from a line or two to an inch; and seated in or upon either the costal, the diaphragmatic, or the pulmonary pleura; and in some cases in the false membranes existing between and connecting these. In some instances, the transformation is neither altogether cartilaginous nor entirely osseous, bony matter, in lamellæ, or in irregular forms, and in detached patches, existing between the layers of cartilage, or otherwise irregularly deposited.

209. These productions are found either in the form of smooth plates or lamellæ, or in that of irregular nodules, or they present a rough surface, with irregular accuminations or points. They are never met with to any considerable extent in connection with the pulmonary pleura, without the subjacent lung being more or less consolidated. In rare instances, they have assumed a rounded, oval, or globular form, either with bases of varying sizes, or with narrow and short peduncles; their surfaces being smooth and shining as if still covered by the pleura. These nodules may be single, or several may exist in the same case; their magnitude varying from that of a pea to that of a large cherry.

210. *E. Fatty appendages* have been found attached to the free surface of the pleura; but very rarely, at least entirely unconnected with adhesions between the opposite surfaces. I have met with these appendages in several cases, but in all they appear to have been developed by the formation of fat underneath a portion of false membrane, and between it and the pleura; the false membrane having been of old date. In some cases, old adhesions, having a polished serous surface, and a thick or rounded form, have consisted, excepting their surfaces, entirely of fat.

211. *F. Tubercles* may be formed, either on the attached surfaces of the pleura in the sub-serous cellular tissue, or in the pleural cavity. In the former situation they chiefly consist of numerous small granulations under the pulmonary pleura, and sometimes they form more considerable masses developed beneath the costal pleura, and causing elevations of the pleural surface. Tubercles are never found within the pleural cavity, unless in connection with false membranes or adhesions, and infiltrating or studding these, as described above (§ 120.), thus constituting the *tubercular form of pleurisy*. But they may exist in both

situations in the same case, as well as in the lungs and adjoining membranes, as the pericardium, peritoneum, &c. Tubercles may be formed underneath, or upon, the attached surface of the pleura, as just described, and may advance even further in their development without any evidence of inflammatory action in their seats or vicinity. But the circumstance of their constant co-existence with certain of the products of inflammation, when they are found within the pleural cavity, or upon the free or internal surface of the pleura, suggests the question, whether they are the *cause* or the *result* of inflammation in the tubercular diathesis? That they are merely one of the products of inflammation in this diathesis, are exuded, in a rudimental state, with the lymph produced by the inflammation, and are further developed as the organisation and other changes of that lymph advance, are circumstances rendered probable by their constant co-existence with these products; whilst the opposite doctrine, that they are the causes of the inflammation, and of the consequent exudation of lymph in which they are enveloped, necessarily allows that they are first thrown out or formed upon the free serous surface, where they excite the irritation and inflammation, with its consequences found in connection with them. Now if they are thus formed on the free serous surface, before inflammation is developed, it is reasonable to infer that they should be found, in some instances, before this effect is produced, or produced to an extent rendering the cause doubtful; but this has hitherto not been remarked (see § 120.).

212. G. *The several forms of malignant* or *cancerous degenerations* have been observed involving the pleura, but generally consecutively — never primarily. These lesions, whether schirrous, carcinomatous, encephaloid, or fungo-hæmatoid, when they implicate the pleura are consequent upon their existence in some other part of the œconomy, most frequently in the mamma, in the axillary glands, or in some other situation in the vicinity. They first extend to the subjacent cellular tissue, causing an irregular thickening and induration, with their characteristic forms of degeneration of this tissue, and an irregularity or unevenness of the serous surface, which ultimately becomes variously changed in colour and consistence according to the form and progress of the malady, until it altogether loses its natural hue, and is altogether involved in the malignant structure. At this advanced stage the surface and cavity of the pleura generally present more or less of a turbid, dirty, ichorous, or sero-sanguineous fluid, which is sometimes also offensive, or of a peculiar odour.

213. ii. Symptoms and Signs of Structural Change of the Pleura. The *symptoms* and *signs* of these changes are mostly the same as have been described above as indicating the progress and advanced stages of inflammation of this membrane. Those changes, which are essentially the result of inflammation, most necessarily present these symptoms and signs, which, in connection with the history of the case, usually show the nature, if not always the exact extent, of the disease. But those lesions which consist of adventitious formations, as regards either the situation or the œconomy, frequently advance without any distinct symptom or sign from which their existence may be inferred.

214. (*a.*) *Gangrene of the pleura* (§ 202.) bein met with chiefly as a consequence of gangrene of portion of the lung, is preceded by the indications of this occurrence. When the symptoms gangrene of the lungs (see Lungs, §§ 173—175. are followed by an acute pain in the side, painfu cough and inspiration, extreme anxiety and depression, followed generally by all the usual symptoms of the utmost vital exhaustion, then thi lesion may be inferred. The physical signs ma consist merely of dulness in percussion, of greater o less extent, with absence of the respiratory sound

215. (*b.*) *Ulceration of the pleura* (§ 203. is announced only when it has terminated in *perforation*. If the ulceration has proceeded from th attached surface into the cavity of the pleura, th passage of the matters, whether gangrenous, puriform, tuberculous, aëriform, &c. the patient ver suddenly experiences acute pain in the side, wit oppression, dyspnœa, and anxiety; and if ai passes rapidly into the pleural cavity, these latte symptoms are not only sudden but also extreme and are attended by the physical signs of *pneumathorax*. When ulceration, followed by perforatio takes an opposite course, proceeding from the internal cavity externally, as stated above (§ 203.) then the symptoms already described (§§ 87. seq.) as attending *empyema*, when terminating this way, are usually observed.

216. (*c*) *Acute or inflammatory effusions into th pleural cavity* have been already fully notice (§§ 204—207.) as respects the symptoms and sign they produce, and passive effusions into this cavit have been elsewhere treated of (see Art. Dropsy §§ 158. *et seq.*). Effusion of blood into thi cavity, *hæmathorax*, unless when it occurs fro rupture of an aneurism, or from external injury is a rare occurrence, as shown when treating hæmorrhage into the pleural cavity (see Art. Hæmorrhage, § 277.). As a pure exudation in thi situation, it is very rarely met with, although th exhalation of a greater or less proportion of red particles with the serum of the blood, in some extrem cases of asthenic acute pleurisy, or of cachecti pleurisy, is not very infrequent, and constitutes th *hæmorrhagic pleurisy* of Laennec. *Hæmathora* — or the effusion of blood into the pleural cavity analogous to the hæmorrhages, active or passive, other organs or surfaces — is so rare, that the phenomena attending, or consequent upon it have no been satisfactorily observed, and they are henc imperfectly described. But, whether the bloo poured out in this situation be a primary lesion or consecutive of some other, or of local injury, cannot view it, with M. Laennec, as an occurrence devoid of importance as regards its effect upon the pleural cavity; or believe that the bloo effused in this situation will be absorbed withou producing inflammation in this cavity. My experience has proved that, although absorption doe take place, inflammatory action, varying in character and intensity with the circumstances of th patient, is the most frequent result, as I hav already shown (§ 206.). It must be admitted that effusion of blood into the pleura will produc similar *symptoms* to those resulting from other effusions to the same amount. But it will be generally observed, that indications — either local constitutional, or both — of inflammatory action the pleura will sooner or later supervene; an that the products of this inflammation, mingle

with altered and nearly absorbed blood, in the pleural cavity, will give rise to peculiar appearances, on examination after death, more distinctive of the immediately antecedent inflammation, than of the hæmorrhage which developed the inflammation. I have nothing to add at this place to what I have stated above respecting the symptoms and signs of purulent or of other effusion into the pleura (§§ 63. *et seq.*), and have advanced in the Art. PNEUMATHORAX, when noticing the combination of aëriform and fluid effusions into this cavity.

217. (*d.*) *Cartilaginous* and *ossific formations* in he pleura are not indicated by symptoms or signs uring life. They are merely contingent changes, ccurring after chronic pleurisy, and are met with hiefly in persons who have lived for a considerale time after such attacks, with more or less isorder of the respiratory functions, and probably with dulness on percussion, or with imperfect or bsent respiratory murmur; and although their xistence may possibly be in some instances suspected during life, they are unattended by any peculiar symptom or indication.

218. (*e.*) *Tubercles* formed immediately beneath he pleura, occasioning small or irregular elevaons of the membrane (§ 211.), without much fusion, are generally attended by a rubbing sound uring respiration; but if effusion exist, or if the ubercles be deposited in false membranes, their resence can be suspected only, and chiefly from he co-existence of the pleuritic lesion with tubercular consumption, or from the occurrence of this sion in the scrofulous diathesis. Tubercular rmations are most frequently found in one side nly, in the same case, but they may exist in both avities; and they may be present in both the eura and in the pericardium. When this latter omplication occurs, without much effusion within e pericardium, there is generally a cardiac rubing sound in connection with a similar sound uring respiration.

219. (*f*) *Cancerous or malignant alterations* in e pleura may be inferred from the gradual, nearly tent, and chronic or sub-acute form, in which e pleuritic affection supervenes upon malignant seases of the mamma, or in the vicinity of the orax; and from the presence of symptoms and hysical signs similar to those attending tubercular rmations in this membrane. The rubbing sound nerally continues for a considerable period, and ntil the subsequent effusion becomes copious; d the pleuritic symptoms appear chiefly when the chexia attending the cancerous malady is well arked, and the system manifests more or less of e usually accompanying anæmia.

220. iii. TREATMENT. The treatment of the ganic lesions of the pleura now passed under view should be directed entirely by the circumnces of the case, and by the evidence furnished their individual existence, and of their morbid sociations. — (*a.*) If there be reason to infer e supervention of *gangrene* of this membrane, atment is then very rarely of any further ail than to prolong existence for a few hours, at most a day or two; and this object can attained only by the exhibition of restoratives, ., as camphor, ammonia, quinine, myrrh, amoniacum, &c.; for, although recovery from ngrene of the substance of the lungs may e place by the aid of these or similar means, it is very rarely procured when this lesion has extended to the pleura.

221. (*b.*) As to the treatment of *ulceration* and *perforation* of, and *effusion* into, the pleura, I can add nothing to what I have recommended to be done for the more advanced stages, and more chronic forms of pleurisy (§§ 63. *et seq.*), for which, however, and more especially for the more simple states of effusion, the means there advised, when judiciously administered, will be often very successfully employed, especially when aided by a free use of the acetate of potash, so as to act manifestly both upon the bowels and kidneys; and by the external means above mentioned (§ 175. *et seq.*). If the causes and circumstances of the disease lead to the inference that much *blood* is effused into the pleural cavity, or that this fluid constitutes the larger part of the effusion, I believe that the operation for empyema should not be delayed, otherwise inflammation, if it have not already appeared, will certainly supervene, in a form not readily removed by treatment, inasmuch as the blood, or at least its unabsorbed portion, will remain to perpetuate the disease, and favour the occurrence of consecutive lesions.

222. (*c.*) The treatment of the *other organic lesions* of the pleura promises but few advantages when their presence are even presumed. *Tubercles* are very rarely present in this membrane, without existing in still greater abundance, and often in advanced states, in the lungs or other structures. Hence the treatment requires to be directed in many cases more to these organs than to this special lesion; and, even when the features of the case warrant the direction of remedies principally to this seat of disease, it will be difficult to suggest others more likely to be beneficial than those advised above for chronic pleurisy (§§ 175—179.). The mistura ferri composita, the iodide of potassium, the iodide of iron, the liquor potassæ with tonic infusions and sarsaparilla, or these variously combined, or conjoined with such other substances as the peculiar circumstances of the case will suggest, are most generally appropriate, for these lesions, as well as for the effusions into the pleural cavity, by which these lesions are often attended, especially when aided by suitable means for the promotion of the alimentary and renal evacuations, and by external derivatives.

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PLEURODYNIA—Synon.—*Pleuralgia, Ple*
rodynia (from πλευρά, the side, and ὀδύνη, pain
Pleuritis spuria, pseudo-pleuritis; Neuralgia th
racica, Pleurodyne, Auct. Var.; *Dolor lateri*
Rheumatismus Pectoris, Naumann; *Pleurodyn*
Point de Côte, Fausse Pleurésie, Fr.; *der Seite*
schmerz, der falsche Seitenstich, Germ.

Classif. — I. Class. IV. Order (*Author*

1. Defin. — *Pain in the side usually occurri*
and ceasing suddenly, independently of any physic
sign of inflammation of the pleura, and genera
connected with rheumatic, neuralgic, or hysteric
affection.

2. *Pleurodynia* and pleuralgia are names in
way applicable to the painful affection under co
sideration, inasmuch as there is no evidence
favour of the pleura being at all implicated in
unless it change its nature, or superinduce or p
into pleurisy. If, however, the word πλευρα
viewed, as it was by the ancients, as meaning
side, without reference to any particular part
structure of the side, these terms will appear mu
less objectionable. That this affection is not
ways rheumatism of the chest, as implied in
name given to it by Naumann, is a fact wh
experience will soon teach the inexperienced. N
should it be viewed, as it has been by M. Jo
and others, as inflammation of one or more of
muscles of the thorax. But it is often connec
with rheumatism, either in some other part of
body, or with the rheumatic diathesis; and it m
be converted or pass into inflammation of
pleura, or of the pericardium, owing either to
predisposition and constitution of the patient, o
injudicious treatment. When it thus present
rheumatic character, then it is to be viewed
treated as I have advised in the article Rh
matism, although it is by no means demonstrat
however frequently it has been assumed, that
pain constituting the principal feature of the
order is caused by an affection of the interco
muscles, or of the fibrous fascia lining the che

3. I. Causes.—Persons of a nervous suscepti
or irritable temperament; of the rheumatic
hysterical diathesis; those who are exposed to
mospheric vicissitudes, to currents of cold air,
marshy or humid exhalations, or to cold or we
any way, and those who live in damp, cold,
low houses, or in cellars, &c., are the most lia
to experience those rheumatic and neuralgic af
tions in the side, which have generally recei
the name of pleurodynia. Owing to the gre
exposure of males than females to these cau
the former are most liable to them; and ad
and aged persons are more frequently affec
than children and young persons. But all

auses of inordinate excitement, and of exhaustion r direct depression of the nervous system, both redispose to, and more immediately occasion, ainful affections in either side as well as in other arts of the body. Owing to the prevalence of he above causes, especially those which proceed rom season, climate, and the soil and water of a ocality, pleuralgic affections may be so prevalent s to be *endemic*, but they can rarely be considered s epidemic, or as being so generally prevalent, ven in those localities, as to deserve that character.

4. II. DESCRIPTION.—Pleurodynia varies much character with the causes which produce it, nd according as it occurs in a *rheumatic, neuralic*, or *hysterical* diathesis, or presents either of hese forms. — (*a*) In the first of these forms, it ay be either acute or chronic; in the former, it sudden, severe, lancinating, increased upon ressure, even upon the slightest pressure or conaction of the affected muscles. It often ceases suddenly as it appeared, the pain shifting, or aving shifted, to some other part. This more cute state of the affection is frequently attended y more or less fever, and the other phenomena acute rheumatism. The chronic state is genelly prolonged for many days — sometimes subding altogether for a time, and then suddenly curring either in the same place, or in the cinity. It occasionally ceases during the day d recurs at night; or it disappears when warm bed, to return at some period of the day. The in is exacerbated during respiration; but this ay take place either during inspiration or expiran only or chiefly, according as the muscles and rves supplying be inspiratory or expiratory. ughing, sneezing, and all movements which aft the muscles, occasion a sharp or cutting pain the part.

5. (*b*.) The *hysterical* and *neuralgic forms of urodynia* are more manifestly seated in the tient nerves than the rheumatic, and are rered chiefly to some part between the sternum d spine. They are often connected with irritan about the origin of the dorsal nerves, or in the glionated roots of these nerves; this irritation, ether functional or inflammatory, being either ted there, or reflected thence from the renal or ual ganglia, or nerves, or from the uterus and aria. These forms of pleurodynia are much re frequent in adult females than in males; in nervous and irritable temperament; in persons o are subjects of anæmia, or who are liable to gular determinations or distributions of blood; l in those especially about the period of the caenia, and when this discharge is irregular, diflt, scanty, or interrupted. (See Art. HYSTERIA, 78. *et seq.*, and NEURALGIA, §§ 89. *et seq.*)

(*c*.) Occasionally cases occur in which the n cannot be referred either to rheumatism or to neuralgic or hysterical condition; but rather *isorder* of some one of the *digestive viscera* — either the stomach, the duodenum, the colon, the liver. In these cases *flatulence* is a very minent symptom, the pleurodynia being enly sympathetic of the distension or irritation sed by the flatus contained in one or more of e viscera. But, in addition to this symptom, er indications of disorder of the digestive organs usually present, especially a loaded tongue, edges being red or flabby; an irregular and lent state of the bowels, and an unhealthy condition of the secretions and excretions. These symptoms are, however, often present in the other forms of pleurodynia, but they exist in this generally in a very prominent manner, and without any evidence of rheumatism, or of hysteria having been previously complained of.

7. III. The DIAGNOSIS of pleurodynia rests upon —1st, the phenomena immediately connected with the painful affection; and 2d, the absence of the symptoms and physical signs of pleuritic, pericardiac and pulmonary disease. If pleurodynia occur in connexion with rheumatism or in the rheumatic diathesis, or if the patient be subject to any form of hysterical affection, or furnish any indication of spinal irritation, or be liable to disorder of the catamenial discharge, then it may be suspected that the pain is independent of inflammation of the pleura or lungs; but the suspicion can be confirmed only by a careful examination of the chest by percussion and auscultation, and by the absence of the physical signs attending inflammatory or structural diseases of the thoracic viscera. The negative evidence thus furnished, the absence of many of the rational symptoms of these diseases, the manifest nervous or rheumatic or dyspeptic character of the affection, and the several causes or circumstances which appear to have produced it, will generally guide the careful observer to a correct conclusion as to its nature and morbid relations.

8. IV. The TREATMENT should depend upon the conclusion thus arrived at. If the affection be manifestly rheumatic, the treatment advised for RHEUMATISM is required; and if the patient be young, robust, plethoric, &c., a moderate bleeding from the arm, or the application of leeches to the side, may precede other remedies. When the pain seems to depend upon disorder of the digestive organs, or upon biliary or other colluvies, then a suitable but smart emetic, followed, after an interval, by chologogue aperients, by a warm bath, and by diaphoretics, will generally remove it. As this affection is merely the manifestation of a disorder seated more internally or deeply, the suppression of it by external applications should be avoided, until the primary affection is removed by a treatment directed to it entirely or chiefly; and when all disordered secretions and excretions are removed, and when the functions and tone of the digestive organs are restored, then whatever of painful affection may remain may be treated by rubefacient and anodyne embrocations or applications, by tonics, and the other means advised for NEURALGIA. The treatment should in every respect be directed conformably with the morbid relations which the case may present. The very general connexion existing, in females, between this affection and disorder of the catamenia requires that treatment should be more especially directed to the removal of that disorder. In this form of the affection, as well as in every other, the intentions and means of cure should have for their objects the precise origin of this and of its associated evils, and the removal of the source of them just adverted to, for as long as it exists the symptomatic effects will recur again and again, or whenever circumstances favour their evolution.

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PNEUMATHORAX. — Synon. — *Pneumothorax*, Itard; — *Pneumathorax* (from Πνεῦμα, air, and ϑώραξ, the chest); — *Pneumatothorax*; — *die Luftbrust*, Germ.; — *Pneumothorax*, Fr.
Classif. — IV. Class. II. Order (*See Preface*).

1. Defin. — *The presence of air in the pleural cavity, occasioning collapse or compression of the lung, extreme dyspnœa and anxiety, and obvious physical phenomena.*

2. I. Pathology of. — Pneumathorax is the consequence of lesions, generally of both the lungs and the pleura, or rather of the lung implicating the pleura, allowing the irruption of air into the pleural cavity, and thereby suddenly occasioning severe circumscribed pain in one side, great anxiety and extreme dyspnœa. It may occur at any period of the course of phthisis; and, as in one case in my practice, it may even take place before the patient has complained, or had recourse to medical aid. This dangerous and generally fatal result of pulmonary tubercles has attracted attention only in modern times. It is usually developed as follows: —

3. (*a.*) A tubercular cavity may extend to the pleura, inflame, and ultimately perforate, this membrane, before adhesions have formed between the opposite surfaces, and thus the air will pass into the cavity of the pleura. This is the most common way in which pneumathorax occurs. — (*b.*) One or more tubercles may form so close to the pleura as to perforate this membrane, and open into a minute bronchus, in the course of softening, even at an early period of the pulmonary disease, and without having produced a limited inflammation of the pleura, or adhesion of the opposite surfaces, at least in a sufficient degree to prevent the passage of air into the cavity of the pleura. This, however, does not occur so frequently as the former; yet I have met with two cases. — (*c.*) In the course of partial pleurisy, the absorption of the contained fluid may leave a void, which is not occupied either by a contraction of the parietes of the chest nor by the lung, which continues either condensed, or bound down by adhesions or false membranes. This vacuum, which may be either very small or more considerable, contains air secreted by the surfaces, by which the fluid was absorbed. Dr. Williams mentions two cases of this kind; but this is a rare form of pneumathorax. — (*d.*) It has been supposed that the products of pleurisy may undergo such changes as will develope a gaseous fluid, especially in the more cachectic states of the disease, and at an advanced period, or shortly before death. Without denying the possibility of this occurrence before death, it may be admitted to take place, in some instances, soon after death. There is not, however, sufficient evidence of this change in the effused fluids in pleurisy having supervened during life to allow of its being ranked as a variety of pneumathorax. — (*e.*) Air may also be present in the cavity of the pleura, owing to a fistulous opening through the parietes of the chest, or in consequence of a fistulous communication between this cavity and the bronchi on the one hand, and the external surface on the other.

4. The intimate adhesions which usually form between the pleura covering the tuberculated portion of lung and the costal pleura obviate the occurrence of pneumathorax; yet when these adhesions either do not take place, or when they are either incomplete or not intimate, and the softene
tubercles or the extending ulceration perforate
the pleura, then the air passes into the cavity
distends it, compresses the lung, and gives rise t
the symptoms and physical signs of this organi
mischief. Most frequently the resulting perfora
tions are small, consisting of an oval aperture,
small fissure, three or four lines long, frequentl
in the midst of a soft, dirty, greyish, or yellowis
texture, which is easily torn. There is usuall
only one perforation; but several in the sam
case have sometimes been met with. The pe
foration occurs in about five-sixths of the case
near the angles of the third or fourth ribs; that i
in a place corresponding with that where pain w
felt, and where pleuritic adhesions, when not g
neral, commonly terminate. In other cases it
more or less distant from the apex of the lung
but it very rarely takes place at the apex, owi
to the frequency of adhesions in this situation.

5. Perforation of the pleura, occasioning pne
mathorax, is much more frequent on the left tha
on the right side. This is probably owing to t
somewhat more frequent occurrence, and the mo
advanced progress, of tubercular ulceration
the left than in the right lung. Dr. Reyna
found, in forty cases of perforation, ascertained
post-mortem examination, that this lesion w
twenty-seven times on the left side, and thirte
times on the right; and in ten similar cases, n
demonstrated by examination after death, the le
side was affected in six cases, and the right in fou
Dr. Hasse met with pneumathorax nine tim
on the left and seven times on the right sid
M. Louis observed this lesion seven times on t
left side out of the first eight cases which occurr
to him.

6. The perforation generally depends upon t
progress of ulceration, usually tubercular, ve
rarely gangrenous, through the pleura. In ord
nary circumstances, when ulceration approach
the pleura, inflammation, with the exudation
plastic lymph, supervenes at that part of this mem
brane which is nearest the ulcerated cavity, a
protects that part of it, either by covering it wi
a thick false membrane, or by uniting it to t
opposite surface by this medium. If a firm a
hesion of the surfaces has formed, and the ulcer
tion proceeds, perforation of both the pleura a
the false membrane takes place without bei
followed by pneumathorax; and even the pariet
of the chest may ultimately be perforated, t
adhesions of the pleural surfaces around t
fistulous perforation preventing the air from pas
ing into the cavity of the pleura. But in oth
cases, especially when either vital power and
sistance are weak, or the lymph thrown out is
an unhealthy or unorganizable character, a
hence neither false membranes nor intimate a
hesions are formed, or are not formed in a sta
sufficient to protect the ulcerated surface, t
air passes into the cavity of the pleura, at one
more points, upon sudden efforts, or severe fits
cough. Ulceration may advance until the pleu
is nearly perforated, either without the producti
of a false membrane or of adhesion, or with these
a more or less incomplete state, when a severe fit
coughing, or a forced inspiration, or some effo
or even an external injury, causes the thinned
ulcerated point to give way suddenly, and induc
all the symptoms and signs of pneumathorax.

7. II. SYMPTOMS AND SIGNS. — *A.* SYMPTOMS. — The effects of the perforation are *immediate* and *consecutive.* — (*a.*) The *immediate* *ffect* is to admit air more or less rapidly into he cavity of the pleura, which permits the lung o assume that state of collapse, to which its atural contractile property would reduce it, by qualising the atmospheric pressure within and vithout it. In addition to the introduction of air nd the dyspnœa thus rapidly produced, the sensibility of the part is generally also suddenly and everely excited; and with the extreme dyspnœa nd pain, great anxiety is felt. The connection etween the lesions and the symptoms is remarkably striking. The pain corresponds with the upture of the thinned portion of pleura and the rruption of the tuberculous matter into the pleura, nd is caused by these occurrences; while the reatened suffocation and anxiety are the effects f the rapid passage of air and of some fluid matr into the pleural cavity. Therefore, when acute ain, oppressed breathing, extreme anxiety, and e symptoms of acute pleurisy, display themselves *ddenly* in one side of the chest of a tubercular or hthisical patient, we may suspect the occurrence f perforation of the pleura, and ascertain the prence of pneumathorax by examining the chest.

8. (*b.*) The *consecutive effects* of perforation vary different cases. Although perforation of the leura will not fail to allow air to pass into the vity, yet the size and other conditions of the ening modify the amount of air introduced, and e effects which follow. If the perforation be ry small, or if it be so placed that the walls of e chest close it upon expiration, or if it be below e level of the effused fluid, or if the opening be such a form as to become valvular, and to close e aperture on expiration, air will pass into the vity in accumulating quantity, and occasion an creased compression of the lung; and even sufcation in the course of a few hours, and before any of the consequences observed, in cases of nger duration, can take place. When, however, e termination of the mischief is not so rapid, the esence of air in a cavity neither accustomed to, r organised for it, and of the matters which pass ong with the air from the ulcerated cavity, exe with more or less rapidity great irritation and flammation of the pleura, attended by acute in, dry cough, dyspnœa, spasms of the interstal muscles; quick, weak, or irregular pulse; at of skin, and all the symptoms of acute pleuy, with the physical signs of pneumathorax 11.), and of liquid effusion accompanying the contained in the pleural sac.

9. When the aperture, by which air passes into cavity of the pleura, is large, there is a freent renewal of the air in this cavity; for the lung kept in a state merely of collapse, and not of cible compression; the air passing out of the vity, as well as passing in, to a partial amount. e consequences are, a more copious purulent retion takes place from the pleural surface, and s secretion always becomes more or less fœtid t continue for some time. The foregoing sympns, however, are not of themselves sufficient to w the existence of pneumathorax; for, notwithnding the sudden supervention of acute pain in side, with oppressive dyspnœa and anxiety, l although, in some instances, these symptoms y be instantly felt after a fit of coughing, or upon exertion when the patient has felt as if something had given way in the pained place, still all these phenomena may exist in some acute cases of pleurisy, without any perforation; whilst, on the other hand, perforation and pneumathorax may take place without any very acute or suddenly developed symptoms, although this is seldom observed. The physical signs, therefore, are chiefly to be depended upon for the diagnosis of this lesion.

10. When the quantity of air which is passed into the pleural cavity is great, if there be no adhesions between the opposite surfaces of the pleura, or if these adhesions be inconsiderable or admit of being much stretched, the lung is compressed and forced against or towards the spinal column. At the same time the thoracic parietes on the affected side are distended, the ribs separated, the diaphragm depressed, and the mediastinum pushed to the opposite side. The widening of the intercostal spaces, the rounding and dilatation of the parietes, the much less degree of motion during respiration, and the much greater dimensions of the affected side upon admeasurement, sufficiently indicate the distension of the pleural cavity by the accumulation of a fluid; the nature of the fluid, whether gaseous or liquid, being readily indicated by the physical signs. The viscera are also displaced by the contained air. The heart and mediastinum are pushed to the right side, if the left be the seat of lesion; and towards the left axilla, if the right is so affected and if the air be in great quantity, whilst the liver and stomach are pushed downwards; the upper regions of the abdomen sometimes protruding more or less.

11. *B.* THE PHYSICAL SIGNS are the most important of the *consecutive effects* of pneumathorax, and are generally very distinctive. The air contained in the pleural cavity gives the walls of the chest a greater degree of resonance on percussion than when the structure of the lung is naturally distended with air. According as the quantity of air is great, so is the sound produced by percussion the more hollow or drum-like, owing to the further removal of the collapsed or compressed lung from the parietes of the chest, and to the diminished entrance of air into the lung. Hence pneumathorax may instantly be detected by a remarkable contrast of physical signs, namely, by a very hollow or clear sound on percussion of the affected side, with little or no vesicular sound of respiration, whilst the healthy side gives a duller sound on percussion, but a much more distinct respiratory murmur.

12. Perforation of the pleura, and its consequences, pneumathorax, and the effusion of fluid, give rise to other phenomena which are further *diagnostic* of these lesions. These are the *sounds* which have been termed the *metallic tinkling sound*, the *amphoric sound*, and the *sound of fluctuation.*

13. (*a.*) *Metallic tinkling* has been variously accounted for by several writers, but none of the explanations, and some of them have been sufficiently singular, and others equally laborious, appears satisfactory. This sound is heard most distinctly when the pleura is perforated, when much air is enclosed in the pleural cavity, and when there is also some fluid effused. It seems to proceed from the air passing, during inspiration, through the pleural orifice of the perforation,

which, being partially obstructed by fluid or mucus, occasions a noise similar to that produced by the breaking of a bubble of air contained by an albuminous or other fluid, and the vibrations, being propagated through the inclosed air, give rise to the *clink*, or *metallic sound* or *tinkling* in question. According to this explanation, although perforation of the pleura most commonly causes this sound, it may nevertheless be heard in other circumstances in which air is contained in the pleural cavity, provided that, during respiration, the air in struggling through a fluid forms bubbles, which, breaking on the surface of the fluid, causes a vibration which is propagated throughout the included air. From this it will follow, that whatever occasions such a degree of motion of the parietes of the chest, even *percussion* during the physical examination of this cavity, may occasionally develope this sound, which has so long puzzled many stethoscopists, which has mystified others, and which has concerned some but little who have paraded the stethoscope as a most serviceable instrument of charlatanry and humbug.

14. (*b.*) The *tinkling sound* may thus present several modifications. Where the perforation is protected or obstructed by its position against the walls of the chest or below the level of the fluid, the tinkling may not be heard unless upon coughing or taking a full inspiration, so as to cause bubbles to be formed in the affused fluid. But the smallness of the perforation, provided that air passes through, will not prevent or obscure the sound, as Dr. WILLIAMS has supposed. "When the orifice is large and free, the air will pass in and out in ordinary breathing, and will produce in its vicinity a sound like that of blowing into the mouth of a glass bottle," or the bung-hole of a small cask, and hence this sound has been called *amphoric*. In these cases the diseased lung is merely collapsed, not compressed by the accumulation of air in the cavity as when the perforation is small, and as it is described above (§§ 8—10).

15. The tinkling or metallic sound may be heard only in certain parts of the chest — only where the lung is non-adherent, and where the effused liquid does not reach — only where a cavity is distended by air so as to give the parietes of the cavity a certain degree of tension, and to furnish the condition upon which the sound chiefly depends. In the sitting posture, this sound is heard best about the mamma, and lower part of the axilla and scapula; but in those cases in which the accumulation of air and the distension of the parietes are the greatest, it may be heard in every part of the affected side; whilst in others, where the collection of air is small, it may be heard only at one spot.

16. When there is a liquid effused into the pleural cavity as well as air contained in it, the diagnosis is generally easy. Percussion shows the level to which the liquid rises, according as it varies with the position of the patient. The motions of the liquid, also, especially upon coughing, will also often give evidence of the presence of air in the cavity. Dr. WILLIAMS has stated that, "on change of posture and on coughing, the liquid will sometimes drop from the parts which have just been immersed; and the sound of this will exhibit the metallic ringing in so distinct a manner, that it resembles the note which a glass
or porcelain vessel yields when struck." (p. 132.
I think that Dr. WILLIAMS is mistaken in this
for, however change of position may produce th
sound, whether as I have explained it or othe
wise, I am certain that no dropping takes place,
can possibly take place, in the physical circum
stances of the parts; but that, in all changes of p
sition which can possibly be made, however e
treme or opposite, the fluid will merely run dow
the parietes of the cavity, without dropping in a
part.

17. (*c.*) If the patient be shaken forcibly, or if
give the trunk a jerk, or an abrupt turn or shak
the sound, which was first mentioned by HI
POCRATES as resembling the *splashing* of wate
will be distinctly heard. This sign has been apt
termed *Hippocratic fluctuation*, and is heard wh
the ear is applied to the side at the time of *su*
cussion; the tinkling sound being also heard
accompany or to follow it, as the air bubbl
break on the surface of the fluid or at the pleur
orifice of the perforation. Fluctuation or splas
ing is best heard when there is much air in t
cavity and a moderate or considerable quantity
liquid. Percussion will frequently indicate t
proportions, if carefully performed.

18. III. The PROGNOSIS of pneumathorax
very unfavourable, not so much as regards t
presence of the air in the pleural cavity, as t
lesions of which it is the consequence. Pneumath
rax most frequently, especially when supervening
an advanced stage of tubercular consumption,
pidly hastens a fatal termination; but in more
vourable circumstances, or earlier stages of th
malady, life may be prolonged for some indefin
time after its occurrence; rarely, however, fo
longer period than a few months. Dr. HOUGHT
has recorded a case of a bricklayer, who liv
eighteen months after perforation had taken pla
and who might have lived longer if he had
imprudently exposed himself in his business,
the signs of a cavity had disappeared, the side h
contracted, and his general health had much i
proved. Dr. STOKES has adduced the case o
gentleman, who lived for many months, and w
generally heard a splashing noise in his chest wh
on horseback. CAMBALUSIER and LAENNEC re
to cases which they consider to have recovere
but upon insufficient evidence. Dr. WILLIA
states, that he has seen "two cases leave the h
pital with the impression that they were nea
well, having gained flesh and lost the worst ph
sical symptoms after the first severe consequen
of the perforation had subsided." (p. 133.)
experience leads me to conclude, that, when
tuberculous disease is limited, when perforat
occurs at an early state of that disease, and wh
the constitutional powers of the patient are
much impaired — circumstances in which perfo
tion rarely takes place — then life may be prolon
for a considerable period, if a cure even may
be effected. For it is not impossible for a sup
ficial tubercle, or very small cavity, to perfor
the pleura, and, by such perforation, or the rupt
of the nearly perforated pleura, to allow the
sage of air into the pleural cavity, the compress
of the lung, and the exudation of lymph upon
surface of the perforated membrane, favouring
diminution or obliteration of the cavity, and
occlusion, or even the cicatrisation of the apert
In these circumstances, therefore, it is not unr
sonable to hope for a considerable prolongatio

life, even although complete recovery may not take place. M. LAENNEC has adduced an instance in which the patient lived six years after pneumathorax appeared; and M. CHOMEL has considered perfect recovery not impossible, the parietes of the chest falling inwards, as in recovery from certain cases of empyema (see PLEURA, §§ 78.).

19. IV. TREATMENT. — This should vary with the several circumstances under which perforation or rupture of the pleura and the passage of air into the pleural cavity take place, with the period which has elapsed since the occurrence, and with the existing state of the patient. When the perforation and passage of air into the cavity have just occurred, the patient often presents many of the indications of having received a vital shock; he is pale, anxious, faint, feeble, and depressed physically and morally. At the same time he complains of oppressive dyspnœa and pain, and his pulse is rapid and feeble. In this state lowering measures would be dangerous. Gentle restoratives with opiates are chiefly indicated, as camphor or ammonia with morphia; but reaction often occurs, if the accumulation of air and the suffocative dyspnœa (§§ 8. *et seq.*) prevent not its supervention. Nevertheless, the irritation and inflammation of the pleura produced by the air are generally attended by some indication of re-action after some hours, although this may be imperfect, or but slightly developed. The pain which is complained of should not be considered as a proof either of the presence or the amount of inflammation or even of irritation of the pleura, for it is often greatest immediately upon the perforation and passage of air into the pleura, and before inflammation is developed by the occurrence. Besides, it is often occasioned by the stretching of adhesions which had existed, and is thus, as well as in other circumstances, independent of inflammatory action. Still we should be prepared for the supervention of inflammatory irritation of the pleura soon after the air has acted upon this surface, especially if the atmosphere at the time be cold and dry; and this complication of inflammation with the pneumathorax will be more certainly indicated by the states of the pulse, skin, and tongue, than by the amount of pain. If the pulse become hard or constricted, the skin dry, and warmer over the affected side, or if the parietes of the side are tender or sore upon pressure or percussion, and if the patient be young, robust, or plethoric, or of the sanguine temperament, then bloodletting, general or local, the latter most frequently, but the former in some instances, and both in others, especially in the circumstances just stated; antimonials, mercurials, and opiates; cooling diaphoretics, aperients, and external derivatives and counter-irritants, as advised for *inflammations of the pleura*, are the means chiefly to be relied on. But these means should be directed with due attention to the peculiarities of individual cases, as insisted upon in the preceding article.

20. Instantly upon the occurrence of this lesion—within even a few minutes of it, as I have seen in one instance—but at any indefinite period afterwards, the quantity of air drawn into the pleural cavity may be so great, and the distension of the parietes of the side so very considerable, as to suggest reasonable fears of almost immediate suffocation, not only from complete compression of the lung of the affected side, but also from a less compression of that of the other side. In these circumstances, exit should be given to the air by puncturing the parietes of the thorax. I am aware that the propriety of resorting to this mode of relief has been questioned; but an instantly impending fatal result has to be averted; and in some instances it may be averted for a considerable time, almost always for a short time, and possibly for months, or even years, by resorting to this operation. I believe that recourse to this operation should not be delayed when pneumathorax has occurred at an early period of phthisis, or when the patient is young, not greatly reduced, or whilst he has not advanced very nearly to a probable termination of a disease which would certainly end fatally, even if perforation of the pleura had not taken place. The pain and risk of the operation is nothing in comparison with the continued distress experienced during the pneumathorax; and although relief may be only temporary, the operation may be repeated several times without increasing the risk of life, but on the contrary greatly diminishing it.*

21. It is unnecessary to remark further respecting the treatment of pneumathorax, inasmuch as the means which have been recommended for chronic pleurisy and empyema are generally applicable also for the more complicated malady which has just now been considered; due regard being had to the peculiar features of individual cases. (See Art. PLEURA, §§ 175. *et seq.*)

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* In 1833, a case of pneumathorax occurred in my practice, at an early stage of phthisis; the patient being young and robust, and not having lost flesh or strength. The nature of the mischief was prominently characterised: the heart was pushed remarkably far to the right side; and the rational and physical signs were all marked and extreme; the dyspnœa and distress were great. I advised that an opening should be made for the exit of the air; and the friends of the patient desired that Sir A. COOPER should make it. We met a few hours afterwards; he admitted his ignorance of the nature of the lesion. I fully explained the cause of the symptoms, and of their extreme urgency; but he refused to perform the operation, stated that he had never performed it with the view of letting out air, and that he would not now do any thing so novel, although he would have been ready to undertake it when he was a much younger man. Having heard Sir ASTLEY's determination, the patient's friends would not allow the operation to be resorted to by any one else; and the patient died asphyxied a few hours afterwards. The operation, if it had been resorted to in this case, might have prolonged life for a very considerable period.

POISONS—Poisoning—Poisoned—Symptoms and Treatment of.

Classif. — General and Special Pathology and Therapeutics.

Poisons may be defined to be *substances which act injuriously upon the human body.* The number of substances which may be comprised under this definition, even in the present state of our knowledge of the productions of the three kingdoms of nature, is very great; and many of these, owing either to their weak powers, or to the imperfect state of our knowledge of their effects, will receive only a slight notice, or be entirely overlooked. It should, however, be recollected that there are many substances which act injuriously when improperly employed either as articles of food or as medicinal agents; this improper employment having reference rather to the quantity used, and the conditions of the frame in which it is employed, than to the injurious nature of the substance. The *definition* therefore may be extended as follows: — *Substances which exert a deleterious influence on the human frame, when taken internally or applied externally, as regards either their nature or the quantity of them employed; or which tend, in either respect, to destroy life, when thus used.*

1. Whilst the word *poison* refers to the substance exerting the deleterious influence, *poisoning* is the commission of the injurious act, and *poisoned* is the state or effect resulting from the substance or agent employed. These words may thus be viewed as referring respectively to the *agent*, the *act*, and *actor*, and the *effects* or pathological states produced by the poisonous agent. It is obvious, that the investigation of the *first* and *second* of these, with due precision, belongs to *legal medicine* or *medical jurisprudence*, and that it consequently does not fall within the scope of my work. I have only briefly to consider the *symptoms* and *effects of poisons* — the *pathological states* produced by substances, whose injurious effects have been observed and recorded by medical authorities, and the best *means of preventing, counteracting, or removing these states.* Before, however, I venture to discuss the pathological effects of individual poisons, and the treatment of these effects, I shall briefly consider — 1st. *The modes in which poisons are employed or exhibited.*—2d. *The action of poisons.* — 3d. *The channels through which poisons act in producing their effects.* — 4th. *The general effects of poisons*; — and 5th. *The special operation of poisons.*[*]

2. I. The Modes in which Poisoning TAKE place, whether the act is felonious, intentional or accidental — whether it is suicidal or from intentional exposure to the agent — are more diverse than may appear on a hasty view o the matter; and the effects produced and the treatment required are thus equally diversified: — 1st. *Several gases, vapours, or fumes of volatile o vaporisable substances have been intentionally exhibited, or accidentally inhaled, so as either to arres the respiratory actions, or to impede or obstruct, o otherwise influence the changes produced in th blood by respiration, as well as those changes o function, and sometimes even also of organisation which take place either primarily or consecutively in the nervous centres.* Several vapours or fumes medicinal as well as poisonous, may be inhaled into the lungs with the view of producing certain anticipated effects. Some of these are thus employed more or less beneficially. Others are more obviously injurious, or even fatal; and a few have recently been directed to purposes which are considered beneficial, after the very superficial and empirical view which has hitherto been bestowed upon this mode of employing them. The vapour of several substances possess the power not only of impeding the changes produced in the blood by the air during respiration, but also of altering the physical characters of the blood itself and the state of the nervous functions. These alterations of the blood and nervous systems are produced not only immediately upon the blood circulating in the capillaries of the air-cells, and upon the organic nerves supplying the respiratory organs, but also consecutively, owing to the passage of the vapou to some amount into the circulation, and to the actual admixture of it in the blood, and to its action

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[*] The following *Synopsis* will show the extent of consideration which a due discussion of the subject now before me ought to comprise. My limits as well as the scope of the work will admit only of a hasty view of the several topics here enumerated: —

I. Modes in which Poisons are employed or exhibited.
  i. *To the Respiratory organs* — Inhaled or Inspired.
  ii. *Taken into the stomach.*
  iii. *Applied externally* — (a) The cuticle not having been removed.
    (b) To a surface the cuticle of which has been removed.
    (c) Introduced by, or into, a wound.
    (d) Injected into blood-vessels.
  iv. *Injected into the large bowels.*
  v. *Introduced or injected into the sexual organs.*
  vi. *Injected into the urinary organs.*
II. The action of Poisons.
  i. *Poisons act locally and primarily.*
  ii. *Remotely and consecutively.*
  iii. *Both locally and remotely.*
  iv. *Chemically.*
III. Channels through which Poisons act.
  i. *Primarily and locally.*
    a. On the nerves of the part.
    b. On the capillaries and vessels of the part, and the contained fluids.
    c. On the irritability of the tissues.
    d. On the general structure of the part.
  ii. *Sympathetically, or by nervous influence* — or through the media of the organic and animal systems of nerves.
  iii. *Organically, or by imbibition or endosmose, and absorption* — or through the medium of the circulating fluids.
IV. General effects of Poisons.
  i. *Depressing nervous influence and vascular action* — Lowering vital power.
  ii. *Inordinately exciting nervous influence, either organic or animal.*
  iii. *Inordinately exciting vascular action.*
  iv. *Exciting nervous influence and vascular action* — Exciting vital power.
  v. *Exhausting nervous influence* — or exhausting vital energy.
  vi. *Altering nervous influence and vital power.*
  vii. *Producing a succession of two or more of these states or effects.*
V. Special operation of Poisons.
  i. *Abstracting the animal caloric or depressing the calorific process in a part, or throughout the body.*
  ii. *Benumbing, depressing, or suppressing sensibility, or the organic nervous influence.*
  iii. *Paralysing involuntary motion and voluntary movements.*
  iv. *Softening, liquefying, or dissolving one or more tissues or textures.*
  v. *Irritating particular organs or parts.*
  vi. *Astringing and increasing the tone or vital cohesion of certain tissues.*
  vii. *Diminishing or increasing the irritability of contractile parts.*
  viii. *Augmenting certain secretions and excretions.*
  ix. *Stimulating the ganglial, spinal, or sensory nerves.*
  x. *Altering the vital actions — the secretions and nutrition of particular organs or textures, according to the substance employed, and the mode of employment.*

on this fluid and on the nervous centres. The vapours of alcohol, of all strong spirituous liquors, of most ætherial fluids, of spirits of turpentine and several volatile oils, produce a more rapid effect when inhaled in more or less concentrated states than when these substances are taken into the stomach; and if the vapour inhaled be much concentrated, or if the inhalation be continued for some time, the changes produced in the blood, and the effects on the nervous system, are such as to endanger or to destroy life. This more immediate and intense effect arises chiefly from the extent of surface upon which the vapour acts, and from the rapid imbibition of fumes or vapours by the respiratory mucous surface. But this subject will be more fully shown in the sequel, when the special operation of certain injurious agents is considered. Most of its pathological and therapeutical relations are discussed in the Article Asphyxia.

3. 2d. The most frequent way in which poisons are exhibited is *that by the mouth — the injurious substance being taken into the stomach* either alone, or simply diluted, or in the drink or food. It is obvious, that the symptoms and the effects of any poison are much modified by the state of dilution or of admixture with alimentary articles when thus exhibited, and by the condition of the stomach at the time, especially as regards the nature and amount of the contents of this viscus. The tate of the constitution, and of the health, and ther circumstances connected with the person poisoned, as well as with the agent employed, also materially influence the effects produced in ifferent cases, by any individual poison, although he quantity exhibited is the same. The rejection by vomiting of a portion of the poison, the time hat has elapsed from the moment of exhibition, he amount and character of the evacuations it may have produced, and the precise nature and haracter of the effects observed at the period when the patient has been first seen by the phy-cian, require, both individually and in connection, o be duly considered by him, the inferences which e must promptly draw from these being made the asis of the most prompt measures of aid. The digestive mucous surface being protected by a mucous secretion, and by the secretions furnished by the collatitious viscera, and frequently coniining more or less partially digested matters in ddition to the vehicle of the poisonous substance, n injurious effect is produced upon it much less eadily in many instances, owing to these circumances, as well as to the nature of the poison mployed, than upon some other parts where the oison is more rapidly absorbed and carried into he circulation. Besides, the injurious substance often in great part thrown off the stomach, or assed through the bowels; and that which remains, by irritating and inflaming the villous surce, is thereby prevented from being absorbed, so entirely absorbed as it might otherwise be, to the circulating fluids; absorption, imbibition, nd endosmosis not so readily taking place in ese circumstances as in others. Nevertheless, e injurious impression made by the substance ken into the stomach upon the nervous systems, nd especially upon the organic or ganglial, may ontinue or may increase, and be extended to veral of the collatitious viscera, and even to mote organs, as the brain, spinal chord, heart, ngs, and kidneys, — to the former by nervous communication, and to the latter partly by this channel, and partly through that of the blood and vascular system, either mode of operation predominating in different cases, according to the poison which has been taken. I need not, however, dilate further on this topic, as it will receive numerous illustrations in the sequel.

4. 3d. *When poisons are applied to the external surface of the body*, the effects are contingent upon the state of the cuticle, which forms an efficient protection against injurious substances, excepting such as are most irritating or virulent; and even many of these latter are inoperative unless they are allowed to remain applied to the surface for a considerable time. — (*a.*) The *protective power of the cuticle* varies in different temperaments and constitutions; substances which produce little or no effect when applied to the cutaneous surface of one person rapidly affecting others when thus employed. This difference most probably depends upon the varying grades of density, thickness, &c., of the cuticle, and possibly also upon the vascularity and sensibility of the subjacent tissues.

5. (*b.*) Poisonous substances, applied to the skin *after the cuticle is removed*, or even to a mucous surface, but more particularly to this surface when its epithelium is detached, produce their effects with great rapidity — the period varying however with the situation, the duration of contact, and the nature and state of the substance. The effects depend upon the nature and intensity of the impression made upon the tissue, upon the sensibility and vascularity of the part, upon the rapidity and amount of imbibition and absorption, and upon several other circumstances which will be more fully set forth hereafter.

6. (*c.*) *When a poison is inserted in a wound*, the effects will be nearly co-ordinate with those which result from its application to a surface deprived of its cuticle or epithelium, some variation probably resulting from the nature and situation of the wound, and upon the degree in which the injury may favour the retention, and the situation facilitate the absorption of the poison.

7. (*d.*) The *passage of the poison into a vein*, or the *injection of it into a vessel*, is productive of the most rapid effects, relatively to the operation of the particular agent employed; for not only is a local effect thereby produced, but the poison, being directly carried into the circulation, operates, according to its nature, both upon the blood and vascular system, and upon the nervous centres, and the vital and excreting organs.

7*. (*e.*) When a poisonous substance is employed externally in either of the modes now indicated, the effects depend principally upon its nature. Numerous specific or other animal poisons, and several virulent vegetable poisons, are thus inoculated; and diffusive or septic inflammation and destruction of the cellular tissue, erysipelas, the contagious exanthemata and fevers, inflammations of the lymphatics, veins, arteries, and glands, various specific diseases, as rabies, smallpox, &c., and other virulent maladies, in which the organic nervous energy is depressed or annihilated, and the circulating fluids are contaminated, are thereby produced. The inoculation of most of these poisons is accidental, but it may be intentional — felonious or suicidal. Certain of these poisons, when allowed to remain in contact with the surface, may produce their usual effects, although the cuticle or epithelium is entire: but when they are brought in contact with an abraded surface, or introduced into a punctured or incised wound, the effects are rapid, and vary in character with the nature of the poison, and the affection of the constituent tissues of the part injured; some occasioning a septic contamination — a solution and disorganization of the cellular tissue, which rapidly spreads, and poisons the circulating fluids; others affecting the veins, and producing asthenic and spreading inflammation of them, with all its worst consequences; several inflaming the absorbents and absorbent glands; and certain others implicating two or more of these, and often the nerves, arteries, and other structures in addition; the secondary and more remote effects being still more complicated, and the ultimate results being often speedily fatal. Numerous illustrations of what I have now advanced will appear in the sequel, when certain animal poisons come under consideration, and may be adduced from the history of infectious and contagious maladies.

8. 4th. *Poisons may be injected into the large bowels*, either accidentally or intentionally, and produce in this situation their peculiar and even fatal effects. Even certain of them may be thus employed medicinally, and, owing either to the ignorance of the prescriber of their influence in this situation, especially in some diseases and states of vital power and action, or to idiosyncrasy of constitution, their operation may be most dangerous or even fatal. Some injurious substances, when taken into the stomach, and mixed with the aliments, are somewhat changed by the action of the secretions, whilst the primary impression produced by them is thereby impaired or modified, and the absorption of them is delayed or prevented, if, indeed, they be not instantly thrown off by vomiting; but there are many which, when thrown up into the large bowels, act more rapidly and more virulently than if they had been taken into the stomach, owing to rapid absorption often taking place in the large bowels, and to the circumstance of their being less likely to be changed in this situation.

9. 5th. *Poisons have been introduced into the sexual organs*, especially of the female, where they have produced their local as well as constitutional effects, the former of these effects being severe according to the nature and quantity of the substance thus employed; and the latter depending upon the same circumstances. This mode of poisoning, as well as the next,

10. 6th. *The injection of poisons into the urinary passages*, is of rare occurrence: it has, however, been employed both feloniously and accidentally; whilst the treatment of several maladies of the sexual and urinary organs, by means of injections of various stimulating, astringent, tonic, or acrid substances, has caused, either directly or indirectly, most injurious, or even fatal results, especially when these have been resorted to in cases to which they were inappropriate.

11. II. Of the Action of Poisons. — *Poisons*, according to the definition of the word given above, may act, 1st. *Locally and primarily*, — 2d. *Remotely and consecutively*, and 3d. *Both locally and remotely*. Thus the substance applied either to the external surface, or inhaled into the lungs, or taken into the stomach, may only corrode or inflame the part with which it comes in contact, this effect being so intense as to endanger or even to destroy life. It may produce but little or no lesion or visible change in the part to which it is applied, and yet, through the medium either of the nervous systems or of the circulating fluids and vascular system, it may destroy the individual. And lastly it may, after having occasioned more or less remarkable local changes, affect the nervous systems, or the vascular system and fluids, or both the nervous systems and the vascular system, with the fluids, secretions, and excretions, thereby destroying life, and sometimes altering even the structure of several of the organs of the body before life is extinguished. Sufficient illustration of these modes of action will appear in the sequel but I must consider them individually and more particularly, and with reference to the tissues which poisons seem especially to affect, and the channels and media through which they act.

12. i. Of the local and primary Action of Poisons. Whether or no the injurious action of a substance be limited to the part to which it is applied, or be extended much further and to distant parts of the frame, it is of moment that we should have some acquaintance, the more intimate and accurate the better, with the nature of the effect produced locally, and with the changes in the constituent tissues of the part. — (*a.*) Certain substances, as aconitine, prussic acid, &c., even when applied to an external part, protected by its cuticle, will occasion numbness or want of sensibility, without any other visible change; the local effect thus produced in the *nerves* not proceeding further, unless the application be protracted or repeated, or the activity of the poison be great, or the cuticle be removed. This effect upon the sensibility evinces not merely a special operation of the substance, but also a disposition or power possessed by it to affect more generally and sympathetically the whole nervous systems, although certain parts of this system may betray the effect in a more remarkable degree.

13. (*b.*) Other substances produce a more severe local effect, and yet this effect will continue altogether, or more or less, limited to the part the injurious operation being caused rather by the intensity and extent of the irritation locally excited than by any other more extended impression or change produced by it. Substances occasioning a local injury or irritation, as mechanical irritants, fragments of broken glass, &c., excite the organic and animal sensibility in the part with which they are brought into contact; and soon afterwards the vessels, the capillaries especially, and contractile parts, are implicated; and even further local changes of structure ensue, owing to the effusion of lymph, serum, &c., and to the alterations thereby produced.

14. (*c.*) Certain substances, whilst they benumb the sensibility of the part to which they are applied, also impair the irritability of the fibrous or contractile tissues; and others, whilst they excite the sensibility, also increase, for a time, both the susceptibility and the power of contractile or irritable parts, ultimately exhausting these properties, according to the nature and quantity of the substance employed, and thereby showing the intimate connection existing between sensibility and irritability, and demonstrating that substances which either benumb, or excite, or exhaust the one, similarly affect the other. The more active of these

agents may thus destroy life by their local effects, especially when they act upon vital organs or parts. Even mechanical agents or irritants, by their intense action locally, and the nature or functions of the organ, surface, or tissue with which they come in contact, may destroy life by their local effects entirely or chiefly. The changes produced by numerous substances are of such a kind as admit of their usual procession being observed. First the nerves of the part, and the sensibility, are either benumbed, or excited, or irritated, or exhausted, and the contractile property of fibrous tissues similarly affected. Then the capillaries and the contained fluids are implicated, and all the phenomena, either of congestion or of inflammation, with the usual results, are developed, according to the nature of the agent employed.

15. (*d.*) Other substances act so rapidly, and produce so general an effect upon the constituent tissues of the part, involving them all in the effect produced, or inducing disorganization, with so great rapidity as to render it difficult, if not impossible, to determine the particular element or tissue primarily or principally affected, or to trace the procession of changes. Intense heat and cold, numerous chemical agents, and some septic poisons derived from the animal and vegetable kingdoms, produce this more intense and disorganizing effect upon the part to which they are applied. Some congeal, constringe, desiccate, corrugate, carbonise, or otherwise destroy the structure; and others dissolve, liquefy, or annihilate the vital and physical cohesion of the several textures, which fall into a state of dissolution or pulpy destruction with varying degrees of rapidity.

16. ii. Of the remote or consecutive Action of Poisons. — The primary impression, or action of poisons is seldom such as destroy life of itself, or without producing remote or consecutive effects. If, owing either to the intensity of the local action, or to the extensive disorganization produced in the part, death should quickly follow the application of an injurious or poisonous substance, the effect may be imputed chiefly to the shock received by the vital power, unless the agent acts directly upon a vital organ, whose circulation and functions it is capable of immediately arresting. A corrosive substance, as nitric or sulphuric acid, &c., taken into the stomach, owing either to its nature or the quantity employed, or to both, causes death in a very short time; but this result is not owing merely to the local action, but to the shock produced by a severe injury inflicted upon an organ supplied by nerves from the organic or ganglial nervous system, and intimately associated in function and organic nervous energy with the organs most necessary to the continuance of life. The local injury is inflicted, the whole body instantly experiences or feels it; the shock, or injurious impression, is rapidly transmitted throughout the whole organic nervous system; and, if it be intense, it annihilates not only the vital influence of the organ on which it primarily acts, but also, and through the medium of the organic nervous system, the action of the heart, of the diaphragm, of the lungs, of the brain, &c. Thus the more immediate of the remote effects are produced, sometimes with a rapidity which might lead to the inference that the local impression and the consecutive result are but one operation. More frequently, however, this result takes place with much less rapidity; the primary injurious impression inducing a succession of pathological phenomena, which often admit of due recognition, as they are manifested in either the nervous or the vascular system, or the blood, or the secretions, or the excretions, or in several or even in all these, as will appear in the sequel.

17. It is obvious that, whilst some injurious agents, from their nature or the quantity, may act either locally or remotely, primarily or consecutively, or in either of these chiefly, there are others which act *in both modes*, either one predominating over the other, according to the agent or agents employed. The mineral acids, in large quantity, or in a concentrated state, act locally, destroy the textures, occasion a general shock of the frame, and even terminate life. In small quantity, or less concentrated, the local action is much less intense, and remote effects are developed, and are such as admit of being traced. Various vegetable or narcotic poisons produce but slight or no apparent local change, yet affect organs remote from the seat of application in a very remarkable manner; and many substances change not only the tissues, on which they primarily act, but also the states of distant parts; these substances even deriving their chief appellations, as acro-narcotics, &c., from their compound properties.

18. III. The Media or Channels by which Poisons act.—It is of great importance to trace the channels through which substances act injuriously on the frame; for the knowledge of these enables us on many occasions to prevent or to arrest the effects produced by these substances. But in order that the media or channels of remote or consecutive effects should be recognised, it is necessary in the first place to ascertain the local and primary operation of the substance, the more remote effects of which we are desirous of tracing in the successive changes produced by it. It becomes therefore desirable to consider — 1st. *The nature of the local and primary impression produced by a poison.*—2d. *The extent and amount of the sympathetic effect, or of the operation by nervous communication or influence as far as this may be known*; and 3d. *The organic operation of a poison, or the circumstance of the imbibition and absorption of the substance injurious employed*, and the probable extent or amount of the mischief produced which may be imputed to this mode of operation. As poisons thus act *locally*, *sympathetically*, and *organically*, or in the ways now specified, and as it is obvious that the action of a particular poison is not limited to any one of these modes, although it may operate in either way more prominently than in the others, it may not be superfluous to consider the matter more in detail.

19. i. *The nature of the local and primary impression produced by a poison* is not always readily ascertained; for, owing either to the quantity or the intensity of action of the substance employed, the several constituent systems and tissues of a part may be so instantly and generally impressed and altered by that substance as not to furnish distinct evidence of the tissue primarily affected, as I have above contended; but in other circumstances the local changes, as well as the consecutive effects, often admit of analysis, although sometimes imperfect, the results necessarily varying with the circumstances of particular cases.

20. *A.* The *nerves* of the part, whether the

organic, the sensory, or the motory, are evidently primarily affected according to the texture to which the poison is applied, or are the first to manifest the effect, unless the substance be such as rapidly to change the organization of the structure; and according as either of these orders of nerves is implicated or impressed, so will the secretions, the sensibility, or the movements of the part be affected.

21. *B.* The *irritability* of contractile tissues is also altered by poisons, more especially by those which change the state or functions of the organic nervous system. If what I have contended for, in the article Irritability, namely, the dependence of this very prominent vital property upon the organic nervous influence, be admitted, it necessarily follows that this property will be co-ordinately affected by whatever changes the state of this influence; and a close investigation of the operation of many poisons proves that those substances, as certain animal poisons, which inordinately depress, or altogether annihilate this influence, affect the irritability of the contractile tissues in a similar manner, and in a co-ordinate degree.

22. *C.* The *capillaries and vessels* of the part must also be changed, as regards their vital properties, whenever the organic nervous influence and irritability are affected; and the change of these vessels must be necessarily similar as to kind and degree with that primarily produced in the organic nerves and contractile tissues. There is every reason also to believe, that the change is not limited to the capillaries and smaller vessels, but extends more or less manifestly to the contents of these vessels, more especially to the red globules and to the fibrine of the blood which they contain; the condition of the former constituent of the blood in these vessels, and the quantity or state of the latter, being always very materially altered by the morbid impression made upon the organic nervous influence and irritability of the part, and upon the vital properties of the capillaries; the physical and chemical characters of the blood in these vessels being thereby thus rapidly changed.

23. *D.* The alterations thus produced in the organic nervous influence, in the irritability, in the state of the capillaries, and in the contents of these capillaries — in the blood — of a part to which a poison has been applied, must necessarily soon be followed by further changes in the whole of the tissues constituting the part — in its *whole structure* — and these changes will be rapid, extensive, and diversified in character, according to the nature of the poison, and as it acts prominently upon either the nerves, or the capillaries, or the fluids, or the other constituents of the part; or in any of the particular modes which will come under consideration in the sequel.

24. ii. *The sympathic operation of poisons*, or the action of a poison on parts remote from that to which it is applied by means of the nervous system, or by any of the orders of this system—the organic, the sensory, and the motory—evidently obtains to a very considerable extent, especially as respects the action of some poisonous substances; but, as this medium of operation is not the only one, and as it is frequently associated with that about to be considered, namely, the blood and vascular system, either channel being more or less operative in producing the remote effect, according to the nature of the substance and state of the system, it is often difficult to determine the precise extent to which either contributes to the ultimate result. It will, however, be shown in the sequel, that certain substances when taken into the stomach, or injected into the bowels, or otherwise brought into contact with parts supplied chiefly with the organic or ganglial nerves, have not merely the sensibility of these nerves excited, but also the involuntary movements of parts distant from that to which the substance was applied remarkably affected, owing to the local irritation being transmitted through the medium of this order of nerves, and the connection of these nerves with nerves of sensation, and with the roots of the spinal nerves; and, further, owing to this connection, the effects are often extended to the spinal chord and to the brain, and thence reflected upon voluntary muscles and the extremities of the body, the resulting phenomena varying with the nature of the injurious agent and the temperament and constitution of the person poisoned by it. It is unnecessary to illustrate this topic at this place, as it is fully discussed in the articles Irritation and Irritability, and especially in that on Sympathy or associated morbid states.

25. iii. *The organic operation of poisons*, or the imbibition and absorption of them, or the action of them through the media of the circulating fluids, as the lymph, the chyle, and the blood, is one of the most important ways in which the effects of these substances are produced. Still this way is not always the same, the route varying with the organ or part to which the poison is applied, and with the nature and action of the particular poison employed. The imbibition or endosmose of some substances through membranous tissues is often much more rapid than that of others; but much depends upon the physical state of the poison, and concentration of the solution of it employed, and other circumstances. The passage of some substances into the blood, when either applied to a mucous surface, or to a surface denuded of its cuticle, or epithelium, or introduced into a wound, is often much more rapid than might be supposed, if the fact had not been demonstrated by experiments. Nevertheless, the rapidity of the introduction of certain poisons into the circulation has been, according to a few observations I have made, overrated by some writers, who have considered that the passage of a poison into the blood may take place in a very few seconds. It will certainly occur in much less than a minute in some cases; but I doubt the extreme rapidity contended for by some physiologists. Great rapidity of absorption is observed chiefly as respects certain saline or virulent vegetable and animal poisons, which are readily imbibed by the capillaries and carried into the blood. Substances which are absorbed by lacteal or lymphatic absorbents act much more slowly, and several of them require a considerable period before they reach the blood, especially if the vessels which have absorbed them pass through glands; and when this is the case the glands are often affected, and in some instances, when the poison is not very virulent or rapid in its operation, the glands either altogether arrest, or delay, for a longer or shorter time, the progress of the mischief.

26. The poison having been carried into the circulation either by the lacteal absorbents, or by

the lymphatics, or by the capillaries and veins, according to the seat or part to which it is applied, and the action which it exerts on the constituent tissues, produces ulterior effects, which are about to be briefly considered, owing to its action, —1st, on the blood itself, in which it mixes, and which it contaminates;—2d, on the blood-vessels and heart; — 3d, on the nervous ganglia and plexuses; — 4th, on the spinal chord and the sensory and motory nerves; — and 5th, on the brain and organs of sense.

27. iv. Those poisons which act more or less *chemically* are most readily imbibed, are absorbed most directly and rapidly, and change not only the physical characters, but also the chemical constitution of the blood, as far as we are acquainted with that constitution. They change the colour, and there is reason to suppose that they affect also the organization of the red globules; they alter or diminish the fibrine, and variously affect the saline and albuminous constituents of the blood. But there are few of those substances which act thus chemically upon the blood, especially alkalies, acids, and numerous neutral salts, that do not also affect the vital condition of this fluid, and change this condition and its chemical constitution both in relation to each other, and in connection with the vessels and heart, and with the nervous centres, more particularly the nervous system actuating the circulating apparatus.

28. IV. General Effects of Poisons. — i. *Some substances or agents depress nervous influence and vascular action*, and thereby lower vital power; the depression being either relative or absolute, and varied in its effects, according to the agent and the quantity, intensity, or duration of its operation. The application, for instance, of cold, or, more correctly, the abstraction of vital caloric, when moderate or of short duration, or acting upon a surface or part only of the body, depresses vital action in that part during its continuance; but re-action takes place when the depression is limited as to seat and time, owing to the determination of the circulation to more internal or to vital parts, or when muscular action accelerates the flow of blood in the vessels. But when cold, owing to its intensity or continuance relatively to the state of the system whilst exposed to it, renders torpid the organic nervous influence, and retards or interrupts capillary and venous circulation through a considerable extent of the frame, re-action may not take place, or may occur so imperfectly or irregularly as not to relieve internal congested organs; and if it occur it may be attended with, or develope inflammation in some predisposed organ.

29. There is perhaps no other agent which tends so completely to depress both the nervous and vascular functions so as even to overwhelm them altogether as cold, when it acts either intensely or for a long period relatively to the constitution and circumstances of those subjected to its influence, or when it exceeds in grade that which has just been stated to admit only of imperfect re-action. Like other agents, therefore, cold is either a tonic, a sedative, or destructive of life, according to its grade and the manner of its operation on the living œconomy; but there is scarcely another physical agent whose sedative effects are so equally manifested upon all the general systems and functions of the frame, and without directly producing some other operation, unless the respiration of air, loaded with carbonic acid, or with sulphuretted hydrogen, or prussic acid used in any form be exceptions. Aconite and colchicum are sedatives to the sensory and organic nerves especially, but they also irritate the surfaces to which they are applied; and digitalis and tobacco act chiefly on the heart and vascular system, without materially depressing the nervous functions of animal life, or the functions of the brain and spinal chord. When, however, these, or other substances, which produce a general sedative or depressing effect, as respects nervous influence and vascular action, are exhibited in large or injurious quantities, their subordinate operations are then so masked as to escape notice, or are so inconsiderable as not to deserve attention. Certain poisons which produce a narcotic effect upon the nervous system, when given in moderate doses, exert a sedative influence upon the vital actions generally, when taken in still larger or poisonous quantities, as shown by opium, belladonna, conium, hyoscyamus, &c., when so exhibited.

30. The sedative effect, when it becomes injurious, is generally not limited either to the part to which the agent is applied, or to a particular system or organ. Besides depressing nervous power in the surface or viscus to which a sedative poison is applied, and causing capillary and venous congestion, the morbid impression is propagated along the nerves to more distant parts, especially to the nervous centres, whilst the poison itself is partially absorbed, and, mixing with the blood, it acts directly upon the nervous masses, and more or less also on various organs, according to its specific influence. This being the general effect — the result being depressing, and ultimately destructive of organic nervous power and vascular action, with varying degrees of rapidity, according to the nature of the poison and the quantity employed,— it may be imputed, according also to the nature and quantity of the agent, to either of these channels or media principally, or to all of them, although in different grades, the fatal or injurious operation arising through these sources singly, or conjointly, but in varying proportions.

31. ii. *Some poisons inordinately excite nervous influence and vascular action*, or stimulate vital power for a time. Heat and oxygen are the most influential agents in producing this effect, and they perpetuate it perhaps longer than any other without exhausting vital action, especially upon withdrawing them. Alcohol, the æthers, ammonia, and numerous other stimulants, may become poisons when exhibited in large quantities, or when long employed, owing partly to their effects locally, but especially to their influence, through the media of the nervous and vascular systems, and of the blood upon the nervous masses or centres, and upon the liver and excreting organs. It is seldom, however, that stimulants destroy life before they have induced either exhaustion co-ordinate with the stimulating action, or effusion to an amount sufficient to interrupt the functions of a vital organ, or alterations of the circulating fluids incompatible with the continuance of the nervous functions or of the heart's action, or even inflammatory or structural changes of some important viscus, or some two or more of these changes.

32. iii. *Exhaustion of organic nervous power, and of sensory and motory influence*, or of vital

energy generally, is one of the most manifest general effects of substances given in quantities sufficient to destroy life in a short time. This exhaustion is especially remarkable when it is caused by substances which injuriously impress the nervous systems, or which act so rapidly as to render it difficult to determine whether the impression of the agent be transmitted by means of the nerves to the heart and brain, or whether the substance is itself absorbed into the circulation, where it directly acts upon these organs, or whether it acts in both ways. Poisons which may be said to kill by exhausting the vital actions must necessarily be considered as having first produced an excessive stimulating effect, which has so rapidly passed into exhaustion as to leave the primary operation unobserved or even unobservable, for exhaustion implies antecedent stimulation. Nevertheless, if the operation of many of the substances which are generally said to destroy life by exhausting vital power, when given in large quantities, be considered with reference to their effects upon the living œconomy in small doses, it will be found either that the quantity which is stimulating is very small, or that the stimulating operation of the substance, even in such quantity, is very equivocal; and, if it may be admitted to exist, it rapidly lapses into a distressing or peculiar form of exhaustion, as may be allowed in respect of tobacco and various narcotics. From this it will appear, that the poisonous effect of the same substance may be imputed by one person to the powerful sedative effect it had produced in the quantity or dose in which it had been given, and by another to the extreme exhaustion consequent upon a great and rapidly evanescent stimulation, &c., according to the views each may entertain of the physiological action of the substance in question.

33. iv. *The general effects of poisons cannot be viewed as merely dynamic; they also alter or change the states of nervous influence and of vascular action.* Those substances which prove rapidly poisonous, owing to their nature or the quantity taken, evince the dynamic operation more remarkably. This may, however, be owing to the circumstance that the dynamic action is much more recognisable than any change in character or kind of action, during the short period intervening between the impression of the agent and a fatal result. It is chiefly such poisons as act slowly, or some of those which are more virulent, but which, when taken in small quantities, are not rapidly fatal, that produce more or less manifest alterative effects. Still these effects are not solitary; they are generally associated with one or two of the general effects already noticed, and also with certain others, which are more specific, or which appertain to the poison in question, and in some respects characterise its operation when employed either medicinally or otherwise. The alterative effects of poisons being recognised with difficulty, in connection with other more general and remarkable results, unless the operation is slow, and as these effects are more peculiar or specific, and at the same time more complicated, I shall proceed to consider them more in detail, and endeavour to analyse them, or show their more special influences, although I cannot do so at this place in so full and satisfactory a manner as I am desirous of doing.

34. V. The Special Operation of Poisons.— It is obvious to the experienced observer of the operation of the more active agents of nature upon the living œconomy, that very few act in one unvarying manner, or that any one of them produces a single effect, or acts solely upon a single function or part, without also affecting others more or less. All that such an observer of the more special actions, either of medicines or of poisons,— and most of the former possess the latter property, —can expect is this, that, although any one of these substances produces certain general results, and extends its influence more or less to different functions and even to remote organs, some particular surface, function, or viscus — some one of the chief factors of life, or of the constant actions and results which these factors produce — some of the manifestations of life in particular tissues, systems, organs, or parts, will be more prominently affected than others, or be chiefly, but not solely, changed by the action of that substance. In the analytical survey I am about briefly to take, it must, therefore, be considered that the special action of any single poison is not confined to the production of one only of the several effects which I shall have to notice under the separate heads which the analysis furnishes; but that it extends to more than one system or viscus, although some one manifests it much more than another, and alters certain vital properties and functions, or a particular property or function, more than others. When the symptoms and changes produced by individual poisons, and the modes of obviating and removing these changes, come under consideration, then the associated and even complicated nature of these changes will be made more evident.

35. i. *Some injurious agents abstract the caloric, or depress the vital calorific process not only in the part to which they are applied, but also throughout the body.* This effect may be produced by the application of cooling substances, or by whatever lowers the organic nervous influence and vascular action, or by both modes of action produced either simultaneously or in rapid succession. A large quantity of cold water or of ice taken into the empty stomach, especially when the system is exhausted by fatigue, or when the body is perspiring freely, may not only abstract the animal heat from parts requiring a certain elevation of temperature for the performance of their functions, but also depress the organic nervous influence actuating these parts, so as to produce capillary and venous congestion, or an arrest of the circulation, and other consecutive effects, until the action of the heart ultimately ceases. Although cold fluids may destroy life very rapidly when taken largely in these circumstances, in the manner now stated, and owing to the influence of cold upon vital actions, as noticed above (§§ 28, 29.), yet there are hardly any substances which are poisonous owing chiefly to this mode of action, although there are several which, when employed in large or frequent doses, produce a refrigerating and depressing effect along with other changes of a more prominently injurious nature, more especially the hydrochlorate of ammonia, the nitrate of potash, and various other salts and dilute acids, which not only depress the calorific process, but also chemically and physically affect the blood and vascular system, and through this medium the nervous system also.

36. ii. *Certain poisons act more especially in*

destroying the sensibility, or the functions of the sensory and of the organic nerves, in benumbing, depressing, or suppressing sensibility, and the organic nervous influence. Of these the most remarkable are monkshood and its active principle aconite, cold; æther and alcohol when absorbed or injected into the blood, or when their vapour is inspired; belladonna, conium, morphia, and most of those which have been denominated narcotics, sedatives, and stupefacients. But these produce also a paralysing effect, remarkably depress the organic nervous influence, diminish irritability, impede secretion and excretion, or even irritate the mucous surface to which they may be applied, as colchicum, tobacco, hyoscyamus, opium, &c.

37. iii. *Other poisons more prominently paralyse the organs of voluntary motion, whilst they impair the irritability of involuntary parts, diminish sensibility, and depress the organic nervous influence,* especially hemlock and its alkali, conia, hydrocyanic acid, and the cyanides, carbonic acid, sulphuretted hydrogen, &c.; stramonium, cannabis ndica, tobacco, digitalis, the preparations of lead, &c.

38. The substances which act energetically upon the nervous system, in impairing either the sensibility or the irritability and the voluntary movements of muscular parts supplied by nerves respectively belonging to these systems, have not their actions limited to one of these functions only, although either may be more prominently affected according to the poison employed. Their effects may, moreover, be extended even to secreting and excreting organs, such poison acting more or less on particular functions than on the others. When either of these substances is taken into the stomach in quantities which are injurious, not only are the nerves of the part affected, but absorption of the poison takes place to a certain extent, and the in-urious impression made upon the nerves by it is ransmitted along the organic and sensory nerves o the ganglia, brain, and spinal chord, which are urther affected according as the substance is pre-ent in the circulation. Some of these poisons eem to affect one order of the nervous system more than another; certain of them impress more especially the organic or ganglial nervous system, deranging the several functions depending chiefly upon it, others affect the brain, consciousness, and sensibility, and impair more or less the voluntary movements, and other allied functions; and these several results are moreover varied not only with he quantity of the poison taken, but with the circumstances connected with its exhibition and the constitution and temperament of the person who is ts victim.

39. iv. *Certain poisons produce a septic action, weakening and dissolving the vital cohesion of tissues, or softening and even liquefying the structures.* These substances not merely depress the organic nervous energy of the parts with which they come in contact, but they also produce a physical or chemical change in the tissues, contaminating the fluids, and favouring the imbibition and absorp-ion, not only of the poison itself, but of the contaminated fluids of the poisoned part. Animal matters act chiefly in this way, more particularly he poisons of serpents, of fish, decomposing or putrid animal substances, the animal poison generated in sausages and preserved or dried meats, he secretions and fluids in disease, or after death; especially after malignant and infectious maladies, and still more especially if any of these be applied to a punctured wound, or to an abraded surface. In most instances the local action of these poisons is evinced by the part being pained, swollen, livid, or otherwise discoloured, soft or boggy, sometimes numbed, and changed in temperature, often rapidly passing from a burning heat to coldness, or being cold from the commencement. These changes proceed from the extremities to the trunk, from the periphery to the centre, and extend more or less rapidly, with remarkable sinking of vital power, a very quick or irritable pulse, and manifest indications of contamination of the fluids and soft solids, more especially when the poison has been applied to an external surface, or to a wound. When it has been taken into the stomach, distressing nausea, vomiting, anxiety, and feeling of sinking, evidently owing to depression of the organic nervous energy, are then generally observed, with other symptoms varying with the particular poison which has been taken, as cutaneous blotches or eruptions, coldness of the surface, suppression of urine, rapid weak pulse, watery stools, &c. &c.

40. The animal poisons which act in the way now described affect chiefly the *vital conditions* of the parts to which they are applied, — depress organic nervous influence, and loosen the vital cohesion of the tissues, whilst they contaminate the fluids; but there are other substances, which soften, or liquefy the tissues, in consequence rather of a *chemical* than a vital operation, although the vital conditions are also to a certain extent affected. These are the *alkalies,* the sub-salts, or those saline substances in which the alkali is the predominant element, the biborate of soda, the iodide of potassium, the alkaline sulphurets, the preparations of antimony, of mercury, &c., when used in large quantity or long employed. These substances act locally, more or less energetically as now stated, especially the pure alkalies; but they are also rapidly absorbed, and they then alter the vital conditions of the nervous and vascular systems, and the chemical constitution of the blood, especially as regards the red globules and fibrine, the proportions of which they even diminish, especially when they have been employed for a considerable time. When thus used, they also liquefy, and favour the absorption of morbid growths or tumours, whilst they relax generally the soft solids.

41. v. *That various poisons excite the ganglial, spinal, and sensory nerves, or either of these orders of the nervous system, more than the others,* will be admitted; but this effect is generally varied and associated, according to the nature of the particular substance employed, with other changes manifested by secreting surfaces and organs. The stimulating operation is evidently exerted primarily upon the nervous organization of the part to which the substance is applied; and, for a time, it tends to concentrate the nervous power, and even vascular determination and action, towards the surface or viscus thus acted upon. Subsequently, however, the effects become more or less diffused; but the rapidity of the diffusion of the stimulating influence over the frame depends upon the nature and quantity of the substance employed, the state of the organs upon which it has acted, and the temperament, constitution, and habits of the subject acted on.

The principal question is — whether or no the general or remote effects are produced by nervous influence, or by the rapid passage of the substance into the circulating fluids, and the consequent operation of it upon the several organs and structures of the frame, or by both these modes, either of them predominating according to the circumstances just stated?

42. *A.* As to the action of stimulants on the nervous system, on either the ganglial, the sensory, or motory, or upon any two or all of these divisions of the system, there can be no doubt as respects that part of it supplying the organ to which the poison is applied; the question being as to the extension of the stimulating operation to distant parts by means of this system. Formerly, the remote effect was imputed altogether to this system, the other mode of action just referred to being overlooked or discarded. From 1819 until 1826 I made many experiments with stimulating substances and tonics, vegetable and mineral, some of which were published in the journals of the day (especially in the London Medical and Physical Journal, and London Medical Repository) with the view of determining the modus operandi of many active agents upon the frame; and I demonstrated, beyond dispute, that this is not the only mode of action, as regarded the great majority of them, which, although acting more or less in this way, operate also, and even mainly, through the medium of the circulating fluids.

43. That the stimulating impression made upon the organic or sensory nerves of the viscus to which the substance is applied is transmitted, more or less remarkably, by means of these nerves to remote parts, which it thus affects, appears extremely probable; for there are several analogies, considerations, and even proofs, both physical and pathological, of this being the fact; and, moreover, these remote effects are often reflected upon other distant parts. Thus the stimulus existing in, or acting upon, an internal viscus, may be transmitted by the organic nerves to the adjoining ganglion, or to the great semilunar ganglion, or to the spinal chord, or to the brain, becoming an object of either obscure or distinct sensation or consciousness, and there the effect may cease, or be reflected thence upon other parts, affecting the actions of involuntary organs, through the media of ganglial nerves, or exciting the movements or sensibility of voluntary parts through the medium of the spinal chord. The remote effect may be produced more or less by either order of nerves or nervous masses, ganglial, cerebro-spinal, or sensory and motory, according to the nature and quantity of the substance employed, and the mode of employing it. Much of the misconception and confusion which have existed as to the operation of agents on and through the medium of the nervous organization have arisen chiefly from the following circumstances: — 1st. Experimenters have considered the organic nerves as forming a part of those proceeding from the cerebro-spinal axis; — 2d. They have viewed the distinct orders or divisions of the nervous system as identical, and as performing the same functions; — and 3d. They have overlooked the fact that it is impossible to separate the vascular system from the nervous, so as to isolate each, and that it is equally impossible to cut off the nervous communications existing in distant parts whilst the arterial communications are allowed to continue, inasmuch as all arteries are surrounded by a reticulum of ganglial nerves. It is owing mainly to these circumstances, and their consequences, that so many ill-planned and ill-performed experiments on living animals have been made — experiments which could furnish no correct inferences, which, moreover, were undertaken to decide points not admitting of being thus decided, and which could not prove the basis of even a loose hypothesis, far less of sound doctrine. Considering, therefore, as will appear more fully in the sequel, that poisonous as well as medicinal agents produce an impression upon the nerves of the part to which they are applied, that is not limited to such part, but which often affects sympathetically distant parts, although in various degrees and modes, according to the nature and state of the substance employed, I proceed to remark upon the operation of stimulants through the medium of the circulation.

44. *B.* That numerous stimulating substances — vegetable, saline or mineral, and animal — are more or less rapidly imbibed by the tissues, and absorbed into, and are afterwards eliminated from, the circulation, are amongst the best established facts in physiological science. The effects which these substances produce, when taken either medicinally or in hurtful doses, are chiefly owing to this mode of action, although the impression primarily made by them on the several divisions of the nervous system is also more or less influential in producing these effects; but the exact extent of that influence can hardly be determined. That the majority of stimulating substances are actually absorbed into the circulation, to an extent varying with the substance employed, and the state and mode of its employment, has been fully established, inasmuch as they have been detected in the blood itself, and in the several secretions and excretions. The special operation of many stimulants thus depend not only upon their primary impressions upon the nervous system, but also upon their presence in the blood, and their action on the nervous masses and centres, and more specifically upon the functions of certain organs and surfaces, particularly upon those organs by which they are eliminated from the blood. The alcoholic, the ætherial, the balsamic, the camphoraceous, and several other classes of stimulants—both vegetable and mineral—act in the way now stated.*

45. vi. That many poisonous substances are *capable of astringing the tissues and of increasing the tone or vital cohesion of certain structures, when employed in small quantities, cannot be doubted:* but this effect more rarely follows their employ-

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* During 1819, 1820, and 1821, I made a number of experiments upon the operation of several active substances; and the results of those which I made with the terebinthinates were published in the *London Medical and Physical Journal* for July 1821. At that time it was generally believed, that medicinal as well as poisonous substances acted upon the nervous system directly and entirely, the results depending altogether upon this system without reference to the blood and vascular system, and without distinction between the organic, the sensitive, and the motory divisions of the nervous system. I believe myself to have been, if not the first, at least amongst the first, to determine by experiments the action of these substances through the medium of the blood, and to show that many of these substances act differently upon the different orders of the nervous system — upon the organic nerves either chiefly, distinctly, or differently from their action on the cerebro-spinal. (See *Lond. Med. and Phys. Journ.*, July, 1821, p. 112. *et seq.*, and August, 1821, p. 185. *et seq.*)

nent as poisons, unless in the case of mineral poisons; and then the operation of these, especially when used in large or injurious quantities, s more chemical than vital; several of them, as he mineral acids and salts, combining to a certain xtent with the tissues and the liquid elements of he tissues, altering the constitution of the capil- aries and of the capillary contents, and thereby ffecting the state of vital function and action. Many of the substances which act as stimulants, by he greater permanency of their effects, and by heir action, in the manner now stated, upon the ssues, have an astringing operation. Substances cting thus on the œconomy have not their ef- ects always limited to the parts to which they are pplied; for I have ascertained that they are ab- orbed, especially when much diluted, or when issolved, into the circulation, and are afterwards arried out of it chiefly by the kidneys and skin. he metallic salts and the mineral acids severally ct in this way more or less rapidly, energetically, nd manifestly; and produce their effects on parts the frame the most remote from those to which hey were applied. The metallic sulphates and trates, the superacetate of lead, the balsams and sins, the phosphoric, the mineral, and many of e vegetable acids, although acting in the way ow stated, severally produce other effects, when mployed in hurtful quantities. Some of them cite certain of the organs concerned in excret- g them from the circulation, others of them de- ess or exhaust the organic nervous influence and e irritability of the heart and other contractile rts; and many of them alter the constitution of e blood, especially of the red-globules and rine, so as to render this fluid unsuitable to the rpetuation of the nervous and vital functions.

46. vii. *Numerous substances act especially upon irritability of contractile parts, and either im- ir or increase this vital property*, according to nature of the substance. These modes of ac- n evidently result from the impression produced her primarily upon the organic nerves of the rt, or consecutively upon the ganglia, the poison ving been carried into the circulation, or from th these modes of operation. Prussic acid and prussiates, monkshood, tobacco, aconite, di- alis, arsenious acid, colchicum, antimonials, rax and boracic acid, ergot of rye, nitre, and eral other substances, when employed in large ses, *depress* the organic nervous power, and the tability of involuntary organs, especially of the rt, without directly impairing the functions of brain and spinal cord, and of voluntary parts, ough affecting them through the media of the nglial and vascular systems. Other substances ect the irritability by increasing it at first and *austing* it afterwards, the effect varying with substance and the quantity employed. This ration probably obtains in respect even of some he articles just enumerated, as arsenic and an- ony. Other substances *excite* the irritability of h voluntary and involuntary organs more or remarkably, as nux vomica and strychnia, cia, St. Ignatius's bean, snake-wood, &c.

47. viii. *Numerous articles act more especially augmenting certain secretions and excretions;* they produce these effects either by their di- action on the organs to which they are ap- d, or by their consecutive operation, through medium of the circulation, upon the organs and surfaces which they specifically influence. Thus emetics and purgatives taken into the stomach excite or irritate the organic nerves supplying the villous surface of the alimentary canal, and thereby increase the secretions and involuntary movements of the tube, each substance possessing either an emetic or a purgative property acting in a manner more or less peculiar to itself, and producing, moreover, in some cases, additional effects. Other substances, as many of those which act upon the kidneys, as the terebinthinates, several salts, particularly the nitrate of potash, the nitrate of soda, the acetate of potash, cantharides or its active principle, and various other articles, are absorbed into the circulation, and excite especially the kidneys so as to increase their secretion, or even to over-excite or inflame them. Other substances, through the medium of the circulation, affect the exhalations and secretions from the bronchi; and others, again, those from the skin. But this subject need not be further pursued, at this place.

48. ix. *That some articles irritate particular organs or parts in a way more or less peculiar to these articles*, either when directly applied, or absorbed and carried in the blood to the organ affected by them, may be admitted. But although this operation, and those just noticed, constitute the chief modes in which substances are expected to act medicinally — their principal therapeutical effects, — yet they are merely subordinate to the more energetic or violent results produced upon the nervous influences and vital actions, when the same substances are employed in hurtful quantities.

49. x. *In connection with this irritating operation, varying with the substance employed and the mode of its employment, an alterative action is also produced; the vital functions — the secretions, the sensible qualities and conditions, and the nutrition, of particular organs and parts being changed in kind or character, as well as dynamically or in degree.* These effects are manifested chiefly when poisonous substances are given repeatedly in small doses, are employed medicinally, or with the view of producing deleterious effects slowly and latently. Numerous medicines have acted injuriously in this way, as well as in the two preceding modes, in consequence of having been employed injudiciously — inappropriately as respects the nature of the disorder, and either during too long a period, or in too large or too frequent doses, the effects thereby produced having been mistaken for the progress of the disease. When substances have thus produced an alterative effect or change of action in any one or more organ or part, they have generally been absorbed to a greater or less extent into the circulation, and have operated, through the medium of the blood, on the tissues, or on the organs eliminating them from the system.

50. xi. *Substances which irritate or excite inordinately the parts or tissues to which they are applied, determine or solicit increased circulation and vital action to these parts, and proportionately diminish vascular action in distant parts, or in the viscera less intimately connected or associated in function with those on which these substances act directly.* Many articles are employed medicinally with the intention of producing these effects — as *revulsives, derivatives*, or *revellents;* and many of the phenomena observed as consequences of poisoning depend upon this revulsive or derivative ope-

ration. This effect arises chiefly from the influence of the organic nerves, which, when irritated, influences the circulation in the associated capillaries and arteries, increases the vital expansion and action of these vessels, and augments the exhalations and secretions from them; the results varying, in kind and in grade, with the irritant or substance thus affecting the organic nerves of the part to which the increased action is thus determined.

51. VI. The Circumstances which modify the Effects of Poisons require to be briefly noticed. (*a.*) The *quantity* used materially affects the action of a poison, so much so that the most virulent poison is medicinal or even salutary when taken in minute doses. Thus prussic acid in a very small dose is soothing and antispasmodic, in a large dose it annihilates the vital action. Several poisons, in small quantities, slightly irritate or inflame the digestive canal, but in larger doses they produce convulsions, coma, and death.

52. (*b.*) *The aggregation and degree of dilution* very materially modify the operation of a poison. The more minutely a deleterious substance is divided, and the more completely it is dissolved in oil or in water, the more energetically and the more rapidly it will act, especially when taken into the stomach. This necessarily follows from the preparation thus made for the action of the poison over a large surface, and for the imbibition of it by the tissues and absorption by the vessels. Certain substances, which are extremely active when thus prepared, remain for some time inactive when they have been taken in a concrete or aggregated state. The dissolving influence of the juices of the stomach, and of the secretions poured into the duodenum, is not without influence upon certain poisons, when taken in an undissolved state; for the carbonate of barytes and arsenite of copper are more soluble in these than in water. The operation of poisons is further changed by aggregation and by degree of dilution. Camphor, in weak dilution, is cooling, sedative, and soothing, in stronger dilution in oil, or minutely divided in mucilage, it is exciting, and, in still larger quantity, productive of delirium, coma, or convulsions; and in fragments it may occasion inflammation, or even ulceration of the part to which it is applied. Certain poisons in a state of vapour, or even substances which cannot, in their usual states, be viewed as poisons, when employed in a state of vapour may become poisonous, if they be applied to extensive surfaces of the frame. Thus the inhalation of the vapour procured from numerous ascertained poisons, narcotics, and others; or of the vapour of æther, of alcohol, and of certain volatile oils, when continued even for a short time, rapidly affects the frame, owing to the remarkably great extent of living surface to which substances in a state of vapour are thus directly applied, to the extent of the impression produced by them on the organic nerves, and to their rapid absorption into the circulation.

53. (*c.*) *Chemical conditions or combinations*, and the states in which chemical substances are employed, modify the effects produced. Some chemical substances, when employed in a concentrated state, act locally merely, as the mineral acids; but when taken internally in a state of weak dilution they are carried into the circulation, and act upon and through the medium of the blood. Morphia, being insoluble, is comparative
inert, unless very minutely divided, but wh
dissolved in a fixed oil, or in alcohol, or co
bined with an acid, it becomes very active; a
numerous substances which, in an uncombin
state, were most deleterious, become innocuo
when chemically combined with their opposites,
alkalies with acids, and *vice versâ*. But this to
is so trite that I need not pursue it further.

54. (*d.*) *Admixture* of various substances, a
mentary or others, either before or after ingesti
varies the effects; generally by diminishing t
activity of the poison, owing to slow absorpti
and imperfect or intercepted contact with t
villous surface of the stomach. If, however,
poison be taken in a state of complete soluti
and if the substances taken with it, or those alrea
present in the stomach, serve to dissolve or
nutely divide it, they may not impede, but, on
contrary, ensure its action. If it be swallowed
a state of imperfect division or in fragments,
alimentary or other substances given with it n
so involve these particles, or the mucus of
surface may so protect the organ, as either
diminish its effects, or to occasion vomiting,
which it may be altogether or partly thrown
Dr. Booth has recorded an instance of an ou
of corrosive sublimate having been swallowed a
a full meal, without any remarkably bad effe
having been produced, full vomiting having b
speedily induced, and other cases are referre
by Dr. Christison (see above, § 3.).

55. (*e.*) *The organ or tissue* to which a poi
is applied has been already stated materi
to influence its action on the œconomy, b
locally and generally (§§ 3—10.). It has also b
stated that the cuticle protects the skin more
less from the action of poisons, even the most
rosive and subtile; and it is not until it be
moved or destroyed that the poison acts, or
act, the effect is much more slowly produ
The mucous surfaces are much more readily a
upon: still the mucus and epithelium cove
them protect them to some extent, and render t
less susceptible of the poisonous impression,
less prone to imbibition and absorption, than se
surfaces, or denuded or incised parts. These la
parts, or wounds of any description, may, howe
escape, if they bleed so freely as to wash away
poison. The rapidity of action varies much
the tissue to which the poison is applied; an
manifestly attributable to the celerity with w
absorption proceeds in such tissue, and the ex
of surface presented to the poison. Thus it is
rapid when a fluid poison is injected into
bronchi.

56. It is worthy of mention, as remarked,
not explained, by Dr. Christison, that the poi
which seem to operate energetically on the sent
extremities of the nerves, and indirectly thro
the brain and spinal cord, act not at all upon
divided surfaces of the brain and large nerve
upon the course of the latter; as proved in res
of prussic acid, opium, strychnia, and several
cotics. This circumstance may be partly ov
to the mode of operation of poisons above
tended for,—viz. upon the organic nerves, or
organic and sensory nerves chiefly; the applica
of them to a cut portion of the fibrous structu
the brain, or of a nerve, not being likely to pro
any further effect than what may arise from

livision of certain fibres of these structures. The ffects of poisons on different parts depend much ipon the vascularity and the disposition to imbibition and absorption possessed by the texture to vhich the poison is directly applied. The con-nexion also subsisting between the texture and he more vital organs, especially the dependence f the part upon the organic nervous system; the tate of the vessels, the amount of hæmorrhage rom them, and a variety of circumstances, also nodify the results.

57. Mineral and vegetable poisons are much ss controlled or influenced in their action by the rgan or tissue to which they are applied than nimal poisons are. The digestive canal and its ecretions change the usual operation of mineral oisons but little; some vegetable poisons are omewhat more modified by the digestive organs, n certain cases; but several animal poisons, which, f applied to a denuded surface, or to a wound, ould be rapidly fatal, may be so altered by these rgans as to be productive of but little disorder, hen taken internally.

58. (*f.*) The operation of various poisons, pecially of narcotic and sedative substances, is odified also by *habitual use* of them, and by *iosyncrasy*. Whilst use diminishes the poisonous fect, idiosyncrasy more commonly increases it. person who has become addicted to opium, or en to some other narcotics, may take as much once, with advantage, as would destroy the life a person not accustomed to the substance; and person may be almost poisoned by a substance, an article of diet, as a particular kind of fish, at would not disorder others. The influence of bit or use is shown chiefly by the organic poins, particularly those already mentioned. Inganic or mineral substances have not their inrious operation so remarkably impaired by use. r. CHRISTISON supposes that this "effect of habit nothing more than an increased power acquired the stomach of decomposing the poison, — just it gradually acquires an increased facility in gesting some alimentary substances which are first indigestible." (p. 29.) This may be the se in part; but something is probably also owing a gradually diminishing susceptibility of the pression produced by narcotics in the organic rves, and of the nervous system generally, owing their frequent exhibition.

59. (*g.*) The *moral and physical states* of the stem also modify the operation of poisons, espelly of organic poisons, — narcotics especially. eat mental excitement, anger, passion, &c., lay, or, to a certain extent, counteract, the operan of narcotic and sedative substances; whilst e depressing passions hasten and ensure their ects. Several diseases, especially those of the rvous systems, as tetanus, rabies, mania, hysia, &c. admit of large doses of opium, or of ier narcotics being given without injurious efts. Other substances, however, which are more lative than narcotic, as tobacco, colchicum, ussic acid, &c., and which act more upon the art, are not tolerated so manifestly during these eases. Febrile diseases, especially during the ge of excitement and increased vascular action, lay or counteract in some degree the action of ne poisons; whilst the same maladies, and more ecially pestilential fevers and pestilential choa, particularly during the stage of exhaustion, show that the frame is more or less insusceptible of the impression usually made by poisons. This want of susceptibility is owing to the low or exhausted state of vital function throughout the body, and to the absence of those vital conditions, or the commencing departure of these conditions, by means of which agents act upon living bodies.

60. Other diseases, or a predisposition to them, as to apoplexy, palsy, or congestive states of the brain, diseases of the heart, inflammatory states of the stomach or intestines, congestions of the liver, &c., may severally favour the operation of certain poisons, whilst these latter may excite or determine an attack of these maladies. Where there is an apoplectic or paralytic tendency, a small dose of a narcotic may occasion a serious effect, or even produce a seizure; and, when there is serious organic change in the heart, a large dose of a sedative, as of hydrocyanic acid, colchicum, or even a moderate dose, may terminate life. The irritant poison, which may be innocuous in some instances, may be fatal in others, where disease of the stomach or bowels, or a tendency to it, already exists; but this subject requires no further illustration. It should also be kept in recollection, that blood-letting either soon after or before a poison has been taken, accelerates the action of such poison, if it remain in the part, by promoting its absorption.

61. VII. CIRCUMSTANCES WHICH SHOULD SUGGEST SUSPICIONS OF BEING POISONED. — (*a.*) *The sudden appearance of severe symptoms whilst the patient is in health.* It is comparatively rare that a substance can be taken in an injurious quantity without almost immediately producing serious ailment. Without denying the occasional production of slow poisoning by the practised poisoners of the middle ages, and of the succeeding two or three centuries, it may be admitted that this mode of poisoning was not so frequently attempted or accomplished as generally supposed. At the same time it should not be overlooked that poisons may be administered, as they sometimes have been, during the *illness* or the *intoxication* of the poisoned person, in order that the act may appear as the result of these states. The poison may even be added to the patient's medicine, or substituted for it, as has been shown on several occasions. Generally the symptoms of being poisoned appear either immediately or within an hour after the poison has been taken; and it very rarely occurs that they are deferred beyond two hours, or three hours at the farthest. There are occasions, however, in which slow poisoning may occur unintentionally, and the symptoms be gradually and very slowly developed. I have met with several instances in a somewhat long course of practice of active and cumulative medicines having been given in large or frequent doses for so long a time as to produce dangerous and even fatal effects, these effects having been mistaken, owing to the ignorance of the practitioner, for the progress and issue of the natural disease. Colchicum, digitalis, tobacco injections, opiate injections, tartar emetic, the preparations of iodine, and several other substances, have thus produced effects for which they did not receive the credit.

62. (*b.*) *The appearance of severe symptoms after a meal, or after taking any substance, fluid or consistent, into the stomach, or after any substance has otherwise been exhibited or applied, should also be a*

source of strong suspicion. What I have said above (§§ 2—11.), as to the several modes of poisoning, is sufficient to show that poisoning may be produced in various ways, besides the more usual way of mixing the poison in the food or drink of the poisoned person. When, therefore, violent or fatal symptoms occur suddenly, or proceed rapidly, diligent inquiry should be made as to the time, nature, and kind of the patient's last meal, as to the circumstances and occurrences to which he has been exposed, as to the persons with whom he last had communications, and as to his habits, and morbid tendencies. It should be kept in recollection, that disease may exist, even for a long time, without occasioning suffering so great as to prevent his usual avocations; and that the stomach itself even may be the seat of disease, and yet a full meal may be taken, after which the most violent symptoms may supervene suddenly and carry off the patient. This is not an infrequent occurrence in cases of perforation of the stomach met with in practice, especially in young women (see Stomach, *Diseases of*). A fatal result, presenting the symptoms of poisoning, may also follow the ingurgitation of a large meal, or of indigestible substances, after long fasting, or of cold fluids when exhausted.

63. When several persons have partaken of the same meal, or of the same substances as the individual who has been attacked with severe illness, the circumstance of the greater or less disorder of all, according as a particular article was partaken of, or the escape of any or of all, with reference to the meal generally, or to any particular article which it comprised, should receive due consideration. For, when all or several of those who have partaken of the same meal suffer more or less, the suspicion of poison amounts almost to proof; whilst the illness of one merely, others who had partaken of the same article not being affected, is a presumptive indication of the disorder being owing to other causes. In estimating, however, matters of this kind, the liquors and fluids drank, and the congruous nature of these, the one with the other, and with the several articles of diet also partaken of, should be taken into the account. Although it may be inferred, that all who partake of the same poisoned dish will suffer according to the quantity partaken of, yet such is not always the case; for the poison may be unequally mixed in the food; and, as respects certain poisons, especially those most frequently employed in this manner, as arsenic, a larger quantity of the poison may prove more innocuous than the smaller quantity, for the former may be vomited, whilst the latter may be retained and act most violently.

64. It ought to be recollected that various articles of diet may produce symptoms which may be more or less severe in all who have partaken of either of these articles, and these symptoms may depend upon the nature of the article itself, and not upon the admixture of any poison. Nevertheless, the article of diet is poisonous; but there is generally in this case no criminal poisoning; for the state and probable effects of the article is generally unknown, and not suspected by any one until the effects appear. Rancid bacon, unclean or improperly fed fresh pork, dried or ill-cured meats and sausages, various kinds of fish, whether diseased or imperfectly cured, or kept too long; the flesh of diseased or over-driven animals; several kinds of shell-fish, especially when out of season, tainted
fly-blown meats, &c. are often productive of irrit
ing and depressing, or acro-sedative, effects, a
have suggested the arrangement of these articles
the class of poisons which act in this manner.

65. (*c.*) *The state of the patient's spirits or fe
ings previouslyto his seizure, and other matters whi
circumstances may suggest, should receive attenti*
Acute observation and inquiry exercised with d
discretion and proper feeling by the physician, w
often throw considerable light upon the origin a
the agent of poisoning — will indicate either t
accidental, the suicidal, or criminal nature of t
act. The acumen required in such circumstanc
as present themselves in connection with poisoni
cannot be aided by what I can say on the topic
will generally be sufficiently exercised by the we
educated practitioner of the present day; but t
following should be more particularly observed,
all their relations, as upon them depend not o
the recognition of the poisonous substance, but
treatment and life of the poisoned person, and
discovery and punishment of the guilty.

66. Matters requiring the Attention
the Physician when Suspicions of Poisoni
are excited. — When severe illness occurs in
circumstances just noticed, endeavours should
used to ascertain every particular as to circu
stances and manner of its appearances. The vess
utensil, or bottle, or paper which contained the
jurious or suspected article; the remains of s
article, whatever it may be, and of the food
drink which had more recently been taken;
matters thrown off the stomach, and the s
stances on which the suspected article has b
spilt or rejected, should be carefully examined
order to ascertain the nature of the poison; and
cases of criminal poisoning, they ought to be p
served and chemically investigated, as fully
forth in works on *Medical Jurisprudence.* If de
take place, the examination of the body as
position and external appearances should be
nute, and the contents of the alimentary canal, a
of the urinary bladder, as well as the digest
organs, and, in some instances, other organs al
should be carefully investigated, both anatomica
and chemically, in order to ascertain the act
presence of the poison, and the amount of structu
change produced by it. Numerous other matt
connected with the poisoned person, and with
appearances of the various objects around hi
both before and after death, ought to be not
but, as these have especial reference to judic
proceedings, I must refer the reader to medi
legal works, especially to what has been stated
Mr. Taylor in his "*Medical Jurisprudence.*"

67. VIII. The Symptoms caused by Poiso
cannot be duly considered until I treat of the op
ation of individual poisons. I may however rema
that the symptoms usually assigned to ma
poisons have not been observed with accura
nor described with due precision; and that th
do not in many cases admit of either accura
or precision, as they vary with the dose
the poison and with the circumstances sho
above (§§ 51. *et seq.*), to modify them more or le
It will be seen from the *arrangement* I ha
adopted in discussing the action of particu
poisons, that I have attempted to take a more
timate view of the effects produced by them than
usually been taken, and to base upon these effe

classification which may aid not only the recog-
tion of the injurious agent, but also the adoption
appropriate means for the removal of these
fects. It must have been manifest to all who
ive observed the operation of poisons, that many
rid or irritant poisons do not produce nearly the
me nor similar symptoms; that several substances
hich have been arranged as acro-narcotic poisons
oduce no narcotic effects, unless contingently;
iat vitally depressing agents have been classed
ith pure narcotics, the effects resembling nar-
otism sometimes observed being merely those of
parting cerebral functions, and that the effects
hich have been imputed to local irritation only
ive been quite as much owing to change of func-
on throughout the œconomy, or to extreme vital
pression. M. Orfila, who has devoted himself
ably and remarkably to the subject now before
e, and has performed so many experiments with
isons on the lower animals, has certainly reduced
e classes of poisons to a too limited number, and
s erred in considering many of the symptoms, as
ell as of the lesions after death, to have been
used by the poisons experimented with, instead
viewing them as partly the results of the injury
flicted on the animals the subject of experiment.
ther experimenters no less deserve the same im-
itation. When he as well as they inform us that
rtain poisons were given to dogs, that in order to
event their rejection by vomiting the œsophagus
is tied, and that, in addition to various lesions
ereby produced, the lungs were found congested
inflamed, can we be warranted in assigning the
lmonary lesion to the poison only? Is not some
rt of these or of other lesions observed, owing to
injury inflicted by the operation or by the li-
ture on the nerves in the vicinity, or on those
tuating the œsophagus or adjoining parts?

68. i. The more intimately and accurately the
nptoms of poisons are observed, the more easily
ll they be distinguished from natural diseases;
d it is of the utmost importance that the former
uld not be mistaken for the latter. The dis-
ctions will be noticed in the sequel; but I may
e state, that the features of *gastritis, enteritis,*
tro-enteritis, peritonitis, bilious and malignant cho-
a, the several forms of colic, malignant or adynamic
sentery, internal strangulation of the intestines,
angulated hernia, and perforations of the stomach
intestinal canal, may be very closely simulated
poisoning with most of the substances classed
der the heads of *acrid and corrosive, acro-sedative,*
o-alterative, and septic poisons (§ 106.); the
ticular features of the assumed disease varying
h the particular poison, the quantity taken, and
various circumstances already shown to modify
operation; and that *apoplexy, epilepsy and con-*
sions, diseases of the brain or spinal marrow, dis-
es of the heart, rupture of internal viscera or of
ge vessels, and spontaneous congestion of the
gs, may likewise be simulated by the operation
many of the poisons ranked under the classes
ressing and paralysing, exciting and exhausting,
rcotic or stupifying, and narcotico-acrid, the
ticular or special effect varying according to
circumstances just alluded to.

69. From this it will readily appear, that the
iculty of inferring, with any degree of accuracy,
particular poison which has been taken, from
effects only, is extremely great; and hence the
essity of obtaining further information as to its nature from what may remain of the vehicle in which it has been taken or otherwise employed, from the matters vomited or evacuated by the bowels, and from other sources or circumstances. In examining the symptoms caused by poisons, care should be taken to estimate as accurately as possible the remaining vital and nervous energy of the patient, to ascertain by the hand and by the ear, or stethoscope, the impulse and energy of the contractions of the heart, to observe the manner in which position affects the state and feelings of the patient, as well as the pulse, and to distinguish between effects which are truly narcotic, and those which are still more serious, viz. those proceeding from extremely depressed or departing vital manifestation of the brain. Equal care should be exerted not to mistake increased irritability for excitement or augmented power, and not to confound a very rapid or a very open and compressible pulse with consecutive inflammation, although inflammation may be actually induced, but it is of an asthenic or spreading kind, when it thus appears; for these states of the pulse may arise merely from some degree of remaining irritation, from the alterations produced in the blood, or even from a portion of the poison still irritating the organic nerves and vascular system. In fine, care should be taken not to mistake the constitutional commotion consequent upon vital shock and exhaustion for sthenic or increased vascular action; and not thus be induced to deplete and lower the system when we should calm its agitations and support its powers.

70. ii. The Duration of poisoning necessarily varies with the virulence of the poison, with the quantity taken, and the repetition and frequency of the dose, and with the circumstances stated above, as modifying the operation of poisons (§§ 51. *et seq.*). Owing to these and a variety of other causes, appertaining either to the nature of the poison or to the state of the poisoned person, and to the effects more immediately resulting from a combination of these, poisoning may be — 1st, *acute or rapid;* — 2d, *chronic or slow.*

71. *A. Acuteness* or *rapidity* of action is usually the result of the virulence, and quantity of the poison; but, owing to the greatness of the quantity, the poison may be rejected by the stomach, and the expected result may either fail, or be more slowly produced. The state of the stomach, especially as respects the contents of the viscus, may also cause a similar issue, by absorbing much of the poison, and protecting the stomach from it.

72. *B. Chronic* or *slow poisoning* may result — 1st. From the lesion caused by a large dose of an active or virulent poison, which, although insufficient of itself to produce immediate or rapid death, owing to the above or other causes, is still sufficient to occasion changes leading, more or less directly, and manifestly, to a fatal issue, *acute* thus subsiding into *chronic* poisoning; — 2d. From the nature and quantity of the substance, which had been given in such a dose at first, as to produce a slow but fatal effect; — 3d. From the repeated ingestion of small quantities, which have gradually developed structural changes, or which, by their cumulative and latent influence, have ultimately burst forth into active operation. — Illustrations of these several manifestations of the effects of poisons will appear in the sequel. Of

the writers, who have discussed the action, the effects and the treatment of poisons, none has so judiciously marked the distinction between *acute* and *chronic poisoning* as Dr. Pereira, in his very distinguished work on the *Materia Medica*.

73. IX. The General Diagnosis of Poisoning. — The Diagnosis of poisoning in the *living* and *dead body* is *general* and *special*. The *former* I shall briefly advert to; the *special diagnosis of poisons, or of poisoning*, requires a recourse to the most precise analysis, to chemical manipulations and chemical tests, and falls not within the scope of my undertaking. — i. *The general diagnosis of poisoning during life* has been partly considered in the preceding sections (§§ 28—72.), and it is more fully exhibited in the description of the several poisons about to be noticed; but further evidence is to be obtained from the presence of poison in, or the absence of it from, the articles or fluids partaken of by the patient, and from the matters vomited by him. When poison is found in the matters vomited in the presence of a medical or scientific man, the proof of poisoning is much stronger than when it is found in the remnants of food partaken of; inasmuch as it is evident from this, that the poison has actually been taken, whereas, in the latter case, it may have been put into the food with some sinister purpose, and not have been swallowed at all. Mr. Taylor justly remarks, that it should be recollected, whilst investigating a case of poisoning in the living subject, that this act is sometimes *feigned*, and at others *imputed*. It is very easy for an evil-intentioned person to put poison in food and to accuse another of having administered it, and to introduce poison into the matters, either vomited or discharged from the bowels. The detection of poison in the matters thrown off the stomach, affords no decisive proof that it has been swallowed, except under two circumstances: — 1st. When the accuser actually labours under the usual symptoms of poisoning; in which case there can be no feigning. 2d. When the matters are undoubtedly vomited into a clean vessel, in the presence of the medical man, or of some person on whose testimony perfect reliance may be placed; these matters never having passed from his view, from the moment of their rejection from the stomach until their analysis, examination, or due custody, under proper seals.

74. *A. The time at which death occurs after the first symptoms of poisoning* is of importance, inasmuch as death from natural causes rarely occurs in so short time as from poisoning. Having ascertained all the circumstances connected with the attack, and all the symptoms manifested from the moment of attack until death, the exact time which has elapsed from the former period until the latter should be correctly estimated, as one of the elements for the formation of an accurate opinion as to the existence or non-existence of poisoning, and even as to the particular cause or agent of it. When a poison has been given in large quantity, the result may be supposed most likely to occur in the shortest time in which it is usually found to act. But the circumstances pointed out above (§§ 52. *et seq.*) may delay its action or its ultimate effects. Poisons not only differ from each other in the period they take to produce a fatal result, but the same poison differs remarkably in this respect in different persons, although the several
circumstances, as far as they may be known, ap
pear to be nearly the same. Hence it is difficul
to determine the shortest period in which a give
poison will destroy human life, when swallowe
in large quantity; and little reliance can b
placed upon the circumstance of an impute
death from a certain poison having occurred to
rapidly or too slowly, as a proof of its not havin
been taken; for, an empty state of the stomach
the retention of the poison, and an exhauste
state of the poisoned person will accelerate, an
a full stomach and free vomiting will delay, th
fatal result. On this subject Mr. Taylor states
that a large dose of strong *prussic acid, i. e.* fro
half an ounce to an ounce, will destroy life i
from ten to twenty minutes. In one case of th
kind of poisoning, the particulars of which I ha
occasion to investigate, death must have take
place in about five or six minutes. If the perso
who is poisoned by this acid survive an hour, c
even less, there are hopes of his recovery. *Oxal*
acid may prove fatal, in the dose of from half a
ounce to one or two ounces, in a period varyin
from ten minutes to an hour,— and if the poiso
be not dissolved when swallowed, the period ma
be very much longer. The *strong mineral aci*
destroy life, in large doses, in from twelve or si
teen hours to twenty-four hours. *Arsenious aci*
usually is fatal, in periods varying from twel
hours to two or three days; but it may cau
death in much shorter periods — in one, tw
three, or four hours — an hour being about t
shortest time. Mr. Taylor, however, remark
that there is nothing to prevent arsenic from d
stroying life in one hour: and that, in a cas
which was most probably one of poisoning b
arsenic, death took place in half an hour. T
shortest time in which *Opium* has been said to d
stroy life is three hours; but the period usual
varies from six to twelve hours; but with it,
with all other poisons, the fatal issue may
protracted long beyond the limits mentioned
the more common period.

75. Whilst the rapidity with which death fro
poison may take place is duly recognised by bo
professional and other persons, the fact that t
same or other poisonous substances may occasi
death slowly as well as suddenly, and even
slowly as the most chronic diseases, has not bee
sufficiently regarded, and the evidences connect
with these effects have not been sufficiently, even
at all, investigated. There can be no doubt, — a
several instances of the fact have come under m
own observation in the course of practice, —
powerful medicines — of poisonous substances-
having been too frequently or too long prescribe
in what was then considered full medicinal dos
— now more justly estimated as dangerous qua
tities, and the consequences have been attribut
to the progress of disease, to idiosyncrasy, or
other causes than the real. To those slow
chronic operations of poisons I shall advert wh
treating of individual poisons. It should n
however, be overlooked that disease of the hea
and apoplexy may produce death as suddenly
a most virulent poison; and sometimes even mo
suddenly than any poison, with the exception
hydrocyanic acid. Death may occur almost i
stantly from organic disease of the heart, and b
rarely within an hour from apoplexy, this ac
being, perhaps, the only substance, unless in t

very rare instances above noticed, which occasions death in so short time; but, unless it be employed to commit murder, some traces of this poison are usually found at hand.

76. *B.* It may so happen, that the *duration* of the symptoms is the only, or the chief, medical diagnosis of poisoning. In this case there must be both difficulty and uncertainty; and an opinion should not be formed without further aids, although a careful review of all the known circumstances of the case, and of all the appearances about the person poisoned, may lead to very probable, and even correct inferences. In *acute poisoning*, or when life is rapidly destroyed, the diagnosis is generally more easy than in the *chronic*, or when death is occasioned by the conecutive effects of poison. But in many, even of he chronic cases, the cause of death is more or ess manifest; as when a person who has swalowed a mineral acid, only partially recovers, and ontinues for many months afterwards to complain f stricture of the œsophagus, of which he ultimately dies. More frequently, however, it is most difficult to assign, with legal strictness, the ltimate result to the primary agent — to connect he fatal issue with the changes first produced by he poison, in cases of chronic poisoning; for umerous fortuitous influences or contingent gents may have intervened to reinforce, modify, ggravate, or otherwise affect, the earlier alteraons, and thereby to subvert the regular succeson of morbid phenomena from the first impreson of the efficient cause until the fatal issue.

77. It is chiefly in a medical and strictly ractical point of view, that the slow effects of oisons — that *chronic and slow poisoning* — beomes interesting, and even most important, — a rm of poisoning altogether neglected by medical urists, because rarely admitting of proof which may not be impugned. Corrosive sublimate, odine, the arsenical solution, strychnine, digilis, colchicum, and many other substances, may verally be given in doses so large, or for so long time, either with a beneficial or with a criminal tention, as to destroy life after a more or less olonged period. In these cases, the slow operaon of the poison may occasion symptoms which ay not be recognised as the effects of the medine; or little or no effect may appear for a conderable period, until it suddenly breaks forth ith such violence as to threaten, or even sudenly to destroy, the life of the person to whom e substance has been thus administered. But e effects may be both marked and characteristic the poisonous substance prescribed, and yet be ewed as a part of the disease, and even identified ith the disease which it was employed to remove. hope, however, to direct a more especial attenon to this matter in the sequel, than it has therto received.

78. ii. *The diagnosis of poisoning furnished by st mortem appearances,* has been very ably condered by the recent writers on medical jurisudence. Mr. Taylor, whose accuracy is enerally commendable, remarks that, "in relaon to external appearances, there are none inditive of poisoning upon which we can safely rely. was formerly supposed that the bodies of persons ho were poisoned, putrified more rapidly than ose of others who had died of natural disease; nd evidence for, or against poisoning, was at one time drawn from the external appearance of the body. This is now known to be an error: the bodies of persons poisoned are not more rapidly decomposed, *cæteris paribus*, than those who have died a sudden or violent death from any other cause whatever." (p. 42.) To the above too general and positive inference, the following exceptions may be made: — 1st. That external marks or changes may be left on parts of the external surface, as the mouth, face, neck, hands, and near the outlets of the natural canals, which not only may indicate poisoning, but even the particular substance employed, as several of the corrosive and irritant poisons. 2d. I have had proofs furnished to more than one of the senses — namely, to sight, smell, taste, and touch, — that certain poisons, which I have classed under the head, *septic and disorganising*, actually produce a more rapid solution of the vital and physical cohesion of the tissues, or a more rapid progress of those *post mortem* changes either preceding or constituting putrefaction, than is usually met with, all the circumstances being otherwise the same. 3d. These senses have furnished me with evidence, that certain poisons will sometimes delay these changes, at least in some parts, and even about the outlets of mucous canals.

79. *A.* The several *internal*, and especially the *digestive viscera*, however, are the quarters in which the physician should endeavour to ascertain the fact of poisoning, in defect or in aid of other evidence. The mouth, throat, œsophagus, stomach, and intestinal canal, often furnish proofs of it; especially when acrid, corrosive, or irritant poisons have been employed, and although these proofs consist of the most severe lesions, and even of almost complete disorganisation, they are often insufficient of themselves to show the particular poison which has been swallowed, or even the action of any poison at all, without proof of its actual presence, or other additional evidence, so completely do these lesions assume, in many instances, the appearances consequent upon certain natural diseases. Much of the difficulty of distinguishing the effects of poison from the consequences of disease, is owing to the period which has elapsed from the time of death until that of making the examination; for, during that period, various *post mortem* alterations supervene, which obscure certain of the more intimate changes existing at the moment of, or just previously to dissolution. Much of the softening, of the corrosion, or of the dissolution of tissues, found twenty, twenty-four, or thirty-six hours after death, has taken place during that period; and even the changes observed in the colour of the blood and of the several membranes and tissues, have chiefly occurred subsequently to death. In cases where the poison is of a virulent, septic, or of a chemical nature, as the strong mineral acids, or the alkalies, and when these have not been entirely thrown off during the short period of life following their ingestion, it may reasonably be supposed that the portion remaining in contact with the tissues will produce some change of the structures, even after death — will affect the dead textures as we perceive such substances to act in some of the operations of domestic economy, and either hasten or delay the solution of vital or physical cohesion, or otherwise change the appearance and condition of the textures by combining more or less intimately

with them. In cases proving thus rapidly fatal, many of the poisons, especially the corrosive, the mineral, or saline, will be found either in the contents of the stomach or bowels, or in contact with the villous membrane of these viscera, or may even be detected by chemical analysis in the coats of the stomach, or even in the liver, or in the blood.

80. Death however may take place suddenly, and various morbid changes may be detected in the digestive canal, resembling, or even identical with, those produced by certain poisons; but unless the poison be detected in the matters vomited during life, or in the contents of the stomach, or of other parts of the canal, or in the blood, or in the substance of the viscera, the evidence furnished by these changes alone is altogether inconclusive; for similar changes may occur about the time of dissolution in cases of sudden death, or previously, or even subsequently to death, in various diseases, not necessarily causing the confinement of the patient until shortly before, or even not until a few hours before death. To these alterations I now more particularly advert.

81. *a. Redness* of the villous membrane of the stomach and intestines is generally caused by acrid, corrosive, or irritant substances; but it is not of itself a sign of poisoning upon which much dependence can be placed; for it may be inconsiderable where corrosion and disorganisation, caused by the most corrosive poisons, are the greatest; it usually characterises all inflammatory diseases of the digestive canal, and it may be very remarkable in cases of sudden death from accident, external injury, or other causes producing fatal shock, and independently of any existing disease, or of the ingestion of any irritating agent, as shown by Dr. Yelloly, and subsequently confirmed by numerous observers. It has been shown — 1st. That vascular congestion of the villous surface of the stomach, with a florid or dark-red hue, is not a proof of disease, and is not inconsistent with a state of health at the time of dissolution or shortly before it.—2d. That this state of redness and congestion found in some cases after death, is not even proof of gastritis. — 3d. That it is not alone an indication of the ingestion of a poison, or even of any irritant. — 4th. That the vascularity of the villous membrane is an injection of the venous capillaries and veins, the redness depending, in the instances observed the soonest after death, upon the arterial character of the blood congesting the venous capillaries; and, in those observed the latest after dissolution, upon the transudation of the colouring matter, or to the post mortem changes.

82. *b.* It is obvious that *redness*, as well as *congestion* of the villous membrane of the stomach, is liable to various changes during the time elapsing from death until examination. These changes are not only such as take place in ordinary circumstances during this time, both in the blood itself and in the tissues, but those also which are more especially caused by the morbid impression of the poison by the treatment resorted to, and by the action previously and subsequent to dissolution of the poison, upon the textures and upon the blood itself. When the redness is caused by poisons which not only irritate, but arrest more or less the putrefactive process, then it may be inferred to continue the longest after death. Mr. Taylor found it continue in the stomach and duodenum of the exhumed body of a man poisoned by arsenic, twenty-eight days after he had been interred.

83. *c. Ulceration* of the internal surface of the stomach is seldom observed in cases of poisoning, and never unless in those which have been manifested by well-marked symptoms previously to death. Ulceration is more frequently caused by arsenic than by any other poison, and this poison may even be found lodged in the edges of the ulcers, which present more generally the appearance of small circular abrasions of the villous membrane, which is more or less generally inflamed, or inflamed in the intervals between the ulcers, the inflammation sometimes extending to the duodenum and intestines. Ulceration from disease is not unusual (see Stomach—*Diseases of*); but, in these cases, the inflammation surrounds the ulcer, which often has tumified or thickened margins, whilst the ulcers produced by poisons present different appearances. The history of the case before death will generally enable the physician to determine to what cause the ulceration should be imputed. But *ulceration* should not be confounded with *corrosion*. Ulceration, although a morbid, is also a vital process, in which the secretions, the nutrition, and the absorption of the part, are disordered, consecutively of inflammation. Corrosion is a disorganisation of the intimate structure by a chemical action, which destroys the vital properties, and dissolves the vital cohesion of the textures; the corroding substance combining more or less with the tissues upon which it acts. Ulceration requires time to produce it; corrosion takes place instantaneously or almost immediately (see more fully on this subject, *Digestive Canal*, §§ 36. *et seq.*).

84. *d. Softening* of the inner surface of the digestive canal is a frequent effect of poisons, and is often found associated with corrosion, but is more diffused. Softening may be often viewed as merely a lesser grade of corrosion, especially when it extends to the several coats. It is generally most remarkable in the stomach, but, when it is limited to this organ, it cannot be considered as a consequence of poisons unless the inference be supported by further evidence, inasmuch as it is, when thus limited, most commonly the result of disease. When it is caused by poisons, corrosions of some parts often accompany it; and the softening is frequently extended from the fauces down the œsophagus, into the stomach and duodenum. This change should, however, never be considered as a result of poison, unless the poison be detected in matters which have been vomited, or in the contents of the digestive canal, or in the coats of this canal; for it is, even when thus extended, a very frequent result of disease, more especially in infants and children.

85. *e. Perforation* of the digestive canal is sometimes found, upon dissections, after the ingestion of poison, but it is also not unfrequently a consequence of disease. When caused by poison, it is commonly merely the extension of corrosion through all the coats of the viscus, and is most frequently found in the stomach, but it occurs in rare instances also in the duodenum and œsophagus. Perforation, like all other alterations of the digestive canal, although preceded by symptoms of poisoning, is not a proof of this act, unless the other proofs just noticed be also present. When it is a consequence of disease it

is produced by ulceration, which rarely or never occurs in cases of sudden or rapid poisoning, ulceration being the result of a morbid process requiring some time for its production: but this topic will be noticed in the sequel (§ 114.), and it is fully discussed in the Article DIGESTIVE CANAL.

86. *f.* The villous coat of the stomach may present other lesions which may furnish stronger evidence of poisoning than any of those already noticed. These are *corrugation*, *partial detachment*, *dark discolouration*, resembling *charring*, of the villous membrane; *ecchymosis*, or *small extravasations of dark coagulated blood*, underneath this membrane, which is raised into small *elevations*, and a *dark red or livid engorgement of the capillaries* and *veins*. These changes are most frequently found in the stomach; but they are sometimes seen, although in a less marked degree, in the duodenum, and even in other parts of the intestinal canal. Some degree of *induration* of the villous membrane of the stomach has been found in some cases after poisoning with sulphuric acid.

87. *g.* A *post mortem* change, which has been variously denominated, and especially as *spontaneous softening*, *pulpy degeneration*, and *spontaneous perforation* of the coats of the stomach, is met with, upon dissection, in rare instances. When this alteration is found in a patient who evinced no indications of gastric disease during life, and when it is unattended by any inflammatory appearances, the coats being gelatinous or pulpy, it may then be viewed as a consequence of the action of the gastric juices after death, as first stated by JOHN HUNTER, and rendered probable by the more recent researches of CARSWELL, BURNS, SHARPEY, and others. But a nearly similar change may be the result either of poisons or of disease. In the former case, which will be more particularly noticed hereafter, evidence of poison will generally be found either in the organ itself, in its contents, or in the matters vomited; and, in the latter, gastric disorder will have been manifested previously to dissolution, and the pulpy softening or perforation will be accompanied with some indications of inflammatory irritation, although in the aphthous, mesenteric, gastric, and gastro-enteric diseases of children, and more especially of infants, about the period of teething, weaning, and when improperly fed, softening, and even perforation of the stomach will occasionally be found, inflammatory appearances either not existing, or if they have existed, having altogether disappeared soon after death (see DIGESTIVE CANAL, §§ 35. 42.).

88. iii. The other *means of diagnosis*, so frequently adverted to above, namely, *the detection of the poison by chemical analysis and tests*, and the support which *moral circumstances* may afford the evidence, belong more especially to the medical jurist. — *A.* The *moral circumstances and appearances*, falling under the observation of the physician, should always be carefully remarked by him, not only as they may suggest to him the existence of poisoning, and thereby direct his attention to every point and aspect of the case, but also as they may be required from him in the judicial investigation, in which he will appear as a principal evidence. In every instance admitting of the least suspicion of poisoning, it is the duty of the medical man to ascertain, as fully as in his power, the whole range of symptoms or morbid phenomena; to observe assiduously the progress of the symptoms, from the moment they came under his notice until their termination in recovery or in death; to obtain information from those best able to furnish it, as to the circumstances connected with the origin and progress of the seizure to trace their origin in obvious or imputed causes; to connect them, as far as may be done, with such causes as usually produce similar effects, and to determine, as far as possible, the presence of such causes in the case in question; and, if death take place, to note carefully all the changes observed in the dead body.

89. The importance of care and circumspection in these matters is shown by the fact that, although instances often occur in which the diagnosis of poisoning cannot be established, unless the poison be actually detected, to the satisfaction of the tribunals, still it may be sufficiently so to warrant the physician in the adoption of such measures as the symptoms will suggest for the recovery of the patient. And it should be recollected that, even in the event of death, there are many poisons which, owing to their nature, cannot be detected by any analysis or test, whilst there are others quite susceptible of analysis, which may be so changed or mixed with substances, alimentary and others, as to escape detection by chemical agents, either in the vomited matters, or in the contents of the viscera, or in the blood. In many such cases, there may be satisfactory proof of the persons having been poisoned, and, in some, conviction has actually followed, although the poison has not been detected in the dead body; the symptoms, the appearances after death, and the moral circumstances being sufficient to establish the fact. Moreover, due attention to every circumstance connected with the history and progress of the case, as insisted on above (§ 61—72.), will enable the physician to ascertain, even during the life of the patient, the particular poison employed, or, in default of this, the class of poisons to which it belongs, and to adopt a plan of treatment, which, if not successful, may nevertheless be appropriate to the symptoms and circumstances of the case. In the event of death, also, he will be more surely directed in his search for the substance which caused it, and his analysis and tests will be chiefly suggested and guided by the changes which the *post mortem* examination will disclose.

90. *B.* As soon as suspicions of poisoning are excited, or indications of it evinced, the *portions of the substance* which has produced the symptoms should be sought for on the persons of the poisoned and of the suspected individual; and if the substance cannot be found in the pure state, or in that of mixture with other substances, a chemical analysis should be instituted of the *several articles, fluid and consistent, of which the patient last partook*; and this inquiry should be full and satisfactory; for one portion of a dish may be poisoned and not the other, — the gravy and not the meat, — the sauce and not the fish, — the pie-crust and not the fruit, &c. &c. The salt may contain arsenic, and nothing else at table may contain this poison; and so on as respects various articles, and as regards several poisons. *The matters vomited*, and those *evacuated*

from the bowels, the former especially, should be chemically examined, or tested, as soon as possible, and during the life of the patient, whenever there is doubt as to the nature of the poison, in order that the treatment may be as appropriate as possible; but as tests, and a chemical laboratory, cannot be carried about with the physician, the physical appearances and characters of the matters thrown up should be carefully observed, in connection with the history of the case, and the existing symptoms, and the treatment directed accordingly. The vomited and evacuated matters ought, however, to be carefully preserved for chemical analysis, and those thrown off the stomach should be compared with *the matters found in the stomach and intestines after death.* These matters, with the digestive canal itself, and often with the collatitious and other viscera, should then be made the objects of chemical research, in order to satisfy the ends of justice. But this subject does not fall within the scope of this work.

91. X. Diagnosis of Poisoning during Disease. — This is a topic which has been slightly adverted to above (§§ 59, 60.) as one which has received but little attention from medical writers, and which hardly admits of satisfactory elucidation. — (*a.*) *Poisoning, either criminal, accidental, or suicidal, whilst the poisoned person is the subject of disease, or under medical treatment,* has occurred oftener than has been commonly suspected. Poisoning in these circumstances has certainly been attempted, and even accomplished, much more frequently than it has been detected, owing,— 1st. To the difficulty of determining the symptoms during life, and the changes after death, which belong respectively to disease and to poison: — 2nd. To the facility with which a poisonous substance may be added to, or substituted for, the patient's medicine, without suspicion being excited: — 3rd. To the symptoms caused by the poison being mistaken for the severity and progress of the disease; the previous duration of illness and other circumstances preventing any inquiry as to the cause of death; — and, 4thly, to the circumstance of the poison which has been employed not admitting of chemical detection, either from its nature, or from the state of admixture or combination, in which it has been taken. The difficulties in forming a correct diagnosis when a person is poisoned, in the course of disease, is heightened by the acuteness and severity of the malady; and when a poison has been administered, whose operation is such as closely to resemble, or as to appear, an aggravation of the symptoms of which the patient had complained, then the diagnosis can hardly be established, unless by the detection of poison in the matters vomited or in the evacuations from the bowels or kidneys, or in the body after death.

92. (*b.*) When a patient is suffering from diseases of *debility*, or is labouring under *exhaustion, anæmia*, the effects of *losses of blood*, and *chronic discharges*, poisoning is more readily effected, especially by depressing, paralysing and acro-sedative substances, than in other circumstances; and the effects, especially when the poison has been administered in successive doses, or at intervals, are not readily recognised or distinguished from the progress of the malady. In these states also of the patient's health, more especially when hæmorrhage or vascular depletions have preceded the ingestion of poison, absorption of it into the circulation more readily and more injuriously takes place, and the patient furnishes much less of vital resistance to its fatal operation.

93. (*c.*) I have had several reasons to believe, from the history of cases, &c., that poisoning has been both attempted and accomplished in the *puerperal states*, especially during the first two or three weeks after delivery; the operation of the poison having been mistaken for one or other of the diseases incidental to that state; and having been such as not to be distinguished from such disease, unless by the discovery of the poison, aided by various moral considerations.

94. (*d.*) *Acute diseases of the digestive canal and associated organs* may have existed for a longer or shorter time, and irritant, acro-sedative, or corrosive substances, may be administered accidentally, criminally, or from ignorance, which may so aggravate the attack as to render it dangerous or fatal. The heroic practice of medicine, so general and so much lauded, even within the range of my own observation and recollection, by those who concealed their ignorance by the swaggering boast of being "practical men," and that the literature and science of medicine were beneath their notice, as they were certainly beyond their reach, has furnished me with several proofs of actual poisoning having been committed by those self-sufficient and illiberal medicasters in the treatment of the diseases just mentioned. I have often seen, and had still more frequent occasion to remark, in medical writings, the recommendation of the most irritant purgatives, in excessive doses, in cases of enteritis, or in dysentery, with the intention of removing obstructions, or of expelling matters which had no existence, the substances prescribed either causing inflammation, or increasing that which already existed, and urging it on to a fatal issue. Irritant, corrosive, acro-sedative, or acro-narcotic substances, given either in poisonous quantities, or in so frequent doses as to become poisonous, in the course of these maladies, could not readily be recognised by their effects in these circumstances, nor even by chemical research, if the employment of them were concealed, and the mischievous tendency of their operation were not known.

95. (*e.*) Even in *chronic diseases* of the alimentary canal, especially *chronic dysentery*, or the *chronic diarrhœa* of warm climates, the exhibition of repeated doses of acrid purgatives, or of other medicines, with erroneous views of the nature of the case, and of the operation of the substance prescribed, has converted a complaint by no means serious into one which has become rapidly fatal. I have seen this practice in various places, and I could adduce numerous cases, in which it has been recorded in published works, or in the case-books of hospitals, furnishing useful, although fatal beacons, in navigating the shoals of medical practice.

96. (*f.*) Persons already the subjects of *diseases of the heart* or *of the lungs*, may be cut off by a criminal, or an incautious use of various sedative, acro-sedative, or acro-narcotic substances, especially when taken in too frequent doses, or continued for too long a time. Digitalis, tartar-emetic, colchicum, aconite, &c., may be given in these diseases so as to produce a fatal result, without the symptoms being suspected as being

caused by poison, or the result being viewed otherwise than as the *natural termination of the disease;* and the examination of the body after death, and chemical research, will fail of discovering the cause. From 1810 until 1830 — a period abounding with medical cant, heroic and empirical practice, and disgusting dogmatism — certain substances came into very general use, from the abuse of which much mischief accrued, even within the sphere of my own observation; calomel, tartar-emetic, colchicum, digitalis, and more recently, iodine, were often given in such excessive doses, or continued in smaller quantities for so long a time, as to induce more serious diseases than those for the cure of which they were resorted to. The natural malady had the efforts of nature to aid them, if these efforts had been developed or duly directed; but the substances which were employed subverted vital energy, suppressed the natural efforts, produced morbid actions and organic lesions, which were mistaken for the course or turn of the primary malady; and, when they failed of causing death, occasioned a new or different form of disease. A patient had disease of the valves of the heart and dropsical effusion; large doses of infusion of digitalis were prescribed to act as a diuretic, and this effect was sometimes produced, and a certain amount of ease resulted; but quite as frequently the disease was arrested in a different way; the action of the heart was so much weakened by this treatment, as to become insufficient to overcome the obstacle to the circulation, and death was the consequence. Early in the present century, colchicum and tartar-emetic were lauded as anti-phlogistic remedies, as they certainly are, and were often brought in aid of the copious blood-lettings and various other empirical means unduly lauded by the ignorant pretenders and writers of the day. More than one writer of great but ephemeral popularity, extolled these substances, and prescribed them in excessive doses for the inflammatory and other diseases of the lungs and bronchi, both of children and adults; and I am confident that, in the former class of patients more especially, they were employed in such quantities, and for so long a time, as to prove fatal to more than they cured. The vital resistance, which so successfully opposes the progress of disease in most instances where there is no constitutional vice, was completely overthrown by these and similar means; and whilst vitality was either suppressed, impaired, or altogether destroyed by them, no opposition could be furnished to the unfavourable progress and consequences of the disease.

97. This subject might be pursued with reference to the diseases of other organs, and to various constitutional and febrile maladies; but I have, perhaps, stated what may be more than sufficient to rouse the attention of those who are not sufficiently aware of the importance which ought to be attached to it; well-educated, closely observing, and, in virtue of these, the only experienced practitioners, hardly require to be reminded of the several matters which these suggestions will undoubtedly recall to their recollection. Any further notice which this subject may require, will be taken of it in the discussion of the effects and treatment of individual poisons.

98. XI. The General Principles of Treatment. — What I have advanced will show the importance which should be attached to the operation of poisons, as forming the basis of rational measures of prevention and cure. Before I proceed to notice the injurious operation of particular poisons, and the treatment which each appears to require, I shall first offer a few remarks upon certain intentions and principles of treatment, which are more or less generally applicable, according to the mode of poisoning which has been resorted to. These brief remarks will refer to the *prevention*, to *the counteraction*, and to *the removal, of the effects of poisons.*

99. *A. Prevention of the action of poisons* may be attempted in certain circumstances, and may succeed either partially or completely. A poison may be swallowed, and, if the means be immediately resorted to, it may be removed before it has acted, or acted to a very injurious extent. — (*a.*) The means of removal are *emetics* and the *stomach-pump*. Of the former, but little may be said more than that they often fail to act, owing to the paralysis, or want of power of contracting, experienced by the parts concerned in the act of vomiting from the action of the poison which has been swallowed. It is therefore requisite to give powerful and warm emetics, as the sulphate of zinc, with capsicum, mustard, &c., according to the nature of the poison which has been taken; the intention being to excite the organic nervous influence at the same time that the discharge of the poison is procured, when this latter is of a sedative or narcotic kind.

100. (*b.*) The removal of the contents of the stomach by means of an apparatus, such as that now in general use, under the name of *stomach-pump*, although suggested by several persons long before the practicability of such means was actually put to the test, was first demonstrated, as being efficacious in cases of poisoning, by Messrs. Jukes and Scott in 1822, then medical practitioners in Westminster; and, in many instances, it is the most efficient and certain mode of removing the poison; but it is liable to certain objections. The perforations in the end of the tube may be obstructed, or the canal of the tube choked by the alimentary substances present in the stomach, and the withdrawal of the contents and of the poison will be thus delayed, or even prevented, if fluids be not injected into the stomach by this tube, in order to remove the obstruction and dilute the contents of the viscus. In cases, therefore, in which imperfectly dissolved poisons have been taken, or where a greater activity may be imparted to the poison by dilution or solution, the recourse to injections may be injurious, and the use of this apparatus may be less efficacious, in these circumstances, than an active emetic, which often empties not only the stomach, but the duodenum also, and increases the secretions of the villous surface and of the liver, thereby washing off the adhering portions of the poison, or preventing the imbibition and absorption of them. When, however, a judiciously prescribed emetic fails to act, or in cases in which an emetic may be inferred to be inactive, or in other doubtful circumstances, recourse to the stomach-pump should not be a moment delayed.

101. The removal of the poison is an indication which is not confined to cases in which the substance has been swallowed. It is equally important in instances of *external poisoning*, the ob-

ject being the prevention of the imbibition and absorption of the poison. There are two modes by which this intention may be accomplished. — 1st. The application of a ligature above the part which has been inoculated with the poison, or between it and the trunk, so as to arrest its absorption and contaminating influence, and the diffusion of its impression by means of the nerves. This mode of prevention has been in use from the earliest ages, and is practised by most savage tribes. It is obvious, however, that this practice would be inefficacious if nothing further were attempted; and that the poison would act as soon as the ligature was removed. The great advantage of the ligature is to delay the operation of the poison until it can be either generally or partially removed by suction, or counteracted by local applications and internal remedies. Many substances are poisonous when applied to the skin, denuded of its cuticle or when inserted in a wound; and may yet come in contact with the mucous surface of the lips and mouth without risk, if there be no abrasion of the epithelium: and hence *suction* of a poisoned wound with the mouth, after the application of a ligature, where this can be applied, or suction without this antecedent in other circumstances, has been resorted to from the earliest ages, and is still practised in all uncivilised countries. The ligature, by arresting the return of blood, whilst arterial action increases the capillary injection, and even augments the discharge from the wounded surface, thereby favours the removal of the poison by suction, or by any other mode of exhausting the air over the part which may be adopted.

102. The intention of removing the poison introduced into a wound by exhausting the air over the wounded part was strenuously contended for by the late Sir D. Barry; and for this purpose he advised the application of *cupping-glasses;* and in situations where a ligature cannot be applied, cupping-glasses are the best means of sucking out the poison, or the blood and serum contaminated by the poison, from the part. But not only is absorption thus prevented, and the poison withdrawn, but the injurious impression made by the substance on the nerves of the part is prevented from extending, owing to the pressure produced by the margins of the glasses. We have certainly not improved in modern times upon the treatment of poisoned wounds recommended by the ancient Greeks, Romans, and Arabians, as Mr. Adams has fully shown. Nicander, Celsus, Dioscorides, Galen, and nearly all the Arabians, advise the application of a ligature, and then the extraction of the poison by sucking, by cupping instruments with scarifications, cauteries, escharotics, &c. They likewise prescribed remedies with the view of altering or counteracting the effects of the poison. If the poison was of a depressing kind or produced cold, they resorted to stimulating and heating medicines; if it was of an opposite nature they gave refrigerants; but they most frequently had recourse to articles of a heating nature, as they believed that the greatest part of poisons destroyed life by producing cold.

103. *B. The counteraction of the operation of the poison* is the next indication; and it often succeeds in respect of some, especially if attempted soon after the poison has been swallowed or applied; and the substances which thus counteract the poison have been called the *antidote,* or *counterpoison.* The antidotes of some poisons, especially of some mineral poisons, are well ascertained; and it is chiefly to chemical science that we are indebted for this knowledge; but we know but little of the means of counteracting many other poisons, especially those of the vegetable and animal kingdoms. Those antidotes whose actions have been ascertained are, 1st, those which form chemical combinations with the poison that are not injurious, as alkalies with acids, &c.; and, 2d, those substances which deprive acrid and corrosive poisons of their properties, or which form insoluble compounds with the poison. Certain antidotes are complete and efficient if administered sufficiently early, or before organic or vital changes of a dangerous nature have been produced; others are only partially efficacious, as ammonia in cases of poisoning with prussic acid.

104. Means which enable the system to resist the action of a poison may be ranked in this category. Those which prevent the absorption of the poison, as several of those which have been already noticed, or such as counteract the depressing influence of certain poisons, as the spices, cayenne-pepper, aromatics, spirituous liquors, &c., in cases of animal or fish poisons, are often more or less efficacious. When poisons are taken in large quantities, the œconomy, especially the nervous system, sustains more or less of shock; and, if appropriate means be immediately used to aid it in rallying, a greater degree of vital resistance will be opposed to the progressive advance of the effects. From these remarks, it may be inferred, that, in our endeavours to counteract the operation of a poison, we should attend to the following cautions, — 1st. To avoid all means which may render the poison more soluble, or which may dissolve it, or add otherwise to its activity; thus we should not give wine or vinegar soon after a large quantity of opium has been taken: — 2d. To avoid such measures as may promote the absorption of the poison into the circulation, as bloodletting; — 3d. In cases of poisoning by depressing agents and narcotics, or such as destroy nervous power and irritability, medicines, emetics or others, which act in a somewhat similar manner, as tartar emetic, ipecacuanha, &c. should not be exhibited. — 4th. That the shock sustained by the ingestion of virulent poisons should be counteracted by energetic means, of a stimulating and restorative kind, administered according to the peculiarities of the case; and that vomitings, however frequent, should not prevent the exhibition of these, in cases of narcotic, depressing, and animal poisons, or even in others, unless the vomitings proceed from the action of corrosive and very acrid poisons.

105. *C. The removal of the progressive effects of the poison, and opposing the tendency to death,* remain to be put in practice either when the first and second intentions cannot be attempted, owing to the time which has elapsed from the exhibition of the poison, or after one or both have failed. To be successful in these circumstances, the physician should be well acquainted with the physiological action of poisons, and with the phenomena by which this action, in its progressive phases, are indicated—with the symptoms and progress of the mischief, and with the pathological states produced by individual poisons, and more immediately inducing death; — he should be acquainted

with the operation of active substances on the œconomy, both in medicinal and in poisonous doses, in order that he may duly recognise the nature and effects of the latter doses, and may apply the former to the removal of these effects, according to rational indications. That a knowledge of the physiological and pathological actions conjoined, consequent upon the exhibition of a poison, and of the ultimate changes of which death is the result, is of the utmost importance to the physician, is evinced by the fact, that it is this very knowledge which, in extreme cases, and after other' indications and means have failed, enables him to devise further measures which may still be successful. Thus, if it be ascertained that the poison, in the advanced course of its effects, has produced paralysis of the muscles of respiration, or spasm or closure of the glottis, means directed to the continuance of respiration, or the production of artificial respiration, may yet save the patient. This fact has been demonstrated on several occasions, and other analogous illustrations of the principle will appear in the sequel. It is obvious that nothing further can be advanced with due precision under this head, until the effects of the individual poisons are considered.

106. XII. CLASSIFICATION OF POISONS. — The *effects*, and the ultimate *results of poisons* being so diversified and complex—many producing nearly similar or variously modified effects, and the same substance evincing very different phenomena in different persons and circumstances, the effects of a single poison being thus neither constant, nor always distinctly developed, — it follows that a satisfactory *classification* of them can hardly be expected. Indeed, all attempts at classification must be conventional; for if we endeavour to arrange them conformably with their physiological action, or according to the systems or tissues on which each appears especially to act, we shall find, as must be manifest from what I have already advanced, that many of them act upon, or through the media of, two or more systems, and upon several functions; and that the substance which affects one person, or one system, in a more or less definite manner, operates differently in others, the effects varying with the circumstances shown to modify the operation of poisons (§§ 51. *et seq.*). Although we should have regard to the succession of changes consequent upon the ingestion of a poison until the ultimate results appear, still we have here comparatively little concern with those which follow the employment of the same substance in small or medicinal doses. It is the deleterious action which should be observed, and the best means of counteracting that operation, and of averting or removing its usual effects. The question is not whether or no opium, morphia, or hydrocyanic acid, &c. be stimulants, sedatives, or narcotics, or entitled to other appellations, which have been given them; but it is practically, to which of these properties, or to what other property, are the injurious effects chiefly owing, and by what successive changes are these ultimate effects produced? It is principally the progressing and advanced alterations of vital function or of structural lesion that are to be arrested and remedied, and it becomes most requisite that we should not only know the nature of these changes, their whole extent, and their probable issue, but also that we should arrange those substances which operate in similar or nearly similar modes, and induce similar results, in order that the treatment which may be found successful against one poison belonging to this category may be advantageously extended to the others. That an arrangement of poisons should be adopted according to this principle — with reference to the operation and effects of these agents, and that the classification may thus be made practically useful in a therapeutical point of view, is shown by the extension by the author of the affusion of cold water on the head and neck to cases of poisoning by various narcotic and sedative poisons. The cold affusion had been employed for ages for intoxication and insensibility caused by inebriating liquors; and the author, having repeatedly seen it thus employed with success, had recourse to it in 1821, in a case of poisoning by *opium*, published in 1822 in the *London Medical Repository* (vol. xviii. p. 29.), and in 1825 he recommended, in the work now named (vol. xxv. p. 40.), this practice in cases of poisoning with *prussic acid*, and with other poisons belonging to the same classes as those just named; and this treatment has been found most efficacious in states of vital depression and insensibility produced by narcotics and sedatives generally. The propriety, therefore, of adopting a classification based upon the most prominent operation and effects of individual poisons, as being the most practically useful, must be apparent. In venturing to recommend an arrangement different from that which has been suggested by Dr. PARIS, and from that advised by FODÉRÉ, and adopted, with certain modifications, by ORFILA, and still further modified by CHRISTISON, DEVERGIE, BECK, TAYLOR, and several other recent writers*, I have been influenced chiefly by the firm conviction, entertained without any doubt from the first enunciation of these classifications, that they were inadequate and inaccurate; inasmuch as the principal operation and effects produced by several virulent poisons had no place given them, or did not fall within the scope of the arrangement, and as various substances were classed under heads to which they could not with due accuracy be assigned, and were hence viewed as productive of effects of which they were altogether innocent, whilst those which they did actually produce were not at all, or not sufficiently recognised. Thus prussic acid and the prussiates were arranged in the class narcotics, and numerous substances were classed as irritants, whose operation in this respect was the least considerable of the several effects produced

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* *The arrangement proposed by Professor* FODÉRÉ was as follows: —

i. Septic poisons.—ii. Narcotic or stupefying poisons. iii. Narcotico-acrid. — iv. Acrid or rubefacient. — v. Corrosive or escharotic.—vi. Astringent poisons.

ORFILA at first adopted, with slight modifications, the above arrangement, but afterwards reduced the classes to the following: —

i. Irritants. — ii. Narcotics. — iii. Narcotico-acrids, and iv. Septic poisons.

CHRISTISON, BECK, and TAYLOR have adopted this arrangement of M. ORFILA, discarding most undeservedly the class septic poisons.

The classification suggested by Dr. PARIS is based upon the presumed mode in which individual poisons act.

i. Poisons which act through the medium of the nerves, without being absorbed, and without exciting local inflammation. — ii. Those which enter the circulation, and act through that medium with different degrees of force, on the heart, brain, and alimentary canal. —iii. Those which act locally on the mucous membrane of the stomach, exciting a high degree of inflammation by them. From the observations made above as to the *general and special operation of poisons on the animal œconomy* (§§ 28. 34. *et seq.*), the following classification is suggested, as corollaries: — i. *Acrid and corrosive poisons.* — ii. *Depressing and paralysing, or sedative poisons.* — iii. *Exciting and astringing.* — iv. *Exciting and exhausting poisons.* — v. *Irritating and depressing or paralysing — acro-sedative poisons.* — vi. *Irritating and alterative — acro-alterative poisons.* — vii. *Narcotising or stupifying poisons.* — viii. *Narcotising and irritating — narcotico-acrid poisons.* — ix. *Septic or disorganising poisons — dissolving the vital cohesion of tissues.*

107. As to these classes I may remark, that the operation of the substances arranged under the *first*, is more or less strictly local, when the quantity of either is large, or when the poison is concentrated; but that when certain of these substances are employed in small doses, or in weak solutions, they will then act in such a manner as may warrant the arrangement of them under different heads. The *third* and *fourth classes* might have been comprised in one and divided into *two orders*, but I considered it better to have too many classes, than to subdivide them. I may offer the same remark as to the *fifth* and *sixth classes*, but for practical purposes I preferred the arrangement as it stands.

108. XIII. Of the special Effects and Treatment of Poisons. — Class. I. Acrid and Corrosive Poisons.—*The irritant poisons of several recent authors.* The numerous substances arranged by recent writers, as *irritants*, comprise many which I have here denominated and expressed more strictly in accordance with their real operation. It surely cannot be admitted, moreover, that the substances which I am about to consider under this class destroy life by *merely irritating* the surface to which they are applied. Is there no local lesion produced beyond irritation? That the local action amounts to something far beyond irritation will be admitted by every one who is in the habit of observing closely, or of attaching precise meanings to words. The want of precision is here chiefly owing to the circumstance of these writers having classed under the same kind those substances which are most acrid and corrosive, and most limited in their sphere of action, with others which are really but slightly irritant, and which are destructive of life by producing other and very different effects from irritation. This will become more apparent in the sequel.

109. i. Of the Symptoms and Diagnosis of poisoning by acrid and corrosive Substances. — The symptoms vary with the degree of solubility, the concentration of the solution, and with the nature and admixture of the substance. When the poison is very soluble or is fluid, and very corrosive, the mouth and tongue evince most severe symptoms; there are burning and pricking or darting pain, redness, swelling with exudation of lymph, or corrosion and destruction of the mucous membrane or epithelium, and an acrid and burning sensation in the mouth and fauces. These sensations and alterations extend more or less to the pharynx, and along the œsophagus; and the patient is incapable of swallowing, or if he attempt to swallow the matters are spasmodically rejected. When the poison is fluid, as a mineral acid or an alkali, the burning pain and change o structure rapidly produced in the mouth, throa and œsophagus, and all the symptoms referabl to those parts, precede disorder of the stomach and in some instances, the poison is not conveye further than the œsophagus, owing to its violen action on the pharynx, and the spastic contractio of this part and of the upper part of the gulle When, however, owing to the peculiarities of th case, or to the less solubility or state of admixtur of the poison, the mouth and throat are but littl or slightly affected, the stomach then evinces th chief disturbance. Pain, sickness, or nausea burning heat, and vomiting, are rapidly produced In some instances the burning pain, and acri constriction, extend from the mouth or pharynx along the œsophagus to the stomach. The pai and vomiting follow immediately upon the passag of the poison into this viscus. The rejected matters consist at first of the contents of the stomac with more or less of the poison, and subsequentl of mucus and serum, often streaked with blood, an mixed with bile, but frequently also altered by portion of the poison being conjoined with them Owing to the rapid rejection of its contents, and o the greater portion of the poison, the stomach may b chiefly or almost alone affected. This is the case however, in comparatively rare occasions, for som of the poison most commonly passes into the duodenum, and often also into the small intestines, especially when the poison, as arsenic, is not very soluble, or is taken in an undissolved state; and i these circumstances some time may elapse betwee the ingestion of it and the occurrence of vomiting But when this or any other poison is taken in suc quantity and state as to produce a corrosive effect the action on the stomach is manifested very soon after its ingestion; and is attended by more or les tenderness, tension, and soreness in the upper regions of the abdomen, and by a terrified or an anxious expression of countenance.

110. When an acrid or corrosive poison reaches the intestines — which may not occur when the poison is very active, and the lesion of parts above the pylorus is intense, and the shock to the vital endowment consequently great — most acute burning or lacerating pains more or less constant, but aggravated at intervals, are felt around the umbilicus or over the whole abdomen, and are attended by a sensation of twisting, sometimes by a feeling as if the intestines were drawn against the spine, and often by a distressing aching in the loins extending to the epigastrum. The abdomen is always tense and tender, but at first there is no swelling, but rather a retraction of the parietes; but distension from flatus generally supervenes. Purging is frequently present with tenesmus, and sometimes with excoriation of the anus. After feculent matters are passed the stools are mucous, watery, or serous, streaked with blood, or contain a considerable quantity of blood. . The affection of the bowels may be the prominent effect, the stomach being comparatively but little disturbed, but more frequently the whole alimentary canal is affected, and vomiting and purging, with distressing pain and vital depression, are present at the same time.

111. As the operation of the poison proceeds painful and scanty micturition occurs; hiccup sooner or later appears, and becomes distressing; the pulse is rapid, small and weak; the strength and spirits are prostrated, the features sunk, the surface

s covered with clammy cold sweats, the extremities re cold and shrunk, and the voice fails In cases vhere the poison excoriates the fauces, pharynx, or ipper portion of the gullet during deglutition, the rritation often extends more or less to the epiglottis nd glottis, producing wheezing or difficult repiration, hoarseness, or spasm of the glottis, and n rarer instances even death by asphyxia. It vill appear from this that this class of poisons proluce effects which may readily be mistaken for everal of the diseases mentioned above (§ 68.); nd to the diagnosis between these effects and those liseases I shall next briefly advert.

112. *A.* CERTAIN LESIONS OF THE STOMACH are ttended by symptoms, especially near a fatal ternination, very closely resembling those produced y corrosive substances.—(*a.*) *Rupture and partial aceration of the stomach* may follow sooner or later fter a full meal, and owing to the circumstance, s well as to the attendant phenomena, occasion uspicions of poisoning, which, however, an exmination of the body after death readily disproves. nstances have occurred of persons who have eaten oo largely, either after long abstinence, or after aving suffered from dyspeptic disorder, and who ave been seized with violent but ineffectual atempts to vomit, pain in the stomach, sudden colapse, and death in a short time, preceded by ablominal tumefaction and tenderness. On dissecion, laceration of the coats of the viscus and the assage of the alimentary matters into the peritoeal cavity have been found. In the case, decribed by M. LALLEMAND, which occurred after ong privation and dyspeptic symptoms, the patient xclaimed that she felt her stomach tearing itself pen. The laceration was five inches long; the oats were not diseased, but the pylorus was inlurated. Dr. CHRISTISON refers to two cases, in vhich the laceration appeared to have been caused y the accumulation of gases arising from deraved digestion. In these, as well as in cases vhere the distending matters have been more conistent, the laceration has been owing as much to veakened vital cohesion of the coats of the stomach s to the amount of the distending matters. Intances of rupture of the stomach have been ecorded by Dr. ROBERTS and Mr. WEEKS; and ipon dissection no sufficient cause of the occurence was detected. It may be therefore inferred hat flatulent distension of the stomach having ocurred, as it usually does, when the vital tone and ohesion of the organ are most impaired, spasmodic eaction or contraction of the parietes had taken lace, during which laceration had been the reult. The rupture may be only *partial;* as in the ase related by Mr. CHEVALIER, where the sympoms of corrosive poisoning occurred after a very ull meal, attended by vomitings of blood towards ts close. Upon examination after death, the inner oat of the stomach was torn in several places, nd that of the duodenum was also extensively acerated.

113. (*b.*) *Rupture of the coats of the stomach at he bottom of a chronic ulcer, or perforation of the tomach,* may be attended by similar phenomena o those caused by corrosive poisons. 1st. The lceration may have existed and been attended y paroxysms of pain, or of retchings, and when t had proceeded as far as the peritoneal coat, or artially through the muscular coats, the distenion of a full meal, or of flatus, in connection with efforts at vomiting, has produced *rupture of the tissue forming the bottom of the ulcer,* and the escape of the contents of the viscus into the peritoneal cavity,—2d. The ulceration may have gone on to *perforation* without any evidence of rupture or laceration. Perforation may, however, take place without the escape of the contents of the stomach into the peritoneal cavity; the peritoneal surface around the perforation having become agglutinated to an adjoining viscus, as in two cases which occurred in my practice.

114. *Perforations* of the stomach are described in the Articles DIGESTIVE CANAL (§§ 36—43.) and STOMACH; it is therefore only necessary to state at this place, that the symptoms attending them, in their course, and towards their fatal termination, should be carefully distinguished from poisoning; for the diagnosis is not always easy. Perforation occurs most frequently in females between 16 or 17 years, and 25 years of age — especially in the scrofulous diathesis, in the sedentary, and in connection with disordered catamenia, and in delicate or weak constitutions. The severe symptoms, especially sudden and acute pains, retchings, or vomitings, anxiety, vital depression, &c., generally occur after eating or drinking, and especially after a full meal; and, if perforation has actually taken place, there is always vital shock or collapse, accompanied by the extension of pain and tenderness, with more or less tumefaction or tension, over the whole abdomen. In these cases, the advanced symptoms and death are results of the peritonitis caused by the matters which have escaped into the peritoneal cavity; and the vomiting is often slight, consisting chiefly or altogether of articles recently taken. There is seldom purging, which frequently accompanies poisoning, although constipation is not so generally observed as stated by some writers. The appearances found after death, and a careful examination of the articles partaken of, and of the matters thrown up, are the chief means of diagnosis.

115. *B.* LESIONS OF THE INTESTINES AND OF ALLIED PARTS may be attended by symptoms resembling the action of corrosive poisons — (*a.*) The *duodenum,* as well as the stomach, may be ruptured, independently of external violence, without any other apparent cause than over distension, and retchings whilst in this state. Dr. CHRISTISON refers to an instance of a man, who was seized after dinner, when mentally excited, with violent pain in the stomach, vomiting, and failing pulse, soon followed by death. The mucous surface of the duodenum was much inflamed; and, four inches and a half from the pylorus, a laceration extending through a third of the circumference of the bowel was observed.

116. (*b.*) The *passage of gall-stones,* and the violent pain, vomitings, and vital depression accompanying this affection may suggest suspicions of poison; but the slowness of the pulse, or the absence of febrile symptoms, the tolerance of pressure in the region of the stomach, or the presence of jaundice, will, in some instances, indicate the nature of the case. Still these symptoms cannot be relied upon, and they may not be present; other circumstances duly investigated furnishing the chief sources of diagnosis. Besides, gall-stones may produce severe irritation, with abdominal or epigastric tenderness and tension, as well as pain and vomiting; and when these occur soon after

the ingestion of food or drink, they furnish sufficient reasons for careful observation and examination on the part of the physician. An elderly lady, after slight jaundice, was suddenly seized with violent pain in the stomach, vomitings recurring in frequent fits, followed, after some hours, by most excruciating pains, incessant retchings, coldness of the skin and failure of the pulse. In seven hours from the fresh accession of suffering she expired. The hepatic duct was found torn across, a gall-stone at the opening of the cystic duct, and three pounds of blood and bile in the peritoneal cavity, which was inflamed in different parts. (*Journ. des Prog. des Sc. Med.* t. xiv. p. 245.).

117. (*c.*) *The sudden flow of acrid bile into the duodenum*, especially during warm seasons, after this secretion had accumulated in the gall-bladder and ducts, is not infrequently the cause of symptoms which have been mistaken for the ingestion of acrid poisons. This is most likely to occur where a person, who is subject to this biliary accumulation, takes some article which disagrees with him, or some chologogue purgative. I have met with two or three instances of persons who complained of the symptoms I have described as diagnostic of biliary accumulation or obstruction (see Gall-bladder, §§ 18. *et seq.*, and Liver, §§ 48. *et seq.*, and §§ 78. *et seq.*), and for whom a moderate purgative dose was ordered. But the medicine having removed the obstruction, the passage of acrid bile into the duodenum occasioned symptoms of so violent a nature — retchings and vomitings, diarrhœa, pains in the stomach and throughout the abdomen, &c. — as to suggest suspicions of an acrid or corrosive poison having been given, instead of the medicine prescribed. The bile which passed into the duodenum in these instances, possessed sufficient acridity to occasion many of the symptoms of poisoning.

118. (*d.*) *Bilious cholera* may likewise be mistaken for the effects of acrid or corrosive poisons; indeed it is most difficult in many cases to distinguish between them, and still more difficult to point out any means of diagnosis which can be depended upon. Much will depend upon the acumen of the physician, and the view he takes of the history of the case, and all the circumstances attending it. The nature of the ingesta, and the state of the matters ejected, should be carefully inquired into; and if heat, acridity, or darting pains be felt in the mouth, pharynx, or œsophagus, their occurrence *before* or *after* the vomiting ought to be ascertained, and the mouth and pharynx should be examined. These symptoms seldom even attend, and never precede bilious cholera; whilst they very frequently, indeed most commonly, precede poisoning with acrid or corrosive substances. Blood is never seen in the matters thrown from the stomach in cholera, whereas it is frequently seen in these matters when the vomiting has been caused by these poisons. Bilious cholera, or any state of cholera observed sporadically in this country, even when excited by indigestible articles of diet, rarely terminates fatally within 48 hours, and indeed very seldom thus terminates even in a much longer period, — whereas the effects of corrosive poisons are much more rapidly fatal.

119. (*e.*) *Pestilential cholera* is also liable to be mistaken for poisoning with acrid substances; but the same circumstances as have been just notice serve to distinguish between them, with the exception of the rapid termination of the former which is frequently equally rapid with the latter But the prevalence, and infectious nature of th pestilence, the general symptoms, the state of th surface and of the extremities, and the appearances and odour of the fluids thrown off during the progress of the malady, will readily distinguis it from poisoning, especially if the physician hav seen cases of it on any former occasion.

120. (*f.*) *Inflammation of the stomach, or o the intestines, or of the peritoneum*, may be confounded with poisoning with corrosive substances the first of these more especially. Acute gastritis uncomplicated with inflammation of an adjoining viscus, seldom occurs primarily in temperate climates, and not very frequently in warm countries unless as a consequence of the excessive use o spirituous liquors, or other stimulants. But i does occur more frequently both in England and Scotland than Dr. Christison has inferred from the statements of M. Louis. Acute gastritis sometimes is produced primarily — and formerly it was produced more frequently — by drinking excessively of spirituous liquors and the severity of the symptoms were occasionally such as to equal the violence of those occasioned by acrid poisons but the history of the case, the symptoms of intoxication, the odour and appearances of the matters rejected, &c., will sufficiently point out the nature of the affection. It must be admitted that the possibility of acute gastritis being produced by natural causes is a question of great interest and importance to the practical physician. Dr Christison remarks, that the possible occurrence of this disease, independently of poison, is the only obstacle in the way of a decision in favour of poisoning when, in cases characterised by signs of violent irritation during life and early death, bright redness, ulcers, and black granular, warty extravasation are found in the internal surface of the stomach; and in regard to their effects he adds, that they can very rarely indeed all arise from natural causes, or indeed from any other cause than poison. Admitting the truth of this, I may state, that violent gastritic symptoms, death after some hours, with vascular injection, redness of the inner surface of the stomach, and numerous ecchymoses, have occurred, without sufficient evidence of poisoning, unless, in some instances, the excessive use of spirituous liquors be considered as such, and to which it is strictly entitled. When ulcers, excoriations, abrasions, or corrosions of the inner surface of the viscus are found, in cases which have terminated rapidly, and in connection with bright redness, ecchymosis, &c., there can be little doubt of the ingestion of an acrid or corrosive poison, although it may have escaped detection. An important sign in cases of gastritis, as well as of cholera, is the absence of excessive heat or burning in the throat, or of painful and difficult deglutition; which very frequently precede the vomiting in cases of poisoning by acrid substances, and which seldom attends and never precedes the vomiting from spontaneous gastritis or enteritis.

121. (*g.*) *Acute enteritis, gastro-enteritis*, or *peritonitis*, may, in some instances, give rise to suspicions of poisoning; and the physician will consequently be induced to inquire, as in the diseases already noticed, — 1st, as to the time at which vomiting

ppeared after a meal, or after the ingestion of any rticle whatever. — 2d. As to whether the disease as ushered in by chills or rigors, or is attended y febrile re-action or commotion.—3d. As to the ate of the bowels, of the evacuations, and of the atters thrown off the stomach. — 4th. As to the ymptoms referable to the mouth, throat, and sophagus. — 5th. As to the presence or absence f diarrhœa, and of excoriations at the anus;—and h. into all the circumstances connected with the istory and existing state of the case. The causes signed for the attack; the relations subsisting etween these causes, and the supervention of ills or rigors, of vomitings, and of consecutive brile re-action; the existence of constipation, d the absence of lancinating pains or burning nsations in the mouth, throat, and œsophagus the commencement, and of painful and violent rging and excoriations of the anus at an adnced period, with other particulars connected ith the history of the case, will distinguish most stances of spontaneous inflammation of the digese organs and of the peritoneum from poisoning ith acrid or corrosive substances.

122. (*h.*) *Perforation of the intestines*, as well perforation of the stomach, always terminates tally; and when it is attended by symptoms nulating those which are caused by acrid poisons, examination after death will show the nature the case. (See Digestive Canal, § 40. *et seq.* d Intestines, §§ 80, 81.)

123. (*i.*) *Colic, iliac passion, and strangulated nia*, may severally be mistaken for poisoning th corrosive substances, especially when they attended by violent retchings or vomiting; or isoning by these substances may be mistaken for se. *Internal strangulation, intus-susception of ortion of intestine*, and the existence of *intestinal cretions*, or other causes of obstruction, may ewise occasion symptoms closely resembling isoning, especially the vomitings, pain, anxiety, l vital exhaustion attending them. But the hisy of the case, the obstinate constipation, the earances and odour of the matters thrown off stomach; the sensations of the patient as to seat of obstruction and pain; and the lesions nd after death, with the other circumstances eady adverted to, will serve to distinguish these ladies from the effects of poisons.

124. Having taken a view of the features disguishing certain natural diseases from the effects orrosive or acrid poisons, I should now proceed lescribe the *structural lesions* produced by these er; but as these lesions differ very remarkably n each other, according to the particular subnce causing them, I shall briefly notice them in nection with the especial consideration of the eral substances acting chiefly by their corrosive acrid properties, or by the *local changes* proed in the viscera, with which they are brought contact, and for facility of reference, I shall t of them in alphabetical order.

25. i. Acids.—*A.* Acetic Acid, in its concened state, *acts* chiefly as a corrosive agent. hough, in its various forms, it is in daily use, s rarely the cause of death, even when swaled by mistake in considerable quantity. Its rious effects have been described by Orfila, rruel, Schubarth, and Hébréart.

26. *a.* According to the last-named experimenter, mall quantity of acetic acid dropped into the *windpipe* occasions difficult and hissing respiration, croupy cough, and death in two or three days, the surface of the larynx and trachea being covered with a false membrane similar to that found after croup.

127. *b.* The concentrated acid, *applied externally*, acts as a corrosive agent on the tissues. In this state it operates chiefly locally, dissolving the albumen, fibrine, and gelatine; and is but slightly absorbed. It coagulates, and renders dark the blood in the capillaries.

128. *c.* If *injected into the veins* in a strong or concentrated state, or if the quantity be considerable, it changes the physical appearances of the blood, and alters the colour and condition of the red globules. According to Dr. Pommer, when it is dilute, or about the strength of the distilled vinegar in common use, several ounces of it may be injected into the blood without material mischief; but the more recent experiments of Orfila throw much doubt upon this inference.

129. *d.* Acetic acid *taken into the stomach* in large quantity, but more especially in a very concentrated state, and if the stomach be empty, produces agonising pain, and a sensation of burning in the stomach, with anxiety at the epigastrium, and convulsions, and death after a few hours. In this concentrated state it acts chiefly locally, and is not absorbed in an appreciable degree. It affects violently the nerves of the organ, the affection being progagated to the large visceral ganglia; and it coagulates the blood in the capillary vessels of the organ, and arrests the circulation through them, occasioning also a vital shock. In dilute states and in frequent doses, this acid acts chiefly through the medium of the blood, lowering nervous energy, and vascular action, as will be shown hereafter. (See next Class.)

130. *e.* The *appearances after death* by the concentrated acetic acid, are lividity of the integuments of depending parts of the body; a brownish and leathery appearance of the mouth, fauces, and pharynx, and a similar change extending down the œsophagus to the stomach or to parts of this viscus. The inner surface of the œsophagus presents large patches of a dark-brown hue, with reticulations of injected capillary vessels. The stomach, in some places, has a greyish tint, interspersed with dark-reddish spots, with numerous ecchymoses, and several large black elevations consisting chiefly of coagulated blood in the sub-villous cellular tissue. A livid or black hue of the fundus or near the pylorus; a thick, dark pulpy matter adhering to parts of the internal surface of the organ; and the presence of more or less of the acid in this viscus or in the intestines, have also been observed. The intestines are not materially altered.

131. *f. Treatment.* Draughts containing calcined magnesia, or the alkaline or magnesian carbonates; the cautious use of the stomach-pump, as the villous surface of the œsophagus and stomach is readily injured by mechanical agents after corrosive poisons; the injection of magnesian or alkaline solutions, and the removal of the contents of the viscus soon afterwards, by this apparatus, are the measures more immediately required. Subsequently, albuminous or demulcent fluids, mild broths, arrow-root, sago, and various mucilaginous and farinaceous articles of diet, may be given in small quantities, and frequently.

132. *B.* The Hydrochloric, the Nitric

and the Sulphuric. — As these acids, usually denominated the *mineral acids*, when used in poisonous states and quantities, produce similar phenomena, and require the same means for the counteraction and removal of their effects, I shall consider them under the same head, and, in some respects, in connection. — *Hydrochloric acid — muriatic acid — spirit of salt* — is not infrequently employed as a poison; but the *nitric acid — aquafortis;* and the *sulphuric acid — vitriolic acid — vitriol — oil of vitriol*, are not infrequently resorted to, for purposes of murder or suicide, or of external injury short of murder. Either of these acids may be swallowed by mistake, or be employed in various criminal ways. Tartra adduces an instance of a female who, having been intoxicated, was poisoned by nitric acid, which was mixed with wine and poured down her throat. A woman was convicted of murdering her husband by pouring sulphuric acid down his throat while he lay asleep with his mouth open; and several instances have occurred of the same acid having been given in poisonous doses, in place of the medicines which had been prescribed. The mineral acids, especially the sulphuric, have likewise been employed, by abandoned persons, to poison their own infants. But they are much more frequently resorted to as a means of suicide. They have also been employed, from motives of revenge or of dislike, to disfigure the countenance or person; the concentrated acid being squirted or thrown over exposed parts of the body. Mr. Taylor states that the external application of nitric acid has been a criminal cause of death on many occasions. In one instance this acid was poured into the ear of a person while sleeping, and it led to the slow destruction of life.

133. *a. The symptoms* occasioned by the mineral acids, *when swallowed in a concentrated form*, are of the most violent description, but the alterations produced by them on the organization are chiefly local and structural. Dr. Christison justly remarks, that they afford the purest examples of true corrosive poisons, their poisonous effects depending entirely on the organic injury they occasion in the textures to which they are applied; and that it is of use to set out, in the investigation of the effects of poisons, by determining the phenomena presented under such circumstances. I shall have more immediately to describe the violent symptoms and the severe structural change produced by these substances before a fatal result ensues; and in the sequel to show the much less violent phenomena, and the very slight local signs which other poisons hitherto classed with these leave of their operation, and yet prove more rapidly and certainly fatal than they; and few will fail of being struck by discovering the great extent of lesion the animal frame will sometimes endure from the former—the most violent of all corrosive substances, and yet recover; and the very slight alterations locally produced by these other poisons, whose operation is so rapidly fatal. These circumstances will of themselves prove sufficient to warrant an arrangement in which substances differing so very materially in their local and constitutional effects as those alluded to should not be classed, as they hitherto have been, under the same head, but should be arranged under different classes, according to their most prominent mode of operation and effects.

134. *b.* The mineral acids may produce fatal e
fects when *applied externally*, when *injected int*
the veins or into mucous canals, when *inhaled i*
the form of fumes, and when *swallowed*. Whe
applied externally in a concentrated form, or eve
in a state of strong dilution, they irritate, corrod
or inflame the skin. The nitric, or rather th
strong nitrous or fuming nitrous acid, produce
these effects most severely; but the sulphuric an
hydrochloric act almost as violently as it. In th
stronger states these acids chiefly act locally an
disorganize the tissues, the coagulation of th
blood in the capillaries and the destruction of th
organization on which they act generally preven
ing their imbibition and absorption.

135. *c.* When *injected into the veins*, even in
state of considerable dilution, they coagulate tl
blood, and thus destroy life; but when the dil
tion is still greater, or such as to allow of the ci
culation and presence of either of these acids in tl
vessels of the heart, ganglia, or brain, before c
agulation even partially takes place, it may re
sonably be inferred, that the vital manifestatio
of these organs will be thereby rapidly subverte

136. *d. If the fumes of either of these acids*,
any of the gaseous forms which they assume, eith
singly or in states of admixture with other gases
vapours, be inhaled, the most severe effects on tl
respiratory passages and lungs are produce
When either nitric oxide gas, or nitrous acid v
pour, hydrochloric acid gas, chlorine, or sulph
rous acid, in more or less strong states, is attempt
to be inspired, spasm of the glottis is produced l
it, and its entrance into the respiratory organs
thereby prevented. In a weaker form, either
these acid vapours may pass into the lungs, but
irritates and inflames the mucous surface of tl
larynx and trachea, the inflammation extendi
along the bronchi to the air-cells and lungs, pr
ducing dangerous or even fatal laryngitis, bro
chitis or pneumonia, or a complication of thes
Several instances are on record of persons havi
been destroyed by the violent and extensive infla
mation of the respiratory surfaces produced by the
fumes, and by the nitric oxide gas converted in
nitrous acid vapour by mixing with the atmosphe

137. *e. The injection of either of these acids in*
mucous canals with a criminal intention has be
rarely recorded. But an instance is published
the *Medical Gazette* (vol. xvii. p. 623.), abridg
from a French Journal, of sulphuric acid havi
been given in an enema by mistake for oil.
soon as the enema was injected, the patient u
terred distressing screams, passed the night in tl
utmost agony, and died in the course of the f
lowing day. Numerous instances have been pu
lished of the murder of children with sulphu
or nitric acid, chiefly the former, which has gen
rally been poured into the mouth or throat. Wh
poisoning is effected in this way, the acid may n
reach the stomach; it may not even get furth
than the pharynx or upper portion of the œsoph
gus. Being poured into the mouth or throat of t
child when asleep or when crying or struggling
portion of it irritates the epiglottis, or even escap
into the glottis, occasioning strangulating coug
and asphyxia by closure of the glottis, with viole
inflammation or disorganization of the phary
and adjoining parts, as observed in some ca
when the acid has been swallowed accidentally.

138. *f. When either of these acids*, or an *admixtu*

f *these acids, has been swallowed,* the effects vary omformably with the circumstances mentioned bove (§51. *et seq.*). These effects have been most bly investigated by Tartra, with reference more specially to *nitric acid*, which, as well as the ulphuric and hydrochloric, may be employed for ie purposes of suicide, or of murder, or may be vallowed accidentally. However taken, with hatever motive, or in whatever quantity or de- ee of concentration, the acid may not, especially hen taken accidentally, reach further than the iarynx, or œsophagus, its acridity, the violence its effects, or the discovery of a mistake, arrest- g deglutition, before any portion of it could have ached the stomach. Nevertheless fatal results ay rapidly ensue owing either to the extensive sorganization of textures in, and adjoining to, e pharynx, or to the inflammation or corrosion the larynx, the tumefaction of these parts closing e glottis, and either causing or threatening as- yxia. In these cases, although the acid may t reach further than the upper part of the œso- agus, the effect upon the larynx may be so lent as rapidly to produce suffocation, if tra- eotomy be not performed. M. Tartra considers t the mineral acids produce effects which may arranged as follows: — 1. Speedy death from lent corrosion and inflammation.—2. Slow death m a peculiar organic change of the stomach and estines. — 3. Imperfect recovery, the person naining liable ever after to irritability of the s nach. 4. The recovery of perfect health; but t operation, by means of asphyxia, caused in the y now stated, should be ranked as a *fifth* mode c variety.

139. *g. The most common symptoms are those of* t *first of these varieties*, namely, burning pain, a acrid acid taste in the mouth, extending to the t oat; extreme heat and pain between the ster- n n and spine, extending to the epigastrium and s nach, where it is most excruciating, and at- t led by extreme anxiety, by most painful or i ossible deglutition; and an increase of these o ttempts to swallow, on pressure and on cough- i Eructations often take place from the stomach, a aggravate the sufferings of the patient, espe- c y in the situations just named. The lips are c monly shrivelled, and are, at first, whitish, and a rwards yellowish, if nitric acid have been ta n; and brownish, if sulphuric acid. Excoria- ti s or corrosions, but rarely blisters, are some- ti s observed on or about the lips, or on parts of th skin, with which the acid may have come in co act, as the cheeks, neck, breast, or fingers; a these marks undergo the same change of co- lo as observed in the lips and mouth. The in- si of the mouth, and of the cheeks, is also more o ess shrivelled, white, or corroded; and the te , often in a very few hours, become loose, b n, or yellowish-brown. The colour of the to ue varies with the acid, and the time which ha elapsed from the application of the acid; but it often yellowish or yellowish brown. Deglu- ti n is so difficult, that attempts to take fluids a followed by the forcible rejection of them by th ose, the pharynx being spastically contracted. T matters vomited are generally brownish or bl k; and, if they fall on marble or lime-stone, th produce effervescence. Afterwards they are m d with altered blood, and with membranous sh ls, which resemble portions of the villous coat of the stomach, and sometimes actually consist of these, but most generally of coagulated mucus. The bowels are obstinately constipated, and the urine is scanty or suppressed. The abdomen, especially its upper regions, is tender and swollen. The pulse is very weak, and towards the close, very small, imperceptible or intermitting. It is seldom very frequent, and it may even continue but little or not at all accelerated throughout. The countenance, at first expressive of anxiety, pain, and distress, soon becomes collapsed, pale, and the extremities cold or clammy. The breathing is laborious, is often attended by singultus, and the movements of the diaphragm increase the pain of the stomach and epigastrium. In many cases, the irritation and swelling in the pharynx and epiglottis, or even in the larynx, cause fits of suffocative cough, with croupy respiration, and, where the larynx has been more particularly injured, suffocation may not merely be threatened, but actually produced.

140. In some instances, especially when the quantity of acid which has passed into the stomach has been large, the symptoms may be less excruciating but more rapid; whilst in others there may be a deceitful tranquillity, and life may be somewhat longer sustained. Thus, in the case adduced by Tartra, of a woman who had been intoxicated, and was poisoned by aqua-fortis mixed in wine, although there were both pain and vomiting at first, yet none of these symptoms were afterwards complained of, death taking place within twenty hours; but the intoxication probably obscured the sensibility, whilst the admixture with much wine modified the operation of the poison. The intellectual faculties generally remain unimpaired to the last. Should the patient survive the first effects of the poison, the mucous membrane of the fauces, pharynx, or œsophagus may be detached and discharged in irregular shreds, or in portions of considerable size, or even in a perfect cylinder.

141. *h. The duration* of this variety of corrosive poisoning may vary from two or four hours, as in the cases recorded by Remer and Sinclair to two or three days; but life may be prolonged to ten or fifteen days. The usual period is from twelve to forty-eight hours. *Death* may be caused altogether by asphyxia, owing to the closure of the larynx; and if tracheotomy be resorted to, life may be thereby prolonged, as in the case recorded by Mr. Arnott; but death more frequently results; the structural change, the violent impression made upon the nerves, the vital shock, the coagulation of the blood in the vessels of the parts with which the acid came in contact, and the local arrest of the circulation and of the associated vital functions, combining to produce the fatal issue.

142. *i.* The *quantity of* a mineral acid capable of producing fatal effects cannot be stated with any precision, as the result depends upon the several circumstances stated above (§ 51. *et seq.*). Dr. Christison remarks that the smallest fatal dose of sulphuric acid which he has found recorded was one drachm, which was taken with sugar by mistake for stomachic drops by a stout young man, and produced death in seven days. A man has recovered after taking six drachms. In a case of poisoning with hydrochloric acid, an ounce and a half proved fatal in about twenty-four hours; and in another case alluded to by Taylor, a man walked about three quarters of a mile after taking

nearly an ounce. Mr. Orr and Dr. Craigie refer to two cases of recovery, although two ounces of the concentrated sulphuric acid had been swallowed in each.

143. *k. The symptoms of the second of these varieties,* according to Tartra, are at first those already described, but they soon abate in violence. The patient then becomes affected with general fever, dry skin, difficult breathing, tension of the abdomen, spasms, and pains of the limbs, salivation, and occasional vomiting, particularly of food and drink. The salivation is attended by fœtor, and membranous flakes, resembling the villous coat of the stomach, are vomited. These flakes are most probably membranous exudations of lymph, resembling those of croup, thrown out on the excoriated and inflamed surface of the organ. Worms are sometimes discharged dead and excoriated by the acid. The functions of digestion and assimilation are arrested, or remarkably impaired, and the frame becomes extremely debilitated and emaciated. Death usually takes place in periods varying from a fortnight to several months. Tartra adduces an instance in which death did not take place until after eight months; the vomiting of membranous flakes continuing until the last.

144. *l. The third and fourth varieties* described by M. Tartra are characterized, as respects the *former* of these, chiefly by the greater mildness of the symptoms from the commencement, and by the patient continuing through life liable to attacks of pain in the stomach, vomiting of food, and general disorder of the digestive functions. The *latter* consists of cases of perfect recovery. Of 55 cases of poisoning by the mineral acids recorded by Tartra 26 died — 19 of the primary, and 7 of the secondary effects. Twenty-nine recovered, and of these 21 perfectly. Suicidal cases, for obvious reasons, were more frequently fatal than the accidental.

145. *m.* The strong mineral acids, as above mentioned (§§ 137, 138.), *may not reach the stomach,* especially when the poisoning is accidental or attempted criminally. The effects produced by them, under these circumstances, upon the pharynx, œsophagus, and larynx being often so violent as to occasion death in a few days. Several instances of this kind have been recorded; and, even when a person has discovered his mistake, and taken only a small portion, which could have reached no further than the pharynx or upper part of the gullet, partial recovery may take place, with stricture of the upper portion of the œsophagus; or fatal inflammation, of the pharynx and larynx, with or without asphyxia, may be the immediate result. That a large proportion of the children poisoned, by the abandoned classes, with the mineral acids, die from the effects of the poison on these parts, without reaching the stomach, is proved in some cases by the appearances observed after death; and is rendered probable in others by the circumstances under which the act is perpetrated. In the case recorded by Mr. Arnott, the injury was confined chiefly to the larynx and gullet, the stomach being distended with food and very little affected. The symptoms were general depression, with croupy respiration and threatened suffocation, for which tracheotomy was performed, with relief to the breathing; but the patient died with symptoms of general exhaustion, in 36 hours, without presenting any marked signs of the op ration of the acid on the stomach.

146. In the circumstances and in the conce trated form, in which the stronger mineral aci are poisonous, whether taken accidentally, or wi a suicidal intention, or given with a criminal o ject, danger or death arises chiefly from the loc or structural change; comparatively little of t acid, as stated above (§ 134.), being carri into the circulation. But these acids may be tak in such states of *dilution* as will admit of th absorption, and action on the frame through t medium of the blood; and thus they may produ noxious effects, especially when given frequent or in too large quantity, or a form of *slow poiso ing;* but, as they do not act by producing a co rosive effect, when given in states of dilution whi admit of their absorption, they will be considere in this form of exhibition, under the class to whi the different effects they then produce more a propriately belong.

147. *n. Appearances after death from the co centrated mineral acids* may be confined chiefly the fauces, pharynx, larynx, and œsophagus, a may be comparatively slight in the stomach. T whole of the alimentary canal, from the mouth the anus, should be examined, and the lesions the upper portions should be carefully observe as these portions, especially those particularize suffer most in cases of poisoning with these su stances. Spots on the skin, about the mouth a lips are often present, and should be examine If the case have proved fatal within the usu period, and if the *concentrated sulphuric acid* ha been swallowed, the inner surface of the mouth generally white, softened and corroded, the m cous coat is readily detached, and the tissues u derneath are of a dark red. The same change observed in the fauces, pharynx, and œsophagu the colour of the mucous surface of these pa sometimes being brownish or ash-grey. The m cous membrane is often more or less corrode partially detached, and, in the œsophagus, assum longitudinal plicæ, owing to the contraction of t canal and its partial detachment. The stomach usually contracted, corroded, and sometimes pe forated. When opened, its contents are common of a dark brown or black hue, of a tarry consis ence, and consisting chiefly of altered blood a mucus. The existence of acidity depends upo the treatment and the period which had elaps from the ingestion of the acid. The villous surfa of the stomach is traversed by black striæ, is mo or less corrugated, or it is generally of a browni or black colour, which is not removed by washin Between the rugæ and underneath the blacken membrane, the tissues are of a deep or dark r hue; but this redness and the blackness of t villous membrane are sometimes partial or patches of various extent. The small intestine especially when much of the acid has passed in the stomach, are more or less inflamed, their co tents much resembling those of that viscus. Whe perforation of the stomach has taken place, all t coats are much softened, especially in the vicini of the perforation, the margins of which are blac irregular, and very soft. The contents of t viscus may not have escaped through the apertur but if they have passed through, the adjoini organs are generally altered by the acid. M Taylor refers to a case in which the spleen, t

ver, and the coats of the aorta, were found cor- ded and blackened by the acid which had es- ped through the perforation.

148. When the acid has been taken in a diluted ate, or at least in a less concentrated form, and the patient live some days or weeks, the œso- agus is more or less constricted, and its mucous rface inflamed or otherwise changed. Inflam- atory lesions are commonly found in the stomach, d the corrosion or charring of the villous mem- ane is not so great as described above. The ood in the vessels is always very dark, that in e vessels of the stomach and spleen is almost ack, and coagulated. In the more prolonged ses, the villous coat of both the œsophagus and mach is either more or less abraded, ulcerated, almost entirely destroyed. The pylorus is ge- rally constricted. In these cases, the patient ks from the irritability of the stomach, from the most total arrest of the functions of digestion d assimilation, and from the action of the acid on the blood and nervous systems. In some, at st, of these cases, and especially when the acid s been much diluted, a partial absorption of it i o the circulation takes place, and changes the c our and state of the blood, and acts otherwise i uriously on the frame, as will be noticed more f ly in the sequel.

149. *o. The appearances produced by the nitric* *c l nitrous acids* are not materially different from t se caused by sulphuric acid. The external s face of the lips often present yellowish or yel- l ish brown spots, the cuticle being easily de- t hed. Yellowish spots are sometimes found a ut the neck, or on the hands. A yellow frothy l id escapes from the mouth and nose. The a omen is often distended with flatus. The inner s face of the mouth and cheeks is of a whitish or y owish colour. The pharynx, larynx, and œso- p gus are softened, tumefied, of a yellowish, or b wn colour, and their mucous membrane is e ly detached, or it is already detached in long s eds or folds. The stomach is similarly altered. I s rarely perforated, and is often distended with g The villous membrane presents extensive p ches of a yellowish, brown, green, or black h , and the coats of this viscus are remarkably s ened throughout. The duodenum is often c nged in a similar manner, although not so ex- t ively; the other intestines are seldom much a red. The non-perforation of the stomach is n t probably owing, as Mr. TAYLOR suggests, to tl circumstance of the acid having been swal- l ed, in most instances, whilst the stomach con- ta ed much alimentary matters. When death ta s place rapidly, the contents of this viscus ge- n lly yield more or less of the acid. When the la nx is implicated by swallowing this or any of th other strong mineral acids, more especially if su cation have been thus produced, the lungs a mucous membrane of the trachea and bronchi a congested with black blood. In more chronic ca s, especially if the patient has lived several w ks, softening, redness, and ulceration in vari- o stages, of the mucous membrane of the œso- pl gus and stomach are found. The œsophagus is ten constricted, and constriction is sometimes al met with in the pylorus and duodenum.

50. *p. The hydrochloric acid* produces similar sy ptoms and appearances after death to those w ch have been now described. Cases of poisoning by this acid are much more rare than by the other strong mineral acids; but those which have been observed with due attention present the same phenomena and lesions as are produced by nitric acid.

151. *q.* Instances of poisoning by an *admixture of mineral acids*—by the *nitric and muriatic acids* — *aqua regia* — which is often used in the arts for dissolving gold and platina — and by the *nitric and sulphuric acids*—*aqua reginæ* — which is employed for dissolving silver, may occur, but they have been very rarely met with. ORFILA has given one instance of poisoning by the latter of these combinations. The symptoms and post mortem appearances were much the same as those already stated, but approached the nearest to those caused by the nitric acid, which predominated in the mixture. The *nitro-muriatic acids* most probably produce symptoms and changes very closely resembling those described above, especially those in connection with nitric acid (§§ 139—149.)*; but they have not hitherto been recorded.

152. *r. Treatment.*—The difficulty of swallowing in almost every instance of poisoning by these acids is the great obstacle to the treatment of their effects. The means, and the intentions which should guide the employment of them, are obvious; but when the constriction of the pharynx, and the spasmodic action of the pharyngeal muscles are such that all articles are forcibly rejected upon every attempt to swallow them, the most influential antidotes and remedies are altogether prevented from exerting their effects. If, however, the patient be still able to swallow, calcined magnesia, or the carbonate of magnesia, should be instantly given in milk, or in any mucilaginous fluid; but if these are not immediately to be procured, finely powdered chalk, whiting, common soap or soda should be substituted, and taken in milk, or in water, or in oleaginous or mucilaginous fluids, according as either may be in instant readiness. The success of treatment entirely depends upon the rapidity with which the *antidote* is administered. Oleaginous and mucilaginous fluids should be freely administered. Linseed or olive oil, linseed tea, gruel, milk, are severally of use when they can be swallowed, either alone, or as the vehicles of the antidotes just named.

153. If swallowing be impossible, owing both to the constriction and to the tumefaction and irritability of the pharynx and œsophagus, the propriety of introducing the remedies now mentioned by the tube of the stomach-pump into the stomach should be considered. The tumefaction of the coats of these passages, the corrosion, and softening they have experienced, and their partial detachment, and the frequent recurrence of severe singultus, are often such as almost to preclude the introduction of the tube, and to risk perfora-

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* The plan of my work and my limits prevent me from entering upon the *chemical analysis and tests* of the several poisons. If these topics cannot be fully discussed with reference to the states, combinations, &c., in which poisons should be investigated by the medical jurist, and to the various objections which may be urged against certain methods of analysis and tests, in ever varying circumstances, they should be entirely relinquished; and it is preferable that the reader should consult either of the able productions of BECK, CHRISTISON, ORFILA, DEVERGIE, TAYLOR, and GUY, as to these matters, than that I should give an insufficient account of them; and to such an account my limits must necessarily have confined me.

tion of the canal in the attempt. Orfila, in 1817, recommended a recourse to the stomach-pump, which, however, was first proposed by Boerhaave, and strongly advised by Renault and Dupuytren shortly before the recommendation of Orfila. But, although thus approved of, this apparatus appears never to have been brought into use until 1822, when its utility was demonstrated by the practitioners mentioned above (§ 100.). It is obvious that the prospect of having recourse to it with advantage, in the circumstances now under consideration, must depend upon the peculiarities of the case, and the acumen and dexterity of the surgeon.

154. When the larynx is affected, causing difficulty of breathing approaching to suffocation, *tracheotomy* should be performed; nor should this operation be then delayed, as prolonged difficulty of breathing causes more or less congestion of the lungs and bronchial membrane, which always accelerates a fatal issue, which issue the lesions of the stomach and œsophagus, might not otherwise have produced.

155. Having neutralized the acid, our chief endeavours should be next directed to the removal of the effects which may be inferred to have been produced by it. Mucilaginous fluids, almond or spermaceti emulsions, gruel, decoction of marshmallows, gum-water, sugared water, thin broths, especially veal broths and jellies, may be severally given, and warm-baths may be allowed. If the patient complain of colicky pains, of dysuria, or of tenesmus, starch or other demulcent and oleaginous enemata, especially those with olive oil, with gruel or with veal or mutton broths, &c., should be administered from time to time, for, under any circumstance of the case, these enemata will be of service.

156. The symptoms of *pharyngitis*, or of *œsophagitis*, or of *gastritis*, or of the association of these affections, which frequently continue until either a fatal issue or recovery results, should be treated conformably with the principles advised for these maladies. But generally the amount of vascular depletions required for the idiopathic sthenic inflammations of the alimentary canal, is not required after poisoning by these strong acids. The frame has received both a severe injury of its vital organs, and a violent shock; and the former generally prevents the re-action usually consequent upon the latter. Hence venesection may not be required, or it may even be dangerous; the habit of body, strength, age, and circumstances of the case, in connection with the degree and character of existing vascular action, being the guides to the adoption either of this practice or of moderate local depletions, or merely of emollients, of demulcent broths, of mucilaginous diluents, of gelatinous and farinaceous articles, and of external derivatives.

157. The irritability of the stomach, and the spasms and pains of the voluntary muscles and extremities which often continue for several days, both in cases which recover and in those which end fatally—these pains and spasms being caused by the injury and irritation sustained by the visceral or ganglial nerves, the morbid conditions of these nerves being extended to the sensory nerves, and reflected upon the voluntary muscles by the motor nerves—are amongst the most distressing symptoms which are afterwards experienced, and are alleviated with the greatest di ficulty. In these circumstances, emollient an tonic substances may be given, in small and fr quent doses, with opium, or the tinctura camphor composita; or the simple infusion of roses may b prescribed, with tinctura opii; or the compoun tragacanth powder, with the pulvis cretæ comp situs cum opio &c.; and warm terebinthina epithemes or embrocations should be repeated applied to the abdomen. Nourishment of a mu cilaginous, gelatinous or demulcent kind should l taken in small quantity and at short intervals; ar if deglutition continue difficult, strong broths ar animal decoctions ought to be administered *p anum.* For this latter important and sometim fatal affection, the emollient linctuses and oth means recommended for *acute and chronic infla mations and stricture of the œsophagus* (Ar Œsophagus, §§ 43. *et seq.*) may be appropriate had recourse to. (See also Stomach—*Diseases of*

158. *s. Sulphate of Indigo.*—Poisoning by th substance is chiefly accidental. Mr. Taylor h observed that, as this compound is nothing mo than a solution of indigo in sulphuric acid, t symptoms and post mortem appearances caused it are the same as those which have been describ as produced by the latter substance. Poisoni by it may be suspected, when, with these sym toms, the internal surface of the mouth has blue colour; the vomited matters also having deep blue tint. In two instances, in which abo an ounce each was swallowed, death took plac in one case eleven hours afterwards, and, in t other, in seven hours and a half; it was remark that the urine which was passed had a blu tinge, indicating the absorption of some portion this compound into the circulation. — The *tre ment* of poisoning by the sulphate of indigo is different from that directed for the effects of mineral acids.

159. *C.* Oxalic Acid.—Poisoning by this a is generally accidental or suicidal. Of ninete cases of poisoning by this substance in the C roners' return for 1837 and 1838, fourteen w suicidal. Owing to the resemblance of this a to Epsom salts, it has sometimes been taken them. Mr. Taylor thinks that its intensely a taste prevents it from being often used with minal intentions; although he has known seve instances of murder having been attempted by

160. *u. The symptoms* are immediate, and so tense as often to have destroyed life before arrival of the practitioner. If the poison taken in large quantity — from half an ounce an ounce dissolved in water, — a burning a sensation is felt in the fauces, throat, and œsop gus, followed immediately by vomiting. In sc instances the impression of the acid on the mach has been so intense as to paralyse this cus, and the parts associated with it in the and little or no vomiting has occurred, de however, rapidly taking place; in other ca the vomiting has been incessant until death. vomited matters are intensely acid, and hav green, or nearly black, colour; consisting of alimentary substances, and afterwards chiefly altered mucus and blood. Extreme anxiety, p and tenderness, are felt at the epigastrium; often, in both, hypochondria, followed by spas singultus, convulsions, collapse of the featu and of all the vital actions, by clammy persp

tions, and cold extremities. Attending these there are often also stupor, unconsciousness, a small, irregular, and almost imperceptible pulse, deep and slow respiration, numbness of the limbs, and death.

161. In smaller quantity, and in somewhat greater dilution, the sensation of acidity, of burning in the throat, and the vomiting varies accordingly. Should the patient survive some time, owing either to the quantity of the poison taken, o the presence of food in the stomach, or to the ischarge of the greater portion of the acid by vomiting, soreness and constriction of the throat, ainful and difficult deglutition, irritability of the tomach, thirst, tenderness at the epigastrium, iccup, diarrhœa, flatulence, and great depression f the vital powers are the most constant symp- oms. Soreness of the mouth, swelling of the ongue, and numbness and tingling of the limbs, re often also experienced; the patient either ying after two, three, or several days, or slowly nd altogether recovering. But recovery is ge- erally attended and followed by more or less isorder, or tendency to disorder, of the digestive rgans.

162. *b. The quantity of oxalic acid* which may estroy a human life has not been determined. he immediate rejection or the retention of the oison by the stomach, and the promptness or sence of medical aid, necessarily determine the sult. Mr. Semple recorded a case in which vo drachms dissolved in water were swallowed. omiting took place immediately, and the symp- ms had nearly disappeared in about twelve hours. man swallowed three drachms: vomiting in- antly occurred, and he recovered in a few hours. girl is stated by Dr. Babington, of Coleraine, have taken forty grains: severe symptoms of stric irritation supervened; but although, as in e other cases, medical aid was procured, the covery was protracted. Mr. Taylor states, that smaller dose than half an ounce generally has t been fatal; although it may be inferred, from e very dangerous effects caused by much smaller antities, that much less than this may destroy e, if judicious treatment be not resorted to. hen the dose of this poison is upwards of half ounce, death is commonly the result; but in- nces of recovery have occurred where the quan- y was much greater than this, and judicious atment has been promptly administered.

163. *c. The period at which death may take place,* ries with the circumstances already alluded to. r. Christison mentions a case where an ounce this poison killed a girl in thirty minutes, and other where the same quantity was fatal in ten nutes, this being the shortest period on record. hen the dose is half an ounce, or upwards, th commonly takes place within an hour or o. But instances have occurred in which life been prolonged for thirteen or fourteen hours. r. Frazer has recorded a case which was pro- ged to twenty-three days; irritability of sto- ch, singultus, fever, and exhaustion being the minent symptoms.

164. *d. Appearances after death.*—The mucous mbrane of the mouth, fauces, and œsophagus is ally white; but it is sometimes partially co- ed by the dark matters discharged by the sto- ch. This membrane may be readily detached these situations, as well as in the stomach. This organ is commonly much softened and pulpy, and contains a dark-brown acid liquid resembling coffee-grounds, from the admixture of altered blood with it. Blood-vessels are seen ramified distended by coagulated black blood. In a case where nearly two ounces were taken and death was rapid, the coats of the stomach presented nearly as carbonized an appearance as that occasioned by sulphuric acid. The œsophagus presents similar changes. It is generally pale, seems as if boiled in water, and its inner membrane is raised in longitudinal rugæ or folds, interrupted by patches of abrasion. The upper portions of the intestines, especially the duodenum, are sometimes slightly inflamed or softened, but they are not otherwise remarkably altered. In Mr. Frazer's case, in which life was prolonged twenty-three days, the villous coat of the stomach and gullet was either softened or entirely detached. The muscular coat was exposed in several places; and was thickened, softened, injected, and inflamed. This acid has not so corrosive an action on the coats of the stomach as the strong mineral acids, as it rarely entirely perforates these coats, although it softens them and destroys their physical as well as vital cohesion. In some instances the inner surface of the trachea has been found inflamed, owing to its anatomical connection with the œsophagus. In a few cases, the lesions have been very slight, although the symptoms were severe; but little beyond softening of the coats of the stomach having been remarked.

165. *e. Death is the result* of the corrosive action of this acid upon the organization of the upper portions of the digestive canal, especially of the stomach, the nerves of the organ being more particularly affected. But the operation of this poison is thus limited, only when large doses of it are taken; and then the local injury and disorganization and consequent vital shock are sufficient to destroy life. It has not been found to affect the larynx so as to threaten suffocation. When swallowed in smaller quantity, or in states of dilution, it is manifestly absorbed, and acts upon the nervous system and on the blood (§25. *et seq.*). Much of the change observed both in the tissues of the stomach and in the blood, in cases of rapid poisoning by this substance, has arisen from the action of such portions of it as have still remained in, or been imbibed by the stomach at the time of death, the changes found on inspection having been partly thus produced *post mortem.*

166. *f. Treatment.* — The *antidotes* against this poison should be most promptly resorted to. The best are chalk, calcined magnesia, or the carbonate of magnesia. These should be abundantly mixed in water, or milk, or in any oleaginous or demulcent fluid instantly at hand. Lime-water and oil may also be given. As chalk is the best antidote, Dr. Christison advises, that even the plaster of the apartment should be broken down in order to be given; but it would be difficult to reduce the plaster in a very short time to a powder sufficiently fine to admit of admixture, and of deglutition in the existing state of the patient. Free dilution — copious draughts of demulcents, emollient decoctions, &c. are generally of use; but they should be given in large quantities, and their rejection by irritating the fauces should be encouraged. If dilution be not free and frequent, it may be in-

jurious, by dissolving the poison and by favouring its absorption. If vomiting can be produced after the antidotes and much fluid have been taken, it should be encouraged by means of oleaginous and emollient fluids; but recourse to the stomach-pump is of doubtful efficacy, as it may injure, or even perforate the softened coats of the œsophagus and stomach. When it can be easily introduced, and when there is little or no singultus, antidotes and demulcent fluids having been already freely swallowed, then it may be of use, if vomiting does not take place, for the removal of the contents of the stomach, and for the introduction of remedial agents when deglutition cannot be accomplished. But it should not be overlooked, that the pharynx and gullet have sustained nearly as great an injury as the stomach, and that the too early use of this apparatus will prevent the antidotes and other medicinal substances which should be swallowed from exerting a salutary effect upon those parts. As the salts which the alkalies form with oxalic acid are as injurious as this acid itself, neither the alkalies nor their carbonates should be given after poisoning with it. The consecutive effects of this substance should be treated as those of other corrosive poisons, or as the operation of this acid requires when given in small or diluted doses, and when acting as will hereafter be shown (See next Class).

167. ii. Alkalies.—*Ammonia, potash, soda, and their carbonates: — pearlash, soap-lees.* — *a.* The *vapour of strong ammonia* may rapidly destroy life, when *inhaled,* by producing acute inflammation of the larynx and trachea, often extending to the bronchi and lungs, and all the symptoms of violent croup. When ammonia is held too near the nostrils to rouse persons from syncope, its vapour may act more or less as an irritant of the respiratory mucous surfaces, and be injurious not only in this way, but also in as far as it prevents a due supply of air to the lungs.

168. *b. The symptoms occasioned by the fixed alkalies,* when taken in large quantities, are nearly the same as respects the caustic states of these alkalies; the subcarbonates and carbonates being more mild in their operation. Poisoning by these substances is generally caused by accident. When the caustic alkalies are swallowed, an acrid, corroding taste and pain, with a sensation of burning and excoriation, are felt in the mouth and throat; these latter sensations proceeding along the œsophagus to the stomach and epigastrium Vomiting often occurs, and the matters thrown off usually consist of soft substances, resembling the softened detached portions of the villous tissue, with mucus, often mixed with dark discoloured blood, and with alimentary articles more or less altered, in the first instance. Both these and other associated symptoms vary with the concentration and quantity of the alkali; but vital depression soon appears. The mouth, tongue, and throat present a tumefied, soft, flabby, and inflamed appearance; the surface becomes cold and clammy; the pulse feeble, small, and quick; singultus is often present; the pain extends to the central and lower regions of the abdomen, and diarrhœa supervenes and becomes urgent and exhausting. The symptoms are somewhat less severe when the carbonates have been taken; unless the dose of these has been very large and the solution very strong.

169. *c. Ammonia* and its sesquicarbonate produc
nearly the same symptoms as the fixed alkalies
the chief differences being, that strong solutions
the former occasion a more violent burning pai
in the fauces, œsophagus, and stomach, than th
latter, the larynx being oftener implicated. B
poisoning by ammonia is not common, cases of
occurring chiefly by mistake, which is most fr
quently discovered before much of it is swallowe
and then the fauces, phayrnx, larynx, and œs
phagus are severally more or less affected, a
cording to the strength of the solution. Ammon
is not so productive of vomiting as the fix
alkalies, when taken in poisonous doses, the sym
toms being more closely allied to those of ga
tritis, associated with enteritis and œsophagiti
and it seldom occasions diarrhœa. In the mo
concentrated states ammonia also occasions si
gultus and convulsions.

170. *d.* The *quantity* required of these su
stances to produce death necessarily varies wi
the concentration of the solution, and with t
state of the stomach as respects the quantity
aliments in it, and other circumstances. T
caustic alkalies are fatal in smaller quantity a
in less time than the carbonates and the p
parations of ammonia. Orfila adduces two i
stances in which half an ounce of the carbona
of potash was fatal, the patients having linger
for several months. The exact quantity, ho
ever, cannot be assigned; for a comparative
small one, if the alkali be caustic, or if it imp
cate the larynx, may be rapidly fatal.

171. *e.* The *duration* of the symptoms, or peri
which usually elapses until death occurs, may
very short, especially as respects the caustic
kalies. Mr. Taylor estimates the shortest peri
at three hours; and in this case death was caus
by three ounces of a strong solution of the c
bonate of potash. When the substance attac
the larynx, as often occurs in respect of t
mineral acids, this period will also be short. T
more immediate effects of the caustic alkal
usually terminate fatally in two or three day
the softening and disorganization of the vill
surface of the digestive canal, and the arrest
circulation in the vessels supplying this can
terminating life in a very few days, and even i
shorter time, if the extent of injury be such
occasion severe vital shocks in addition. Wh
the injury is less, or the vital resistance to
greater, the patient may linger for weeks or ev
months; the solution, abrasion, or excoriation
the villous surface of the stomach, and of ot
parts of the canal, being attended by pain a
tenderness in the hypochondria and other regi
of the abdomen, with vomitings, anorexia, in
gestion, diarrhœa, and often also with difficult
nearly impossible deglutition. Owing to the
jury or destruction of the digestive villous surfa
digestion and assimilation are impaired or
rested, and the patient sinks from the inanit
thus occasioned by the local injury; whate
amount of absorption of the poison may have tak
place into the circulation, in cases where
substance has been more diluted, and the lo
injury less, acting a very subordinate part in p
ducing the ultimate result.

172. *f.* The *appearances after death* consist ch
ly of a diffluent softening, abrasion, or detachm
of large portions of the villous surface of the fau

harynx, œsophagus, and stomach ; and sometimes lso of parts of the duodenum and intestines. The nternal surface of the canal, especially of the tomach, presents a chocolate colour ; and the ontents are fluid, viscid, and often dark from the dmixture of exuded blood. The softening of the oats of the stomach sometimes extends to all he coats, but especially to the more internal ; nd much resembles the gelatinous softening net with in the stomach in rare instances, and atributed to the action of the gastric juices after leath (see §§ 84—87.) ; but there have been more umefaction and darker discolouration in the poioning now being considered. When death has een produced by ammonia or its sesquicarbonate he softening and tumefaction have been atended by signs of inflammation and excoriation, nflammatory appearances existing also in the rachea and larynx.

173. *g.* Of the *action* of the alkalies and their arbonates it may be concluded, that, in their oncentrated states, in large quantities they are atal chiefly by their local action, in the way tated above (§§ 171, 172.) ; and that, in weaker orms, or in small doses, they are more or less bsorbed, as demonstrated by the composition of he urine, and other secretions ; but they are enerally eliminated by the emunctions before hey accumulate in the blood to a very injurious mount.*

174. *h. The treatment of the alkaline poisons* onsists in the immediate exhibition of fluids conaining vinegar, or any of the vegetable acids vhich may be obtained with the least delay. If ny of these be not quite at hand, draughts f beer or of malt liquors ; or demulcents with il, or milk, gruel, &c., may be taken until these cids are procured. A tepid infusion of chamoile flowers is afterwards of use in promoting omiting, and it may be given with or without noderate doses of the sulphate of zinc. The tomach-pump may be more injurious than beeficial, especially if the caustic fixed alkalies ave been taken, for the tumefaction and softenng of the coats of the œsophagus and stomach re often so great as to render it difficult to inroduce the tube without causing laceration or njury.

The *treatment* of the secondary effects of these oisons consists chiefly in removing the effects vhich may be inferred from the symptoms still to ontinue. At first demulcents, oleaginous and mollient substances may be administered, and fterwards gelatinous and farinaceous articles of ood in small quantities may be given. An attempt nay be made, with caution, to restore the tone of he villous surface, by giving small doses of *reosote* with demulcents, or of the pyroligneous cetic acid, or the compound infusion of roses vith small doses of quinine, or of the sulphate f zinc, or such of the tonic and astringent inusions or decoctions as may be found to agree the est with the stomach. When the difficulty of swallowing and continued irritability of the stomach excite fears of abrasions of the villous coat of the digestive canal, and if diarrhœa warrant the supposition that this lesion extends as low as portions of the intestinal tube, then astringents and tonics, vegetable or mineral, as either appears most appropriate, should be given in small but frequent doses, with small quantities of opium, in demulcent and emollient vehicles. By attempting to support vital power by suitable means, and to restore the tone of those parts of the villous surface which have been the least injured, nature will thereby be the better able to reproduce in some measure the abraded portions, or in some way to supply their functions. In other respects the treatment, the diet and the regimen, should be adapted to the features of particular cases, with a careful observation of the *juvantia* and *lædentia.*

175. iii. Antimony — Chloride of.—*Butter of Antimony.*— This is the only preparation of antimony which I shall notice as a *corrosive poison ;* the other preparations of this metal being more or less absorbed, and acting otherwise on the system. The *chloride*, as usually employed, is a very corrosive liquid, varying in colour, according to the quantity of iron it contains, from a light yellow to a dark red. Poisoning rarely occurs from it. Mr. Taylor, however, refers to three cases which have been recently recorded : two were caused by mistake, one intentionally ; and, in this last, between two and three ounces of this solution were swallowed.

176. *a.* The *Symptoms* were, in many respects, the same as those described above as being caused by the caustic alkalies : a burning pain in the throat course of the œsophagus and stomach ; constant efforts to vomit ; collapse of the features, coldness of the surface and extremities and faintness ; a small, weak and frequent pulse ; pains in the abdomen, with tenesmus, but no evacuations. To these succeeded drowsiness, convulsions, and, in the suicidal case, death in ten and a half hours. The two accidental cases recovered, much smaller quantities of the poison having been taken.

177. *b. On inspection after death*, the fatal case presented the internal surface of the digestive canal, from the mouth to the jejunum, of a black and charred appearance. The mucous membrane was destroyed throughout this extent : "there was none of this membrane in general remaining, only a flocculent substance, which could be easily scraped off with the back of the scalpel." The subjacent coats were so soft as to be torn with the greatest ease.

178. *c.* The *treatment* should consist chiefly of copious draughts of water, or emollients and dimulcents containing sugar, and, after free vomiting has been procured, with opium or syrup of poppies. If vomiting does not immediately follow the ingestion of this poison, Orfila recommends that a decoction of conchona, or of willow or oak bark, or of powdered gallnuts, should be freely taken as soon as possible. The treatment of this poison does not differ from that advised for the fixed alkalies as respects either these substances or those mentioned under that head. *See also the preparations of antimony* in Class v.— Acro-sedative Poisons.

179. iv. Iodine and Bromine.— *A. a. Iodine* acts differently on the œconomy according to the concentration of the tincture or solution of it which

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* *When injected into the veins*, Orfila believed that he alkalies caused death by coagulating the blood. I ind it remarked in my note-book, when detailing some xperiments with the alkalies, in which I was concerned n 1820, that "the alkalies and their carbonates, when njected into the veins, appear to destroy life by impairng organic nervous energy, the irritability of the heart, nd the functions of the brain, and by their influence on he nervous masses and structures whilst circulating in he blood vessels and capillaries."

may be used. In a state of strong spirituous or ætherial solution it acts as a powerful corrosive of the tissues to which it may be applied; but in weaker solutions, and in various states of combination, it is much less corrosive, or is merely an irritant, and is more or less copiously absorbed into the circulation. In these states, it acts as an irritant and alterative — or *acro-alterative poison*, in which class I have considered it and its preparations.

180. *b.* The *fumes of iodine*, when inhaled, produce a violently irritating effect upon the respiratory passages, especially the larynx and trachea. If the vapour is concentrated, it occasions constrictive irritation and inflammation of these parts, which may be followed by asphyxia. In milder states, it occasions inflammation of the air-passages, with or without pneumonia. I have seen more than one case in which the vapour of iodine had been resorted to in the treatment of pulmonary consumption, with the effect of producing dangerous bronchitis, owing to the strength of the vapour which had been inhaled.

181. *c. Applied externally*, iodine, in a concentrated or pure state, or in that of a strong tincture, acts as a caustic, and changes the cuticle to an orange-yellow colour, causing desquamation, and, if allowed to remain, inflammation and destruction of the tissue with which it comes in contact. In weaker states of solution it acts as a desiccant of secreting or mucous surfaces, and inflames them more or less intensely. Hence, if injected, even in these states, into mucous canals, or taken into the stomach, it would act as an acrid corrosive poison.

182. *d. When iodine is swallowed*, in a more or less pure or concentrated form, it produces the most violent sufferings, especially if the quantity be large; but the effects vary remarkably with the state and contents of the stomach at the time of its ingestion; for if this viscus contain much bread, potatoes, or farinaceous or amylaceous articles of food, the iodine will be thereby rendered much milder in action, by forming an iodide of starch, as Dr. Pereira has remarked. Spirituous solutions of iodine, or the ioduretted solutions of the iodide of potassium, when swallowed in more or less strong or concentrated forms, cause a most acrid sensation with constriction, burning pain, and dryness of the throat, descending down the œsophagus to the stomach, where they produce lacerating pains and efforts to vomit, extreme thirst, tenderness of the epigastrium, with anxiety, tremors, loss of strength, palpitations, faintness, sinking of the pulse, suffusion of the eyes, and restlessness. Dr. Jahn mentions a case, in which an over-dose occasioned violent pain in the abdomen, vomiting, profuse bloody diarrhœa, coldness and blanching of the skin, rigors, rapid pulse, &c. In a case noticed by Dr. Christison, a drachm and a half of the ioduretted solution of the iodide of potassium produced acute pain and burning in the pit of the stomach, nausea, followed by vomiting of yellowish matters, which had the taste of iodine; by restlessness, headache, giddiness and pallor of the countenance; and by recovery after five days. In a fatal case recorded by Zink (*Journ. Complim.* t. xviii. p. 126.), the symptoms were restlessness, burning heat and dryness felt from the throat along the course of the œsophagus to the stomach, unquenchable thirst; palpitations, and a frequent unequal and weak pulse, violent priapism, copiou diarrhœa, parched tongue, tremors and faintness The patient was bled; the blood was cupped and buffed. He died after five weeks. In anothe case in which the tincture of iodine caused slow poisoning and death, M. Zink found the following lesions: —

183. *e. Appearances after death.* The intestine were distended with gases; effusion had taken into the peritoneum; and adhesions had formed between several of the viscera. The gullet wa much reddened internally, and remarkably constricted. The stomach was distended, and wa externally inflamed in patches, and in one plac apparently excoriated. It was inflamed internally, and corroded to a great extent near to the pylorus; the peritoneum covering the corroded part was detached and perforated with numerou small holes. The intestines were reddened and inflamed in places with patches approaching to sphacelation. The liver was enlarged, and of pal red or rose colour. The gall-bladder contained large biliary calculus. The spleen seemed inflamed in some places. The pleura contained some serum.

184. *f.* The *quantity* of this poison required t destroy life depends upon the concentration of the solution employed, and the nature and quantity o the aliments in the stomach. When the iodine i pure or in large quantity, in whatever state it may be employed, it acts as a corrosive or caustic poison causing death by its local action. In states o weaker solution, or in combinations which weaken its action, or in small doses often repeated, it produces *slow poisoning* as will be shown hereafter It is then absorbed, and it accumulates in the system, producing emaciation and various morbid changes. The quantity required or the time taken to produce death has rarely been remarked in respect of this poison. Dr. Gardner states that a scruple of pure iodine, in the form of tincture destroyed a child four years of age in a few hours.

185. *g.* The *treatment* of the more corrosive states in which iodine may be given is not satisfactory. The stomach-pump should be early employed and vomiting encouraged by giving fluids containing amylaceous and farinaceous substances. Starch enemata should also be thrown up; and demulcents taken frequently. In other respects the treatment should be the same as recommended for *gastritis*.

186. *B.* Bromine is but little known as a poison. Its vapour is most irritating when brought in contact with the conjunctiva. — *a.* When its vapour is *inhaled*, violent cough, a feeling of suffocation with dryness and constriction of the larynx, are occasioned, and are soon followed either by inflammation of the respiratory passages, or by asphyxia. Franz had violent cough, and sense of suffocation, followed by headach, instantly after momentarily breathing the vapour of bromine.

187. *b.* When a *watery solution is injected into the veins*, according to the experiments of Franz, Barthez, Dieffenbach and Butzke, it appears to coagulate the blood, and causes immediate death, preceded by convulsions.

188. *c. Taken into the stomach*, it is a more corrosive poison even than iodine. Butzke, after swallowing a drop and a half of this substance, in half an ounce of water, felt heat in the mouth,

œsophagus, and stomach, followed by colicky pains. Two drops occasioned nausea, hiccup, and increased secretion of mucus. (See CHRISTISON, on Poisons, p. 1 5., and PEREIRA's *Mat. Med.*, vol. i. p. 250.) From these experiments it is evident that bromine acts in a similar way to iodine in every respect; but that it is poisonous in smaller quantities than iodine, although the *symptoms* and changes produced by it in the digestive canal are the same as those occasioned by that substance. The *treatment* is the same for both poisons.

189. v. LIME acts as a corrosive poison when taken into the stomach, or applied to a vital part, in its caustic and unslaked state; but it is rarely so employed, even accidentally; two cases of this kind only being noticed by medico-legal writers. It is evident, from its caustic action, that the ingestion of it, or its introduction into mucous canals, will be followed by corrosion, and inflammation of the tissues with which it comes in contact. When employed in its quick state, it will even decompose or destroy the structures by imbibing their watery, or fluid constituents.

190. *a.* When *swallowed*, it occasions heat, constriction, and pain in the throat, descending to the stomach, with unquenchable thirst, nausea, retchings, severe colicky pains, constipation, and the usual symptoms of corrosive poisoning, followed by nearly the same *changes* as have been already described, especially inflammation and corrosion of the parts with which it had come in contact.

191. *b.* The *treatment* should be the same, as respects *antidotes*, as that advised for poisoning by the fixed alkalies (§ 174.), especially an immediate recourse to vinegar, lemon-juice, or any vegetable acid, and to demulcent drinks. Subsequently, if symptoms of gastritis, or gastroenteritis are developed, vascular depletions, and the usual treatment of these diseases should be prescribed.

192. vi. PHOSPHORUS, when minutely divided, proves a violent corrosive poison. According to the experiments of MAGENDIE and ORFILA, when it is dissolved in oil and *injected into the veins*, it occasions almost instantaneous inflammation of the bronchi and substance of the lungs.

193. *a.* It may be *taken into the stomach* either as an empirical remedy or accidentally: but its ffects on man have not been often observed. It was at one time much employed, in small doses, in medical practice, especially as an aphrodisiac, nd it probably occasioned dangerous symptoms ven when thus prescribed. It is generally *slow* in its operation, although it is poisonous in very mall quantities, particularly when melted in warm water or in oil. The most rapidly fatal case I find noticed is that by Dr. FLACHSLAND. A young man took, at the recommendation of a uack, some of this substance on bread and butter, o cure general debility, constipation, and impoence. He was immediately seized with violent ain in the stomach, continual retchings, disharges after injections that shone in the dark; nd he died in forty hours. The quantity of phosphorus taken was not known. Dr. CHRISTISON tates, that a grain and half proved fatal in a case which was mentioned by M. WORBE. A stout oung man, having taken half a grain without inury, took a grain and a half in hot water. Seven ours afterwards he was attacked with pain in the stomach and bowels, with incessant vomiting and diarrhœa, excessive tenderness and tension of the belly, and died exhausted in twelve days. M. JULIA-FONTENELLE relates the case of an apothecary who, after taking in one day first one grain of phosphorus, and then two grains, without experiencing any effects, swallowed next day three grains at once in syrup. In the evening he felt generally uneasy from a sense of pressure and constriction in the abdomen, which continued for three days, when he was seized with violent and continual vomiting of matters which had an alliaceous odour. On the seventh day, spasms, delirium, and palsy of the left hand supervened, and death speedily ensued. It is manifest that, if applied to wounds, or introduced into any of the natural canals, the effects would be very violent, and even fatal after a longer or shorter period.

194. *b.* The *morbid appearances* after poisoning with this substance have been recorded only in the cases observed by WORBE and FLACHSLAND (§ 193.). In the case of the former, where only one grain and a half of this poison were taken, the skin was generally yellow, and livid in places. The lungs were gorged with blood. The muscular coat of the stomach was inflamed. The other coats near the two extremities of the organ were black. In Dr. FLACHSLAND's case, much fluid blood was discharged on making the first incisions. The omentum and external surfaces of the stomach and intestines were red. The villous coat of the stomach presented an appearance of gangrenous inflammation, which Dr. CHRISTISON suggests to have been black extravasation only; and the duodenum was similarly affected. The large intestines were contracted to the size of the little finger, and the mesenteric glands were enlarged. The kidneys and spleen were inflamed.

195. *c. Treatment.* — Large quantities of demulcent liquids should be exhibited, and magnesia given to neutralize any phosphorous and phosphoric acids which may be formed. Vomitings should be early encouraged by large mucilaginous draughts; and inflammation allayed by general and local depletions, or the latter only, or both, according to the peculiarities of the case. Dr. PEREIRA advises parts burnt with phosphorus to be washed with a weak alkaline solution, to remove any phosphorus acid which may perpetuate the irritation.

196. vii. SALTS, CORROSIVE ALKALINE—*Saline Caustics.*—Of the *alkaline salts*, the most *corrosive* are the *bichromate of potash* and the *binoxalate of potash*. Several other alkaline salts, which have usually been arranged with corrosive poisons, exert their fatal influences otherwise than by any corrosive effect they produce on the digestive canal; this effect never amounting to more than irritation and inflammation, which are of themselves insufficient to cause death in the short period sometimes observed.

197. *A.* The *bichromate of potash* is extensively used in dyeing. Accidents may hence occur from it, although it may not be resorted to with suicidal or criminal intentions. In a case in which a strong solution of it was taken, burning pain in the throat, violent vomiting, and the other symptoms of corrosive poisoning, and death in five hours, were occasioned. On *examination* after death, extensive destruction of the mucous membrane of the stomach and small intestine was

found. Dr. CHRISTISON remarks that, when this salt was first introduced into the art of dyeing, the workmen, who had their hands frequently immersed in its solution, were attacked with obstinate ulcers in the parts touched by it, and that these sores gradually extended deeper and deeper without spreading, until they actually sometimes made their way through the arm or hand.

198. *B.* The *binoxalate of potash*, when taken into the stomach, produces the same *symptoms* and *structural lesions* as have been described as the consequences of the ingestion of *oxalic acid;* and the treatment of instances of poisoning by the bichromate of potash, or by it, differs in no way from what has been advised for poisoning with that acid (§ 166.).

199. viii. SALTS—METALLIC.—Several of these salts exert a corrosive action on the living tissues; and, when taken into the stomach, in states of strong solution or in substance, they destroy life chiefly in virtue of this action; but, in smaller doses, and in weaker solutions, they act differently, are more or less abundantly absorbed, and produce effects which rank them under certain of the *classes* of poisons to be considered in the sequel. It is chiefly with reference to this corrosive and local action that I have here to notice them.

200. *A. Antimony.* — The several preparations of antimony liable to become poisonous, with the exception of the *chloride*, (§ 175.), act as irritant and depressing agents, and are therefore treated of in the CLASS, *Acro-sedative poisons.*

201. *B.* BISMUTH — *Subnitrate of* — *Magistery of Bismuth* — *Bismuthi trisnitras.* — Poisoning by this substance has rarely occurred. In the experiments of ORFILA, forty grains of the *nitrate of bismuth* introduced into the stomach of a dog produced all the symptoms of corrosive poisoning, and death in twenty-four hours; the villous coat of the stomach being reduced to a pulpy mass, and eroded in parts. The *subnitrate* was found to produce the same symptoms and lesions as the nitrate, but a much larger dose was required.

202. *a.* In a case in which the *trisnitrate* was taken, in the dose of two drachms, the patient was immediately attacked with burning pain in the throat, vomiting of brown matters, purging of watery stools, cramps, and coldness of the limbs, intermitting pulse; followed by inflammation of the throat, difficult deglutition, a constant nauseous metallic taste, hiccup, laborious breathing, suppression of urine, swelling, and tension of the belly, salivation, delirium, &c. He died on the ninth day.

203. *b.* On *inspection* it was found that, from the pharynx to the rectum, their were but few points of the digestive canal free from change. The tonsils, uvula, pharynx and epiglottis were gangrenous, the larynx spotted black, the gullet livid, the stomach very red, with numerous purple pimples; and the whole intestinal canal was red and gangrenous in places, especially at the rectum. The endocardium was bright red. Probably in this case there was partial absorption of the salt, which had thus inflamed the endocardium; if, indeed, the redness was not merely the result of *post mortem* coloration.

204. *c. Treatment.* — No chemical *antidote* is known to this poison. Emollient drinks should be given abundantly, and the poison evacuated from the stomach as speedily as possible by means of the stomach-pump, or otherwise. Afterwards demulcent enemata ought to be administered. A strictly antiphlogistic treatment should be adopted, to prevent inflammation, or to remove it if it have supervened. Opiates in full doses, camphor and demulcents should also be exhibited.

205. *C.* COPPER — *The preparations and compounds of*, are violent poisons; but although they produce an active emetic effect when taken into the stomach, they act in large doses more upon the nervous system, than locally, or as corrosive or caustic agents. These preparations have seldom been given with a criminal intention, owing to their acrid taste, unless with the view of producing abortion, and with this object the *sulphate* has been often taken. Poisoning by them is most frequently the result of accident. When swallowed in the largest quantities they sometimes occasion the least serious effects, owing to their instant rejection by vomiting. They nevertheless often produce, either most *acute* and virulent poisoning, or effects which are more slowly developed, thereby occasioning a *chronic* form of poisoning. Even in the most acute or rapid cases, the lesions they produce on the digestive canal may be the least remarkable, whilst in the slow or chronic form these lesions may be severe.

206. *a.* The *symptoms*, as respects the digestive organs, are nearly the same as in other instances of corrosive poisoning; but the vomiting is most rapid and copious, and the rejected matters present a remarkably *blue* or *green colour*, sometimes with minute or broken crystals of the salt. Abdominal pain is acute, and is attended by diarrhœa, extreme anxiety, and spasms of the extremities. *Jaundice* is sometimes met with, — a symptom rarely observed in other cases of acute or corrosive poisoning. Stupor, coma, insensibility, convulsions, and sometimes paralysis supervene early, and terminate life in periods varying from three or four hours to several days. In the more *chronic* states, these symptoms are developed and proceed more slowly; the discharges present a greenish hue, especially if verdigris have been taken, and the salt may be detected in them. The digestive canal evinces the most severe disorder: vomiting coppery eructations, salivation, diarrhœa, tenesmus, dysuria or suppression of urine, cramps, convulsions, prostration of strength, &c. continuing for several days, or until death or recovery takes place.

207. *b.* On *Dissection*, of the chronic cases especially, evidences of inflammation, in various parts of the digestive canal, have been found, generally attended by softening, tumefaction, ulceration, and more rarely with perforation of all the coats of the tube. These lesions are often more remarkable in the intestines than in the stomach. The digestive villous membrane presents a green colour, or even minute particles of the poison. These lesions are not constant; but the nervous system betrays, in the great majority of instances, marked functional disorder. Therefore poisoning with the salts or oxides of copper will be further considered under the CLASS, *Acro-sedative Poisons.*

208. *c. Treatment.* — The *chemical antidotes* for the cupreous preparations have been stated by Dr. PEREIRA to be the whites of eggs, given abundantly, or whatever may contain most *albumen.* In the absence of eggs, milk or wheaten

flour should be employed. *Iron filings* have been proposed by Navier, Payen, and Chevalier, and subsequently by Dumas and Edwards; the iron decomposing the cupreous salt, and precipitating the copper in the metallic and inert state. The *ferrocyanide of potassium* is also said to be a good antidote; a drachm or two of it may be taken with safety. *Sugar* was proposed by M. Duval: its efficacy, although denied by Orfila and Vogel, has been recently contended for by Postel. (Pereira, *Mat. Med.*, vol. i. p. 776.)

209. The efforts of the stomach should, however, be promoted in order to procure the discharge of the poison; and, with this view, the whites of raw eggs, milk, warm mucilaginous drinks, &c. should be given frequently and liberally, and, as well as starch, administered as enemata. The stomach-pump may be of service in some instances; but, when vomiting follows freely and abundantly the ingestion of these draughts, it may be more injurious than beneficial. Inflammatory symptoms should be combatted in the usual way, according to their severity and the peculiarities of the case. The nervous symptoms require a recourse to external derivatives, and the other means which will be mentioned in the sequel, (*See* Class, *Acro-sedatives.*)

210. *d.* In the more *chronic* cases of poisoning, with the cupreous compounds, opiates in full doses, with or without creasote and camphor may be given in demulcent vehicles: or the syrup of poppies may be similarly exhibited or administered in enemata, and be aided by warm baths and external derivatives; but these means should not be resorted to until the poison has been evacuated from the stomach and bowels.

211. *D.* Gold — *Hydrochlorate of* — *Chloride of* — *Iodide of Gold* — and some other preparations of this metal have been recently employed in medicine, especially on the Continent, and may, from accident or otherwise, occasion poisoning. — *a.* Dr. Christison states that the poisonous properties of the *chloride* are powerful, and closely allied to those of the hydrochlorates of tin and nitrate of silver. The chloride of gold occasions death in three or four minutes when *injected into the veins*, even in very minute quantities, and the lungs are found after death so gorged with blood as to sink in water. (Orfila, *Toxicol. Génér*. t. i. p. 593.)

212. *b.* If the chloride of gold be *swallowed*, corrosion of the digestive canal takes place; and the salt is so rapidly decomposed that none is taken up by the absorbents; and death ensues from the local injury solely. Even in doses so small as a tenth of a grain, it has caused much irritation of the stomach. The form of fulminating gold has produced alarming poisoning, where it was used in medicine. Plenck says that it excites griping, diarrhœa, vomiting, convulsions, fainting, salivation, and sometimes even occasions death. Hoffmann repeatedly saw it prove fatal, the most prominent symptoms being vomiting, great anxiety and fainting. In one of the cases the dose was only six grains.

213. *c. Treatment.* The *antidotes* for the preparations of gold are the same as those found most successful for poisoning by corrosive sublimate, especially the whites of raw eggs, or *albumen*, large draughts of *milk*, &c. The gastro-enteric symptoms should be removed by vascular depletions, derivatives, emollient enemata, warm baths, opiates, &c.

214. *E.* Iron. — None of the preparations of iron fall under the class of corrosive or caustic poisons, unless the *tincture of the sesqui-chloride*, and it owes its injurious operation, when taken in large quantities, to the excess of acid, the *symptoms* and *lesions* produced by it being the same as those occasioned by *hydro-chloric acid* (§ 150.)

215. *F.* Mercury. — *The preparations* of this metal often cause poisoning, which may be either *acute and rapid*, or *chronic* or *slow*, according to the quantity taken, to the repetition of the doses, and to the modes of employing them. In large doses, the more active of these preparations act rapidly, and are corrosive and acute poisons; but, in small or repeated doses, their effects are chronic or slow, and they act as *acro-alterative poisons*, in which *class* I shall consider this mode of their operation, in connection with that of some other preparations of mercury. It is thus chiefly the *acute* or *corrosive action* of these preparations which I have here to consider: the *chronic*, or consecutive effects, will fall under the class just referred to.

216. *a.* The *bi-chloride of mercury* — *corrosive sublimate.* — The poisonous operation of this substance has been ably investigated by Orfila, Christison, Pereira, Devergie, Beck, Taylor, and others. The *symptoms* caused by a large dose of the bichloride appear either immediately, or in a very few minutes after having been swallowed. A coppery, or metallic taste, is felt in the mouth, and if the poison be in a state of solution, sensations of remarkable acridity, burning constriction, and corrosion are felt in the mouth, fauces, and pharynx, descending to the stomach; where, in whatever state it may have been taken, pain is very soon occasioned by it; is increased on pressure, and is followed by nausea and vomiting; the matters thrown up consisting of the alimentary articles remaining in the stomach, and afterwards of stringy masses of white mucus, streaked or mixed with blood. To these supervene difficult deglutition, the rejection of whatever is taken into the stomach; sometimes a sense of strangulation or suffocation; the extension of pain over the abdomen, and intolerance of pressure; violent purging, and lacerating pains of the bowels, followed by tenesmus and mucous and bloody stools; anxiety, restlessness, and short or laborious respiration; a quick, small, and contracted pulse; burning thirst, and a white, dry, constricted state of the tongue and mouth; anxious expression of countenance, at first with flushing, subsequently with collapse and twitchings of the muscles of the face; suppression of urine or dysuria; cold sweats, great debility and sinking; sometimes ptyalism; sinking and irregularity of the pulse; and coldness of the extremities. Death is often preceded by stupor, insensibility, convulsions, or twitchings of the limbs, or even by paraplegia.

217. Poisoning by this substance *differs* from that produced by *Arsenic:* 1st, The well-marked taste, and the acridity and irritation of the throat and œsophagus, produced by the former, are much greater than by the latter: — 2nd, The symptoms are more violent and immediate upon the ingestion of this poison, than after arsenic: — 3rd, The evacuations are oftener mixed with blood, and irritation of the urinary organs, or sup-

pression of urine, is more frequent, than after poisoning with arsenic. The symptoms caused by corrosive sublimate resemble, in the most acute cases, and at the commencement, an attack of common *cholera;* subsequently, when the patient survives two or three days, they resemble those of *dysentery*, especially as respects the existence of tenesmus, and of mucous and bloody stools; and when ptyalism, or affection of the salivary glands, is not present.

218. *b. Appearances after death.* — These are confined chiefly to the digestive canal. The mucous membrane of the throat and œsophagus, and sometimes also of the mouth and fauces, is softened, and of a whitish or bluish grey colour; that of the œsophagus, especially near the cardia, is partially corroded. The villous surface of the stomach often presents a slate-grey or greyish tint, arising from the action of the poison, as supposed, upon this surface during life. Underneath, the tissues are more or less inflamed, sometimes in patches, and large black ecchymoses, or extravasations of blood are often found underneath the villous membrane. In rarer cases this membrane is only simply inflamed. The coats of the stomach are corroded, discoloured more or less, and often softened so as not to admit of removal without laceration. Perforation, however, is very rare. Similar changes to the above are met with in the small intestines, and in the large bowels, especially in the sigmoid flexure of the colon and rectum; but not to so great extent as in the stomach, although sloughing ulcers are more frequently met with in these latter situations. The colon is generally very much contracted. In cases which have not been very rapidly fatal, sloughing ulceration, dark discolouring of the ulcers or in their vicinity, and softening, are met with in several parts of the digestive canal. Various alterations of the urinary organs are occasionally observed; but these are neither constant nor uniform, with the exception of contraction of the urinary bladder, which is always observed. The epiglottis and trachea are sometimes inflamed; and the endocardium often presents indications of inflammation. The coats of the stomach and intestines and the collatitious viscera often yield mercury on analysis. Poisoning by this substance does not delay the accession or progress of decomposition, as observed in respect of poisoning by arsenic.

219. *c. The quantity which may destroy life* varies greatly with the circumstances adduced above (§ 51, *et seq.*). The *smallest* quantity instanced by Mr. Taylor is *three grains*, this having been given to a child, by mistake, for calomel; but he believes that *two* or not more than *three grains* have proved fatal in an adult. If this quantity — even two grains — be taken at once on an empty stomach, I do not doubt that it is capable of producing a fatal result, if medical aid be not procured; but I state this chiefly from much experience of the medicinal exhibition and properties of this substance. When this poison has been taken on a full stomach, or when free vomiting has followed the ingestion of it, or when medical treatment was not long delayed, very large quantities have failed to produce death. A case is recorded by Dr. Booth (*Med. Gaz.*, vol. xiv. p. 63.), in which *an ounce* was taken, and, owing to these favourable circumstance recovery was effected.

220. *d. The period at which death takes plac* varies, in the *acute cases*, from two or three hou to five or six days. Mr. Illingworth (*Me Gaz.*, vol. xxxi. p. 557.) met with an instance c death from the sublimate in from two to thre hours. Death from this substance in from ten t twenty-four hours is common; but life may b prolonged for several, or even many days, a though the dose of the poison has been very larg when medical aid has been soon obtained. I these, the symptoms of *slow*, or *chronic poisonin* have generally appeared; and the effects — ptyalism, diarrhœa, tenesmus, &c. — described i connection with the *acro-alterative* action of thi and other preparations of mercury, have usuall been observed. *Acute* poisoning by this substanc is the result of the chemical action, and the destruction of the tissues caused by the contact c it. The fatal issue is produced by the exten of lesion of the digestive canal, aided by th shock to vital power and nervous energy Whatever absorption may occur, in the circumstances more favourable to this mode of operations, and in the more prolonged cases wi further aid this issue, owing to the injuriou influence which an excessive amount of th poison in the circulation will exert upon the hea and nervous masses.

221. *e. The treatment of acute poisoning* by co rosive sublimate consists of the *removal* of th poison, of the administration of *antidotes*, and th counteraction and removal of the effects produced. — (*a*) The *removal* of the poison from th stomach is best procured by the encouragemen of vomiting by means of copious draughts of fluid containing, or consisting of, the antidotes about t be noticed. Mr. Taylor states that, "if vomitin do not already exist, it must be promoted by th exhibition of emetics." But it may be urge against this advice, that the circumstances ar rare which admit of emetics; for they may increase the mischief in the stomach, or otherwis complicate the case; or time may be lost in waiting for their operation, which may not soon tak place, unless they are of an energetic kind. A recourse to the stomach-pump is liable to the objection already urged against it, in cases where th œsophagus and stomach are constricted, corroded or softened by the poison (§ 174.). Swayed b these considerations, I advise an immediate recourse to such draughts as are most likely t promote vomiting and thereby the rejection o the poison, and to convey at the same time th *antidote* which may be obtained with the leas delay.

222. (*b.*) The *antidotes* are chiefly those whic more or less efficiently decompose the corrosive sublimate: these are *albumen*, the *gluten* of wheat, *milk iron filings*, and *meconic acid.* — *a. Albumen* appears to decompose the sublimate so as to render i almost inert.—Dr. Christison has adduced severa cases proving the remarkable efficacy of this antidote. The celebrated Baron Thenard swallowe inadvertently a concentrated solution of corrosiv sublimate; but by the immediate and abundant us of the whites of eggs, he suffered no material harm Raw eggs — both the whites and the yolk — shoul be taken most abundantly, and ought not to b

ithheld, even although the poison has been taken r a considerable time; for this antidote is often fficacious notwithstanding, and is the one most be depended upon. Peschier states that one gg is sufficient for every four grains of the poison; ut no harm can result from taking many, as they ill be thrown off by vomiting; indeed they ould be so given as to promote vomiting.

223. *β. Gluten* has also been recommended y Professor Taddei. It may be prepared by ashing flour in a muslin bag, under a current of ater; but it will be preferable, when albumen nnot be procured, to mix flour in water, and ve it in abundance: it will thus often promote miting (§ 221.), and act as an antidote. *Milk*, the absence of albumen or flour, may be likeise given, or *gum-water*, *linseed tea*, or sweetened ater. *Iron filings* are stated to be useful, by recing the sublimate to the metallic state. *Meconic id* is also said to be an antidote, by forming an soluble meconate of mercury. But, as Dr. Peira justly remarks, a knowledge of this fact is little practical value, since the acid is not gerally procurable; and tincture of opium, which ntains it, cannot safely be used in sufficient antity; for Dr. Christison finds that five grains corrosive sublimate require an infusion of thirty-ee grains of opium to precipitate the whole of mercury. Mr. Taylor states, that the *prohloride* of tin, in the proportion of one part to een parts of water has been recently proposed M. Poumet as an antidote. But the efficacy this substance has not been sufficiently tested the human subject. These antidotes, even almen, cannot be expected always to be sucsful. The sooner they are given the greater is chance of success. Several instances, howr, have been recorded of their failure, owing her to delay in their exhibition, or to the perfect ution and quantity of the poison, or to other cumstances of the case. Hence it will always proper to exhibit the antidotes, as already add (§ 222.), especially the eggs, in large num, and in the way most likely to promote voing.

224. (*c.*) The *effects* produced by the poison as f as these are indicated should next attract the ention of the physician. These approach, in s e cases, to the more common forms of gastroe eritis, or of dysentery, or even of peritonitis; t the vascular action is generally less sthenic t n in those, owing to the extent and severity of t injury sustained by the villous membrane and r ves of the digestive canal, and hence vascular c letions cannot be carried to the same extent a n these diseases. They are, however, generally r uired, most frequently locally by leeches, r ely by venæsection, or by both modes in the s e case. Demulcents with opiates should be f ly administered, and emollient and anodyne e mata be thrown up. Fomentations, rubef ent embrocations, &c., ought to be applied to t abdomen, and frequently renewed; and warm b hs resorted to occasionally.

25. (*d.*) The *diet*, as recovery advances, should c sist chiefly of farinaceous articles, of light p ada, gruel, demulcent drinks, milk, rice-milk, o creams, and broths made of the flesh of young a nals, and flannels ought to be worn nearest the s .

26. *f.* The *nitrates of mercury* are corrosive poisons. They are easily dissolved in water, especially if there be a little excess of acid present. Mr. Bigsley has recorded (*Med. Gaz.* vol. vi. p. 329.) the case of a boy who dissolved some mercury in strong nitric acid, and swallowed about a tea-spoonful of the solution. He was instantly seized with excruciating pain in the pharynx, œsophagus, and stomach; urgent anxiety, cold skin, small pulse, colic, and purging. He sank rapidly, and died in about two hours and a half. The fauces, œsophagus, and stomach were found after death corroded and inflamed. The *treatment* is the same for poisoning by these salts as for that by corrosive sublimate. The diluted proto-chloride of tin is suggested as an antidote by Mr. Taylor.

227. *g. Bicyanide of mercury* is a most active corrosive poison. A person swallowed twenty-three grains of this substance, and was immediately attacked with all the symptoms characterising the ingestion of corrosive sublimate; and, on *inspection* after death, the same lesions of the digestive canal were observed. The *treatment* is also the same as that already recommended for poisoning by the sublimate.

228. *h. White precipitate*—the ammonio-chloride of mercury; *red precipitate* — the red oxide of mercury; *turbith mineral* — the subsulphate of peroxide of mercury; *cinnabar* and *vermilion* — the persulphuret of mercury; and *calomel* — the chloride of mercury, are severally acrid poisons, in very large or repeated doses, and may even corrode the digestive canal; but their effects are uncertain as respects this mode of action, and therefore they will be more appropriately considered hereafter; when also poisoning by the external use of mercurial preparations, and by other modes of employing them, will be noticed.

229. *G.* Silver — *Nitrate of* — *Lunar caustic* — is a powerful corrosive poison, when employed in substance or in strong solutions. It rapidly combines with, and is ultimately decomposed by the tissues; the acid corroding them. It is, in these states, a local and disorganising agent, and is not absorbed unless it be employed in small and frequent doses. There are very few cases of poisoning by it on record, and these have not been detailed with any precision. — *a.* The *symptoms* produced by this poison are most probably but little different from those caused by several other corrosive poisons; but, judging from its effects in large medicinal doses, diarrhœa is most probably not occasioned by it.

230. *b. Treatment.*—The *antidote* for nitrate of silver is common salt, which, acting upon the nitrate, forms nitrate of soda, and chloride of silver, which is innocuous. The contents of the stomach should be removed, and the symptoms alleviated, by demulcents, opium, external derivatives, and local bleedings; by emollients containing salt, and by anodyne enemata.

231. *H.* Tin — *the chlorides or muriates of.* — A mixture of these is extensively used in the arts, and may hence produce accidental poisoning; but instances of such an occurrence are extremely rare. They appear to act as local corrosive poisons when taken in large quantity, and to occasion the usual symptoms of this class of poisons. They are decomposed by many organic substances, and then the *treatment* of poisoning

by them should consist of the liberal and frequent ingestion of albumen, milk, and demulcents; and, after the stomach has been completely evacuated, of the administration of opium, emollient enemata, &c.

232. *I.* Zinc — *Chloride of — a.* This substance, now employed as an antiseptic, when taken into the stomach, or applied to any living tissue, in states of strong solution, is a powerful caustic, or corrosive poson. It may be inferred to produce the usual *symptoms* of corrosive poisons, as I am not aware of an instance of poisoning having been caused by it; and its effects may be *treated* by the administration of the carbonate of soda, or any of the alkaline carbonates, with albumen, demulcents, and other means already recommended for caustic and corrosive poisons.

233. *b. Sulphate of Zinc — white vitriol* — has been considered as a corrosive poison; but its corrosive and local action is very rarely so great as to occasion death, even when given in very large quantity, for it is generally immediately thrown off the stomach, and occasions merely an irritant and astringent action; and, with reference to this action, it will be considered in the *third class* of poisons.

234. ix. Vegetable Acrids. — There are numerous vegetable productions which produce poisonous, or at least injurious effects, when taken into the stomach; or, when applied externally, or otherwise employed. Many of these act chiefly locally, inflaming and corroding the tissues; whilst others produce less local irritation, but are absorbed to a greater or less extent, acting thus remotely and injuriously upon the nervous centres and on vital organs. Under this class, I shall very briefly notice such of the vegetable poisons as act chiefly on the digestive villous surface, when swallowed, and locally as respects the parts to which they may be applied.

235. *a. Anemone nemorosa — A. pratensis — A. Pulsatilla*, and *A. sylvestris* — are severally very acrid poisons. Bulliard states, that an old man with rheumatic gout, applied the bruised root of *A. Pulsatilla* to the calf of his leg, on going to bed; violent suffering, with sphacelation of the part ensued. Animals have exhibited marks of intense inflammation of the stomach and rectum, after having swallowed it. *A. nemorosa* is said to produce dysentery in sheep. The inhabitants of Kamschatka make use of this plant to poison their arrows. Robert and Vauquelin extracted a fluid of an acrid taste and pungent odour from the flowers of the *A. pratensis*, which acted like a caustic on the tongue.

236. *b. Arum maculatum — Wake-robin — A. Dracunculus*, and other species of arum are acrid poisons, in the recent state, and when not acted upon by heat. They occasion a burning pain and swelling in the throat; difficult and painful deglutition. Bulliard states that three children, who ate of the leaves of the *A. maculatum* were thus affected, and experienced horrible convulsions. Two of the three died after some days. The *Calla palustris* — or *Water Arum* — excites a similar action to the above.

237. *c. Bryonia dioica — Bryony.* — The root of this plant occasions vomiting, violent pain, profuse alvine evacuations, and faintings. Pyl mentions a fatal case from taking two glasses of an infusion of the root to cure an ague. Tormina and purging soon supervened and killed the patient.
occasions violent inflammation in the large a
small intestines, and of the stomach. Brand
imputes the acrimony of the plant to a princip
which he has called *bryonine*, which induces i
tense inflammation of the parts to which it
applied.

238. *d. Caltha palustris — Marsh Marygold* — h
been noticed by several writers as an acrid poiso
inflaming the œsophagus, stomach, and bowe
even of the lower animals. A family of fi
persons in Germany, after partaking of it, we
all seized, in half an hour, with pain in the st
mach, sickness, vomiting, diarrhœa, and dysuri
and, on the following day, with a general swelli
of the body, and a copious eruption. The
however, all recovered. In addition to the infla
matory action produced by it in the digesti
canal, it appears to be absorbed, and to occasi
general vascular excitement, and irritation of t
urinary organs and skin.

239. *e. Chelidonium majus — Celandine* — has
bitter and acrid taste; and causes inflammation
whatever parts to which it may be applied. Wh
taken into the stomach it inflames the digesti
mucous surface, and is partially absorbed; e
citing the brain and nervous system; and causi
congestion of the lungs. These latter effects, esp
cially that on the brain, is more remarkably p
duced by *C. Glaucium.* — *Clematis Vitalba*
(*Virgin's bower*) — *C. Flammula* — *C. erecta*
C. integrifolia — are all acrid and caustic. Wh
applied to the skin, they produce redness, pustu
and excoriations. Stoerck and Mueller p
scribed them in some chronic affections, especia
syphilis, rheumatism, and scrofula, in small dos
in the form of infusion; continuing their use
some weeks with alleged benefit. M. Roqu
states that they occasion dysentery in anima
The powder of the leaves, in doses of one, tw
or three grains, have also been employed. Th
are exciting, diaphoretic, and alterative in sm
doses; but, in large doses, they destroy life by t
intense inflammation they produce in the wh
course of the digestive canal.

240. *f. Croton Tiglium — Purging Croton.* — T
seeds of this plant have a burning, acrid, a
nauseous taste. They were formerly employ
as a hydragogue-purgative; but, on account of t
violence of their operation, were laid aside. O
seed is sufficient for a dose, and even sometim
excites violent vomiting and purging. More
cently the *expressed oil* of this plant has come in
use. Dr. Pereira met with a case of poisoni
by inhalation of the dust of the seeds. T
patient had been employed for several ho
in emptying packages of the seeds. He co
plained of loss of appetite, of a burning sensati
in the nose and mouth, followed by pain at t
epigastrum, and copious lachrymation. He l
came giddy and insensible, but recovered. I
bowels were not affected.

241. The oil causes rubefaction and a vesicul
or pustular eruption when rubbed on the sk
and when rubbed on the abdomen, it often purg
When swallowed in one or two drops, it produ
a burning acrid taste in the mouth and throat, a
acts as a drastic purge, procuring watery motio
and sometimes an increased secretion of uri
It appears to be partially absorbed; but it e
dently acts as a sedative irritant of the digesti

ucous surface. The only case of poisoning which known to have been caused by it, was that of a oung man, ill of typhoid fever, who took by istake two and a half drachms of the oil. Three uarters of an hour afterwards the skin was cold, d covered with a cold sweat; the action of the art and pulse were scarcely perceptible; the spiration difficult, and the extremities blue. An ur and a half afterwards, there were excessive voluntary alvine evacuations, but no vomiting; e abdomen was tender to the touch; and a rning sensation was felt in the œsophagus. he blueness extended over the body; the surface came insensible, and death took place after ur hours. This oil, even in the usual purging se, sometimes acts violently, generally speedily, though not certainly, occasioning much de- ession of the vascular system, and a feeling debility.

242. *g. Cucumis Colocynthis.— Bitter Apple.*— e spongy or medullary part of the fruit is a astic cathartic, causing inflammation of the vil- us surface of the bowels, and bloody evacuations. is substance has caused death in several in- nces owing to mistake. A woman swallowed a -spoonful and a half of colocynth powder, and d in twenty-four hours. A person took two sses of a decoction of colocynth, and died in a rt time. Vauquelin discovered the active prin- le of this plant, and called it *colocynthin*.

243. The *symptoms* are, at first, frequent albine cuations; great heat and colicky pains in the vels; dryness of the throat, and unquenchable st; a small and rapid pulse; redness of the gue; a fixed pain around the umbilicus, and derness. To these succeed coldness of the ex- nities, cramps, sinking of the powers of life and th. On *dissection* the whole digestive canal ibits marks of inflammation, which is often most nse in the stomach and large bowels, the villous nbrane of which is abraded, readily detached, ven ulcerated. The intestines are studded with k spots or ecchymoses; the inflammation some- es extends through all the coats; the peritoneum g inflamed, and either adherent to its opposite aces, or covered by a false membrane, or con- ing a whitish fluid and florenti.

44. *h. Cyclamen europæum* is a violent irritant, ting vomiting and purging. Bulliard states its root produces cold sweats, dizziness, and vulsions; the patient voids blood both by vo- ng and by stool, the super-purgation and in- mation proving even fatal.

45. *i. Daphne Gnidium* (*Spurge-flax — Flax- ed Daphne*)—*D. Mezereum* (*Mezereon*).—The of these plants acts as a corrosive poison when ied to living tissues. I have frequently em- ed the mezereon bark as an external irritant, ad of caustic alkali, in forming an issue. en swallowed, it inflames the digestive canal, ing heat and dryness of the throat; salivation, minal pains, frequent vomitings, bloody s, giddiness, and feebleness of the limbs; and esions above described (§ 243.). The *Daphne reola* is also poisonous, and produces nearly same effects as the other species.

46. *k. Delphinium Staphisagria—Stavesacre— nated Larkspur — D. tricorne.* — The acrid erty of these plants is lodged in the alkaloid, h Lassaigne and Fenuelle discovered in , and which is an extremely acrid irritant. The local effects of these plants are evidently the most striking. They have been found to inflame intensely the digestive mucous surface, when swallowed, but not to produce any alteration of other organs.

247. *l. Euphorbia officinarum.*—The stalk of the various species of the genus Euphorbia furnishes a milky juice, which, on being dried, is called *euphorbium*. It is a gum-resin, which contains an active principle, styled *euphorbin*. A tea-spoonful of the gum-resin was administered by mistake; and it occasioned a burning sensation in the fauces and throat, rapidly extending to the stomach, and causing incessant watery vomitings. The pulse became remarkably rapid and irregular; a cold perspiration broke out, and death took place after two days. The body was inspected eight hours after death; the coats of the stomach could be torn with the greatest ease; the internal surface of the viscus was studded with gangrenous spots; the spleen was enlarged and much softened, and the inner coat of the aorta was beautifully injected with blood, and highly inflamed. The after lesion was probably caused by the partial absorption of the poison in this case.

248. Many of the *species* of the genus *Euphorbia* are poisonous, as the *antiquorum, canariensis, Tirucalli, Peplus, helioscopia, verrucosa, platyphyllos, palustris, hibernica, amygdaloides, sylvatica, exigua, mauritanica, neriifolia, Esula, heptagona*, &c., and have been employed in poisoning spears, arrows, &c. The species *Lathyris* and *Cyparissias* are said by Lamotte to have proved fatal when administered in a *glyster*. A person allowed his closed eyelids to be rubbed with the juice of the *E. Esula*: inflammation took place, and it was followed by the loss of the eye. A boy, six years old, ate some of the *E. Peplus*. It produced vomiting, purging, spasms, a weak small pulse, inability to swallow, insensibility, cold extremities, and death. *On dissection*, the tonsils, fauces, and pharynx were seen very much inflamed. The villous membrane of the stomach and small intestines were very red; but that of the large intestines much less so. The urinary bladder was very contracted. The epiglottis and larynx were highly inflamed. The lungs were healthy. The veins of the dura mater were congested. The blood was fluid. The brain was healthy.

249. *m. Gratiola officinalis — Hedge Hyssop* — acts chiefly locally, causing inflammation of the part which it touches. It has produced death rapidly when an extract of it was injected into the veins.

250. *n. Hippomane Mancinella—Manchineel tree.* —The wood of this tree, when green, excites inflammation of the skin when rubbed against it. The dust of the wood is so acrid as to excite inflammation of the respiratory passages, or asphyxia, when inhaled with the air. Dr. R. Madianna found that the juice excited inflammation when applied even to the sound skin. Orfila and Ollivier applied this juice to a wound in the cellular tissue, with a fatal result. When given internally, it soon destroyed life; the stomach and intestines being found, on dissection, very highly inflamed.

251. *o. Jatropha Curcas— Indian nut.* —The seeds of this plant are a violent poison, exciting incessant vomitings, purging, severe pain, vital depression, and death. Its fatal effects are more rapid when it is taken into the stomach than when

introduced into the cellular tissue. When swallowed, it produces intense inflammation of the digestive canal. Mr. Bennett states that it is used as a purgative by the natives of the Philippine Islands, an over-dose producing intense pain, vomiting, and purging; their only antidote being large draughts of cold water.

252. *p. Juniperus Sabina—Savine.*—The leaves and tops of this plant contain an acrid poison, in the form of a volatile oil of a remarkable odour. They are acrid and irritant in the state either of infusion, powder, or tincture, and yield a light yellow oil, in which the active properties of the plant chiefly reside. The powder, or the infusion, or the oil, has been often taken, in excessive doses, in order to procure abortion — the power of accomplishing which effect it does not possess more than any other violent irritant. When employed with this intention, it not unfrequently destroys the life of the mother, and sometimes even before an abortion is procured. Mr. Taylor states that, in a case in which the savine powder was taken with a fatal issue, he found a green fluid in the stomach, which, with the œsophagus and small intestines, was highly inflamed. The poison was identified by placing the minute portions of the leaves found in the stomach under a powerful microscope. A girl, to procure abortion took a strong infusion of savine leaves, which produced violent pain in the abdomen and strangury. She miscarried two days afterwards, and died four days after that. On *dissection*, extensive peritoneal inflammation was found. The inside of the stomach was very red, and chequered with patches of florid extravasation (Christison, *Op. Lat.*). Whilst this substance acts locally it is also partially absorbed; and, through the medium of the blood and urine, affects the urinary organs.

253. *q. Momordica Elaterium— Wild or Squirting Cucumber.*—The fecula deposited by the expressed juice of the fruit of this plant — *elaterium* — contains the active principle to which the properties of the plant are imputed, and are chiefly if not altogether owing. Drs. Clutterbuck, Paris, Morries, and Pereira have examined this fecula, and found that its active principle — *elaterin* or *momordicine* — which is soluble in alcohol, is a very active purgative in the dose of one-twentieth of a grain. Elaterium — the fecula of the juice of the fruit — when of the best quality is a drastic and hydragogue purgative in the dose of the one-twelfth of a grain. Its acridity is such that it inflames and ulcerates the fingers of those who prepare it. Although acting thus energetically as a local irritant, it appears also to be partially absorbed; and even to have its irritant action transmitted by means of the nervous system to parts more or less remote. When taken in a large dose it produces violent hypocatharsis and very copious watery stools; being the most energetic hydrogogue purgative known. Even a quarter of a grain of the purest kinds of elaterium may produce this effect and procure the discharge of several pints of fluid by the bowels. An over-dose occasions not merely violent griping pains in the abdomen, but also increased frequency of pulse, a dry tongue, great thirst, and dampness and coldness of the skin. A female took, by the advice of a quack, in divided doses, two grains and a half of elaterium and sixteen of rhubarb. They produced incessant vomiting and purging, which did
not yield to treatment. She died in thirty-si
hours. On *dissection*, the villous membrane
the stomach and intestines was intensely inflame
The colon was contracted: the other viscera we
healthy. (*Boston Med. Mag.*, vol. iii. p. 25.)

254. *r. Narcissus Pseudo-narcissus — Daffod*
— Meadow Narcissus. — The extract of this pla
applied either externally or internally, produc
violent retchings, followed by death, owing to i
tense inflammation caused by it in the stoma
and intestines, even extending to the rectum.

255. *s. Ranunculus.* — Several species of th
genus of plants are remarkably acrid and corr
sive, especially the *R. acris*, *R. sceleratus*,
Flammula, *R. arvensis*, *R. bulbosus*, *R. alpestri*
R. aquatilis, &c. The leaves, flowers, and e
pressed juice irritate, inflame, and ulcerate t
external surface according to the duration of the
application; and, when swallowed, they excoria
the tongue, mouth, and throat; corrode and i
flame the stomach, and tumefy the œsophagus a
pylorus, occasioning extreme pain, retchings, &
(Plenck.)

256. *t. Rhus Toxicodendron—Poison Oak—P*
son Ivy. — Fontana, Alderson, Barton, Big
low, and others, have noticed the intensely poiso
ous action of this and several other species of t
genus *Rhus*. A small portion of the milky juic
applied to the skin, excites burning, swelling, i
flammation, and small vesicles, containing a sha
transparent humour; and nearly the same sym
toms are produced by touching the leaves. D
Alderson states that sphacelation has follow
contact with the acrid juice of this plant in son
cases. Drs. Cutler and Bigelow mention va
ous noxious effects to have followed the handli
and the burning of the wood of the *Rhus vern*
or *poison sumach*. The inflammation produc
by the several poisonous species of this genus a
pears to present peculiar characters, with a mark
disposition to diffusion, tumefaction, and gangren
or to assume the form I have described wh
treating of *diffusive inflammation of the* Cellul
Tissue. The leaves and juices of these speci
have been employed in medicine as excitants, a
are supposed to produce not only intense irrit
tion, but also considerable stupefaction; a
hence it may also be considered as a power
acro-narcotic poison. (See Class VIII.)

257. *u. Stalagmitis cambogioides—Habradendr*
cambogioides. — The gum-resinous exudation fro
this plant occasions, in *large doses*, nausea, vom
ing, griping pains of the bowels, copious wate
stools, &c. In *excessive doses* it acts as an ac
poison. A drachm caused horrible retchings a
purging, followed by syncope and death. T
fatal effects consequent upon taking a great nu
ber of Morison's pills have been owing to t
gamboge contained in them. The *symptoms*
these cases were vomiting and purging, pain a
tenderness of the abdomen, coldness of the e
tremities, and sinking of the pulse. On examin
tion, *post mortem*, inflammation, ulceration, a
sphacelation of the intestines were found.

258. *v.* There are many other plants, as seve
species of the *Rhododendron*, *Pedicularis*, *Plu*
bago, *Phytolacca*, *Ricinus*, *Sambucus*, *Sedum*, *T*
nacetum, *Pastinaca*, &c., which possess very ac
properties, and which, when taken into the s
mach, occasion symptoms and lesions similar
those caused by the plants already mention

thers produce not merely more or less inflammaion and excoriation, but also other functional and rganic changes, which rank them in the classes vhich follow.

259. *y.* 1st. The *action* of the acrid vegetables s generally exerted upon the tissues with which hey come in contact, in which they occasion inammation, excoriation, or corrosion, ulceration, or phacelation, with the symptoms usually attendng these lesions, according to the parts in which hey are produced. 2nd. The fatal effects of hese poisons are more certainly developed when hey are taken into the stomach, than when applied xternally, or introduced into the cellular tissue: r, in the former case, they affect a greater exent of surface, having an intimate connexion with he organic class of nerves, and, through these erves, developing a wider range of morbid symathies than in the latter. 3rd. Some of these oisons, in addition to these local effects, are parally absorbed, and produce changes either funconal or structural — nervous or vascular — in ther remote organs, as the lungs, the urinary orans, the nervous masses, &c.

260. *z.* The *treatment* of the vegetable acrids onsists chiefly of the expulsion of them by ncouraging vomiting, by means of mucilaginous raughts; and of allaying irritation by opiates, exrnal derivatives, emollient and anodyne enemata, nd local depletions. Opium may be given in full r frequent doses, and rubefacient embrocations r fomentations assiduously applied over the abomen. I have found the turpentine fomentations, piates, starch enemata, with the compound tincre of camphor or syrup of poppies, the most enerally efficacious; and, if vital depression pervene, camphor, ammonia, decoction of cinhona, or aromatic infusions are the most serviceble. During recovery the *diet* and *regimen* lvised during convalescence from the effects of everal corrosive poisons should be adopted, (§§ 57. 174.).

261. CLASS II. DEPRESSING AND PARAYSING POISONS — SEDATIVE POISONS. — There re several agents which destroy life by the extent which they abstract the vital caloric, depress the ervous energy, and lower the action of the heart nd vascular system generally. In virtue of these odes of operation, they destroy vitality without ny very obvious pre-existent excitement, and ithout producing either the appearances or the ymptoms or lesions attending local irritation. he effects of these agents are manifested by the ates of function and of vital manifestation and acon, and by no further lesion than may be attriuted to failure or loss of function or action — by e absence of such structural changes as are lculated to account for death, conformably with ur acquaintance with the extent and conseuences of pathological conditions. Of this mode which certain poisons act, I have already taken general view (§§ 28—30). I shall therefore otice, as briefly as possible, those agents which ome under this class — which destroy life by cting in this way, and independently of such ructural lesions as are of themselves calculated produce the result. It may, however, be here emarked, that there are numerous substances, hich, in addition to more or less manifest lesions f structure produced by them, act also as sedaves or depressants of nervous energy and vital action, which produce more complicated effects or associated results, and which thereby constitute other classes of poisons, more especially the *fifth class.*

262. *A.* ACETIC ACID, in various states of concentration or purity, may be so employed as to act as a sedative. It has been considered above (§ 125.), with reference to its corrosive operation, or to its employment in larger doses, and in states of strong concentration. But when taken in states of dilution, and when the use of it is continued for a considerable time, it acts not only as a sedative, but also as a slow poison. These effects depend, in some degree, on constitution and the quantity of it usually taken; for, in moderate doses, both it and the *mineral acids* are tonics and refrigerants, and increase the appetite, whilst, in larger doses, or when too long continued, they impair or otherwise affect the assimilating processes, and even change the constitution of the blood. When very dilute acetic acid is taken, especially during vascular excitement, or in febrile states, it allays thirst, lowers the heat of surface, and increases the urine. It is certainly absorbed to a greater or less extent; and, both locally and through the medium of the circulation, it exerts some degree of astringent action. I have met with several instances of disorder from the protracted use of this acid, amounting nearly, and, in one quite to that observed in the following case: — A young lady enjoyed good health, was plump, had a good appetite, but was afraid of becoming too fat. She was advised to drink a small glass of vinegar daily: she did so, and her plumpness diminished; but, after some weeks, she began to complain of a short dry cough; her body became lean and wasted; her breathing short and difficult, and the usual symptoms of tubercular consumption supervened. On *dissection* all the lobes of the lungs were studded with tubercles. The long continued use of acetic acid seems to favour the development of several organic changes which originate in debility. MORGAGNI believed that it favoured the production of schirrus of the pylorus.

263. *B.* ACIDS—THE MINERAL. — The action of these acids in large quantities, and in strong and concentrated states, has been already considered (§ 132. *et seq.*); in which states they act locally and as corrosives. But in states of weak dilution, they operate differently, their effects varying with the quantity and continuance of the use of them. Many years ago I made a series of experiments with these acids in different states of dilution, and for various periods; and most of them were made upon myself. I found, — 1st, That the *sulphuric*, the *nitric*, and the *hydrochloric acids*, were severally absorbed into the circulation when taken in states of dilution short of producing corrosive effects; — 2d, That, after periods varying with the amount and frequency of the dose, and with the acid taken, the presence of the free acid could be detected more or less abundantly in the urine; — 3d, That sulphuric acid appeared sooner in the urine than the nitric or hydrochloric, and that the nitric required the longest time to appear, and the largest doses; but as to this particular, I was not quite satisfied; — 4th, That the sulphuric acid evinced the most decided refrigerant and sedative action, especially when much diluted; — 5th, That the use of these

acids was at first tonic and refreshing, and to some extent astringent and diuretic; but that, when continued for some time, and when they were more abundantly absorbed, especially the sulphuric, they then were depressing; occasioning indigestion, weakness of the pulse, and in my own case, after the sulphuric acid had been taken some time, intermissions of the pulse, and impaired impulse of the heart, the urine at this time containing free sulphuric acid, or this acid in excess; — 6th, That a too long continuance of these acids, particularly of the sulphuric, not only impaired digestion and assimilation, but also weakened the heart's action, lowered irritability, caused emaciation, disordering the bowels, and the secretions poured into the digestive canal; — 7th, That these acids act as refrigerant tonics only when employed for a short time in such quantity as may render drinks agreeably acid; that they are most beneficially prescribed in this manner, in order to remove a particular diathesis or specific condition; and that they are slow poisons when long continued in healthy states of the frame, the good effects often imputed to them resulting either from other causes, or from vital resistance and the efforts of nature; — 8th, They affect when continued for some time the constitution of the blood; — 9th, The mineral acids when thus employed are excreted from the blood chiefly by the kidneys and the skin.

264. *C.* Alkalies and their Carbonates when taken in states of weak solution, or continued for too long a time, or in doses short of producing the effects described above (§ 167. *et seq.*), impair more or less remarkably vital power and vascular action. These substances are readily absorbed into the circulation, whence they are eliminated chiefly by the kidneys, and slightly by the skin. The prolonged use of them may occasion slow or chronic poisoning, owing to the effects produced by them on the digestive mucous surface, and on the urinary organs; for they manifestly favour the too rapid detachment or exfoliation of the epithelium covering the villous and mucous membranes of these viscera, whilst they alter the constitution of the blood, and affect the healthy states of the hæmato-globulin. When thus improperly employed, their operation as sedatives tends rather to favour the origin and development of organic lesions and chronic diseases, which may ultimately terminate life, than to cause death in a more direct and immediate manner.

265. *D.* Cold. — The *abstraction of animal heat* — may, from its intensity or continuance, destroy life. Cold is a powerful sedative, benumbing the sensibility, weakening muscular motion, and lowering vascular action. It also favours internal congestions, especially of the lungs, brain, and liver, and ultimately of the large veins and right side of the heart; these congestions, increasing the effects of cold on the sensibility and on the vascular system to a fatal amount, unless judicious means of counteraction be adopted. The fatal effects of cold are favoured by repose; by the drowsiness, somnolency, or lethargy which it induces, and by a passive submission to this feeling; by previous excesses in spirituous liquors or intoxicating drinks, or even by the use of those at the time of exposure, if active exercise be not taken. But it is unnecessary to pursue the subject further at this place, than to associate its effects with other injurious agents, for the purpos of diagnosis, and of comparison with the action other sedatives, or even with narcotic poisons, this agent has been noticed above (§§ 28, 29.), a *specially* treated of with reference to its *effects* a *treatment.* (See art. Cold.)

266. *E.* Digitalis. — *Digitalis purpurea* has be usually classed with narcotics, or acro-narcotic but it is more properly a sedative than a stupefyi agent, as this latter property is either not at a or imperfectly evinced; and whatever narco effect may be considered as actually produced it, in any instance, is to be imputed entirely to depressed, paralysed, or departing manifestation cerebral function. The irritation caused by di talis in the digestive canal is not great, does proceed to inflammation, and is attended marked depression of vital power. The effe produced by it on the heart obviously depe upon the quantity taken, the rapidity of its sorption, or the accumulation of it in system, and upon the other peculiarities of case, and particularly upon those connected w the constitution of the patient. In many ingestion, even in a very large and poison dose, produces acceleration of the pulse sometimes remarkable acceleration; but pulse is always then weak, compressible small, the acceleration being manifestly, in other cases, of great quickness of pulse, evidence of extreme depression of organic nerv influence and vital power. But, as the irritabi of the heart and other muscular parts become paired with the depression of the organic nerv influence upon which it depends, the increa frequency of the heart's action, if it have occur subsides more or less rapidly into remarka slowness and irregularity, with or without in missions, until the action ceases altogether.

267. The noxious operation of digitalis is ma fested in all animals. One drachm of the pow acts as a sedative in horses affected with infla mation. Two ounces destroyed this animal twelve hours. The influence of this poison the heart of the horse is various. At first, action of this organ is sometimes accelerated; other instances it is not affected, and in some i retarded. It generally occasions diminished m cular power, convulsive movements, tremors, loss of sensibility. Of the numerous writers w have discussed the operation of digitalis, ther none who has estimated it so accurately as Pereira, or at least so conformably with my c experiments, and with my observations of effects during a period of thirty years. M years ago, I tried the effects of it upon mysel large doses, in different forms of preparatio; and in practice, I have pushed it in some stances, as far as appeared compatible with safety of the patient.

268. *a. Symptoms.* — Dr. Pereira has dis guished *three grades* of operation of foxglove, o poisoning by this plant; and I shall adopt division. — (*a.*) *The first degree* is that usu produced by *small and repeated doses,* and cons chiefly of nausea or loss of appetite; of altera of the heart's action, and of the pulse, which comes irregular, or accelerated, or slower t natural, of depression of spirits, of impai strength, and of increased secretion of ur These symptoms observe no regular order, so

times the diuresis, at others nausea, and occasionally the affection of the circulation being the first to appear. The influence of digitalis on the circulation is by no means uniform. In some cases, the pulse is accelerated or rendered full and soft; in others it is slower, or irregular; in many it is intermittent; and in others it is not materially affected. A small dose, in some instances, reduces the frequency of the pulse, and renders the pulsation irregular or intermittent, or both; whilst a very large dose may be taken without any material effect upon the action of the heart. In the summer of 1816 I took, whilst in good health, two drachms of the tincture at one dose; and finding no further effect from it than loss of appetite and slight depression, I took another drachm three hours afterwards. I find in my note-book that the pulse was not affected by it, during that and the subsequent day, further than it was readily accelerated by the least exertion, and that very slight nausea, but no drowsiness, was produced by it. Dr. Withering, in one case, found the pulse fall to 40 pulsations in a minute, and Dr. Fogo, in another, to 36. The lowest I have seen it from the use of foxglove was 44; but 50, or even lower, is not infrequent. The slowness is sometimes preceded not only by acceleration, but also by increased fulness, and softness. Even when the pulse is much slower than natural, in the recumbent posture, it generally rises very remarkably above the usual frequency in the sitting, and still more in the standing position. This is owing to the weakened state of the heart, caused by the digitalis, an increased frequency of contraction being required to compensate the loss of power, especially in positions unfavourable to an abundant supply of blood to the brain, by which the cerebral energy may be developed, and the nervous influence of the heart thereby reinforced and increased. This effect of position upon the action of the heart of a person under the influence of digitalis should be kept in recollection, and he should not be allowed suddenly to assume a sitting or standing posture; for the heart, already remarkably weakened, is unable to act sufficiently, or to overcome the increased obstacle which either of these postures furnish to it, especially when it loses the usual supply of cerebro-spinal nervous influence, or even when it experiences a diminution of that supply. Owing to these conditions, and to insufficient attention being paid to them, a patient may be seized with fatal syncope whilst he is under the operation of this substance; and there is every reason to believe that this occurrence has actually taken place oftener than once in these circumstances.

269. The influence of digitalis on the pulse is more remarkable in debilitated and anæmiated persons than in the plethoric or robust. Sometimes no effect is produced on the pulse in respect of number, force, or regularity, until nausea, vomiting, or headache is experienced; and occasionally a comparatively moderate dose may occasion these symptoms. Shroek, as quoted by Pereira, experienced from two grains of foxglove nausea, headache; small, quick, and soft pulse; dryness of the throat; giddiness, weakness of the limbs; and, some hours afterwards, his vision became dim, with a sensation of pressure on the eyeballs.

270. The *cumulative effect* of digitalis is one of the most important facts to be kept in view in connexion with the use of small and repeated doses of this plant. After an indefinite time, during which the foxglove has been thus employed, without any very marked effect, or with a slight effect merely, dangerous symptoms, in some instances terminating in death, have suddenly appeared. These generally consist of remarkable irregularity, frequent intermissions, or extreme weakness and slowness of the heart's action; giddiness; pallor of the countenance; nausea; vomitings; watchfulness; impaired sensibility; and sometimes convulsions. Dr. Pereira and Dr. Holland, however, consider this cumulative effect very rare. But this depends upon the time during which the digitalis has been exhibited, and the amount of the dose. Early in the present century, when this plant, especially the infusion of it, was given in large doses, and very indiscriminately, in dropsies, I met with several instances of the cumulative operation of it in most dangerous forms; and two of these occurred in patients for whom I had myself prescribed it, and in whom I had watched its effects. One of these perfectly recovered from both this operation of the remedy, and from the disease for which it was prescribed (dropsy); the other also recovered from this effect, and was partially benefited by the medicine; but the disease — tubercular consumption — ultimately terminated as usual. — *Salivation* is an occasional consequence of the use of digitalis in repeated doses; and it may occur even after a few moderate doses, as noticed by Withering, Barton, Pereira, and myself.

271. (*b.*) *The second grade* of poisoning by digitalis is that which is most frequently produced by too large, or too long continued doses. The *symptoms* are described with great accuracy by Dr. Pereira. They are usually nausea or actual vomiting, slow and often irregular pulse, coldness of the extremities, syncope, or tendency to it, giddiness, confusion of vision, and loss of muscular power. The sickness is sometimes attended by purging, but oftener by diuresis, occasionally by neither. The patient complains of a sensation of weight, pain or throbbing of the head, especially the forehead; of giddiness, of weakness of the limbs, and watchfulness. He sees objects dimly, or of a green or yellow hue; or he sees motes, sparks or mists before his eyes. The pulse is feeble, sometimes accelerated, at other times slow, but is affected by the slightest exertion. There is remarkable tendency to syncope upon raising the head from the pillow, and to profuse cold sweats; sometimes delirium, stupor, salivation and loss of sensibility supervene. There is much difficulty in assigning the quantity of the drug capable of producing these effects, whether taken in a single dose or in divided quantities. Much will depend upon the state of the plant, the kind of preparation, and the constitution of the patient. I may, however, here state as the result of experiment and observation, that very large doses — three or four times the usual doses of either of the preparations, or even more — may be given without any effect during inflammatory action; that febrile excitement, physical exertion, and a high range of temperature seem to suspend the action of even very large quantities of the drug; whilst the depressing passions, cold, the contemporaneous use of antimonial preparations of colchicum, or of

refrigerants, manifestly accelerate and heighten their effects.

272. (*c.*) *The third, or fatal grade* of poisoning by digitalis is *characterised* by retchings, purging, griping pains in the bowels, remarkable faintness, cold sweats, anxiety and depression of spirits, collapsed features, vertigo, dilated pupil and disordered vision; a slow, feeble, irregular and small pulse, extreme physical depression and exhaustion, inability to sustain a sitting or upright posture, involuntary evacuations, low delirium, insensibility, convulsions, stupor and death.

273. *b. The appearances after death* by digitalis have not been accurately observed. There is, perhaps, no drug which has been employed, either medicinally or criminally, the operation of which has been more inaccurately described than this has been. Digitalis produces but slight irritation of the digestive mucous surface, the nausea, retchings, &c. sometimes observed, resulting more from the efforts of nature to throw off a depressing and poisonous agent than from any inflammatory action produced by it — these symptoms depending upon the reaction of vital organs upon an injurious influence affecting the ganglial or splanchnic nervous system rather than upon irritation. The symptoms which have been imputed to narcotism and to congestion of the brain arise from very different states; for the giddiness complained of, the convulsions even, and all the symptoms which may be referred to the brain, I am convinced, by careful observation, are results of impaired circulation in this organ, of weakened nervous energy, and of a deficiency of blood in the vessels within the head. I have always found the carotids pulsating weakly; the head cool, and the features sunk; and it is well known, that convulsions as often result from a diminution of blood within the cranium as from congestion or excess — perhaps oftener. Doubtless, when convulsions occur this state is altered, and congestion is the consequence; so that, when convulsions precede dissolution, a congested state of the vessels of the brain and of its membranes will be found. Digitalis acts as a poison — and even as a medicine — by depressing the organic or ganglial nervous energy, and consequently by lowering irritability and the tone of vascular action. The manifestations of life in the several organs are thereby similarly affected; the functions of absorption and of urinary secretion being the least disordered. The ultimate result is, that the depressed states of organic nervous power and of vascular action primarily caused by digitalis, impair the cerebro-spinal influence and the functions of sense and of muscular motion depending upon that influence; and that these states severally act and re-act on each other, when the poison is energetic, or its operation not counteracted, until the action of the heart ceases altogether.

274. *c. The treatment* of poisoning by digitalis must depend upon the circumstances of the case. If the symptoms are produced by a large quantity of the drug taken at once, and if there be reason to infer that it still remains even in part on the stomach, the removal of it either by the stomach-pump, or by vomiting should be procured. The sulphate of zinc is the most suitable emetic in this case, and it should be given in a full emetic dose with powdered capsicum, and vomiting should be encouraged by means of warm diluents containing stimulants, as ammonia, camphor, &c When the poison is evacuated from the stomach, o when the symptoms are consequent upon repeate doses of it, or result from its cumulative influence an immediate recourse to stimulants, as brandy ammonia, camphor, opium, cardiac tinctures, capsicum, should be had; and mustard poultices blisters, or other rubefacients ought to be place over the epigastrium. Strong coffee or green te may also be freely given. In the instances o cumulative poisoning by this plant which occurred in my practice (§§ 270.), camphor an ammonia with capsicum were chiefly employed and green tea for drink. The noxious effects c digitalis, however produced, are not readily removed, but require the lapse of several days before they entirely disappear; the disorder of th pulse and the affection of the eyes being the las to depart. During the treatment of the effects c this poison, the patient should be kept in a recumbent position, a change to the sitting postur being allowed only with the utmost care.

275. *F.* Lead.—*The preparations of lead* are severally poisonous. The metal itself, is not injurious, if it remain unchanged. But when reduce to an oxide or a carbonate it becomes most injurious. Small shot has been swallowed in orde to remove obstructions in the bowels, and evacuated without producing any inconvenience. D Bryce (*Lancet*, Dec. 31. 1842) has recorded case, however, of a man who took three ounces c small shot (No. 4.). On the third day he complained of great depression and anxiety, wit sunken features, coldness of surface, dizziness, an numbness in the arms and legs. These symptom continued to increase; purgations were administered to overcome the obstinate costiveness; an in a fortnight he recovered. In this case th metal was either oxidised or reduced to a salt i the stomach or intestines. The chief compound of lead which have been found injurious are, th *carbonate*, the *acetate* and *sub-acetate*, the *chloride* the *iodide*, and the *oxide*, combined either wit vegetable acids or with fatty substances; and eithe of these may produce *acute* or *chronic poisoning*.

276. *a. Acetate of lead — Sugar of lead.* — Thi salt is productive of acute or chronic poisoning according to the dose, the repetition of it, or th mode of its administration. Orfila found that in large doses, it caused pain, vomiting, and death and that when its action was slower, and absorption took place, paralytic and convulsive symptoms appeared. Owing to the disposition of th salts of lead, and especially the acetate, to combin chemically with the tissues, the villous surface o the digestive canal, in cases of acute poisonin with this salt, is whitened or otherwise discolour by it. Injected into the veins, or applied t wounds, it affects the nervous system, causin vertigo, paralysis or coma, and convulsions, an congestion of the lungs.

277. *b.* The *symptoms* produced by the ingestio of this salt vary with the dose. Ten grains take daily for seven days caused a sensation of tightness in the breast, a metallic taste of the mouth constriction of the throat, debility, sallow countenance, slow respiration and circulation, turgi and tender gums, ptyalism, numbness of th fingers and toes, pains of the stomach and bowels costiveness, but no nausea. These symptoms ar

scribed by Dr. Laidlaw, and agree with the nptoms I have myself observed in cases where ge doses of this substance has been taken for veral days. When much larger or poisonous ses, as three or four drachms or upwards, have en swallowed, a pricking, constrictive, and peliar pain is felt in the throat and in the course the œsophagus; pain, anxiety, and distressing hing are felt at the epigastrium, and diffusing emselves over the abdomen; vomiting takes ace, and is attended by paroxysms of colicky ins, which are not increased by pressure, as in ses of inflammation, but, on the contrary, are ieved by it. Aching and anxiety, with a senion of constriction of the abdominal contents wards the spine, are experienced in the intervals tween the severe paroxysms of pain: the bowels e constipated; the skin is cold, and the strength ostrated. Giddiness, coma, convulsions, and ath supervene, if suitable aid be not adminisred. This very *acute form* of lead poisoning however, comparatively rare. Much more freently, after suffering for several days with the dominal symptoms, the parietes of the abdomen ing at first retracted, and subsequently tense and stended with air, owing to the paralysed state of e muscular coats of the intestines, the patient mplains of cramps or loss of power of the muscles the extremities, or of numbness or complete ralysis. The bowels continue constipated; voiting occasionally takes place, preceded or atnded by severe paroxysms of pain; torpor, coma, convulsions supervene; or death takes place ddenly or unexpectedly.

278. *c.* The effects of this salt often pursue a ore *chronic* course, and then are in all respects nilar to those described when treating of *inters' colic.* (See art. Colic, § 25. *et seq.*) Dr. . T. Thomson (*Med. Gaz.* vol. x. p. 689.) has ntended that the acetate of lead does not beme poisonous until it is converted in the body to the state of a carbonate; but there is no oof of the carbonate having a more deleterious fluence than the acetate. Dr. C. G. Mitsierlich has even shown that the acetate is not ss injurious than the carbonate, especially when ixed with acetic acid, in which form it is more iergetic than when given in the neutral state. Taylor, op. cit. p. 169.)

279. *d. Sub-Acetate — Diacetate of lead — oulard's extract of lead.* — This substance has used death in a few instances, and is a more owerful poison than the neutral salt, probably wing to its containing a larger quantity of the xide. Mr. Taylor states that two cases of oisoning by Goulard's extract occurred in 1840 two children of four and of six years of age. he quantity taken was not great, but both died thirty-six hours, with symptoms very closely esembling those of pestilential cholera. The odies were inspected (§ 285.). Mr. Marshall, owever, mentions a case of recovery from two uid ounces of this extract.

280. *e. Carbonate of lead — white lead cerusse.*— t is insoluble in water, but still possesses poisonous roperties, a decided proof, as Mr. Taylor reiarks, among numerous others, that insolubility oes not prevent a substance from exerting a oisonous action on the system. The gastric and iliary secretions, or the pressure of a free acid in he digestive canal, may dissolve a sufficient quantity to be deleterious. In a case reported by Dr. Snow, a child, aged five years, ate a portion of the carbonate, ground up with oil, not larger than a marble. During three days, pain in the abdomen, and constipation alone were complained of. On the third day the symptoms were greatly aggravated, and vomiting occurred. The child died ninety hours after the injection of the poison; some very offensive stools, of a greenish black colour, having been passed just before death. A female, aged thirty-three, took, by mistake for magnesia, from six to eight drachms of the carbonate of lead. Five hours afterwards, Mr. Cross found her in a cold perspiration, breathing heavily, with a frequent small constricted pulse. There were vomiting, dryness of the throat, anxious expression of countenance, and severe colicky pains. The extensor muscles became paralysed, and the flexors rigidly contracted. Sulphate of magnesia with dilute sulphuric acid and castor oil were given her, and very dark evacuations were procured. In four days she was convalescent.

281. These cases sufficiently illustrate the *symptoms* of the *acute form* of poisoning by carbonate of lead. The *chronic form* of poisoning by this substance, characterised by severe paroxysmal pains in the bowels, constipation, paralysis, &c., is identical with *painters' colic.* (See Colic, § 25. *et seq.*) This form of poisoning is frequently caused by the absorption of the poison either by the lungs, or by the skin, or both. It has been found that, where the carbonate of lead was ground in a dry state, both the labourers and animals have died from its effects, owing to its diffusion in a state of impalpable powder in the air. Even the air of a newly painted room, especially when it is slept in, will, in some constitutions, produce acute or serious effects; but the chronic operation of this agent is most common. The diagnostic symptoms of this latter form of poisoning have been fully stated in the article referred to; but recently Dr. Burton has shown, that blueness of the edges of the gums where they join the bodies of the teeth, generally attends, or even precedes, the usual symptoms of this form. Dr. Chowne, however, contends that the presence or absence of this lime is not connected with the effects of lead. Chronic poisoning by the carbonate of lead is not infrequently caused by *water* which has passed through lead pipes, or been kept in lead cisterns, especially if these have been new, and if the water contain carbonic acid. Hard water, or water containing the sulphate of lime, or any of the neutral salts, produce little or no action on metallic lead. (See *Guy's Hosp. Rep.*, vol. iii. p. 70.)

282. *f. Iodide of lead. — Plumbi iodidum.* — As this substance is employed in medicine, it is necessary that the injurious effects produced by it should receive attention. It is a fine yellow powder sparingly soluble in cold water, but readily soluble in boiling water. Twenty-four grains of the iodide were given to a cat, in two doses, with an interval of four hours between them. The animal suffered violent colic, and died in three days; but no signs of irritation were observed after death. Iodide of lead in doses of from five grains to thirty were given to a bull-dog. On the fifteenth day the animal refused food, and kept in the recumbent posture. He died on the eighteenth day, having swallowed altogether upwards of ten drachms of

the iodide. During the whole period he had only three or four intestinal evacuations. I have employed this substance both internally and externally; but it has not, in the form I have prescribed it, produced any marked signs of irritation.

283. *g.* The effects of the *chloride of lead* and of the *chromate of lead* I have not observed; but there is every reason to believe that they would be poisonous in large doses, the latter especially. The *sulphate of lead* has usually been considered as inert by Orfila and others. The *nitrate of lead* acts in a similar manner to the acetate.

284. *h.* The *oxides of lead.*—The *yellow oxide,* and the *brown oxide — peroxide* — are but little known unless to chemists. *Litharge* and *minium* (*red lead*) are much used in the arts, and have caused poisoning accidentally. Liquids used for culinary or dietetic purposes, especially if they contain a free acid, may become impregnated with oxide of lead, derived from the glaze of the vessel in which they are kept, forming poisonous salts. Litharge glaze may also be dissolved by alkaline and fatty substances, All newly glazed vessels yield traces of lead on boiling in them acetic acid or caustic potash; the oxide of lead being dissolved by the acid or alkali. Litharge was formerly much employed to remove the acidity of sour wine, and convey a sweet taste; an acetate, or some other vegetable salt of lead being in these cases formed. Many years since, a fatal epidemic colic prevailed in Paris owing to this cause. The adulteration was discovered by Fourcroy. *Wine* thus adulterated is known by its being blackened by hydrosulphuret of ammonia. *Cyder, new rum,* and *sugar,* are sometimes the medium of conveying the salts of lead, owing to lead or its oxides being employed in certain parts of the apparatus or substances used in their manufacture. Dr. Trail found that, when new rum is kept in oaken casks, the tannin of the oak is slowly dissolved by the spirit, and the lead is precipitated in an insoluble form, the spirit thus becoming wholesome.

285. *i. The appearances observed after death* from lead poison have been very loosely described; and those which have merely been the results of congestion, of the coagulation of the blood in the veins and venous capillaries, with more or less discolouration from the chemical action of the poison, have been stated to have been inflammatory. Dr. Mitscherlich found that, when the dose of the acetate was large, the villous surface of the stomach was chemically changed by it — softened, corroded, and reduced to a whitish colour, owing to the combination of the salt with the tissue. When given in a small dose, the acetate was decomposed by the gastric secretions, and exerted no corrosive action on the villous surface. When this salt was reduced to a state of an albuminate and dissolved by acetic acid, death took place with great rapidity; but the stomach was not found corroded. This effect was produced by the neutral salt only, and not when the dose was small, or when the poison was combined with an acid. (Taylor.) — In the cases of poisoning with Goulard's extract mentioned above (§ 279.) the villous membrane of the stomach was found by Dr. Bird of a grey colour, but otherwise perfectly healthy. The intestines were contracted, in one instance more so than in the other. In a case of acute poisoning by this extract that terminated fatally in forty-eight hours, the villous coat of the digestive canal, from th œsophagus downwards, was softened, and wa said to present inflammatory appearances. Th mucus on the internal surface of the canal con tained much of the poison. The changes ob served after death from the *chronic form* of poisoning by lead are described at another place. (Se Colic, § 25. *et seq.*)

286. *k.* The *modus operandi* of the preparation of lead deserves attention. These preparation according to their physical conditions and mode of administration, may act locally or remotely, in both ways. Certain of them, as the neutra acetate, by combining with the tissues, may a chiefly locally, and be only slowly absorbe Their remote action may arise from their absorption from the digestive canal, from the skin, from the lungs. When thus absorbed, to such a amount as to affect the organic nervous and va cular systems, the following effects appear: th temperature of the body sinks, the pulse becom smaller and slower, the capillaries are somewh constricted, the secretions from mucous surfac diminished, and hæmorrhages, where they exis are checked. This sedative and constringe operation is manifested chiefly in exhaling a secreting surfaces and organs. If the poison co tinue to be absorbed, the nervous and muscula systems are more or less affected, and the nervou and muscular systems of organic life are the fir to betray disorder; as evinced by anxiety at th epigastrium, colicky pains through the abdome especially in the course of the colon, spasm the muscular coats of the bowels, impaired secr tion, and constipation. As the effects procee pain extends to the spine and to the limbs, spasm affect the muscles, especially of the extremitie or partial loss of sensibility or of the power motion, or of both, appears. Ultimately th palsy becomes more or less complete, or gidd ness, sopor, coma, or convulsions supervene, even death takes place preceded by either of thes

287. Thus a *sedative* and an *astringent* a tion, and subsequently *morbid sensibility,* fo lowed by *spasm,* and next by *palsy,* are produce by the absorption of these poisons. These effec generally appear to a greater or less extent, *firs* in the organic or involuntary, and extend to th animal or voluntary, nervous, and muscular sy tems. But occasionally they are only slight i the former, although severe or even fatal in th latter; or they are most severe in, or altogethe limited, to the former. There can be no doubt these effects being produced by the presence the poison, in the state either of an oxide, or a salt, or in some other form or compound, i the blood, and in the tissues. Orfila detecte lead in the urine of a female who swallowed a ounce of the acetate. Tiedemann and Gmelin i the blood of animals poisoned by it. Mr. Taylo in the milk of a cow poisoned by the carbonate and Professor Cozzi, Wibmer and others, in th blood, muscles, and viscera, after painters' colic.

288. *l. Treatment.* — The more *acute form* c poisoning by any of the preparations of lead, re quires the exhibition of demulcents or diluents holding in solution some sulphate — as of soda magnesia, potash, or alumina. If vomiting doe not follow the free exhibition of these, the sulphat of zinc may be given, or the stomach-pump b cautiously had recourse to, or the throat or fauce

ay be tickled. If the patient has been poisoned y the *acetate*, the carbonates should be avoided, they would increase the activity of the poison, hilst the sulphates would render it inert. Alumen, and casein, the albuminous principle of ilk, precipitates the oxides of lead, and are, erefore, excellent antidotes when given in large uantities. The treatment should be somewhat ifferent in cases of acute poisoning by the *caronate of lead*. Mr. Taylor remarks, that the lkaline sulphates should not be employed as anidotes for these, since it requires long digestion at high temperature for these salts to react on the arbonate of lead, and even then the decomposion is only partial. He suggests, therefore, the dministration of an alkaline sulphate mixed with inegar, or some weak vegetable acid, such as emon juice. Emetics or the stomach-pump hould also be employed. Afterwards the bowels ught to be duly evacuated, and oleaginous and emulcent enemata thrown up. If irritability of tomach continue opium should be given, and the olicky and paralytic symptoms ought to be treated s advised in the article Colic (§§ 60—68.).

289. *G.* Hydrocyanic Acid and the Cyanides. — *Oil of bitter almonds, &c.*— *Prussic acid*, since ts operation has been more generally known, specially as respects its rapid and unerring ffects, has been frequently employed for selfestruction, and in some instances even for murer. Death has also occurred from it owing to ccident. In 1837-8 there were twenty-seven cases of poisoning by it, nearly all of which were suicidal. This substance has been variously lassed by writers on *Medical Jurisprudence;* some have viewed it as a *narcotic* because it produces insensibility in fatal cases. Others have considered it as an *irritant* poison, because it often produces spasms or convulsions, although no evidence of irritation is furnished by it on the tissues. But spasms or convulsions attend all intense impressions on the nervous system, especially when these impressions destroy life. Others again believe it to be both narcotic and irritant, or *narcotico-irritant;* and, not being content with imputing to it a single property which it does not possess, assign to it two properties of which it is equally devoid; for no one becomes unconscious from it, or is spasmodically or convulsively affected by it, if, indeed, they be so affected at all, until life is departing or about to depart. As it therefore *annihilates* the manifestations of life in a few seconds, and in a way in which no irritant or narcotic ever acts, however energetic, comparing its action with theirs; and as there is no other terms which convey the idea of its mode of action better than *sedative* or *paralysing*, I am obliged to adopt them, as indicating the *privation of sensibility and all vital action*, the chief properties evinced by it, when applied in a poisonous dose to a living body, — as indicating the *annihilation of life*.

290. Common hydrocyanic acid is a mixture of the pure or *anhydrous acid* with water, and sometimes with alcohol. As it is kept in shops, it varies from 1·3 to 6·5 *per cent.* of the anhydrous acid. The *two* chief forms in which it is kept are, that of the London Pharmacopœia, which contains two *per cent.*, and that of Scheele, which contains from four to five *per cent.* of anhydrous acid.

291. *a.* The *symptoms* caused by poisonous doses of this acid vary with the mode of exhibiting it, and with the quantity up to a certain amount; but, beyond that, the effects are tolerably uniform. — *Inhaling the vapour* of hydrocyanic acid produces death more rapidly than any other mode of employing this poison. Dr. Pereira caused the almost instantaneous death of a rabbit by applying its nose to a receiver filled with the vapour. This acid also acts rapidly when applied to an *abraded surface* or to a *wound*. Sobernheim states, that an apothecary at Vienna died within an hour after the entrance of the acid into a wound in the hand produced by the glass vessel in which it was contained. Even when applied to the sound skin it produces some degree of action. After applying Scheele's acid to the fingers for a short time I experienced numbness, extending considerably above the place of application, that continued for several hours, and in one occasion the whole day. Dr. Christison says that M. Robiquet's fingers were numb for several days after their exposure for some time to the vapour of the acid. Judging from these facts, this acid cannot be viewed as devoid of influence upon the *unabraded* or *whole skin*.

292. *b.* On *mucous membranes*, this poison acts with rapidity and certainty. Mr. Nunneley, whose researches into the operation of this substance have been most extensive, states, that when applied upon a mucous membrane, as the conjunctiva, the rectum, or the vagina, prussic acid acts with as great rapidity as when swallowed. A knowledge of this is of importance, as poisoning may be effected in this way, and detection of the crime would be very difficult. The action of the acid on the lungs, when air impregnated with it is breathed, is not only rapid but certain in its effects, and is one of the easiest modes of exhibiting it, but the most difficult after a few hours to detect, as the odour being so diffusible is very soon dissipated.

293. *c.* When *swallowed*, prussic acid produces almost instantaneous effects if the quantity be sufficient to destroy life, or if the stomach be not loaded with food, which may intercept a large portion of it, and delay its operation. But the *symptoms* produced by a dose hardly, or barely sufficient to cause death, are different from those observed when the quantity is large, and death very rapid. The effects are more rapid and certain in young and delicate persons, — in weak constitutions, and when the stomach is empty than in the middle-aged and the robust, and when the stomach contains more or less food. (*a.*) A *small poisonous dose* occasions a bitter warm taste, which is soon followed by sensations of faintness and giddiness. The respiration becomes slow, difficult, and spasmodic, the pulse small or imperceptible; and insensibility supervenes, often with convulsions; a state resembling an epileptic paroxysm being sometimes produced. The pupils are either contracted or dilated, and the eyes staring. If the treatment about to be recommended be resorted to in this state, recovery usually takes place rapidly, vomiting often occurring.

294. (*b.*) In *a large or rapidly fatal dose*, the phenomena are such as hardly admit of observation; death follows so quickly, and is attended by so few symptoms, excepting the cessation of sensibility, of breathing and of the heart's action. In the

case of a chemist in my vicinity who took more than an ounce of Scheele's preparation, death must have occurred in a few seconds, neither spasms nor convulsions having been observed. In a case communicated by Mr. French to Mr. Taylor, seven drachms of the common prussic acid was taken, and about two minutes afterwards he was found lying on the floor insensible. There were no convulsions of the limbs or trunk; but a slight flickering motion was observed about the muscles of the lips. Respiration seemed to cease for some seconds; it was then renewed in fits, expiration being deep and slow. The deceased took the poison while ascending the stairs; his body was found on the landing; the bottle had rolled some distance from him, the stopper was lying in another direction. Simon relates a case in which an ounce was taken; the symptoms were the same. The hands and feet were cold, and no pulse could be felt. The finger-nails are often of a livid colour, and the hands clenched. When the dose is large, the odour of the acid is generally exhaled from the mouth.

295. *d*. The utterance of a *scream* or *shriek* has been said to be indicative of poisoning by this acid; but Mr. Taylor states that this symptom does not occur in the human subject; and Mr. Mills, the deputy coroner, says that his inquiries show that it does not occur. There is merely a gasping for breath, or a low moaning or sobbing noise. Mr. Nunneley found that the shriek or cry did not occur in more than about one half the number of cases of animals, and only in about one-third very loudly. When it was uttered in animals, it was of a peculiar kind, and so indicative of distress as to give an idea of consciousness on the part of the animal of impending death — it was characteristic of the poison. When the dose of prussic acid is small but still fatal in the human subject, *convulsions* have sometimes been observed; but they have not been met with when the dose has been large and death rapid. In these latter cases the symptoms have been scarcely noticed; but are probably the same as seen in the lower animals, namely, imperceptible pulse, insensibility, a few deep and slow respirations, and death. Mr. Nunneley's experiments, as well as the history of several cases in which large quantities of this poison have been swallowed show that death is seldom so rapid as to prevent volition and voluntary motion being exercised for a few seconds afterwards,—but in a few seconds death often takes place without a struggle. The most rapidly fatal case with the particulars of which I am acquainted, was that of a gentleman whom I knew, and which occurred in 1828. Above an ounce of Scheele's acid was taken. Instantly upon swallowing it, he must have repented of his act, for he hastily called out, brandy, ammonia, repeating the words, fell down and never moved afterwards. In some few instances, Mr. Nunneley found the action of the poison so expeditious as to prevent the slightest exhibition of voluntary motion; but in the majority of warm blooded animals and dogs, about twenty seconds elapsed before the symptoms were manifested — thus allowing, presuming that a similar interval would occur in man, sufficient time for several acts being performed, which were supposed by many to have been doubtful, if not impossible, after the ingestion of the poison.

296. *e*. It has been supposed, that this acid possesses an *accumulative property*—that after having been taken for some time, in moderate doses without any apparent mischief, it may, without any remarkable increase of quantity, suddenly give rise to all the effects of poisoning. Mr. Taylor states that one case is reported which renders this opinion probable, and another has been communicated to him which tends to confirm it. Dr. Lonsdale, who has paid some attention to this matter, does not admit that prussic acid possesses this property, on account of its volatility and diffusive influence; and although I have very frequently prescribed this substance I have not seen any proof of an accumulative influence. Mr. Taylor states, that serious effects have followed slight alterations made in the dose; but I have never met with such. The proper test is to observe whether or no such effects follow the persistence in the use of the same dose. It is very important, practically, to determine the question.

297. *f*. *Post mortem appearances.*—In cases of suicide or accident, the vessel which contained this poison will generally be found near the body. But the person poisoned may have thrown it from him upon swallowing its contents. The body commonly exhales an odour of prussic acid for some time after death; but if it has remained exposed for some time before it is seen, and especially if it be exposed to the open air, or in a shower of rain, the odour may not be perceptible. Putrefaction is said to be accelerated after death by this poison. This appeared to have been the case in two instances which I had occasion to observe. Mr. Taylor doubts this effect. Orfila states that in most sudden deaths, from whatever cause, putrefaction is, *cæteris paribus*, accelerated. Externally the body is commonly livid; the nails are blue, the hands clenched. The jaws are closed; and there is some foam about the mouth, especially when death has been preceded by convulsions. The face is bloated and tumid; the eyes prominent, shining, and glassy; and the veins are congested with dark blood. The stomach and alimentary canal are generally in a natural state; the internal surface being sometimes red or congested, as often seen after sudden death. The lungs are generally more or less congested. The brain is usually congested, especially in the less rapidly fatal cases, and when convulsions have preceded death. The blood is sometimes found quite fluid, in others thicker or semi-coagulated. It is generally of a dark colour; but Mr. Taylor, quoting Heller and Metzdorff, says that it is occasionally red, or even of a pinkish hue. Other changes noticed by writers may be viewed as accidental. Indeed there is no organic alteration observed that can account for death from this poison. Those now stated, — and they are the chief met with, — are slight; and are seen in other cases of sudden death. Life is so soon destroyed by this agent as not to allow of any change beyond simple congestion taking place. In a case reported by Dr. Geoghegan, where an ounce of the acid was swallowed, a patch of dark-red extravasation was found under the villous coat near the pylorus. In a case recorded by Mr. Pooley, the blood was of a very dark colour; but the lungs were not congested; in one by Mr. Hicks they were much congested; whilst in another by Mr. Nunneley they were only partially congested. In an instance reported by Mr. Crisp,

e abdominal and thoracic viscera were all althy, the blood imparting to them a purple ue. (Taylor.)

298. On opening the stomach the *odour* of ussic acid is frequently perceptible, and if the uantity taken has been large, the odour may continue for several days after death. If the inspecon has been recent after a large dose, the odour often perceived in all the cavities and even in e blood. This odour has a distant resemblance that of bitter almonds; but it is accompanied ith a peculiar impression of acridity on the nosils and back of the throat. But this odour — e diluted odour of bitter almonds,—may be pereived by some persons and not by others; or it ay be entirely absent. It may not be present, or ot perceived in a very sensible manner in the dead ody, if the dose of the poison has been small; if e patient has survived a short time after it has een taken, if it be masked by other odours, and the body has been dead some time, or has been xposed to the air, &c. (§ 297.)

299. g. *Relation between the rapidity of the effects nd the quantity and concentration of the poison.*— r. Christison has shown, that beyond a certain ose, the weak and the strong acids appear to act ith equal rapidity. Experiments on animals and cts observed in the human subject show, that a ose of the poison sufficient to cause death may ave this effect in as short a time as a very much rger one,— that a drachm of Scheele's acid may ause death as rapidly as three or four times the uantity, especially if the poison be taken on an mpty stomach, and if the person be weak, or deilitated by disease. It hence follows, that if two rachms of this acid be fatal in a given time, it annot be inferred that twice or four times the uantity will be fatal in one half or one fourth f that time. Mr. Nunneley states, "that, vhen called to a person poisoned by this acid, we annot merely, from the length of time he has urvived, or the evidence of the symptoms, determine any thing with certainty as to the degree f concentration or dilution of the acid, nor, xcept within wide limits, much as to the absolute uantity taken." (p. 83.) He moreover found hat concentration does not heighten the effects f this poison, but that dilution to a moderate xtent even renders them more speedy, probably rom bringing the poison in contact with a larger xtent of surface at the same instant. It may appen that a dose just sufficient to destroy life may ail, or be longer in producing its effects, owing to its interception by the food on a full stomach, or by other circumstances pointed out above; but a quantity sufficient to destroy life under any circumstances may have this effect with as great rapidity as three or four times that quantity.— Hence there is no relation, beyond a certain amount, between the rapidity of the effects, and the quantity or concentration, of this poison.

300. h. *Quantity required to destroy life.* — Dr. Geoghegan relates an instance of a quantity of the acid having been taken equal to twenty-seven drops of the dilute acid of the London Pharmacopœia (at two per cent.) without any effect, the dose having been gradually raised to this amount; but when the dose was raised to thirty-six drops, the patient in two minutes was seized with the usual symptoms, and nearly lost his life. The quantity of anhydrous acid swallowed in this dose was only about two-thirds of a grain; but, as this substance had been taken in gradually increased doses, the probability of an accumulative effect having here resulted should be taken into consideration — a question of great practical importance, but one which is solved with difficulty. Mr. Hicks furnishes, in the case which he has reported, the *smallest dose* which has been determined with accuracy, as productive of death. A healthy adult female took a dose, equivalent to *nine-tenths* of a grain of anhydrous prussic acid — to forty-nine drops of the dilute acid of the pharmacopœia — and to twenty-five of Scheele's acid. She died in twenty minutes. In a case observed by Mr. T. Taylor, a stout healthy man swallowed exactly the same quantity by mistake, remained insensible for four hours, when he vomited, and began to recover. The vomited matters had no odour of the poison, and hence absorption of it had probably taken place. This quantity, nine-tenths of a grain of anhydrous acid, or *one grain*, may therefore be viewed as sufficient to destroy human life, although a somewhat smaller dose may have this effect, in certain circumstances, or a somewhat larger dose may fail of producing it, in others. Mr. Taylor thinks that the *largest dose* from which an adult has recovered was in a case reported by Mr. Nunneley. The person swallowed forty minims of an acid, at 3¼ per cent. The man was for a short time conscious, got into bed after taking it, and spoke. He felt his jaw become stiff, and then remained insensible until roused by the cold affusion. Although recovery took place in this case, still the inference just stated, as to the quantity which may destroy life, remains unaffected by it.

301. i. The *period at which death takes place* differs in different cases, although the dose taken may have been the same. This may be expected from the different circumstances above shown to influence the operation of poisons. In the seven cases which occurred in Paris, from the same dose of the poison given to each at the same time, death took place after periods varying from fifteen minutes to three quarters of an hour. It is only when the dose is just sufficient to cause death, that an individual survives from half an hour to one hour; but I know of no case in which the period was longer than an hour. In one instance, in which seven drachms were taken, death took place within five minutes; and in another, where an ounce was swallowed, within ten minutes. In the case referred to, as that in which the smallest fatal dose was observed, death occurred in twenty minutes. When the quantity is two drachms or upwards, the period of death varies from two to ten minutes.

302. But it is necessary to distinguish between the periods at which insensibility and absolute death take place. For, although death does not commonly ensue until after a few minutes, insensibility — the loss of volition and consciousness — may occur in a few seconds. Dr. Lonsdale states, that a drachm of Scheele's acid would affect an ordinary adult within the minute, and three or four drachms within ten or fifteen seconds. When the acid is stronger, and the quantity larger, he believes the annihilation of the sensorial functions to be immediate. Mr. Taylor remarks, with reference to this topic, that while, as a general rule, insensibility may supervene

from a large dose in a few seconds, the individual occasionally retains a power of performing certain acts indicative of consciousness, volition, and locomotion, for a few seconds.

303. *k. Diagnosis of poisoning by prussic acid.* — But little is required to be said as to this topic, after what has been already advanced. The effects of this poison will be readily distinguished from those of *opium* or of other *narcotics* or *acro-narcotics*, as the coma caused by these poisons is seldom seen until after the lapse of a quarter of an hour, or twenty minutes; whilst insensibility, from this acid, even in small doses insufficient to cause death, is very rarely delayed beyond two minutes. Besides, the patient may be roused from the narcotic influence of opium or other narcotics; but he cannot be roused from that produced by prussic acid, until he entirely recovers from it. Convulsions furnish no diagnostic evidence. In poisoning by this acid, a fatal issue always occurs within an hour, more frequently within a quarter of an hour; whilst poisoning by the substances referred to seldom terminates fatally before a period varying from six to twelve hours. The odour of the acid, when perceived, is also an important diagnostic proof (§§ 297, 298.).

304. It is of the greatest importance that the effects of this poison should not be confounded with death from *epilepsy*, *apoplexy*, or *disease of the heart*, in either of which death may take place within the period in which prussic acid proves fatal. A *post mortem* examination will generally furnish the diagnosis, when no other evidence can be obtained, or can be depended on, especially as regards apoplexy and cardiac disease: but as respects epilepsy the proofs may be incomplete, unless the odour of prussic acid be present. It may likewise be important to determine whether the poisoning by this acid has been *suicidal* or *accidental*, especially if the life of the individual be insured. In general, the several circumstances observed in connection with the case are such as at once explain the nature of it; but there are no means by which suicide may be more secretly perpetrated than by that now discussed. As to this topic, I must refer the reader to what has been stated by Mr. Taylor and Dr. Christison.

305. *l. Modus operandi.* —The local and primary operation of this poison is certainly upon the nerves of the part. This is shown by the numbness produced by it when applied to even the unabraded skin. In some experiments I made with it, many years ago, it was found to impair the irritability of muscular parts, and in some instances to destroy this property altogether in those parts to which it had been applied. It also, in these experiments, caused dilatation of the capillaries, with congestion and stagnation of the blood in them. That the local impression made upon the nerves, more especially upon those of the cerebro-spinal system, is rapidly transmitted to the brain, medulla oblongata, and spinal chord, cannot be doubted; for the abolition of the functions of those parts of the nervous system is generally so instantaneous, especially when the stomach is empty, that it cannot be imputed altogether to the absorption of the poison, although absorption undoubtedly takes place very rapidly, and destroys life: the insensibility resulting more immediately from the impression of the poison, the arrest of the heart's action, and death proceeding co secutively from the absorption of it. That th poison is absorbed is fully proved by the detecti of it, by chemical agents, in the blood, and the odour of this fluid in the cavities when th are opened, and in several viscera; thus showi that its operation on organs remote from the p to which it is applied, and the death of the in vidual take place mainly through this channel that the heart is paralysed, and its action al gether arrested by the presence of the poison the blood. There is, however, sufficient reas to believe, that the very decided and immedia impression produced by it upon the nerves of t part to which it is applied is rapidly propagat to the *medulla oblongata* and brain, through t medium of the nerves, before the poison reach the nervous centres, or heart, by the medium absorption, or through the channel of the bloo for Mr. Nunneley found that, "when the ac was administered by the rectum or the vagin both hind legs of the animal were sooner affect than the anterior part of the body." (p. 76.)

306. The *cause of death*, in cases of poisoni by prussic acid, appears, after the best attentior can give the subject, and after much experien of its medicinal effects, to result as follows: 1st. The deleterious impression made by the pois upon a sufficiently large surface, or to a certa amount, being transmitted by the nerves to the *m dulla oblongata or its vicinity*, causes insensibilit and, if that impression is not of overpoweri or annihilating intensity, convulsions also: —2 That the deleterious impression is less violently, more slowly, developed or extended through t ganglial nervous system; and that, before life destroyed by the impression made on the nervo system, absorption of it, to a greater or le amount, into the circulation takes place; an 3d. That the presence of the poison in the blo entirely abolishes the already impaired respirato and circulating functions by its action upon t nervous centres, and on the heart itself. T poison may thus be viewed as acting primari upon, and through the medium of, the nervo system, and consecutively, by absorption a through the channel of the circulation; the latt completing, what the former mode may have fail of accomplishing.

307. *m. The chemical combinations of hydrocyan acid* are more or less poisonous. (*a.*) Coulo Robiquet, Schubarth, and Magendie have d monstrated the poisonous action of the *hydroc anate of ammonia*, and of the *hydrocyanate of potas* A dog was killed in twenty minutes with twent drops of the diluted acid neutralised by ammonia and another in three hours by twenty-five dro neutralised by potash. Nevertheless, ammonia one of the best antidotes to the action of this aci when administered after the poison. Orfila r lates a case in which six grains of the hydr cyanate of potassa proved fatal within an hour, i the human subject, when administered in an i jection.

308. (*b.*) The deleterious properties of the *ferr cyanates or triple prussiates* are much more doub ful than those of the former. Some experimente with it have found that the *ferrocyanate of pota* is poisonous in large quantities; whilst othe state that it possesses little or no deleterious pr perty. Wollaston, Marcet, Emmert, Ma

ven, and Schubarth say, that a drachm, or en two drachms, of this substance may be given th impunity to man or the lower animals.

309. (*c.*) *The sulpho-cyanic acid,* a substance alogous in its nature to the ferrocyanic acid, is once supposed like it to be a poison of great tivity; but this, Dr. Christison adds, admits of me doubt. Dr. Westrumb considers it more isonous in the form of *sulpho-cyanate of potassa.* ibmer reports that Soemmering found both is acid and the salt to be poisons of great ergy; for half a drachm of concentrated sulpho-anic acid given to a dog occasioned immediate ath, — and the same quantity of the salt killed nother in one minute. These substances require rther investigation. They are certainly more nergetic than they have been viewed by Dr. hristison. Dr. Westrumb detected this salt in e blood and in the viscera.

310. (*d.*) *Cyanide of potassium* is a poisonous salt uch used in electro-gilding and plating. It is solid, sometimes a chalky-looking, at others a ystallised substance; and without odour, until ut into water, when it is freely dissolved, forming n alkaline solution, from which prussic acid is oundantly evolved. It is used medicinally on e Continent. Mr. Malaguti states that a dog as killed in a few minutes after taking less than ree grains of the cyanide in solution, and that e largest dose that should be given to the hu-an subject is five sixths of a grain. A person as killed at St. Malo by too large a quantity of having been prescribed. Another person died t Breslau after fifteen minutes from taking a dose f a mixture containing fifteen grains of this sub-ance. The symptoms were the same as those roduced by the pure acid.

311. *n. Various vegetable substances contain hy-rocyanic acid,* and are poisonous in consequence. he plants which have been found to yield hydro-yanic acid belong to the division *Drupaceæ*, of ecandolle's natural order *Rosaceæ*. They re the *bitter almond*, *cherry-laurel*, *bird-cherry*, *each*, and the *mountain ash*. The poison is rocured from these, according to Dr. Christi-on, in two forms, — as an essential oil, and as distilled water. The *distilled waters* yield hydro-yanic acid, and an essential volatile oil, which lso retains much of this acid, which is peculiar, nd which requires further investigations into its onstitution and effects; but I must refer the eader to Dr. Pereira's *Materia Medica*, where he subject is fully discussed. (See vol. ii. p. 536.)

312. (*a.*) *The volatile oil of bitter almonds,* and even the bitter almonds themselves, are poisonous and owe this property to prussic acid, none of which, however, exists already formed in the kernel of the fruit, nor is it produced unless by the agency of water on the kernel. Even the mastication of the kernel produces the poison which destroys life. Mr. Taylor found that mere trituration of the almond kernel with water produced hydrocyanic acid. There are instances on record, wherein these almonds, when eaten in large quantity, have produced dangerous symptoms and even death. The *volatile essential oil* is a most active poison; its deleterious action depending entirely upon the hydrocyanic acid which is intimately combined with it. Five pounds of the almond are said to yield about half an ounce of the oil, and the quantity of anhydrous acid contained in it varies, according to Dr. Christison, from eight to fourteen *per cent.* It is thus at least four times as strong as the dilute prussic acid of the pharmacopœia. Sir B. Brodie happening to touch his tongue with a rod which had been dipped in this oil, suffered almost instantaneously an indescribable sensation at the pit of the stomach, feebleness of the limbs, and loss of power over the muscles; these effects being, however, quite transient, but sufficiently evincing the rapid propagation of the deleterious impression through the medium of the nervous system.

313. Several instances of poisoning by this oil are recorded; and some have been noticed by Christison, Pereira, and Taylor. The last of these writers adduces the following: — A druggist swallowed by mistake half an ounce of "almond flavour." In half a minute he fell down in a state of syncope; his face being deadly pale, and his pulse imperceptible. After some time he rallied and vomited some undigested food and bile, strongly impregnated with the odour of bitter almonds. Delirium with slight convulsions came on. He then became sensible, and conversed upon his condition; but he again gradually relapsed into delirium, his eyes being prominent and brilliant. In a few minutes he again became sensible and slowly recovered. The quantity of "almond flavour" which he had taken contained about half a drachm of essential oil. In a case which occurred to Dr. Bull of Hereford, seventeen drops of the oil destroyed the life of a woman aged forty-nine in half an hour. Mr. Taylor here justly remarks upon the disgraceful state of medical police and legislation in this country, in the fact of a most virulent poison being sold for the purpose of flavouring pastry and liqueurs; but Mr. Taylor cannot surely be ignorant that British legislation does not concern itself with means which either destroy or preserve human life, until public opinion or an overwhelming necessity compels attention to such matters, and then they become objects of disgusting jobbing and disgraceful traffic, the measures which they produce benefiting chiefly the subservient supporters of a political party, the members of a clique, the satellites of power, and the worshippers of mammon.

314. Even a very small dose of this oil may cause fatal effects. Mr. Taylor, amongst other interesting cases, gives the following: — A girl about eight or nine years of age swallowed about a tea-spoonful of "ratafia," composed of one part of the essential oil of bitter almonds and seven parts of spirit. About seven drops of the oil were taken. When seen immediately after the accident there were complete insensibility, closed eyelids, brilliant and glassy eyes, dilated pupils, quick pulsation of the carotids, no pulse at the wrist, relaxation of the muscles of the extremities, and rigid contraction of the muscles of the lower jaw. Cold affusion with stimulants, stimulating frictions, and emetics were employed. Vomiting was induced; the ejecta had a strong smell of prussic acid; and the child recovered. — (Smith, in *Lancet*, June 1844.) In a fatal case of poisoning by this oil, no odour was perceptible about the mouth when the body was found; but upon *inspection*, a powerful odour of prussic acid es-

caped from the cavities. All the viscera were in a healthy state. (*Med. Gaz.*, April 7. 1843.) The *vapour of this oil*, although it may cause vertigo, or stupor, is not likely to produce death unless it be inhaled for a considerable time.

315. (*b.*) *Laurel water — Cherry laurel water* — is a very weak solution of prussic acid, containing about a quarter of a grain per cent. of the strong acid. In large doses it produces the usual effects of prussic acid. — *Cherry laurel* was formerly much used for flavouring liqueurs and sweet-meats. Almost every part of the plant is poisonous, especially the leaves and kernels, but the pulp of the cherry is not. *Cherry laurel oil* is a weaker poison than the oil of bitter almonds, and contains about three per cent. of the anhydrous acid. Coullon relates an instance of the death of a child from the application of the leaves to a large sore on the neck. The distilled water and the oil of this plant are poisonous when introduced into the rectum, or into the cellular tissue, or injected into a vein, and when thus employed, or when swallowed, they occasion giddiness, palsy, insensibility, convulsions and death; thus acting in a similar manner to the pure acid.

316. (*c.*) *Peach flowers and kernels, and the fresh young shoots of the plant*, are poisonous. Coullon adduces two fatal cases of poisoning with *peach-blossom.* But the effects are different from those produced by pure hydrocyanic acid, as the peach-blossom acts more as an irritant of the digestive canal, and causes, in addition to insensibility and convulsions, efforts to vomit, and violent purging. A medical man swallowed half an ounce of a liquid prepared by digesting gin on a large quantity of *peach kernels.* He became giddy, and had violent constriction of the fauces, and dimness of sight. He vomited and recovered. (Taylor.) There are other plants which yield a distilled water and an essential oil containing more or less prussic acid; but as these are not used, at least in this country, I shall only refer to Dr. Christison's excellent work respecting them.

317. *o. Treatment of poisoning by prussic acid and its compounds.* — (*a.*) The remedy which is most efficacious in the treatment of the effects of these poisons is fortunately one which may generally be obtained without delay, namely, *cold water*, the *affusion of which upon the head, occiput*, and *nape of the neck*, rouses the patient from his insensibility more rapidly than any other means. This treatment was first recommended by the author of this work in the *London Medical Repository*, for July, 1825. It then attracted no attention, and was not even noticed by any of his contemporary editors. Dr. Herbst of Göttingen, however, in 1828, three years afterwards, recommended the same remedy, and the recommendation was then noticed in the British Medical Journals. The author, however, asserted his prior claims in the ninth and tenth volumes of the Medical Gazette. Dr. Herbst made several experiments on animals to show the efficacy of this treatment; which has now been tested in many cases in the human subject. It is of course the more successful the earlier it is employed; but as long as respiration and the heart's action continue, it should be resorted to and repeated according to its effects. The presence of convulsions, or of general palsy in addition to insensibility, should not prevent the administration of it. Indeed, convulsions and spasms may furnish grounds for hopes of success from it; and i cases where the insensibility and general pals have been extreme, the occurrence of convulsion or spasms has been indications of commencin benefit. The water should be about the temperature of spring water; should be made to fall in full and large stream upon the head — the vertex occiput and neck; and be repeated at short intervals according to its effects; and in a simila way to that advised by the author for poisoning b opium. (See *Lond. Med. Repos.*, vol. xviii. an hereafter.)

318. (*b.*) *Ammonia* has been considered by man as the most energetic antidote. It was advised b *Mr. John Murray*, and may be employed by inhalation, or in any other manner according to th state of the case. When given internally, th strong *aqua ammoniæ* should be diluted with twelv parts of water. It is most advantageously employed when the patient is roused, or even partially roused by the cold affusion; and then th *inhalation* of the vapour of ammonia, if properl managed, is more efficacious than the ingestio of the remedy, which may not be accomplished or even attempted when insensibility, convulsions, and spasms of the muscles of the jaws ar urgent.

319. (*c.*) *Chlorine* has also been advised as a antidote for this poison by Riaux, Buchner, Simeon, Cottereau and Valette. Orfila considers it the most efficacious antidote of any hithert advised. Unfortunately the patient may be dea before the antidote can be procured in almos every instance in which it will be required. The excellency of a remedy will avail but little the patient when it cannot be procured, or when he is no longer capable of breathing or swallowing i when it reaches him, even when it has been procured with the utmost rapidity.

320. The means, therefore, upon which confidence may be placed are the cold affusion, the inhalation of the vapour of diluted ammonia, or of chlorine, when it can be obtained in time, and the ingestion of stimulants. As this poison is usually taken with a suicidal intention, an excessively large dose is generally swallowed: and this excessive quantity often precludes success from any of the means already mentioned, or from any other. The immediate evacuation of the stomach by the stomach-pump, or the administration of a zinc emetic, conjoined with cordials and stimulants, as capsicum, &c., ought not to be overlooked. As this poison and its compounds cause congestion of blood within the cranium, blood-letting, or cupping on the nape of the neck may prove most beneficial in some cases, where this effect appears most urgent, and the habit of body admits of this practice. But it should not be overlooked that blood-letting may accelerate the absorption of the poison; and therefore the stomach should be emptied in the first place, if it be considered that much of the poison still remains in it.

321. *H.* Zinc — Oxide of. — This substance is not productive of serious effects even when taken in large quantity. Owing to its insolubility its absorption must be slow. When taken internally for a long time it acts as a slow poison, and produces a *tabes sicca*. A gentleman, for the cure of epilepsy, took daily twenty grains of the oxide, until he had consumed 3246 grains, which must have been

ourse of five months' duration. At the end of time he was pale, wasted away, almost idiotic, l the surface of an earthy hue. His tongue s thickly coated, the bowels constipated, the erior extremities cold and œdematous, the ab-nen tumid, the superior extremities cold and ivelled, and the skin dry like parchment; and pulse about sixty, thready, and almost imper-ptible. Under the use of purgatives, a light tritious diet, and tonic and diuretic medicines, rapidly recovered; but still remained subject epileptic attacks. — (*Brit. and For. Med. Re-w*, July, 1838.)

322. *I.* The Vapours of Ether, and of Al-hol, when inhaled into the lungs, until they are bibed by the blood circulating in the bronchial face and lungs, produce a paralysing influence on the cerebro-spinal nervous influence; the va-urs of the ethers paralysing or altogether sup-essing sensibility; and the vapour of alcohol ecting more especially voluntary motion, or both luntary motion and sensibility. Owing to these ects, the consideration of these agents might ve fallen under the present class; but I shall tice them more particularly under the *class of pefying or narcotic poisons.*

323. Class III. Excitants. — Stimulants. Exciting and Exhausting Poisons. — There e various substances, which are simple ex-ants or stimulants, as respects either the rvous influence or vascular action, and which, en taken in moderation, are in no way in-ious, unless a too frequent recourse be had them. If, however, those be administered excessive doses they may produce injurious or en fatal results, owing either to excessive sti-ulation or to its consequences, especially exhaus-n, congestion, effusion, and other changes in vital gans. Fatal effects, however, from most of the bstances comprised in this class, are compara-ely rare; and when they produce these effects, ey operate more or less upon, or through the edium of the blood, and thereby seriously affect e functions of the brain, heart, and lungs. It not improbable that certain excitants may act energetically upon the nervous system, and, rough them, upon the vitality of the frame, as pidly to exhaust or destroy the influence of ese systems, and vitality in all its manifesta-ns. An intense electric shock, or lightning, ay produce this effect; and we may conceive a ock from a galvanic battery of such violence as mediately to occasion the same result. In these ses the agent acts upon and through the medium the nervous systems, although the blood and scular system, and the muscular structures, ay manifest the chief or only lesions.

324. i. Alcohol — *spirits of wine* — *spirituous uors*, such as *gin*, *whisky*, *brandy*, *rum*, and *rack*, have been taken in so large quantities as produce not merely intoxication, but even ath, in a few hours. The poisonous operation alcohol has been ably investigated by Dr. hristison. In the article Drunkenness, I ve described the slowly developed effects and timate results of habitual drunkenness; and e articles Delirium Tremens and *Granular egeneration of the* Kidneys are illustrations of rtain other forms of slow or *chronic poisoning* by irituous and other intoxicating liquors. It will e necessary for me, therefore, at this place to notice only the more *acute forms* of poisoning by alcohol and its compounds.

325. *A.* The *symptoms* of the more acute states of poisoning by alcohol are, violent excitement of the nervous functions, and of the passions or emotions; flushed face; excited vascular action, followed by giddiness; confusion of thought; various mental affections, varying with the character of the individual; delirium; dozing, passing into profound somnolency, which, after several hours, is interrupted by headache, sickness, vomiting, and terminates in a heavy or stupid headache, giddiness, or nervous exhaustion. Such is the more favourable course of severe intoxication; but a more unfavourable result may accrue, either during the stage of vascular excitement, or in the following period of congestion; the somnolency deepening into profound coma, terminating in death. Dr. Christison furnishes the following illustrations of this state of poisoning. Two brothers drank in half an hour three bottles of porter, into which twenty-four ounces of whisky had been secretly mixed by a companion in order to intoxicate them. In the course of drinking both became confused; and fifteen minutes after finishing the last bottle one of them fell down insensible, and had no recollection of what happened for twelve hours; but he recovered. The other staggered a considerable distance for an hour, and then became quite insensible. In four hours he was comatose; the breathing stertorous and irregular; the pulse eighty, and feeble; the pupils dilated and not contractile, and deglutition impossible. He remained in this state till his death, which took place fifteen hours after this debauch.

326. In this state of acute alcoholic poisoning, an apoplectic tendency may be developed into a true *apoplectic seizure;* and the usual appearances of apoplexy be found within the cranium after death; this seizure occurring either in a simple form, or associated with paralysis, especially hemiplegia. This result takes place either during the somnolent stage, — this state passing into profound coma, — or a partial recovery from somnolency occurs, and apoplexy, either gradually or suddenly, appears after the effects of intoxication have nearly or altogether passed off. — An individual reached his home in a state of intoxication. He became lethargic, and died in the course of twenty minutes. On examining the body, Dr. Alison could not discover any morbid appearance, except some watery effusion in the ventricles and on the surface of the brain. The contents of the stomach had a strong smell of spirits. This case, however, presents a more rapid course than is usually observed when intoxication passes directly into coma and apoplexy. A man drank thirty-two ounces of rum in the afternoon, and was comatose most of the ensuing night. Next morning, although very drowsy, he was sensible when roused; and in the evening he was convalescent. But, two days afterwards, he became delirious; and in two days more comatose and apoplectic. No other morbid appearances than congestion were found in the brain.

327. In some instances, the lethargy and insensibility caused by acute intoxication is attended by *violent convulsions*, which have presented either an hysterical or an epileptic form. I was called to a female who had drunk a large quantity of

spirits in a short time. She was muscular and robust, violently convulsed, unconscious, and occasionally she uttered the most distressing screams. Recourse was had to the cold affusion on the head, the convulsions assumed more of the hysterical character, and the coma was diminished and soon ceased. In another case, also of a robust female, whom I attended with Mr. Lambert, convulsions of an epileptic character appeared during the insensibility caused by the ingestion of a large quantity of spirits. When I saw her, the symptoms were exactly those of a violent epileptic attack, and, as in the former case, characterized by the strong smell of spirits. The convulsions continued for a long time, and then passed into violent phrenitic delirium, which was not removed for several days; but recovery, complete and lasting, followed cold affusions, and copious local depletions.—A medical student, after drinking four bottles of champagne, during and after dinner, besides some other wines and liquors, became phrenitically delirious. Violent convulsions supervened and recurred at intervals, during which the phrenitic symptoms continued. I saw him about thirty hours after his debauch. The maniacal delirium, and the brief attacks of convulsions, recurred almost hourly, attended by the most intense indications of vascular determination to the brain and its membranes. The treatment about to be recommended was adopted, and he recovered.

328. *B.* A still *more acute state* of poisoning than the above, by alcoholic liquors is sometimes met with. When these liquors are swallowed in large quantity in a very short time, there is seldom much preliminary excitement. Coma occurs in a few minutes, and gradually assumes an apoplectic character. The face is livid or pale — sometimes ghastly; the breathing stertorous, and with a spirituous odour; the pupils dilated and insensible, sometimes contracted; and death often takes place in a few hours. Tetanic convulsions occasionally appear in this form, although not so frequently as in the preceding. Instances of this rapid form of poisoning have been recorded by Orfila, Bedingfield, Marx, and others. Dr. Christison mentions an instance of a man who drank at once a bottle of whisky. He died in four hours with symptoms of pure coma.

329. The effects of alcoholic liquors are greatly heightened, and often to a fatal extent, by exposure to cold either after or during the ingestion of the poison; and intoxication and insensibility more rapidly result. This is owing not only to the sedative influence of cold, but also to the partial or complete arrest of the excretion of the spirituous vapour by the lungs and skin. Most of the accidental deaths which have occurred in this country from exposure to cold during intemperate weather have been caused by a too free use of spirituous liquors just previously to such exposure; insensibility, coma, and death supervening.

330. Numerous instances have occurred, especially in this metropolis, of various liquors containing alcohol, especially malt liquors, having been made the vehicles of other poisons, and given with the intention of robbery or murder. The poisons thus administered have been usually opium or prussic acid — especially the tincture of opium. Such cases may be recognised by the fact that the effects are of a much more severe character than could result from the quantity of alcoholic fluid which had been taken. In the cases, it is often very difficult to decide wheth the symptoms are caused more by the alcoho liquor than by the poison with which it w drugged.

331. *C.* The *appearances observed after fatal ac poisoning by alcohol*, consist chiefly of increas vascularity of the internal surface of the stomac sometimes with ecchymoses, the villous membra presenting either a bright red, or a dark brow or some intermediate hue; of congestion of t brain; of an increased quantity of fluid in t ventricles and between the membranes; a sometimes of effusion of blood in the substance the brain, or between the membranes, or of bloody serum in the latter situation. When dea takes place rapidly, a strong odour of spirits m be perceived in the contents of the stomach; a in less rapid cases this odour has been said have been perceived in the serum effused with the cranium; but this may not be felt if so time has elapsed before the inspection has be made. (See art. Drunkenness, § 8.)

332. *D.* The *quantity* required to destroy l cannot be determined. Much depends upon the ag habits, &c. of the individual, upon the state of t stomach, and upon the treatment. Young perso not accustomed to spirits, may be killed by comparatively small quantity. Mr. Taylor a duces the following: A boy, aged seven yea swallowed three ounces of brandy. Shortly afte wards he was observed to stagger. He was se to bed, and vomited violently. In about fo hours he was in a profuse perspiration, and h head, face, and neck were very red. Ha an hour afterwards he was found insensibl strongly convulsed, and the skin cold. He di in about thirty hours. Addiction to spirituo liquors often enables the system to tolerate large quantity without much effect. A lar powerful young man, thus addicted, in the pr sence of the author, swallowed for a bet bottle of rum within half an hour. He was hard affected by it. A full stomach previously to th ingestion of spirits also affords a greater toleran of this poison.

333. *E.* The *period* which elapses from the i gestion of the spirits until death occurs also vari with the circumstances just mentioned. M Taylor states that the shortest period which h has seen reported, occurred in a case of a man wh swallowed a bottle of gin for a wager. In quarter of an hour afterwards he became intox cated, and soon after that insensible, and died *half an hour*, although a large quantity of th spirit had been removed by the stomach-pum Dr. Chowne adduced an instance of a boy, age eight years, who was found insensible half an ho after having taken about half a pint of gin. Th liquid drawn off his stomach seven hours afte wards had no odour of gin, nor was the odour it perceptible in his breath. He was insensib and motionless; the limbs relaxed and powerles the face pale, and the surface cold. The pul was quick and feeble. He died without rallyi or recovering consciousness *sixty-seven* hours aft taking the poison.—On *inspection*, the brain wa found healthy. There were slight effusion serum, and distension of the veins of the pia mate The stomach was pale. No exact *period* can b assigned for the fatal termination of the effects

s poison; this termination depending chiefly
on the absorption of the spirit into the circula-
n, and upon the rapidity and extent of the ab-
rption—the quantity accumulated in the blood,
pecially when the kidneys, lungs, and skin do
t rapidly excrete it, suppressing the cerebral
actions and impairing the irritability, and ulti-
tely arresting the action, of the heart.

334. *F. Treatment.* — The contents of the sto-
ach should be withdrawn by the stomach-pump
speedily as possible; and the cold affusion ought
be resorted to immediately, in order to remove
symptoms of intoxication, or the insensibility
coma which may have already appeared.
eviously to 1822, the treatment of dangerous
ses of poisoning by alcoholic liquors, as well as
ose by narcotics, was not understood, and was
rtainly far from being successful. In July of
at year, cases demonstrating the good effects of
cold affusion on the head in poisoning by these
ents, were published by Mr. Wray and myself
ond. Med. Repos. vol. xviii.); and the efficacy
the practice in cases of poisoning by spirits has
en vouched for by Dr. Ogston in an able me-
oir on intoxication. He states that, where the
nperature of the head is steadily high, and that
the surface not much reduced, it is a safe and
icacious remedy.

335. Having removed the contents of the
mach and used the cold affusion, the liquor
moniæ acetatis with the ammonia in excess
ould be freely given in camphor water. Cases
comparatively rare which admit of blood-
ting or even of local depletions. In young,
ust, and plethoric persons, not accustomed to
oxication, and when the affection of the brain
of a phrenitic character, then vascular depletions
often required; but they should be resorted to
h caution, and their effects carefully watched.
hen the insensibility and coma are profound,
l when they resist the cold affusion on the head,
liquor ammoniæ acetatis, with the carbonate of
monia and camphor water should be given;
l if deglutition cannot be effected, they ought
be conveyed into the stomach by the stomach-
mp, or administered in enemata. Warmth, and
promotion of a free perspiration, are always
eficial. In other respects the treatment is the
ne as described in the articles Drunkenness,
l Delirium with tremor; the more *chronic*
tes of poisoning by alcohol being there dis-
ssed, especially under the former of these heads.

336. ii. The Æthers—especially the *sulphuric,*
nitric, and *hydro-chloric,* may occasion danger-
s or fatal effects when taken in excessive quan-
, or when their vapours are too long *inhaled.*
A. When taken into the stomach, the opera-
n of the æthers is analogous to that of spirituous
uors. M. Orfila performed several experi-
nts with them on the lower animals; but as
se were accompanied with placing ligatures on
œsophagus, little importance can be attached
the results. I am not acquainted with any
gerous effects which have occurred from swal-
ving any of these æthers; and I believe that
y may be taken in larger doses than they are
ally prescribed, and be productive, in certain
tes of disease, of much benefit.

337. *B.* The *inhalation of æther,* especially
sulphuric, has lately come into vogue for the
lition of sensibility, in order that surgical operations may be performed with comfort, and even pleasure, to the patient. But it appears doubtful to me, after witnessing several instances of the inhalation of æther, whether or not the risks contingent on it do not more than compensate for the escape from pain during an operation. The inhalation of æther to the extent of annihilating, even for a very short period, the sensibility, must necessarily be attended by changes in the nervous system; and even in the blood, otherwise a most important function, — and one presiding over and directing all our animal functions, — could not be entirely subverted for a time; and it may be inferred *à priori* that congestions of the brain and medulla oblongata, congestions and inflammations of the bronchi and of the lungs, and alterations of the blood, especially as regards the red globules and fibrin, will result from the passage of so large a quantity of æther into the circulation as is usually required to produce insensibility; and I believe that these results have actually accrued already, in some instances, from the practice; and that, although matters may have proceeded favourably as respects the operation, congestive bronchitis or congestive pneumonia has nevertheless been developed by it; whilst the absorption of purulent matter, and the occurrence of phlebitis, after great operations have been favoured by it, by lowering the general amount of vital resistance, by affecting the constitution of the blood, and by weakening the tone of salutary vascular re-action.

338. The attempts recently made to introduce the *inhalation of æther* into general practice for the alleviation of the *pains of parturition,* as well as for trifling operations and unimportant occasions, are fraught with some danger; and I am confident that a further experience will prove my predictions to be correct. I may here explicitly state what the danger is, as regards the *puerperal state;* namely, the supervention of *convulsions,* of *hæmorrhage, maniacal delirium, puerperal fevers,* sinking of nervous power in various ways, but especially in the form of cardiac *syncope,* and inflammations of the *respiratory organs,* or of the *brain.*

339. Instances were, a few years since, published of a druggist's maid-servant having been found dead in bed, owing to the air of her apartment having been loaded with the vapour of nitric æther by the breaking of a jar containing a large quantity of this substance. She was found lying on her side, with her arms folded across the chest, the countenance and posture composed, and her whole appearance that of a person in deep sleep. The stomach was found red internally, and the lungs were gorged. The brain was not examined. — A young man was found completely insensible from breathing air loaded with sulphuric æther, and remained apoplectic for some hours. — I am acquainted with an instance of similar effects having accrued, from the vapour of strong spirits having been inhaled whilst the person was transferring the contents of a large cask into bottles.

340. *C.* The *treatment* of insensibility caused by æther is not materially different from that produced by ardent spirits. The cold affusion on the head and neck is the most to be confided in, if the case be in any way alarming.

341. iii. Camphor.—There are few substances

the action of which is more variable, according to the dose, the mode of exhibition, state, and constitution of the patient, &c. than camphor. Hence its operation has been differently described, and its employment in disease has not been always judicious or beneficial. Having been in the habit of prescribing it, often in large doses, in various dangerous diseases, I was induced, on two occasions, to take a considerable quantity, in order to ascertain its effects from my own sensations; and on several other occasions I have taken smaller doses. These experiments were made chiefly in 1823 and 1824, and the results were published in the *London Medical Repository* for September, 1825.

342. *A.* The *vapour* of camphor is injurious to insects; and when long inhaled by man, it occasions headache, pallor of the countenance, slight irritation of the respiratory mucous surfaces, followed by slight reaction of the circulation, especially in the brain and lungs.—*Locally*, on the *denuded dermis*, or on the *mucous surfaces*, it appears to impress the nerves of the part; and, after rendering the part at first pale, it increases capillary injection and redness, and developes moderate vascular reaction in it. Whether applied to the skin denuded of its cuticle, or taken into the stomach, or injected into the rectum or other mucous canals, camphor is readily *absorbed* into the circulation, and is eliminated from it chiefly by the lungs and skin, and not perceptibly by the urinary organs, although it is believed to affect those organs.

343. *B.* The *primary action* of camphor is exerted chiefly through the medium of the nervous system; but *consecutively*, and as it becomes *absorbed* into the circulation, its action is more fully manifested on the brain, on the heart and vascular system, and on the lungs, especially on the bronchial mucous surface, as it is eliminated by the respiratory organs from the blood. The following are the results of my experiments with this substance above alluded to (§ 341.).

344. Camphor produces effects varying with the dose, and the period which elapses from the administration of it. When taken into the stomach, triturated with oil, or divided minutely by means of mucilage, magnesia, &c., fifteen grains produces the effect of half a drachm given in the form of pills or bolus, or less minutely divided; and this latter quantity sometimes produces, especially when the stomach is empty, and taken in oil or much diffused in mucilages, &c. and in certain constitutions, very severe effects. Given, therefore, in doses of from fifteen to thirty grains, diffused in mucilage, it produces the following effects, which, as they are progressively different, may be divided into *three stages.*

345. *a.* In the quantity just mentioned, camphor occasions a peculiar sensation of heat and constriction in the throat, and along the œsophagus as it is swallowed, followed by a similar feeling, attended by slight anxiety, at the epigastrium and region of the stomach. The sensations of internal heat and of concentration or constriction in this situation continue for some time, and are attended by slight thirst, a more constricted and slightly accelerated pulse, and a colder state of the extremities. The surface of the body also becomes cooler, and a sense of chilliness and of coldness, greater than the actual loss of temperature, is produced; yet there is, at this time, a feeling of internal warmth and excitation, as if the energies of more remote parts were drawn towards the stom . To these sensations are added pallor of the co tenance, vertigo, pandiculation or slight rig . The head is cool, the action of the carotids so what diminished, and the respiration slow r natural.

346. *b.* In from one to two hours, the striction and diminished action of the surface d extremities have passed off, and replaced by n e or less reaction and determination of blood to e head and periphery of the body. The pulse comes fuller and stronger; animal heat is creased; the features are more developed, and e colour returns or is increased; the vertigo, pa culation, chilliness, and rigors having disappea l. Shortly afterwards headache, flushed face, exc d pulse, sometimes noises in the ears, various t slight affection of sight, watchfulness or sl t mental excitement, or delirium and disturbed sl , in some instances, are experienced.

347. *c.* These effects having continued a w hours, the excitement of the pulse and of the b n subsides, the heat of the skin passes into a free spiration; the pulse becomes slower and so r, and a refreshing sleep terminates the head e and slight disturbance of the brain and orga of sense; and the nervous and muscular syst s remain composed. These are the usual effec of a large dose (from fifteen to thirty grains) of is substance upon a healthy person, when it i t repeated. Where smaller quantities are t every four or five or six hours, the effects stituting the second stage are chiefly manif d to an extent in proportion to the amount of e doses. When dissolved in oil or in spirit it appears to act with greater activity, and t e more readily absorbed into the circulation, wh e, if the dose be large, or if the doses are repeat t short intervals, it acts energetically upon e nervous system, overexciting the brain, and ca g maniacal delirium, and even convulsions d death. It seems also to possess antiseptic perties.

348. *C.* The *smallest quantity*, which has duced symptoms similar to the above, calcul d by their severity to cause alarm, is *one scrupl* I have often, however, given this quantity, and peated it a second and a third time at interva of six and eight hours, with marked benefit, in w and malignant states of fever. When give n an enema, and in a state of minute divisio it often acts with great rapidity, and sometimes h great severity. Dr. Christison adduces a se where half a drachm was thus administered, d severe nervous symptoms were produced. I e often prescribed as much as this, but never n e, in an enema, for insensibility or profound coma d either alone or with assafœtida; and it has s times been efficacious, but never injurious. a case of most profound and protracted com n which deglutition was abolished, to which I s called with Mr. Kingdon and another pr tioner, this substance, administered in an en a, in a very large dose, roused the patient, and cured ultimate recovery. Mr. Taylor addu a case by Dr. Siemerling, in which a man, d sixty-nine years, swallowed *two drachms* fo e relief of rheumatism. Three hours afterwar e resembled a drunken person. He complaine of burning heat in the throat and stomach, of th bings in the head, and pains in the course o e

ne ; of ringings in the ears, and dazzling light ore his eyes. To these succeeded subsultus dinum and insensibility, and profuse perspira- n. This last state was, however, of short dura- n ; and he slowly recovered.

349. Dr. Wendt mentions a case, in which ht scruples were taken dissolved in spirit — the gest dose hitherto mentioned. Vertigo, dimness sight, delirium, and burning pain in the sto- ch, but no vomiting, were the only symptoms. e man who took this quantity was an habitual nkard ; but he recovered. I have often found t drunkards may take large quantities of this stance without producing any unpleasant nptom ; and I have given it in very large doses om ten grains to one scruple) with opium for delirium of drunkards, with marked benefit.

350. *D.* The *appearances* occasioned by poison- s doses of camphor have not been observed in n. According to the experiments of Orfila d Scudery, the mucous membranes of the mach, duodenum, and urinary organs were in- med, and the membranes of the brain injected. e other appearances were less constant. All cavities had a strong smell of camphor.

351. *E. Treatment.*—When the effects of cam- or are not very severe, they soon pass off. t when they become alarming, whatever of s substance may still remain in the stomach uld be removed by an emetic or by the sto- ch-pump, and demulcents with opiates, or nbane, or poppies, and the cold affusion on the d, or the shower-bath, ought to be resorted to, maniacal delirium supervene. If convulsions insensibility appear, the cold affusion, injec- ns with assafœtida or ammonia, and other sti- lants may be administered. If strangury occur, mulcents and emollient enemata are generally the greatest service.

352. iv. Chelidonium majus and C. glaucium duce inflammation of parts to which they are plied ; but they appear to be partially absorbed, d to act upon the nervous system, causing de- ium, in cases where they have been partaken of mistake. In M. Orfila's experiments, they casioned remarkable congestion of the lungs, ether taken into the stomach, or applied to unds.

353. v. Heat, in its various forms and appli- ces, may be very briefly considered under the esent category, as it may become more or less idly injurious, or even destructive of life. — *a. mospheric heat*, or the *temperature of an apart- nt*, may be so high as to interfere with the re- ratory functions, to impede the decarbonization the blood ; to excite, and ultimately to ex- ust, the nervous energy ; to change the state of e blood ; and, lastly, to disorder all the excre- g functions, and to arrest the vital actions. hen, with a high range of temperature, the ing body is exposed to a stagnant state of the , when there is not a sufficiently rapid renewal the atmosphere, then the noxious effects are oduced with a rapidity co-ordinate with the de- ee of atmospheric stillness ; and asphyxia is oduced with proportionate celerity. But when e elevation of temperature is not so great, al- ough still high, nor ventilation so imperfect, en the deleterious changes are less rapid, and sume a slow form, inducing various *chronic fections*, more especially of the liver, stomach, and bowels, and often also of the spleen. Fatty liver, various states of enlargement and chronic change of this organ, bilious fever, &c., are not infrequent consequences of this cause ; and very frequently occur, even among the inhabitants of cold regions, who shut themselves up in close apartments, warmed by stoves, during the cold seasons.

354. It is important to remark, although the circumstance must be obvious, that the air, when raised to a high temperature by the usual means resorted to in factories, — by heated air, by steam, or hot water transmitted through metal pipes to different parts of the building, — readily becomes stagnant, and that due ventilation is with difficulty preserved in connection with this mode of warming, although the great numbers of persons usually employed in these places require a more than usually rapid renewal of the air. The consequences are, that the persons there employed rapidly vitiate, or even poison the air which they breathe, independently of any deleterious miasm which may be generated by the articles, materials, apparatuses, or appliances used in these manufactories.

355. *b. Warm baths, vapour-baths, fumigating baths.* — Medicated baths, and various natural *warm or mineral baths*, although beneficial when appropriately resorted to, may nevertheless become, owing to their exciting and exhausting influence, most deleterious in various states of the system, even in health, and still more so in several diseases. What is a most successful medicine when judiciously employed, becomes either a rapid or a slow poison when it is not appropriately prescribed.

356. Heat applied to the external surface in such excess as to produce scalds or burns, especially when an extensive surface is implicated, is productive of danger or death, not so much by the extent or severity of the local injury, as by the sympathetic development of inflammation of mucous or serous surfaces, and its consequences.

357. *c.* The injury produced by swallowing hot or *boiling fluids* is dangerous or fatal, according to the amount or seat of local lesion. When the fluid is of a temperature as high as 200° or 212°, it rarely gets lower than the upper part of the gullet, and the injury is generally limited to the pharynx, epiglottis, and larynx. Accidents sometimes occur from drinking hot or boiling water from a tea-pot or kettle ; and Dr. M. Hall has adduced the accounts of four such which occurred to children ; and, in all, *cynanche laryngea* was produced. Two of these cases terminated by suffocation, one was relieved by tracheotomy, but died soon afterwards, and the fourth recovered after having been nearly choked. (*Trans. of Lond. Med. and Chirurg. Soc.*, vol. xii. p. 1.)

358. vi. *A.* Ipecacuanha has been considered by some as an *irritant*, and by others as an *acro-narcotic :* but, strictly speaking, it cannot be viewed as either — not as an irritant, as it does not irritate or inflame the capillaries of the surfaces to which it is applied ; — nor as a narcotic, for it does not stupify. Its impression is primarily upon the nervous organisation of the part to which it is applied, and is rapidly followed by muscular contraction or reaction, when the quantity of the substance is such as to produce an impression sufficiently strong

to develop this effect. — The susceptibility of the influence of this substance is remarkably great in some persons — so much so as to occasion the most distressing effects. When this susceptibility is great, even the presence of a few grains of ipecacuanha in the same apartment as the person thus constituted is sufficient to produce a sense of suffocation, tightness in the chest, nausea, depression, or faintness, or other disorder, varying with the idiosyncrasy of the individual; but the most frequent affection is one resembling asthma. I have met with several persons who are thus affected by the odour of ipecacuanha, or by the impalpable powder of this substance, when any of it is inhaled; and seen two instances of most distressing suffering produced by it. It is not unusual, also, even when this susceptibility of the effluvium of the drug does not exist, to meet, in the course of medical practice, with persons upon whom very minute doses of any of the preparations of ipecacuanha produce more or less distress, especially nausea, retching, and depression.

359. *B. Emeta.* — The active principle, or alkaloid of ipecacuanha, whether taken into the stomach, or applied to a wound, occasioned, in the experiments of MAGENDIE, death after some hours, preceded by vomiting and coma, the lungs and stomach being found inflamed.

360. *C. Treatment.* — It is rarely that any thing more than time is required to remove the effects of ipecacuanha; for an overdose of it is prevented from becoming injurious by its immediate rejection from the stomach. It is chiefly when, owing to idiosyncrasy, its more distressing effects are produced, that treatment is requisite. In the cases which I have treated, an open, free, and warm air, camphor with henbane taken in demulcents, and a warm mustard poultice applied over the lower part of the sternum and the epigastrum, soon removed the disorder. When nausea, retchings, and depression occur from small doses of this substance, or when the operation of it becomes exhausting or too prolonged, then small doses of ammonia and créosote, or this latter in an aromatic and emollient draught, will afford relief.

361. CLASS IV. — EXCITING AND CONSTRINGING POISONS. — *Nervous and Muscular Excitants.* — Although numerous medicinal substances act more especially upon both the nervous and the muscular or contractile systems, yet there are comparatively few of them which act so violently upon these systems as to produce death, unless they are employed improperly in the treatment of diseases, and aggravate existing morbid conditions, by interrupting the salutary efforts of nature, and by arresting or preventing the evacuation of hurtful or contaminating matters. Several substances, whilst they more or less excite the nervous and contractile tissues, become materially or chemically combined with the parts with which they are brought into contact, more especially with mucous membranes, by which they are readily imbibed. Tannin, gallic acid, and the gallates, krameria, alum, kino, catechu, solutions of several of the mineral salts, &c., whilst they excite nervous and contractile parts, and thereby produce a tonic effect, are partially imbibed by, or combined with, the tissues to which they are applied; and although this latter operation is not very manifest
in the living textures, it is sufficiently demonstra
in dead animal matter, which is thereby preser
from decay for longer or shorter periods.
constringing influences of these and of sim
substances are displayed more upon the exhal
and secreting surfaces, to which they are app
than upon remote structures and organs;
when the quantity is more considerable, or w
the dose is often repeated, they are then m
abundantly imbibed and absorbed into the
culation, and act more or less energetically u
the nervous centres and contractile parts. M
of these substances, however, are not poison
unless they are taken in excessive quantities,
are employed inappropriately in certain state
disease.

362. But there are some of them which
amongst the most virulent poisons in nature,
are exceeded only by prussic acid in their poisous influences. These substances act chiefly
exciting the nervous systems, the excitement
ing propagated to the spinal chord, and refle
thence upon the muscular system, the irritabi
of contractile parts being inordinately exci
and being followed by various consequences
cording to the persistence or the exhaustion of
excitement, and to the parts more especially
fected. These substances generally increase
sensibility, and in this respect chiefly they di
from narcotic or stupifying poisons. They
not paralyse or diminish muscular contracti
but on the contrary inordinately excite this fu
tion, so as frequently to become incompatible
the continuance of life, tetanic asphyxia be
often the more immediate cause of death. T
produce no visible change in the tissues to wh
they are applied, or in the alimentary canal, o
any change is observed it is accidental, not ne
sarily connected with the operation of the pois
and insufficient to account for any portion of
phenomena or symptoms they produce. They
chiefly, by being absorbed, and through the
dium of the circulation, upon the nervous cent
more especially upon the spinal cord; and t
owe their activity to an alkaloid principle wh
is poisonous in an extremely small dose.

363. i. ALUM.—*Sulphate of alumina and pot*
can hardly be considered as a poison, althoug
may prove injurious when taken in very la
quantity or in various disorders. It acts as
excitant and astringent; and is absorbed into
circulation; whence it is excreted chiefly by
kidneys. Its beneficial operation in lead coli
owing to its exciting the organic nervous and m
cular structures of the digestive canal. M. ORF
has detected this substance in the stomach, liv
spleen, and urine.

364. ii. NUX VOMICA — STRYCHNIA, &c.—
veral species of the genus *Strychnos*, name
S. nux vomica, *S. Sancti Ignatii*, or St. Ignati
Bean, *S. Colubrina*, *S. Guianensis*, *S. Tieuté*, wh
yields the *Upas Tieuté*, an Indian poison, &c.,
extremely active poisons, and owe their activity
an alkaloid principle which has been call
Strychnia, or *Strychnine*. This substance has
intensely bitter taste, perceptible even when o
grain is dissolved in 80 lbs. of water. It
sparingly soluble in water, but more abundan
in alcohol and the volatile oils. It exhibits
alkaline action, and forms neutral and crysta
lizable salts with the acids. Dr. CHRISTIS

led a dog in two minutes with 1-6th part of a in injected in the form of an alcoholic solution o the chest. He has seen a wild boar killed in e same manner with a third of a grain in ten nutes. There is little doubt that half a grain roduced into a wound might kill a man in a few nutes. It acts most rapidly and energetically en a solution of it is injected into a vein.

365. *A.* The *symptoms* produced by strychnia are iform and striking, when this substance is ap- ed in a large poisonous dose. The animal is at st agitated, and is soon afterwards seized with rtings and stiffness of the limbs, which increase til it is attacked with a fit of violent general sm, in which the head is bent back, the spine ffened, the limbs extended and rigid, and the spiration checked by spasm of the respiratory uscles. An interval of calm succeeds, during ich the sensibility is generally more than ually acute, and the senses unimpaired; but other paroxysm soon follows, each successive ack being more severe, and the intervals shorter, less marked, until at length the severity of the , and the duration of the spasm of the respiratory uscles terminate in suffocation. Dr. CHRISTISON s observed the first symptoms of this poison in m 60 to 90 seconds after the application of it a wound; and 45 seconds after its injection o the pleura. MM. PELLETIER and CAVENTOU ve seen them appear after 15 seconds, when ected into this cavity. M. BOUILLAUD says at it has no effect when applied directly to a rve.

366. *B.* As to the *quantity* of strychnia likely to stroy life, much will depend upon the mode of plication, and its administration in a dissolved or dissolved state. There is no doubt that one half, even one third of a grain, when dissolved and jected into a vein, would be sufficient to destroy man. Three eighths of a grain given medi- nally produced violent tetanic convulsions, asms of the extremities, trismus, opisthotonos, asmodic contraction of the respiratory muscles, c. Dr. PEREIRA has given the particulars of a se which favours the idea that strychnia, like gitalis, accumulates in the system, and suddenly casions violent symptoms after the exhibition of in small and frequently repeated doses; and hich demonstrates the poisonous operation of this bstance in man.—A Swede, between fifty and ty years of age, suffering from general paraly- , one side being more affected than the other, ok one eighth of a grain of strychnia three times day for some weeks, without effect. The dose s increased to one quarter of a grain thrice ily, also without effect. It was further in- eased to half a grain, twice or thrice a day; d this dose was taken for some days before the fects of this substance were manifested. The tient was found in a fit. The whole body s in a state of tetanic spasm; the trunk and mbs were extended; the shoulders thrown back; e muscles rigid and hard; the face and chest ere of a purple colour; respiration had ceased, d the pulsation of the heart was very weak. rtificial respiration was imperfectly kept up by mpressing the thorax; and the circulation was mewhat restored. The deep purple colour of e face went off. The man sighed and the re- iration returned; but the spasms very soon ap- eared with increased violence, and attacked the respiratory muscles. Respiration entirely ceased the surface again became purple, but the circulation still went on. Artificial respiration was continued imperfectly, when the relaxation of the muscles would allow of it; but was this time ineffectual. The heart soon ceased to beat, and the purple colour of the surface was instantly replaced by the pallor of death.

367. A young man swallowed forty grains of strychnia. The symptoms commenced in a quarter of an hour. Trismus and spasm of all the muscles speedily appeared, and the whole body became as stiff as a board. The lower extremities were extended and stiff, and the soles of the feet concave. The skin became livid, the eyeballs prominent, the pupils dilated and insensible, and the patient lay in a state of universal tetanus. A remission occurred, but the symptoms soon became aggravated, and the patient died asphyxiated owing to spasm of the muscles of respiration, in about an hour and a half after taking the poison. On inspection, twenty hours after death, the body was very rigid. There was affusion in the spinal sheath [probably only the spinal fluid], and the upper part of the spinal marrow was softened; the brain was congested, but the alimentary canal was in its normal state. —(*Lancet, Jan.* 27. p. 647. 1838.)

368. Mr. FRENCH informed Mr. TAYLOR that a person took a grain of strychnia at a dose. Vomiting occurred, and no ill effects were produced; but half this quantity may give rise to dangerous symptoms, when taken for the first time. When commenced with in small doses and gradually increased, the system may become gradually habituated to its influence, until a large dose is reached, when its effects may be suddenly and fatally manifested, as in the case mentioned above (§ 366.).

369. The operation of *strychnia*, or of its *salts*, or of any of the substances which contain this poison, should not be mistaken for *tetanus*. This disease is developed much more slowly, and death takes place after a much longer time, than in cases of *acute* poisoning with any of these poisons. But if the dose be small and frequently repeated, a much less acute form of poisoning may be produced, and one which may, with great difficulty, be distinguished from tetanus. An attempt was made to defraud insurance offices in London, by insuring the life of a young woman very largely, and destroying her by administering strychnia in porter.

370. *C. Nux Vomica*, the *Bean of St. Ignatius*, the *Upas Tieuté*, the *Wourali poison*, and the other substances enumerated above (§ 364.), owe their poisonous properties to *strychnia*. St. Ignatius's bean is said to contain nearly three times the quantity of this alkaloid found in nux vomica. But this last substance is most frequently employed as a poison. The symptoms produced by it are similar to those caused by strychnia, but are less severe. Nux vomica is usually taken in the form of powder. It has an intensely and persistent bitter taste; and generally tetanic spasms appear in from five to twenty minutes after it has been taken. The symptoms are altogether the same as have been described, and death is produced by the asphyxia consequent upon the spastic contraction of the thoracic muscles.

371. MR. BAKER states that *nux vomica* is taken by many of the nations of Hindostan habitually,

generally night and morning, beginning with an eighth part of a nut, and gradually increasing the dose to an entire nut, or about twenty grains. If it be taken immediately before or after a meal, it never occasions any ill effects; but if this precaution be neglected, spasms are apt to ensue. As this substance is taken in a state of coarse powder, and not in greater quantity than one nut, and frequently after having been half roasted, it is probable, that it is only slowly acted upon by the juices of the stomach; and that the modifying influence of habit as regards it is not considerable. Mr. Baker adds that it is thus used as a preservative from lepra and some other chronic disorders; but it is more likely that it is taken on account of its tonic and aphrodisiac properties. The habitual use of this substance proves that the cumulative influence imputed to it above does not exist.—(*Trans. of Med. and Phys. Soc. of Calcutta*, vol. i. p. 140.)

372. *D.* As *nux vomica*, in *powder*, in *extract*, and in *tincture*, is an excellent remedy in several disorders, and is frequently used medicinally, the *symptoms* indicating its injurious operation should be more fully described. When large doses are given, the stomach often becomes disordered, the appetite impaired, and the bowels constipated. The muscular system and the sensibility are next affected. All the senses are more than usually acute. The sensibility of the surface to cold, or to slight touch, is remarkably acute; and depression of spirits, anxiety, and a feeling of weakness and weight in the limbs are complained of. Mr. Pereira remarks that the limbs tremble, and slight rigidity or stiffness is felt upon motion. The patient staggers, and, when he stands, a slight tap on the ham brings on a convulsive motion, which nearly throws him down. If the medicine be persevered in, these effects increase, and the voluntary muscles are thrown into a convulsed state by very slight causes. The sudden contact of external bodies acts like an electric shock upon him, and produces a convulsive paroxysm. A deep inspiration, turning suddenly in bed, startling sounds, &c., have a similar effect. The further use of nux vomica renders the symptoms still more intense; the fits of spasm now occurring spontaneously, and without any of these provocations. It acts upon the bladder and genital organs, and exerts an aphrodisiac effect on both sexes. The pulse, however, is but little increased in frequency, and is sometimes calm even when muscular rigidity has appeared. Preceding and accompanying these effects, great sensibility of the surface, painful formications, and acuteness of the senses are experienced. The intellectual powers are unimpaired. If the use of this substance be continued, especially in an increased dose, the symptoms are still more violent, and tetanus, tetanic asphyxia, and death succeed each other with great rapidity, as they follow large doses of *strychnia* (§ 365.).

373. *a.* Dr. Christison states the smallest *quantity* of nux vomica likely to produce death to be three grains of the alcoholic extract; which is not so small a dose as fifteen grains of the powder, which was fatal in a case adduced by Dr. Trail. Thirty grains taken in two doses caused death; and fifty grains (equal to a quarter of a grain of strychnia) were fatal in an hour.

374. *b.* The *period* after the ingestion of the poison at which death usually occurs is generall from one to two hours, but Dr. Christison mentio a case that terminated in fifteen minutes. Whe this poison destroys life within a few hours, or still shorter time, vomiting rarely occurs, and th patient dies from the tetanic asphyxia. B when death does not take place thus suddenly a fit of spasm, the person continues to be affecte for twelve or eighteen or twenty-four hours wi similar or milder paroxysms, and may expire fro exhaustion, or entirely recover. A fatal termin tion by exhaustion is not, however, so frequent that by asphyxia. M. J. Cloquet met with case of fatal exhaustion consequent upon the vi lent and repeated spasms produced by this su stance. The tetanic fits returned for more th twenty-four hours, the sensibility being very acut Death did not take place until the fourth mor ing.—(*Nouv. Journ. de Med.* t. x. p. 157.)

375. *c.* There are several instances of *recove* on record. Sobernheim states that a young ma took half an ounce of this powder, and experienc the usual symptoms. After the administration emetics he recovered. Dr. Bassedow has record a similar case; recovery following the operation emetics. Mr. Baynham states that a girl swa lowed half an ounce of the powder; the usu symptoms appeared, but the treatment having be prompt, they subsided in about four hours fro their first appearance, and the next day she w only feeble and exhausted. He says that he h often prescribed a scruple of nux vomica thr times a day without any ill effects! In this, well as in other cases, there was neither vomiti nor purging until they were produced by t treatment. A strong dose of sulphate of zi caused free vomiting in a few minutes. —(*Lon Med. Gaz.* vol. iii. p. 445.)

376. *E. Appearances after death.*—These va with the rapidity with which death takes place, ar the period after death at which the body is e amined. In a case recorded by Mr. Ollier, dea took place in an hour, and the changes we slight. The stomach was almost natural, althou between two and three drachms of the powder nux vomica had been taken. The vessels of t brain were somewhat congested; the heart flacci empty, and pale. In a case which was rapid fatal, detailed by M. Ollivier, and examined him and Orfila, the body was found remarkab rigid, although not less than forty hours had elaps since death. The more depending parts of t external surfaces were purplish. Much serous fusion was found on the surface of the cerebellu and softening of the whole cortical substance of t brain, but especially of the cerebellum —this ca confirming the opinion of Flourens, that n vomica acts especially on the cerebellum. T lungs were congested with black fluid blood. - (*Archives Génér. de Med.* t. viii. p. 18.) — In case mentioned by Mr. Taylor, a quantity of t powder was found in the stomach, to the intern surface of which it adhered tenaciously. T vessels of the brain were congested. No oth changes were noticed. The spastic contraction the muscles seems to pass into the state of cadav rous rigidity after death, without intermedia flaccidity.

377. *F. Treatment.*—The most efficacious trea ment of poisoning by the substances containi strychnia is an immediate recourse to the stomac

mp, and, if this apparatus is not at hand, to the
ore powerful emetics. Dr. Christison remarks,
at, when nux vomica in powder has been taken,
adheres tenaciously to the inner surface of the
omach, and that the means used to evacuate the
omach should therefore be assiduously continued.
metics may not act, as in Mr. Ollier's case,
erefore they ought not to be solely confided in. If
e patient be not attacked with spasms in two hours,
e may be considered likely to recover. In cases
poisoning with *strychnia*, the efficacy of any
eatment is very doubtful, for the quantity
hich is poisonous is so small, and its absorp-
on so rapid, that means must be instantly re-
rted to in order to be efficacious. Dr. Chris-
son quotes M. Donnè, who states that he has
und iodine, bromine, and chlorine to be anti-
otes for poisoning for this, as well as the other
egetable alkaloids; these substances, he says,
rming, with the alkaloids, compounds which
e not deleterious, and which, being in chemical
nion, are not readily decomposed. Animals, he
ates, which had taken one grain of strychnia, or
vo grains of veratria, did not sustain any harm,
hen tincture of iodine was administered imme-
iately afterwards; but the delay of ten minutes
the administration of the antidote rendered it
seless. Further evidence is required as to these
ntidotes. Dr. Pereira remarks, that probably
stringents, as infusions of galls, green tea, &c.,
ould be serviceable. To relieve the spasms,
arcotics may be employed. Sachs and others
ave recommended opium. As conia is the
ounterpart of strychnia, it deserves a trial. Dr.
ereira applied it to a wound in a rabbit af-
cted with tetanus from the use of strychnia; the
onvulsions ceased, but the animal died. In the
bsence of conia the extract of hemlock may be
ied. To relieve the symptoms consequent upon
e endermic application of strychnia, acetate of
orphia applied to the same part has given relief.
—(Pereira, Op. cit. p. 1306.) — In a case in
hich I pushed strychnia so far as to occasion
evere spasms, spirits of turpentine were applied
ith tincture of opium in the form of an em-
rocation along the spine, and were administered
enemata with assafœtida, and the spasms very
oon disappeared.

378. iii. Brucia — *Brucia antidysenterica* — or
alse Angustura bark. — This vegetable alkaloid
auses symptoms of the same kind as strychnia.
According to Andral, brucia is twenty-four times
ess powerful than strychnia; but the bark itself
ppears to be nearly as strong as nux vomica.
Professor Marc took an infusion of this bark in
istake for true Angustura; and, although the
ose was only three fourths of a wine-glassful, yet
e was seized with nausea, pain in the stomach,
iddiness, sense of fulness in the head, ringing in
he ears, stiffness of the limbs, pain on every at-
empt at motion, locked jaw, difficult articulation,
&c. These symptoms continued two hours, and
bated under the use of æther and laudanum.
Dr. Emmert states, that a boy who died from
aking this poison experienced so distressing a state
of sensibility in the intervals between the spasms,
hat he begged not to be touched, as he was
hereby thrown into a paroxysm. This physician
has investigated the operation of this poison, and
he believes that it acts directly on the spinal cord,
and not through the intervention of the brain. In his experiments division of the medulla oblongata, artificial respiration being kept up, or division of the spinal chord, did not prevent the effects of the poison from being manifested in the parts supplied with nerves below the division. The *symptoms* and *treatment* of this poison are the same as those of strychnia, and of the substances which contain it. There are few other substances which are productive of death by operating in such a manner as to bring them under the present category; but the *cocculus Indicus*, and the *coriaria myrtifolia*, appear to possess properties in many respects similar to the foregoing.

379. iv. Cocculus Indicus. — *The berries or fruit of the anamirta cocculus.* — Cocculus Indicus is poisonous to all animals. It acts on the cerebro-spinal nervous and muscular systems, causing tremblings, staggering, tetanic convulsions, and death. It does not appear to increase the sensibility; and the coma observed is rather the result of the exhaustion of vital influence by it, than of any narcotic property, which is only produced when the dose is large, and at an advanced period of its operation. Orfila says, that this poison acts like camphor on the nervous system, and principally on the brain. M. Goupil states, that it communicates its poisonous properties to fish, which have been killed by it, and more especially to barbel. It is frequently added to malt liquors for the purpose of increasing their intoxicating powers. Its active principle has been called *Picrotoxine*. Dr. Pereira observes that, from accounts he received from an excise officer, the action of this poison is exerted more upon the voluntary muscles than upon the intellectual powers; and that, notwithstanding the severe prohibitory statutes against the employment of cocculus indicus in brewing, there is every reason to believe that it is extensively used; but a solution of the extract being employed, the detection of it is rendered very difficult. Morrice, a writer on brewing, directs three pounds of cocculus indicus to be added to every ten quarters of malt. "It gives," he says, "an inebriating quality which passes for strength of liquor, and prevents second fermentation in bottled beer, and consequently the bursting of bottles in warm climates," — pleasant information this for those who indulge in these liquors; and satisfactorily accounting for the injurious operation of them on the human frame. According to Wepfer and Orfila this substance in poisonous doses exhausts the irritability of the heart.

380. The *treatment* of poisoning by *cocculus indicus*, or by *picrotoxine*, consists in the prompt removal of the poison from the stomach, and in having recourse to the means advised for the effects of nux vomica (§ 377.).

381. v. Coriaria Myrtifolia possesses properties similar to the foregoing. It is frequently found as an adulteration of senna. According to Professor Mayer it produces violent fits of tetanus, followed by apoplectic coma. A grain injected into the jugular vein of a rabbit occasioned in about five hours a single convulsive paroxysm, which proved immediately fatal. Sauvages has recorded two cases of death caused by the berries. M. Fee has adduced five cases of poisoning, owing to the adulteration of senna with this substance; and one of them proved fatal. The symptoms were violent convulsions, locked-jaw, and colic. M. Roux

also published, in an interesting memoir, three cases which came under his own observation, one of which proved fatal; the symptoms being sparkling and rolling of the eyes, locked-jaw, loss of voice, convulsions recurring in paroxysms of the duration of eight or ten minutes, and death after sixteen hours. Of those fatal cases the membranes of the brain on *dissection* were found congested in one, no other change being observed; the internal surface of the stomach and bowels was injected in another; and in the third no alteration could be detected. The *treatment* for poisoning with this substance does not differ from that recommended for the substances containing strychnia (§ 377.).

382. Class V. — Irritating and Depressing Poisons. — *Irritating and Paralysing — Acro-Sedatives.* — Although this class of poisons is more or less allied to the third and fourth classes, and not less so the sixth and eighth, still it is distinct from all of them — 1st. in the alterations of function and structures produced by it; and 2d. as respects the treatment required to remove these alterations. The substances ranged under this class not only affect the nerves of the part to which they are applied, but irritate them, and excite more or less of morbid action of the capillaries. In conjunction with this local action they are more or less imbibed by the membranes, and absorbed into the circulation, thereby affecting, each with modifying influence, the vital manifestations of the systems and organs of the body. Their general operation when administered in very large or poisonous doses is to irritate the tissues with which they come in contact, and to depress vital power throughout the frame, or to paralyse the functions of certain organs or parts. The irritating action they exert locally is extended, especially as respects some of them, to adjoining viscera; and this action is also exerted in those excreting organs which eliminate them from the blood, although often very slightly or inappreciably. But it is rare to observe after death evidence of irritation and its consequences to such an extent as to account for the fatal issue; and, therefore, we are induced to infer that, although these changes may have aided in producing this result, the depressing influence exerted upon the nervous systems, and upon the vitality of the frame in general, by this class of poisons, is that to which their fatal operation is mainly due. Even in those cases in which evidence of irritation, and the changes consequent upon this condition, are the most remarkable, although death may, according to the views of some, be ascribed chiefly or altogether to those changes, still they are insufficient of themselves to account for the rapidity of this issue, especially when they are compared with the extensive disorganizations observed after the more corrosive poisons, whose action is strictly local, and which often do not cause death until after prolonged periods of suffering.

383. i. Aconite — *Monkshood — Aconitum napellus. — Aconita — Aconitine — Aconitina.* — According to the observations of Dr. Fleming, the species *napellus,* and its varieties, are the most poisonous of the genus. The amount of numbness and tingling felt on chewing the root, indicates the respective activity of the various species; the power of exciting these sensations, residing in the aconitina, which the plant contains. The most active officinal preparations are the tincture and
alcoholic extract; but all parts of the plant a
poisonous, this property residing in the *aconitin*
the alkaloid discovered in aconitum napellus l
Geiger and Hesse. Cases of poisoning by th
plant are not frequent. I have seen only o
instance; but injurious effects have followed, a
though rarely from a too large dose of the tin
ture. The expressed juice, and the officinal pr
parations, are most rapidly fatal when injected i
to a vein, or into a recent wound. They are al
injurious in smaller quantity, and with great
rapidity when introduced into the serous cavitie
or into the cellular tissue, than when taken in
the stomach; and they are poisonous also whe
introduced into the mucous canals.

384. *A.* Applied *locally,* aconite produces ve
slight irritation of the tissues; but it often excit
a sense of heat. It hardly occasions any visib
change of the part. On the nerves it acts as
local sedative, especially to the nerves of sens
tion, occasioning numbness and tingling. Th
loss of sensibility is followed by impairment
muscular contractability, and irritability. It do
not appear, according to Dr. Fleming's expe
ments, to produce dilatation of the pupil; and h
states that the topical application of the poison
unaccompanied by pain, redness, or swellin
even when the physiological and remote effec
are produced to the greatest extent; the peculi
sensations caused by chewing the root bein
unattended by any inflammatory irritation.

385. *B.* The *remote* or constitutional operatio
of aconite depends upon the absorption of it;
shown, — 1st, by the rapidity and intensity of th
remote action being in proportion to the absorbi
powers of the part to which it is applied, and
the facility with which the preparation employed
capable of being absorbed; 2d. By the circum
stance of no remote effects, or but slight effect
being produced when it is applied to the soun
skin, although the topical action indicates th
the nerves were affected by it, in the manner abo
stated. Being imbibed and absorbed into th
circulation, it acts upon the nervous system, an
more especially on the cerebro-spinal nervou
system; impairing the sensibility and the functio
of sense, and diminishing the power of muscul
action. It seems also to impair organic nervou
influence, and irritability, proving a sedative
the cardiac and vascular actions, and reducin
as shown by Dr. Fleming, the strength, volum
and frequency of the pulse, more or less ac
cording to the dose. This antiphlogistic
sedative operation of aconite, has been full
evinced in various severe diseases for which I hav
prescribed it. It is of importance to determin
whether or no the frequent or continued exhibitio
of this substance produces a *cumulative actio*
Although I have often prescribed aconite, ye
I have not had reason to believe that this actio
has ever occurred. Dr. Fleming, however, stat
that two individuals were affected with gener
tremors, severe pain in the head and eye-ball
constant lachrymation, intense photophobia, hea
of skin, quick pulse, and great restlessness, symp
toms which were distinctly attributable to th
continued use of this substance.

386. *C.* The *symptoms* produced by poisonou
doses of the aconite are a sense of warmth in th
stomach, with a numbness and tingling, and feel
ing of distension of the tongue and lips, sometime

with slight nausea, followed by vomitings, or retchings. The countenance becomes pale and sunken, and muscular power prostrated. The senses are impaired, but consciousness remains, or slight wandering delirium appears. Some persons feel as if they were dying or sinking. The voice is whispering or lost: the respiration weak and superficial; the pulse weak, or slow, small or irregular. The surface is cold, and covered with a clammy sweat. At a more advanced period the patient becomes speechless, deaf, and blind. The pupils are at first contracted; but afterwards, sometimes general muscular tremors or slight convulsions supervene; the pulse at first slow, becomes imperceptible, the coldness of the surface and extremities increases, and the patient dies from syncope. In a case, in which I was consulted, petechial ecchymoses appeared on the surface of the body and on the face, and marked congestion of the brain occurred with hemiplegia, yet the patient recovered, the palsy having nearly disappeared when I saw him some years afterwards. In most cases, especially when any part of the plant has been ate by mistake, heat, sense of constriction, numbness and tingling in the mouth and throat are the first symptoms complained of. Vomiting or diarrhœa is generally present, with swelling of the abdomen. A lady was poisoned by eating the root in mistake for horse-radish with roast beef. She could not thus have taken much of it; but shortly afterwards slight vomiting with abdominal pains came on, and although emetics, &c., were used, she died in three hours.

387. The symptoms may appear immediately after taking the poison or not for one or two hours, the delay being owing to the part and state of the plant taken, and to the presence of food in the stomach. Five grains of the fresh extract of aconite were given to each of three patients in the hospital at Bourdeaux. In a quarter of an hour after taking the poison, they had tremors of the muscles, a pricking sensation over the body, and severe vomiting followed. They became unconscious; and on recovering their senses they complained of confusion of sight and intense headache. The pulse was slow and irregular, the respiration short and hurried; the skin was cold and clammy. Two of the patients recovered. Dr. GEOGHEGAN adduces two cases, one of which died in an hour and a quarter after eating the root, and the other in two hours. One drachm of the root has proved fatal, but it is probable that less than this would kill an adult. Dr. MALE died from the effects of not more than eighty drops of the tincture taken in ten doses, over a period of four days; the largest quantity taken at once having been ten drops.

388. *D.* The alkaloid, *aconitine*, is the most virulent poison known, exceeding even prussic acid. One fiftieth part of a grain of aconitina proved nearly fatal. Its operation and effects are altogether the same as those of aconite, only much more intense.

389. *E. Death* is produced by aconite owing to the sedative influence caused by it on the nervous system, or to its paralysing effect upon the muscles of respiration, or to the impaired irritability of the heart, fatal syncope supervening. The death of the human subject takes place generally by syncope, which sometimes occurs suddenly, unexpectedly and immediately: the fatal sedative and paralysing influence of the poison on the nervous system appearing chiefly in experiments on the lower animals, when the dose of the poison has been very large.

390. *F. The appearances on dissection* have been very imperfectly observed. Venous congestion, to a greater or less extent, has generally been found. In some instances, engorgement of the brain and membranes, with considerable subarachnoid effusion has been met with. In the cases recorded by PALLAS, DEGLAND, and GEOGHEGAN, inflammatory appearances were present in the alimentary canal. The lungs were generally congested, and the blood very dark.

391. *G.* The more *diagnostic* or characteristic phenomena produced by this poison are numbness and tingling of the mouth and throat, or parts to which it is applied; vomiting or retching, with tumefaction of the abdomen, numbness, tinglings or tremors of the extremities, contraction of the pupils, slowness or failure of the pulse, and of the heart's action, and death from this last change.

392. *H. Treatment.*—If retchings only have occurred without free vomitings, an emetic, consisting of sulphate of zinc with capsicum, or of mustard mixed in water, should be administered. If the poison have passed into the intestines—or sufficient time have elapsed for this to have taken place, warm purgatives and enemata should be resorted to. Stimulants, as warm brandy and water; camphor or ammonia, with capsicum, and small doses of opium; sinapisms or terebinthinated embrocations over the epigastrium, or along the spine; strong coffee, and frictions of the surface, are the means chiefly to be confided in.

393. ii. ARSENIC.—*Arsenious Acid—Arsenic and its compounds.*—Of all the varieties of death by poison none is more important, as Dr. CHRISTISON remarks, than poisoning by arsenic. The facility with which it as well as all other poisons may be procured in this country, and the ease with which it may be secretly administered, lead to its adoption for the purpose of murder. It is fortunate, therefore, that there are few substances, and hardly any other poison, which can be detected in such minute quantities, and with so great certainty, according to the full and minute directions which will be found in the works of ORFILA, PARIS, BECK, CHRISTISON, DEVERGIE, PEREIRA, TAYLOR, GUY, and others. The *compounds* of arsenic met with and employed in the arts, and by which life may be destroyed either accidentally or intentionally, are, 1. The *protoxide* of *Berzelius*, or *fly-powder.*—2. *Arsenious Acid*, or *white arsenic.*—3. The *Arsenite of Copper*, or *mineral green.*—4. The *Arsenite of Potass*, or *Fowler's solution.*—5. The *Arseniate of Potass;* and 6. The various *sulphurets*, pure and impure, as *Realgar, Orpiment,* and *King's yellow.*—Of these, *arsenious acid*, or white arsenic, is that most frequently administered as a poison. Mr. TAYLOR states, that in 1837 and 1838 there were 185 cases of poisoning by this substance in England, the greater number of which were cases of suicide and murder.

394. White arsenic possesses a very feeble acid re-action, although it combines with alkalies. It has, in small quantity, hardly any taste, and hence the frequency and risk of its employment. It is sparingly soluble. Cold water dissolves from half to one grain to one fluid ounce of water; and boiling water allowed to cool upon the powder

dissolves a little more than one grain to the ounce of water. Mr. Taylor states that the presence of organic matter in a liquid diminishes the soluble power of the liquid. Viscid or mucilaginous fluids of course suspend the finer parts of the powder of this substance. The solubility and action of arsenious acid are said to be increased by admixture with nitre. This writer states, that a tea-spoonful of powdered arsenic weighs about 150 grains, a table-spoonful 530 grains, and a pinch about seventeen grains.

395. *A. Symptoms.* — Arsenic, *taken into the stomach*, produces different *forms* of poisoning, according to the quantity and state of the poison, as respects admixture, &c., and to the state of the stomach and constitution of the individual — according to the various modifying circumstances already mentioned (§§ 51, *et seq.*). The *forms* of poisoning thus resulting are, 1st. *Acute*, 2d. *Chronic*; and the acute assumes two varieties, which have been distinguished and described by Dr. Christison.

396. *a.* The *acute form* of poisoning with this substance is differently characterised according as the arsenic affects more especially the alimentary canal, or the nervous system, and vital powers. — (*a.*) When the *digestive canal* is more particularly attacked, signs of violent irritation are manifested along its whole course, with faintness, sickness, burning pain, and tenderness in the region of the stomach. When the poison has been taken in a state of solution, these symptoms are felt very soon after its ingestion — generally from ten to fifteen minutes; but, in other circumstances, it usually does not begin to act until half an hour after it is swallowed; and its operation is seldom delayed beyond an hour. Several cases are, however, recorded in which the action of the poison was not manifested for several hours — for three, four, five, or even seven hours. Dr. Christison thinks that it is delayed for a longer or shorter time by sleep. The sickness and pain are soon followed by retchings and vomiting, especially when drink is taken. There are also heat, dryness, and tightness in the throat and pharynx, creating an incessant desire for drink, attending and occasionally preceding the vomitings. Sometimes this affection of the throat is very slight. When it is severe, it is often attended by fits of suffocation and convulsive vomiting; and by hoarseness and difficulty of talking. The matters vomited after alimentary matters have been thrown off are yellowish or greenish, and in the more protracted cases they are streaked or mixed with blood. Soon after the appearance of the gastric symptoms, diarrhœa generally supervenes; but in some instances, instead of diarrhœa, the patient is harassed by ineffectual calls, or tenesmus. About this time the pain at the pit of the stomach is excruciating, and is likened to a fire within him. It often extends over the abdomen, which becomes tense, tender, and sometimes swollen; but occasionally drawn inwards at the navel. If diarrhœa be considerable, or has continued for a short time, pain, heat, and excoriation of the anus are complained of. In some instances, the burning pain and irritation with vascular injection appears to extend from the mouth to the anus; and there are frequently also observed signs of irritation of the air-passages and lungs, with shortness of breath, tightness across the lower part of the chest, and occasionally darting pains. Sometimes symptoms of pneumonia are more fully developed. T urinary organs are often affected, the patie being distressed by frequent, painful, and difficu micturition, by pain in the bladder, or swelling the penis. Females frequently experience burni pain, swelling or excoriation of the labia p dendæ. Occasionally the irritation is so great as cause suppression of urine: but the disord of the urinary organs rarely occurs unless t lower bowels are also severely irritated, and t case has been protracted for two or three da Soon after the appearance of the first sympto the *pulse* becomes feeble, small, and rapid, a subsequently irregular, and hardly perceptib The surface of the body and extremities are col and often covered with clammy cold swea The feet and hands often livid. The features collapsed, and expressive of extreme suffering a anxiety. The conjunctiva is often very mu injected; and the eyes are red and sparkli The tongue and mouth are parched; and ap thous appearances are sometimes observed in t throat. Convulsive motions, especially of a slig form, and consisting of tremors or twitchin often commence in the trunk and become mo general. When the diarrhœa is severe, or h continued for a short time, cramps in the legs a arms are severe and frequent. Delirium som times appears towards the close, and is occ sionally attended by stupor. Death takes pla calmly, but is sometimes preceded by conv sions. In some instances, a remission of t symptoms has been observed, particularly wh life has been prolonged till the close of the seco or third day. In cases such as now describe constituting the most frequent variety of the acu form, death occurs about twenty-four hours aft the ingestion of the poison, and generally befo the close of the third day; but, in rare instanc life may be prolonged until the fifth or sixth da

397. (*b.*) In the *second variety* of acute po soning by arsenic, the signs of irritation a inflammation of the digestive canal are eith slight or altogether absent; death ensuing in fiv six, or seven hours, or at a period too early f the full development of inflammatory actio owing to the impression of the poison on t organic nervous system, and on the general v tality of the frame. When Sir B. Brodie i jected a solution of the oxide into the stomach a dog, the pulse was rendered slow and inte mitting, and the animal became palsied in t hinder legs, lethargic, and died in convulsio In some cases of this variety, one or two attac of vomiting occur at the usual interval after taki the poison, but it seldom continues; extre faintness, amounting almost to syncope, being t most uniform symptom. Pain is usually felt the epigastrium, but it is sometimes very sligh and unattended by the other signs of infla mation. Occasionally there are oppression, stup from depression, or slight convulsions; but t faintness and general sinking of the vital powe are the prominent phenomena; death common taking place in a few hours. Even in the mo protracted cases, and where life continues till t second day, extreme vital depression is the mo striking feature. Dr. Christison remarks th this acute variety has been observed, — 1st, whe the dose of the poison was very large; 2d, whe it was in small masses; and, 3d, when it was i

state of solution. The first and last of these cumstances account for the rapidity and chacter of the symptoms, as furnishing the contions favourable to a general or extended imession of the substance on the villous coat of e stomach, and a rapid absorption of it into e circulation : but the second circumstance just imed admits not of so ready an explanation. ases of this variety of poisoning by arsenic are ot frequent; but Dr. Christison has referred to velve instances in illustration of it; and which fficiently show that the most rapid cases of isoning by arsenic are not always attended by ther violent or well-marked symptoms. It ould, however, be recollected that the present riety passes insensibly into the former—that any cases will present phenomena approaching ore or less either of the varieties now described, intermediate between them.

398. All the above symptoms are not present every case of the acute form, for pain may be tirely absent, although the quantity of the poin has been very great; the greatness of the uantity, as just stated, having been supposed to ave been the cause of its absence. But Mr. aylor states, that a case occurred in Guy's ospital, where only forty grains had been taken, nd the patient died without complaining of pain. he symptoms of intestinal irritation are seldom anting, or there is vomiting if there be no purgg. But Mr. Taylor refers to a case in which ere was neither vomiting nor purging. Thirst, though a most common symptom, may also be bsent.

399. *b.* The *chronic form* of poisoning by rsenic may also present *two varieties* or states. -(*a.*) In *one* the symptoms may at first be cute and inflammatory; but these may subside, ith or without treatment, and signs of nervous ritation and vital depression become most proinent: or the inflammatory and the nervous ymptoms may appear together, and proceed *pari assu.* The nervous affection varies in different ersons. It chiefly consists of partial or incomlete palsy in some cases, or of more or less comlete epilepsy in others, or of partial or irregular onvulsion; or they may even resemble those of ysteria, of tetanus, or of delirium, passing into tupor. Five individuals partook of a dish poisoned vith arsenic, and were seized with the usual ymptoms of inflammatory irritation of the alientary canal. One of these had an epileptic fit n the first day, which returned on the second, vith frequent twitches of the muscles of the trunk, umbness in one side, and heat and tingling of he feet and hands. Another had tremors of the ight arm and leg, followed by epileptic fits in the ight, which returned the next fifteen days at the ame hour in the evening, and afterwards recurred t intervals for several months.

400. Of the *secondary* effects of this variety of rsenical poisoning, *palsy* and spasm or *contracions* of the extremities are the most frequent. The palsy is generally partial, and often commences at the fingers or toes, and proceeds gradually upwards. Dr. Murray (*Edin. Med. and Surg. Journ.*, vol. xviii. p. 167.) has given an instructive account of this effect of arsenic. Four persons were affected about an hour after breakast with the primary symptoms of poisoning by rsenic. But, in addition to these, the muscular debility was extreme; and in two amounted to true partial palsy. One of them lost altogether the power of the left arm. The other had great general debility and long-continued numbness and pains of the leg. In a case of an over-dose of the arseniate of potass, the paralytic affection consisted in the loss of sensation and of motion of the hands, and the loss of motion in the feet, with contraction of the knee-joints.

401. (*b.*) In some instances, especially *when the dose of the poison has been small and frequently repeated*, instead of the acute or inflammatory symptoms at the commencement, indications of *slow* or *chronic poisoning* approach insidiously, and may be mistaken for chronic disease of the digestive organs or of the nervous system. Hahnemann has briefly defined *slow poisoning* by arsenic as "a gradual sinking of the powers of life, without any violent symptom—a nameless feeling of illness, failure of strength, an aversion to food and drink, and all the other enjoyments of life." This is, however, not a correct view of such cases, although it may represent a few of the most slow or chronic states produced by this poison; as with the gradual sinking of vital and of muscular power, there are generally more or less of the symptoms about to be enumerated also present:—Protracted indigestion with flatulence, pain in the stomach or bowels, sometimes in the course of the colon; slight diarrhœa, or tenesmus, or both; furred tongue, with dryness, constriction of the throat, and thirst; severe attacks of flatulence, sometimes with hiccup when substances are taken into the stomach; occasionally salivation or exfoliation of the epithelium of the lips, cheeks, and throat; inflammation of the conjunctiva, with suffusion of the eyes, intolerance of light, and frequently with a dark circle surrounding the eyes; irritation of the skin, often with an eruption—the *Eczema arsenicale*—and exfoliation of the cuticle, and falling out of the hair; extreme muscular weakness, tremors, paralysis, spasms, or contractions of the limbs; sometimes convulsions, anxiety, faintness or syncope; shortness of breathing, dry cough; palpitations on slight exertion, or upon being startled, remarkable weakness, smallness, and irregularity of the pulse; emaciation, swelling or œdema of the extremities; nervous headache, mental depression, sometimes low delirium, stupor, or even death, have supervened upon excessive or too long continued doses of arsenical preparations. I once suffered severely from dyspepsia and excessive flatulence caused by an accidental over-dose of Fowler's solution; and I have met with several cases where the above symptoms—some in one case, others in another, &c.—have followed the use of these preparations. There is also some reason to believe that endocarditis and lesions of the valves of the heart have been excited by the too liberal employment of the arsenical solution. I have at present a patient with disease of the cardiac valves, who has taken the solution in very large doses, and during several protracted courses, for lepra.

402. *B. The application of arsenic to sores, ulcers, or eruptions; or to wounds, or to blistered or other surfaces deprived of its cuticle,* often has produced fatal poisoning. When arsenic is thus applied, both local inflammation is excited or increased, and constitutional effects are produced by its absorption. Wepfer states that a girl, affected

with psoriasis of the scalp, had it rubbed with a liniment of butter and arsenic; and was soon seized with acute pain and swelling of the whole head, fainting fits, restlessness, fever, delirium, &c. She died in six days. Similar cases are recorded by Amatus Lusitanus, Zitmann, Belloc, Roux, Blackadder, and others; the arsenic having been applied to sores or ulcers. Harles remarks, respecting the propriety of the outward application of this substance, that it may be applied with safety to abraded surfaces, to common ulcers, or to malignant sores, even when highly irritable, provided the part be not recently wounded, so as to pour out blood. This distinction is not, however, to be confided in, under every circumstance; for the poison may be absorbed without being imbibed by the venous capillaries of the part.

403. When arsenic is thus applied, inflammation of the part, extending more or less, is generally produced. In some instances the local irritation is but slight, or altogether absent: but it is in others very severe. The lesions, consequent upon the absorption of the poison when thus employed, are irritation of the stomach and bowels, especially of the rectum; various affections of the nervous system, as spasms, convulsions, palsy, &c.; faintness, and vital depression. In several instances palsy has appeared in parts adjoining that to which the poison was applied. An arsenical preparation was long employed to destroy a tumour on the right side of the neck, and was followed by complete palsy of the muscles of the neck and arm of that side.

404. *C. The poison may be administered in enemata.* — Fodéré adduces the following case. A lady was under treatment for some slight disorder; but died unexpectedly after symptoms of poisoning. It was afterwards discovered that her servant, after unsuccessful attempts to poison her by dissolving arsenic in her soup, had succeeded by administering it in injections. In this way, doubtless, all the effects of arsenic may be produced, and the poison be the less likely to be detected after death — this mode of poisoning requiring all the vigilance which the physician can exert.

405. *D. This poison may be introduced into the vagina.*—Amongst other instances of this mode of poisoning adduced by Ansiaulx and Christison, the following is recorded by Dr. Mangor. A farmer near Copenhagen lost his wife under suspicious circumstances, and six weeks afterwards married his maid-servant. In a few years he attempted, aided by another servant, to poison his second wife. Having failed, he introduced a mixture of arsenic and flour into the vagina after coition, in the morning. The symptoms appeared about mid-day, and death took place next morning. The murderer married, soon after, his guilty paramour, and after a few years got rid of her in a similar manner. About three in the afternoon she was seized with shivering, and with heat and pain in the vagina; the poison having been introduced in the morning. The remembrance of her former crime excited her suspicions, and she wrung from her husband a confession. On the local symptoms, acute pain in the stomach, incessant vomiting, and delirium supervened: death took place after twenty-one hours. On *dissection*, grains of arsenic were found in the vagina, although frequent lotions had been used in t treatment. The labia were swollen and red, t vagina flaccid, the os uteri gangrenous; the du denum was inflamed, the stomach natural.

406. *E. Poisoning by arsenic may take pla through the respiratory organs.* — This usual occurs in consequence of the *accidental inhalati of arsenical vapours.* Otto Tachenius, a chem of the sixteenth century, quoted by Dr. Chris son, states, that he once incautiously happen to breathe the fumes of arsenic, and was surpris to find his palate impressed with a sweet, mil grateful taste, such as he never experienced b fore. But in half an hour he was attacked l pain and constriction of the stomach; then wi difficult breathing, general convulsions, an u speakable sense of heat, bloody and painful mi turition, and, finally, with such an acute colic contracted his whole body for half an hour. I recovered from these alarming symptoms l taking oleaginous drinks; but during all the su ceeding winter he had low hectic fever. The can be no doubt of arsenical vapour or fum being rapidly poisonous, when inhaled in a co centrated state, or even when very diluted, longer breathed; and then they may produ slow or chronic poisoning. The vapour may ev be employed in this way with criminal intention Dr. Christison has quoted several writers ar cases illustrative of this mode of poisoning. Tl following is a most instructive instance of tl kind: — An apothecary inhaled the fumes whi subliming arsenic; and was soon after seized wi frequent faintness, constriction at the præcordi difficult breathing, constant thirst, parched tongu and throat, great restlessness, watchings, an pains in the feet. He had afterwards profus daily perspirations, and palsy of the legs; an several months elapsed before he quite recovere (See B. Timæus, Cas. Med. L. vii. c. 11.; an Christison, Op. cit., p. 302., for similar cases. Paracelsus, being one day enraged with an ac quaintance, held him over an alembic in whic arsenic was subliming; but the object of hi temper nearly lost his life.

407. *F. Applied to the sound skin*, arsenic ha either no effect, or merely a slow and slight effect unless under certain circumstances. If the poiso be simply placed in contact with the skin it seldo acts; but if it be rubbed upon the skin, especiall when mixed with fatty matters, it acts chiefl locally, producing a pustular eruption or eschars but according to Renault it produces no con stitutional disorder. This statement, however should not be depended upon; for there are severa facts recorded that prove arsenic sometimes t have been productive of very serious local and constitutional effects when applied to the human skin, either in the state of fine powder, or in the form of ointment, liniment, or paste. In these cases, several of which are adduced by Dr. Christison, the symptoms were faintings, giddiness, pain in the stomach, vomitings, tenesmus, ardor urinæ, tremblings of the limbs, low delirium, hectic fever, debility, prolonged recovery, and falling out of the hair.

408. *G. Diagnosis.* — Poisoning by arsenic may be mistaken for the severer states of *cholera*, or even for a case of *pestilential cholera.* The propriety of deciding the question, from the symptoms alone, as to whether or no poisoning has been produced

y arsenic, belongs more especially to the writer
n Medical Jurisprudence. This question has
een ably discussed by Dr. Christison and the
her writers so often referred to. But the diag-
osis between poisoning by this substance and
atural disease falls more especially within my
rovince. It should be admitted that the diagnosis
often difficult; but due attention to the history
f the case, especially in respect of the accession
f the attack; the prickings, burning sensations,
r heat, redness and constriction in the throat, and
n the course of the œsophagus, especially early in
e attack; the redness of the eyes; the swelling,
eat, pain, and excoriation of the anus; the te-
esmus, and the burning or colicky character of
e abdominal pain; the ardor urinæ, dysuria, and
eat of the urinary passages; the increased suf-
ering on speaking and swallowing; the consecu-
ve eruption of pimples, or excoriations of the
ps, tongue, and throat; the nature of the nervous
ymptoms, particularly the epileptic form of con-
ulsions, the incomplete or partial palsy, the
ervous sinking, anxiety, and muscular tremors,
nd the low delirium, are diagnostic of poisoning,
pecially by this substance, and are rarely pre-
ent, even individually, in cholera, and perhaps
ever in such states of association as are observed
fter the administration of arsenic. But strict
ttention to the phenomena and recollection of the
ymptoms as described above will show the nature
f the case with tolerable certainty; although
uch more precise information, as respects both
e moral circumstances and the chemical investi-
ation, will be required for the administration of
ustice.

409. *H. The organic lesions produced by the pre-*
arations of arsenic.—These have been described
ost ably by Dr. Christison, and illustrated by
eference to numerous cases, to which I must refer
e reader. The changes produced by arsenic are
umerous, and varied in most instances, according
o the quantity administered, the state of the
tomach at the time, and the period the patient
ved after its ingestion. Similar changes are
sually observed after poisoning by the external
pplication of the substance to those produced by
s internal administration. The most remarkable
lterations are generally found when the quantity
wallowed has not been very large, and when the
ndividual has lived sufficiently long to admit of
he development of inflammatory action and its
ore immediate consequences. When death has
aken place very rapidly—in a shorter period than
ight or ten or even twelve hours, little or no
hange is often observed. In these cases, it may
e presumed that the impression of the poison on
he organic nervous system, and the action con-
equent upon its absorption on the heart and ner-
ous centres, cause death before vascular reaction
ould supervene.—*a.* Much more frequently,
owever, the internal surfaces of the stomach and
uodenum, often also of the œsophagus and
harynx, on the one hand, and of the intestines,
ore especially the rectum and colon, on the
ther, evince signs of inflammatory irritation and
ertain of its more immediate results, especially
apillary injection, sometimes with small ecchy-
osis, or slight extravasations of blood, or soften-
ng of the villous coat, or effusion of lymph, or
lcerations. Redness with vascular injection is
eldom absent from the throat and gullet, when the patient has lived above a few hours. In the stomach, the colour is often a dull or brownish red; or it is of a brighter hue, interspersed with dark striæ of altered blood. The ecchymoses and larger extravasation of blood are always of a dark hue. Ulceration rarely occurs, and chiefly in cases where death has not taken place until after the second or third day. Although inflammatory appearances may be absent in cases which have ended rapidly, yet they have been found in the stomach in several which have terminated in five, six, seven, or eight hours after the administration of the poison. Thickening, or tumefaction of the villous membrane, with more or less softening, a friable state of it, and even abrasions of minute portions, are occasionally observed. Gangrene and perforations of the stomach or intestines are never found. Changes, which have been mistaken for gangrene, have consisted chiefly of extravasations of dark blood. The ulcerations said to have been found in some instances when death has taken place a few hours after the ingestion of the poison, are very probably minute abrasions or excoriations of the villous surface. A sanguinolent fluid is sometimes found in the cavity of the stomach; and occasionally arsenic, variously altered in its appearance, is found closely adhering to the internal membrane. The colon is often much contracted and its inner surface inflamed, especially the sigmoid flexure and the cæcum. The rectum is generally much inflamed and excoriated, the latter change extending around the anus, particularly when life has continued one, two, or three days.

410. *b.* The *respiratory organs* sometimes are found congested, and the bronchial membrane more or less reddened. Occasionally the pleura is injected, and slight effusions of serum exist in the pleural cavities. The *heart* is generally flabby, and sometimes the inner surface, particularly the columnæ carneæ and valves, is more or less reddened. The *blood* is often fluid and generally dark-coloured. Slight effusions of serum and congestion are occasionally found within the *cranium*. Inflammatory changes are frequently seen in the *urinary passages*, and often extending to the female sexual organs.

411. *c.* The *antiseptic influence* of arsenic, more especially upon those parts where this substance exerts its injurious action, or where it is brought in contact, has recently attracted attention and been fully established. It thus very frequently not only preserves these parts, more especially the alimentary canal, from putrefaction, but also the alterations which it had produced in them. It may be presumed that the amount of antiseptic effect will depend very much upon the quantity of the poison, and upon the retention of it in the body at the time of death. If much of it remain in the stomach and bowels, or become absorbed and continue either in the blood or in the several tissues and organs, an antiseptic and mummifying effect may be expected; but if the poison be discharged by vomiting and purging, and eliminated from the body before death takes place, then the putrefaction process will proceed as usual, or even with greater celerity. This effect of arsenic, in arresting the progress of putrefaction, seems to be the result of a chemical action exerted by this substance upon the fluids and soft solids of the body.

412. *I. The quantity of arsenic likely to destroy life* depends upon a variety of circumstances. But

four grains, or even *three,* may kill a child, if it be taken in solution or when the stomach is empty. Dr. Christison adduces the case of a child who died in six hours after taking four grains and a half in a state of solution; and a woman, seventy years of age, was killed by four grains. Mr. Taylor states that a young lady died after eating a portion of cake which could not have contained more than *four* grains, and probably less than three grains. He states, that three of a party at dinner who had partaken of the port wine on the table were seized with symptoms of arsenical poisoning. The wine was found to contain about one to two grains of the poison in each fluid ounce. A lady took a quantity containing less than two grains of arsenic. In about half an hour she experienced faintness, violent vomiting, but no pain. She recovered after a few hours. A gentleman took as much as contained little more than two grains. His symptoms were similar, but more severe. If he had taken another glass of the wine, he might have been killed. Although the wine was saturated with arsenic, yet no peculiar taste was perceived. The escape of these persons was probably owing to the circumstances of the wine having been taken on a full stomach, and of its having been soon followed by violent vomiting. It is probable that, from one to two grains would prove fatal to a child or to a debilitated person, and three grains to an adult. On the other hand, cases of recovery from the ingestion of large quantities are not infrequent. A person recovered after taking half an ounce, the poison having been carried off by vomiting and purging; but instances of recovery from so large a quantity are very rare, and are owing to the arsenic having been taken on a full stomach, and to its speedy evacuation.

413. *K. The period at which death takes place from arsenic* varies with the circumstances so often alluded to. Dr. Borland informed Mr. Taylor of a case in which two ounces of arsenic were taken, and death took place in less than *two hours* from syncope. There was neither pain, vomiting, nor diarrhœa. Such rapidly fatal cases are very rare. But the time at which death takes place is not strictly dependent upon the quantity of the poison taken. There are many cases reported in which death has occurred in from three to seven hours, but much more frequently it does not supervene until a period varying from twelve or eighteen hours to three days, in the acute forms of poisoning by this substance. In thirteen cases recorded by Dr. Beck, the smallest quantity taken having been one drachm, and the largest two drachms, the shortest period for death was four hours, the longest two days. In one instance, two ounces of the poison destroyed life in three hours and a half; but in another case four or five grains killed a person in four hours; so little does the rapidity of the effect depend upon the dose or quantity. When the poison has been administered in small and repeated doses, and in cases of *slow* or *chronic* poisoning, and in some instances of the external application of it, and when a partial recovery from the first effects has occurred, a fatal issue may not take place until many days or weeks after its administration.

414. *L. The modus operandi of arsenic* has not always been rightly estimated. This substance has been generally considered as a tonic; but, judging from my experience of its action in my own person, and in the treatment of many diseases, cannot believe that it possesses any tonic propertie but, on the contrary, that it exerts an *irritatin* and *depressing influence;* its chief *medicinal effects* being *anti-periodic* and *alterative,* —effect which result from the employment of it in ver small and frequently repeated doses; an irritatin and depressing, or paralysing action, following th administration of larger doses. Its local operatio is chiefly as an irritant, capillary injection, inflammation, and its immediate consequences usually occurring. But the primary impression produced by large quantities of this poison is probabl sedative as respects the nervous system, both locally and generally, inasmuch as death, precede by signs of vital depression, often takes place before inflammatory appearances are developed That *arsenic is absorbed* into the circulation, an affects this fluid, the heart, and the nervous centre are facts, which the detection of it in the live spleen, kidneys, lungs and urine, fully proves, an which the changes in these organs further serve t show. Even when it is applied to an abrade surface, or to parts which admit of its absorptio it has been found to affect more especially th inner surface of the stomach, duodenum and larg bowels, and it has been detected in these situatio by chemical research. It appears to exert a specific influence upon the alimentary canal, irritating and inflaming it, and at the same time depressing the organic nervous energy. It exerts also marked action on the emunctories by which it i carried out of the circulation, especially the urinar organs, the villous surface and glandular apparatus of the large bowels, the skin and lungs exciting, irritating, or inflaming these, accordin to the quantity existing in the circulating fluids.

415. *M. Treatment.*—As the poisonous operatio of the preparations of arsenic is chiefly owing t the absorption of them, it is obvious that, befor they can be absorbed, they must be dissolved—either dissolved when administered, or subsequently by the juices of the stomach. Therefore n substance ought to be recommended as an *antidot* unless it possesses the property of rendering th arsenic insoluble, or of preventing its solubility and no known compound possesses this power t any considerable extent. The *hydrated sesquioxide of iron* possesses this property to a certai extent. Mr. Taylor performed many experiment on this antidote, and obtained the following results:—1st. When arsenious acid is *dissolved* i water, and agitated with twelve or fifteen times it weight of the hydrated oxide, the poison is precipitated with it in a very insoluble form. 2d When the poison is mixed and agitated in a stat of *powder* with the oxide, there is little or no effect the poison being only mechanically diffuse through the oxide. 3d. When the poison i powder is mixed with oxide of iron rendered alkaline by ammonia, so much appears to combine wit the iron as the quantity of alkali present will rende soluble in cold water. The rest is diffused in granules through the oxide. Most of the experiments he adds, in favour of this antidote have been performed in solutions of arsenic; and therefore the results are irrelevant, since arsenic is most frequentl taken in powder, and often in very coarse powder Recently the *acetate of the sesquioxide of iron* ha been recommended as an antidote by M. Duflos but Mr. Taylor found that, in respect of arseni

powder it is as inefficacious as the hydrated ide, even when an alkali is added, to produce fectual precipitation ; and that, with regard to e solution, the poison is more readily precipited by the hydrated oxide than by the acetate of on. Other antidotes have been mentioned, more pecially large doses of *magnesia* and *charcoal ;* t they deserve little credit, and are no further rviceable than by involving the poison more or ss, and thereby preventing its action upon, or its sorption by, the surface of the stomach — an tention which may be accomplished more cometely by albumen, milk, and various other subances. The substances formerly lauded as anlotes, have been shown by the researches of Enault, Orfila, and others, to be quite ineffi-cious ; whatever of success may have followed eir exhibition having been owing to the several rcumstances shown above (§§ 51. *et. seq.*), to mofy, counteract, or prevent the operation of poisons.

416. So little advantage, therefore, being likely be derived from antidotes, our chief hopes ould be placed on the immediate evacuation of e poison from the stomach, and upon the reoval of the injurious effects which may have een produced. If *vomiting* has not taken place, or insufficient, it should be promoted by an emetic f sulphate of zinc, or sulphate of copper, or by ustard taken at intervals in a wine-glass of ater, or by tickling the throat with a feather ; the contents of the stomach may be removed y the stomach-pump, avoiding as much as ossible the introduction of fluids when the poin has been taken in a state of powder or of mperfect solution. When vomiting takes place may be promoted by taking albumen, milk, thick ucilaginous fluids, linseed tea, &c. : and, alough the patient should not be allowed to xhaust his strength in retching, without some ne of these fluids being taken for the stomach to t upon, still it should not be taken in too large quantity at one time, in order that the stomach ay contract frequently on itself, and thus expel om its surface the mucous secretion which often nvelopes the poison, and protects the inner surce of the organ from its action. Mr. Taylor dvises a saponacious liquid, made of equal parts f oil and lime-water, to be given ; and Dr. Paris free exhibition of olive oil. When vomiting has ommenced from the action of the poison, an metic or the stomach-pump is then un necessary, as is operation will proceed, when aided by the uids just mentioned.

417. Having by these means discharged the oison from the stomach, there generally remain wo formidable morbid conditions produced by it be removed. These are inflammatory irritation nd action of the alimentary canal, and nervous r vital depression, with various concomitant pheomena. This association is of the most perplexg kind, inasmuch as the means calculated to elieve the one aggravates the other. Nevertheless, there is sufficient reason to infer that the poison altogether evacuated, and more especially if the rst impression or shock produced by the poison as passed off, the pain and vomiting having deeloped more or less reaction, bloodletting, general r local, or both, will be practised with advanage ; but if too early resorted to, the absorption of he poison and the vital shock may be both inreased by it. Terebinthinated epithems, sinapisms, or blisters over the epigastric region, or over the greater part of the abdomen, and a free exhibition of opium by the mouth, and in starch or mucilaginous enemata, are generally most beneficial ; but before opium be given, the entire evacuation of the poison should be ensured. Subsequently, and when the irritation of the bowels assumes a dysenteric character, or when tenesmus, or dysuria is urgent, the opium may be conjoined with ipecacuanha, camphor, nitrate of potass, tragacanth, &c. ; and these may be administered also in enemata. The medicated warm-bath ; fomentations to the perinæum and anus, preceded by the application of leeches to those parts, and a farinacious, or mucilaginous diet are important parts of the treatment.

418. The *nervous symptoms* often accompanying the vital depression produced by the poison, are most successfully treated by opium taken with small doses of camphor ; by the application of terebinthinated embrocations, and by mild tonics and restoratives in small doses, and in demulcent vehicles. If palsy continue after the removal of disorder of the digestive organs, exercise in the open air, the preparations of nux vomica, or strychnia cautiously prescribed, and external irritants are the chief means of cure. If the bowels become confined, either during the more chronic cases, or during recovery or convalescence, olive oil, taken in frequently repeated doses, and administered in enemeta, is the most appropriate aperient During convalescence, and for a long period afterwards, dyspepsia, flatulence and various states of disorder of the digestive organs often continue for a long time, and are best relieved by change of air, by travelling, and by strict attention to diet, — by the adoption of a bland, farinaceous diet, avoiding spirituous liquors, and the substances pointed out as injurious in the article on Indigestion.

419. iii. Colchicum Autumnale — *Meadow saffron.*—All the parts of this plant are poisonous at such periods of the year as occasion their development or perfection, but they vary slightly in their effects. The several preparations of the plant have lately been much employed in medicine, on account of their influence in paralysing or diminishing morbid sensibility, in removing pain, and in increasing the functions of excreting organs, especially of the digestive canal, the liver and kidneys ; its effects on these, however, being by no means certain. In large doses, it acts as an irritant of the alimentary canal ; and as a sedative, often remarkably depressing vascular action, and vital power. Even from small or medicinal doses, these injurious effects are manifested in some instances, and not in a few of these the vital depression is extreme, and consequent upon one-third or one-fourth of the usually prescribed medicinal dose. I have seen on several occasions poisonous effects produced by too great temerity in the use of this medicine ; and these effects were not manifested so injuriously on the digestive canal as on the nervous system and vital influence ; extreme sinkings, failings of the pulse, and syncope, following its ingestion. In two instances, — in one a powerful man, — a single dose of only ten minims of the tincture, which I prescribed for gout, produced alarming symptoms ; and a drachm taken by a medical man contrary to my advice, produced effects from which he recovered with diffi-

culty. In some constitutions, owing to idiosyncrasy, it acts with remarkable severity, particularly as respects the vital depression produced by it. GEIGER and HESSE discovered a principle in this plant, or alkaloid, which has been called *colchicina*, *colchicia*, or *colchicine*, and which neutralizes acids, and forms with them crystallisable salts.

420. *A.* The *symptoms* arising from poisonous doses of colchicum have been described by Messrs. FEREDAY, CHEVALLIER, DILLON, HADEN, and CHRISTISON. The *cormi*, the *seeds*, the *flowers*, and the *leaves* of the plant, produce nearly similar symptoms when taken in large quantities. An hour, or an hour and a half, after the ingestion of the poison, acute pain, followed by retchings, vomiting, and tenesmus or purging, or both, is experienced. The pulse soon becomes feeble, the countenance anxious, and afterwards the matters vomited are dark-coloured, and the purging profuse and watery. The pulse is excessively slow or feeble, the respiration hardly perceptible or feeble, the muscular weakness extreme, and the urine suppressed, the watery portions of the blood being discharged by the bowels and stomach. The patient sinks after a period varying, with the dose and the constitutional powers, from a few hours to three or four days; but there are neither convulsions, nor insensibility, nor delirium, unless in a few instances. Mr. TAYLOR states that a burning pain is felt in the throat and œsophagus; but this is not mentioned in the details of some cases, and probably it depends much upon the state in which the poison is taken. Mr. MANN communicated to him a case, in which three drachms and a half of the wine of colchicum were taken in divided doses, and caused death on the fourth day. There was no inflammation of the mucous membrane found on *dissection*, but simply extravasation of blood into the mucous follicles. Mr. TAYLOR states, that a man took a decoction made with a tablespoonful of the seeds and a pint and a half of water. He was seized with vomiting and purging, which were incessant until death, which took place in about thirty-six hours. The only appearance of note was, that the stomach had a violet or purple hue. A gentleman swallowed, by mistake, an ounce and a half of the wine of colchicum: he was immediately seized with severe pain and the other symptoms, and died in seven hours. In another instance, where an ounce was taken, death occurred in thirty-nine hours. Most of the cases recorded of poisoning by this substance have been detailed imperfectly and loosely. In Mr. FEREDAY's case, which has been given more fully than the others, there was no cerebral disturbance.

421. *B.* The chief appearances observed on *dissection*, were a patch of redness in the internal surface of the stomach, near the cardiac orifice, and a slight effusion of blood between the muscular and peritoneal coat of a portion of the jejunum. The omentum was turned up between the stomach and convex surface of the liver behind, and the diaphragm in front. The pleuræ were somewhat reddened, and the lungs much congested with black blood. The heart was flabby, and its structure easily broken down. The surfaces of the lungs, diaphragm, and heart were covered with ecchymosed spots. The bladder was empty. The face, neck, front of the thorax, insides of the thighs, and the integuments of the scrotum and penis, were covered with patches of pur
efflorescence. (*Lond. Med. Gaz.* vol. x. p. 16
In the bodies of the children mentioned by BER
there was considerable redness of the stomach a
small intestines. In GEIGER's case, inflammato
appearances were seen in the stomach and sm
intestines. In a case related by M. CHEVALLIE
and in another adduced in the *Edinburgh Medi*
Journal, no alterations were found. (CHRISTISO
op. cit. p. 792.)

422. *C. Treatment.*—Retchings often contin
for some time, and are ineffectual; therefore f
vomiting should not be expected, without the aid
an emetic, which may consist of sulphate of zinc
mustard mixed in water. The stomach-pump m
be employed if the patient be seen soon after t
ingestion of the poison. After the evacuation
it from the stomach, it remains to counteract t
injurious impression produced by it on the orga
nervous system, and upon the heart and nervo
centres by its absorption into the circulation; a
the only means we can employ with these i
tentions with any hopes of success, are opiu
ammonia, camphor, capsicum, and creasote, v
riously combined, according to circumstances.
have had very frequent recourse to the prepa
tions of colchicum in practice, but have seld
given them in full doses, without conjoining th
with one or more of these substances, which ha
always prevented any unpleasant symptoms fr
following their administration. Where idiosyncr
also has stood in the way of their exhibition
found these medicines prevent any sinking
distress, and to remove these effects when th
have appeared. There can be no doubt, the
fore, that these remedies are most appropriate
cases of poisoning by colchicum. They may
aided by sinapisms, or terebinthinate embrocatio
or epithems over the abdomen, and by mucila
nous or oleaginous draughts and injections, whi
may be made the vehicles of the remedies j
advised.

423. iv. HELLEBORE.—*Black hellebore, Hellebor*
niger,—*White hellebore, Veratrum album*—*V*
ratrum sabadilla—*Veratrine*—*veratria*.—The o
ration of black hellebore and of veratrum
nearly similar; and the alkaloid of the latter
veratria—produces the same action as either
these, a much smaller quantity being required
produce the same amount of effect.—*A. Black h*
lebore, in poisonous doses, causes a burning pain
the stomach and intestines, vomitings, purgin
cramps in the lower extremities, cold sweats, fai
ness, paralysis, sometimes insensibility from e
haustion or vital depression, and extreme weakn
of the pulse. Death appears to result from t
excessive vomitings and purging, and impair
irritability and action of the heart.

424. *B. White hellebore*—*Veratrum album*—a
as a local irritant, exciting at the same time t
nerves of the part. In excessive doses, it irrita
the digestive mucous surface, and depresses ner
ous and vital power. The *symptoms* are viole
vomiting and purging, sometimes of blood; ten
mus, and griping pains in the bowels. These a
preceded or attended by a burning sensation
the mouth, throat, and œsophagus; constricti
of the throat, with a sense of strangulation; a
are soon followed by a small or almost imperce
tible pulse; by faintness, cold sweats, trembling
giddiness, loss of voice, blindness, and dilat

pils, insensibility, syncope or convulsions ter-
nating life. In some cases, noticed by Dr.
EREIRA as having occurred to Dr. RAYNER,
ese symptoms were present, with the exception
purging.

425. *C. Veratria* is poisonous in very small doses.
r. TAYLOR states that a physician prescribed for a
ly one grain of veratria divided into fifty pills,
d three were directed to be taken for a dose.
ot long after the first dose had been swallowed
e was found insensible, the surface cold, the
lse failing, and with other symptoms of ap-
oaching dissolution. She remained some hours
a doubtful state, but ultimately recovered. If
e veratria was well mixed in the pills, the dose
s here not large; but this admits of doubt.

426. *D.* The *treatment* of poisoning by these sub-
nces is similar to that recommended for other
isons belonging to this class. After the evacu-
on of the poison, the effects should be attempted
be removed by means of stimulants conjoined
h opium. In a case treated by Dr. PEREIRA,
infusion of nutgalls seemed to give relief.
ffee has been recommended both as a drink and
a clyster. The external applications already
vised in similar circumstances should not be
hheld. Demulcents should be made the ve-
les for stimulants, astringents, and opiates.

427. v. FOOD-POISONS—*Poisonous food—Poison-*
fish — Poisonous meats — Poisonous cheese. —
rious articles of food not infrequently occasion
urious effects, and even death in a few hours.
e slighter effects have sometimes arisen from
osyncrasy; but not so frequently as supposed
some writers. This cause may be admitted in
pect of those instances which have sometimes
curred of a single person only having been
ected, of several who have partaken of the same
icle or dish. Poisonous articles of food — fish,
ats, &c., have hitherto been classed as *acro-*
cotics. As they are more or less *irritant*, and
acrid and irritant convey ideas nearly related,
first part of the appellation somewhat ap-
aches the truth; but that they produce nar-
ic or stupifying effects cannot be so readily
nceded, inasmuch as this particular effect no
ther appears than as it results in some in-
nces from the sinking of vital and cerebral
ver, and the diminution of sensibility owing to
state. These poisons in truth act as irritants
the alimentary canal, and as sedatives or de-
ssants, or paralysers of organic nervous or
l energy. Whilst they irritate the mucous
faces, and glandular apparatus of that surface,
y rapidly depress vital power; and the irri-
on they occasion passes not into inflamma-
y action, but into excessive secretion and
alation, — or, if inflammatory action be de-
oped, it is of an asthenic and spreading
n. That these poisons do not act locally only
y be inferred from the ultimate effects being
ch more serious in most instances than the
ount of local lesion can explain; from their
taminating nature, from the ready imbibition
them by mucous surfaces, and from their
edy absorption from these surfaces. The
ous articles which are sometimes productive
oisonous effects occasion modified or even dif-
nt symptoms; but they are remedied by very
rly the same means.

28. *A.* POISONOUS FISH. — Several species of
both in this climate and between the tropics, are always poisonous; and others are injurious only occasionally or rarely. Some accounts of the poisonous fishes of the tropics have been given by Drs. THOMAS, CHISHOLM and FERGUSSON; and various memoirs and notices of poisonous fish in this country and Europe have been published by Dr. BURROWS, Dr. COMBE, Dr. EDWARDS, Professor ORFILA, and Professor CHRISTISON. I had occasion many years ago within the tropics to treat a case of poisoning by fish, which nearly proved fatal; and I have seen two or three instances of poisoning by mussels in this country; but there was no danger in these cases, although the symptoms were severe. The fish which are the most frequently injurious in this country, are all the kinds of edible shell-fish, especially mussels, cockles, periwinkles, lobsters, crabs, and craw-fish. And either of these, when kept too long after having been boiled, or when only parboiled and reboiled after various intervals, as sometimes practised by the lower dealers, will produce more or less disorder. Salmon and eels are also sometimes poisonous, but the former is injurious chiefly when out of season, or when insufficiently preserved.

429. *a.* The *symptoms* produced by poisonous fish differ much in different persons; and certain of the effects observed are more or less owing to idiosyncrasy; but the most violent and fatal operation is not so frequent, if at all, owing to this cause. (*a.*) Thirty persons were poisoned by mussels in Leith in 1827, and of these two died. The symptoms were carefully observed and described by Dr. COMBE. No one complained of any thing peculiar in the smell or taste of the mussels, and none suffered immediately after eating them. An hour or two or more elapsed, and then the bad effects consisted rather in uneasy feelings and debility, than in distress referable to the stomach. After eating two or three, and various numbers above this, the lowest number, slight tension at the stomach, with heat and constriction of the mouth and throat, was complained of. These were succeeded by a difficulty of swallowing and speaking freely, by prickly feelings in the hands; by numbness about the mouth, gradually extending to the arms, with great debility of the limbs. Two or three had cardialgia, nausea, and vomiting; but these were not general or lasting symptoms. The muscular debility was present in all the cases. An unpleasant taste was felt in the mouth. There was slight pain in the abdomen, on pressure, especially in the region of the bladder. The secretion of urine was suspended in some cases, in others it was free, but passed with pain or effort. The action of the heart was feeble, the breathing was unaffected. The face was pale, and expressive of anxiety; the surface somewhat cold, the mental faculties unimpaired. One of the two fatal cases died in three hours, the other in six or seven hours. In one case only did the symptoms of irritation pass into those of inflammation of the digestive canal. The instance which was treated by me within the tropics, was characterised by constant vomiting, by remarkable loss of muscular power, by rapid failure of the heart's action, coldness, and clamminess of the surface, and sinking, with intermissions of the pulse. This form of fish-poisoning may be called the *paralytic*, or vitally depressing, this condition predominating over the irritant.

430. (*b.*) In the other form of poisoning by fish,

cutaneous eruptions, with or without asthma, or asthmatic symptoms without external eruption, are generally present, and signs of local or general irritation predominate. From one to two or three hours after eating the fish, especially mussels, uneasiness, or sense of weight at the epigastrium; heat, and constriction of the mouth and throat, with thirst; numbness, prickings, and itchings of the surface, particularly of the extremities; difficulty of breathing, lachrymacation and swelling of the eyelids, and an eruption resembling urticaria are complained of, but sometimes the eruption is papular, sometimes vesicular, and it is always attended by heat and itching. These symptoms are sometimes attended by vomitings, by colicky pains and diarrhœa; but these are often absent, or of short continuance. In the cases related by MOHRING the eruption was preceded by dyspnœa, lividity of the face, insensibility and convulsions. In Dr. BURROWS's cases, the symptoms began with dyspnœa, nettle-rash and swelling of the face, conjoined with vomiting and colic; delirium and convulsions supervened, and death took place in three days. In MOHRING's cases the symptoms appeared in a few minutes; in those by Dr. BURROWS, not until twenty-four hours after eating.

431. (*c.*) Fish kept too long before or after having been cooked, or otherwise spoilt, especially salmon and shell-fish, has, in two or three instances which I have observed, produced symptoms, differing more or less from the two forms of fish-poisoning now described. The poison causing the above effects exists in the fish when cooked, is present in the fresh or live state, and is not produced by changes that have taken place, either after death or after cooking. But the injurious effects occasioned by such changes as occur after the death, or the cooking of the fish, are different from the foregoing; and are not attended by either the rapid sinking of vital power on the one hand, or the dyspnœa and eruption on the other. The injurious operation, in the circumstances now stated, very much resembles an attack of colic, with vomiting, or an attack of cholera; there being generally severe vomiting with griping pains, occasionally purging with cramps of the extremities, much debility, and sinking of the pulse; but these latter symptoms are not so severe as in the first form, and death has not occurred in any of the cases which I have seen.

432. *b.* The *source of the poison*, in these cases and forms of fish-poisoning which are produced by fresh fish, has been a matter of speculation. In the numerous cases observed by Dr. COMBE the mussels were fresh, plump, and healthy-looking; and Dr. CHRISTISON analysed some of those which were taken from the stomach of one of his patients without being able to detect a trace of copper — to which the poisonous operation of fish has been attributed. That idiosyncrasy has, as Dr. EDWARDS contends, something to do with the injurious effects of fish, is true in few or rare instances. Dr. CHRISTISON remarks, that a relation of his could not partake of salmon, trout, herring, turbot, or lobster, without being attacked with violent vomiting; and several instances of the kind have been mentioned to me by persons who have possessed this peculiarity; to which, however, fish-poisoning cannot be imputed in the great majority of cases. In the nearly fatal case seen and treated by me in a most intimate friend now living, who
was never disordered by any kind of fish on a
other occasion, and has always been in the ha
of partaking freely of every kind of fish, no su
idiosyncrasy existed. The mussels, which prov
to be poisonous to thirty persons in Leith, we
minutely examined by Drs. CHRISTISON, COMB
and COLDSTREAM; and it would appear that n
thing particular was detected in their appearanc
excepting that the liver appeared much larg
darker, and more brittle than in the wholesome fis
The poisonous mussels were all taken from o
spot, and every person who partook of them w
more or less severely affected, according to the nu
ber who ate of them. Animals suffered as severe
as man, a cat and dog having been killed by the
It is very probable that, as respects these musse
and perhaps also as regards some other shell-fis
the poisonous principle exists in the liver, as su
gested by the statement of Dr. CHRISTISON, b
what that principle is has not been ascertained.
the cases of poisoning of two women by musse
M. BOUCHARDAT states, that he detected sufficie
copper to account for the effects; but it is not
tected in most cases; and even when present, t
quantity found is too small to account for t
poisonous effects on the human subject. Th
can be no doubt, as I have suggested above, t
much of the injurious effects of various kinds
shell-fish, eels, &c., arise from a sickly state, p
duced by the means used to bring them alive
market; and that the choleric and colicky sym
toms described (§ 431.), as being often p
duced by salmon and other kinds of fish, ar
chiefly from changes subsequent to the death a
cooking or preserving of the fish.

433. *c. The treatment of fish-poisoning* should
pend much upon the time that has elapsed fr
the eating of the fish until the commencement
the symptoms; and this may vary from a f
minutes to twenty-four hours, or even more.
the period has been short, and the fish still rema
on the stomach, an active emetic, as mustard,
the sulphate of zinc, should be given with a la
dose of capsicum, and the vomiting encourag
by means of diluents conjoined with stimulan
aromatics, spices, &c. The elapse even of a lo
period between the ingestion of the fish and
appearance of disorder, should not prevent a
course to emetics, for the fish may, in its poison
state, remain long unchanged in the stomach.
vomiting has taken place without the aid of
emetic, it should not be considered sufficient
less there has been an abundant discharge of
digested or other matters, the treatment now
vised being required nevertheless. If the irrita
lity of the stomach become excessive, it will be
no avail to attempt to remove it by means
opium and effervescing draughts, unless they
conjoined with powerful stimuli and warm spic
for this state of the stomach is always in fi
poisoning attended by sinking of the vital pow
especially of the heart's action, and by colic
pains and flatulent distension of the bow
Powerful stimulants, aided by warm embrocatio
rubefacient epithems, or sinapisms, over the e
gastrium and extremities, are then required.
believe that capsicum — the true cayenne —
small-bird pepper — is an antidote to fish pois
when taken freely. In the nearly fatal ca
which I treated within the tropics (§ 42
after other means had failed to allay the vomiti
and rally the powers of life, and after brandy

ater had been thrown off the stomach, a tea- oonful of powdered *cayenne* was mixed in a imbler full of brandy and water (equal parts of ich), and taken at a draught. All the symptoms ere instantly mitigated, and next day nothing iore than debility was complained of. That the onstant vomitings attending this and some other ates of poisoning is owing to more than irritation - is owing in some degree to exhaustion of vital ower, is shown by the instant arrest of both the ausea and the vomitings by so powerful an ex- tant as that now mentioned; and which I have rescribed in somewhat similar conditions with qual advantage. I have employed this spice, specially in an early part of my practice, and in alignant diseases, in very large doses, believing iat it is not so irritating to the stomach as its npression on the nerves of the mouth and palate ould indicate, but that, on the contrary, it im- arts a salutary stimulus to the digestive canal, id counteracts the influence of many depressing gents. If the poisonous fish have passed into the owels, causing colicky pains, flatulent distension the abdomen, and sinking of the vital powers, iemata, containing spirits of turpentine, with istor oil; and, in extreme cases, asafœtida or ipsicum, or both, should be administered and peated according to circumstances, and the warm rpentine embrocation or epithem ought to be plied over the abdomen.

434. *B.* POISONOUS MEATS. — Certain kinds of eat are sometimes poisonous even in a fresh state, dependently of any disease. Others are poisonous ving to some disease of the animal at the time of ath. Others again are injurious in consequence changes which have occurred after the animal is been killed, — these changes arising either om the deposit of the ova—or exuviæ of insects - from fly-blowing, or from decomposition, or e more slowly developed combinations of the ementary particles which take place in imper- ctly preserved or salted provisions, especially in usages, dried meats, bacon, &c. The secretions certain animals are poisonous during their lives, pecially those possessed by them for the purposes self-preservation; and the fluids and secretions others are sometimes poisonous, both during life d after death, owing to the nature of the disease which these animals are the subject. These tter infect the healthy, contaminating the fluids d soft solids. They are fully considered in the ticles, BLOOD, DISEASE, and INFECTION, and in ose devoted to the specific forms of disease to iich they give rise. Some notice is also taken certain of them when treating of *Septic Poisons.*

435. *a. Fresh pork* is often injurious, and gives e to various symptoms according to the idiosyn- asy of the individual, and to the manner in which e animal had been fed. In the East, especially warm climates, pork is often injurious and pro- ictive of diarrhœa and dysentery; effects which have seen caused by it in several instances in is country. The Mosaic law forbade the use it; and there can be no doubt of the wisdom this law as respects warm countries, and I be- ve as regards all countries. — The *poisonous ects* of fresh pork vary. In the most severe cases has produced a dry and burning sensation in the roat, with heat and pain in the stomach, retchings d vomiting; a sense of sinking at the epigastrium; veak, small, and irregular pulse; coldness of the tremities, a cold and clammy perspiration, and colicky pains in the abdomen and around the umbilicus. In other cases the pain has been confined to the stomach alone, or it has been situated in some other part of the abdomen. In addition to these symptoms there have sometimes been remarkable swelling of the face extending over the scalp without any vesication or redness, swelling and tenderness of the abdomen, an eruption resembling urticaria over the breast, legs, and arms, and a quick sharp pulse. In rarer instances, there have been neither retchings nor vomitings, but severe colicky pains and sinking of the pulse and vital powers. Such were the more acute cases of poisoning with pork, and of which Dr. M'DEVITT has detailed six cases, all of which were produced by fresh or recently salted pork, and especially by roasted pork. He believes that the injurious effects are produced chiefly by the fatty parts; but I have reason to believe that the viscera are still oftener injurious.

436. The symptoms may appear any time from three or four to thirty hours after the ingestion of the meat. When the symptoms are delayed until seven or eight hours after the pork has been eaten, they much resemble those of either violent colic or enteritis, and are attended by a sense of sinking or of impending dissolution, and a weak intermitting pulse, &c. In other cases, especially when a longer period than this has elapsed from the ingestion of the poisonous food — from twelve to twenty-four hours — diarrhœa, or an attack resembling cholera, or dysenteric symptoms of a severe character, have taken place. In many instances the symptoms are slight, especially when the offending article has been evacuated speedily by vomiting or by copious evacuations from the bowels; and even when the symptoms assume an alarming character, the discharge of it, when fully accomplished, is followed by immediate relief of all the symptoms. When only one, of several of those who have partaken of this food, has been thus affected, then we may infer either that the affection is owing to idiosyncrasy, or that the part eaten by the individual has been tainted or otherwise changed; but I am acquainted with occasions on which great numbers of persons, as a large portion of a regiment of troops, have been affected, after eating fresh pork, some very severely, with the symptoms above described, or with diarrhœa, or colic, or dysentery.

437. *b. Bacon* seldom produces symptoms of *acro-sedative* poisoning unless those parts of it generally on, or near to, the surface, which have undergone change during the process of preserving, or near the large vessels. Mr. TAYLOR states, that one fatal case from poisoning by bacon occurred in the metropolis in 1836; and I have seen very severe effects produced by a minute portion of a spoilt or rusty part of ham or bacon having been swallowed. But equally severe and nearly similar symptoms have followed the ingestion of a very small piece of either *mutton* or *veal*, when flyblown or otherwise changed. Mr. TAYLOR states, that meat of any kind, when too recently killed or decayed, may produce severe effects and even death. I believe, however, that decay, unless far advanced or connected with the deposition of the ova or exuviæ of insects, or the generation of mouldiness, or the lowest forms of animal life in the preserved articles, will not produce of itself the severe symptoms constituting acute or fatal poisoning.

438. *c. Animal substances of various kinds* have

become poisonous, owing to changes during their preservation, which Dr. CHRISTISON has called a "*modified putrefaction.*" In Germany and other countries, where animal substances are preserved by drying and smoking chiefly, and without much salt, some unknown injurious principle appears to be developed in these substances from the combinations of their elementary particles during the process of preservation. The articles in which these injurious changes have been observed are sausages, bacon, and hams, dried mutton and beef, cheese, smoked salmon, and various other dried or preserved animal substances.

439. (*a.*) *Sausages* have proved most frequently poisonous; but it is possible that they may, at least in some instances, have possessed this property independently of any changes during their preservation, and that it may have existed in the flesh or viscera of the animal, especially the pork, when quite fresh, of which the sausages were made. This circumstance is rendered the more probable by the accounts of three cases which terminated fatally from the effects of sausages made with the liver of an apparently healthy pig slaughtered only a week before. The *inspection* of the bodies threw no light on the more immediate cause of death in these cases. (*Lond. Med. Gaz.* Nov. 1842.) — But the poisonous effects so frequently observed in Germany to be produced by sausages more evidently are developed by a modified putrefaction or by a combination of the elementary particles, taking place during the process of preservation, and different from the usual states of putrefaction. The sausage-poison has been described by Dr. CHRISTISON from the materials furnished by KERNER, DANN, and HORN. In a period of little more than thirty years, 234 cases of sausage poisoning occurred in the state of Würtemburg, and of that number 110 proved fatal. Those sausages which have been found poisonous have usually been of large size, and cured by drying and smoking with wood. They become deleterious in the spring after they have been long kept, and been alternately frozen and thawed; and are poisonous only at a particular stage of decay, and cease to be so when putrefaction has fully advanced. Those that are poisonous possess an acid reaction, are soft, have a nauseous putrid taste, and an unpleasant sweetish-sour smell. The central parts are chiefly deleterious, these parts being poisonous even when the surface is wholesome.

440. (*b.*) The *poison of cheese*, as observed in several continental countries, and rarely in this, appears to be developed by analogous changes in the curd to those observed in sausages; and is more probably developed by a partial decomposition having taken place in the curd before it was subjected to pressure, than by any change subsequently to this process. Dr. CHRISTISON thinks that the cheese-poison is occasionally met with in Cheshire, where among the small hill-farms the limited extent of the dairies obliges much of the curd to be kept for several days before the quantity required for large cheeses is accumulated.

441. *d. The symptoms* produced by spoilt *sausages, cheese, bacon, hams,* and *salmon*, which has become partially decomposed before, or after being cured, are probably very nearly the same in respect of each of these articles; but they have been more frequently and precisely observed and described as regards the ingestion of spoilt sa
sages. Generally, the effects of these are n
manifested until twenty-four hours, or two, thre
or even four days after they had been eate
This tardiness of operation is probably owing
the difficulty of digesting them, and the slowne
of their absorption. The first symptoms are pa
in the stomach, vomiting, purging, dryness of t
mouth and nose, and hoarseness, or loss of voic
Deglutition becomes difficult and painful; t
pulse fails, swoonings ensue, and the skin is co
and ultimately insensible. The eyes, eyelids, a
pupils are almost motionless. The secretions a
excretions are at last suspended, but often profu
diarrhœa continues throughout. Fever is rare
present, and the mind continues unaffected. Fa
cases end with convulsions and oppressed breat
ing between the third and eighth day. In cas
of recovery, convalescence is very long protracte

442. *e. The appearances on dissection* have be
described as observed in cases of sausage-poiso
ing. There are usually signs of inflammatory
ritation in the internal surface of the digesti
canal. The throat is white and dry; the œsoph
gus thickened; the stomach and intestines re
dened, and croupy exudations are formed on t
surface of the trachea. The heart is flaccid; a
the body is said to resist putrefaction. But it
evident, from this account, that the structu
changes consequent upon poisoning by th
articles of food have not been observed with d
care and precision.

443. *f. The treatment of poisoning by pork,
by sausages, preserved meats, and other articles
long kept or imperfectly preserved,* should not d
fer materially from that recommended for fis
poison. The chief indication is to procure t
discharge of the offending substance as speed
as possible, by means of the emetics conjoin
with the warm spices already mentioned (§ 433
If it be inferred that it has passed the pylorus, t
enemata advised for fish-poison, and the extern
applications also recommended, should also
resorted to. In cases of poisoning by these su
stances, *creasote*, conjoined with warm spices, w
small doses of opium, and with ipecacuanha
diarrhœa or dysenteric symptoms appear, will
found of great service, especially when the stoma
becomes irritable. In most cases also, musta
poultices, or turpentine epithems, over the e
gastrium or abdomen, will be of service; a
they ought never to be omitted in the more ac
and dangerous cases.

444. C. DISEASED ANIMAL SUBSTANCES, FLUI
SECRETIONS, &c. — *a. The flesh of over-driven a
mals*, especially if these animals have been d
prived of drink for some time before they we
killed, and probably also their viscera, produ
injurious effects, especially in cachectic constit
tions. But according to the experiments of
MORAND, the flesh of such animals is perfect
wholesome when cooked and eaten, although t
application of the blood, or raw flesh, to a scrat
or wound, or even to the sound skin, is often f
lowed by dangerous or fatal effects — sometim
consisting of an eruption of gangrenous boils, t
pustules malignes of the French, at other tim
appearing as diffuse inflammation of the skin, or
the cellular membrane, or of both.

445. *b.* The *viscera and offal* of animals occ
sionally produce analogous effects to these just me
tioned, even on the unabraded surface. Sir

rodie has shown, that the contact of these with raded or wounded parts may cause chronic ates of erysipelas, &c. I have seen several in- ances of the scratches or pricks of the fingers of oks by the bones of hares, or of other animals, d even abrasions of the skin, having been fol- wed by inflammation of the absorbents or of the ins, or by diffusive inflammation of the cellular sue.

446. *c. The flesh or viscera of diseased animals,* d especially of those which have died of en- mic or epidemic distempers, are undoubtedly urious, and even in some instances rapidly fatal. r. Taylor states, that four members of a family Oxfordshire, in the spring of 1841, dined in od health upon part of a sheep which had died a disease then prevalent among cattle. The mptoms which followed this meal resembled se of irritant poisoning, accompanied by others licating an affection of the nervous system. One the patients, a child, died in less than three urs, the others recovered. There was no poison scovered in the food, nor in the body, nor was y poisonous vegetable used at the meal. (*Op. t.* p. 214.)

447. *d.* There are certain districts in North nerica, in which the *milk and flesh of animals,* ecially cattle, acquire poisonous properties from grass on which they feed. The disease thus oduced in persons who partake of this poisonous od, has been named in America the "milk-sick- ss," or "trembles." These districts lie to the st of the Alleghanies, and those who venture thin them are obliged to abstain from the flesh the cattle within the same limits, as well from milk and its preparations. It appears from the ort of Drs. Hosack, Post, and Chilton, that inhabitants of some of these districts, with a kless disregard of human life, carry the butter d cheese, which they dare not themselves eat, markets at a distance; and that thus symptoms poisoning, and even death, for which the medical endant cannot account, are frequently produced. cording to the same report, the cattle from these tricts are sent in great droves over the moun- ns, but, in order to deceive the purchasers, they sent to New York by a southern route. The sh of these animals occasion aggravated symp- ns of cholera. "The viscera of these cattle often found diseased; the livers most gene- lly so." Owing to the symptoms of poisoning ich have followed the use of beef, butter, and eese from these districts, the American govern- ent caused a medical inquiry to be instituted o the matter, and the reporters recommended sale of these articles to be prohibited. In the ent of this recommendation being adopted, it is t improbable that the poisonous food may be ported to England. (See *Edin. Med. & Surg. urn. for July,* 1844.)

448. The above interesting and important fact an ample illustration of what has been stated by me physiologists, namely, that certain secretions ay acquire poisonous properties from the nature the ingesta, without the individual appearing be materially disordered. I have repeatedly d occasion to observe, that the *milk of a nurse* s produced all the symptoms of slow poison- g, occasioning vomiting, diarrhœa, and sinking vital power, with or without convulsions in the ild which she suckled; and that this state of e milk has not been occasioned alone by the nature of the ingesta, but also by the more violent mental emotions. That the nature of the food may thus affect the secretions, without materially disordering the animal, is further shown by the poisonous nature of the *honey* in some districts, as that of Trebizond, which is said to be collected from poisonous plants. I believe that the deleterious effects of pork are chiefly owing to the unwholesome nature of the food upon which the animals had lived for some time before they were slaughtered.

449. *e. Poisonous honey,* especially as met with in Trebizond, causes, according to Mr. Abbot, violent headache, vomiting, and a condition resembling intoxication. A large dose produces deprivation of all sense and power for some hours afterwards. These effects agree with those mentioned by Xenophon, in his account of the "Retreat of the Ten Thousand." Pliny also takes notice of this poisonous honey. Tournefort ascribes this property to the bees feeding on the *Azalea pontica.* (*Lond. & Edin. Philos. Mag.* vol. v. p. 314.) The poisonous effects of honey have also been observed in North America, by Drs. Barton and Hosack, who consider that the injurious property is owing to the various species of *kalmia*, the *Andromeda mariana*, the *rhododendron*, the *Azalea undiflora*, and the *datura* on which the bees have fed. The *symptoms* mentioned by Dr. Barton are dimness of sight, or vertigo, succeeded by a delirium, which is sometimes mild and pleasant, and sometimes ferocious; ebriety, convulsions, with foaming at the mouth; pain in the stomach and intestines, vomiting, purging, and, in a few instances, death. Sometimes vomiting is among the earliest symptoms, and in that case the patient is readily relieved, although a temporary weakness of the limbs remains. (*American Philosoph. Trans.* vol. v. p. 65.) In the cases recorded by Dr. Hosack, the chief *symptoms* were violent vomiting, cold extremities, a livid appearance of the countenance; the pulse having been remarkably reduced. In these instances the honey was of a dark reddish colour, and of thicker consistence than usual. (*Edin. Philosoph. Journ.* vol. xiv. p. 91.)

450. *f.* The treatment of poisoning by the *flesh of diseased animal* (§§ 444—448.), judging from the fects or symptoms as far as they have been described, should not materially differ from that which I have recommended for poisonous fish (§ 433). Having expelled the injurious substance by emetics, and by purgatives and enemata, if it have passed the pylorus, the powers of life should be developed by means of the tonics, stimulants, aromatics, spices, external applications, &c., there prescribed; and especially quinine, camphor, capsicum, and opium.— In the cases of *poisoning by honey,* just noticed, the efforts of nature suggested the best remedy, namely, the early discharge of the injurious substance from the stomach and bowels, by emetics and purgatives. I believe that, in all cases of poisoning by injurious articles of food, the best purgative that can be employed is, a combination of spirits of turpentine, castor oil, and capsicum, taken on the surface of coffee, or some aromatic water; enemata, containing the same medicines, being also administered according to the circumstances of the case.

451. vi. Mineral and Saline Acro-Sedatives. —*A.* The Antimonial Compounds act as irritants

of the surface or part to which they are applied, and, owing to their absorption chiefly, and probably also to their more immediate influence upon the nervous systems, they depress vital power and vascular action. The *chloride of antimony*, the preparation which is the most corrosive and irritant, has been noticed above (§ 175. *et seq.*), and shown to be injurious principally in consequence of its local effects. But the other officinal preparations of antimony exert a much more remote and extensive influence, more especially the *potassio-tartrate*, the *sesquioxyde*, the *oxysulphuret*, or kermes mineral, and the *compound antimonial powder*, which was intended to represent the empirical powder of Dr. James. The medicinal properties of these preparations differ more or less; but, when given in excessive doses, the first, or the *potassio-tartrate of antimony* may be considered as representing their injurious effects, both local and constitutional. When treating of it, therefore, my observations will apply also to the other compounds of this metal.

452. *a.* The *antimony-tartrate of potash*, or *potassio-tartrate of antimony*, or *emetic tartar*, is a powerful irritant when applied to any part, or even to the cutaneous surface, in a state of minute division or strong solution; and generally causes an eruption of painful pustules resembling those of ecthyma or small-pox, and various constitutional changes, according to the dose and the mode of employing it. As this preparation is the most prescribed, it is of importance that its *local* and *remote effects* should be well understood. — (*a.*) When applied to the *cutaneous surface, emetic tartar* gives rise to somewhat different results according to the mode of its application. In a state of strong solution it occasions an eruption of small semi-globular painful pustules; in that of powder sprinkled over a plaster or mixed in an ointment, the pustules are larger, and, when fully developed, are flattened, with a central dark point, contain a puriform serum and an albuminous deposit, and are surrounded by an inflammatory border. The central dark point soon extends, and forms a dark crust as desiccation of the pustule advances, that is afterwards thrown off. The internal use of this substance in large or poisonous doses sometimes gives rise to a similar pustular eruption, or to aphthous spots, in the mouth, fauces, pharynx, œsophagus, and intestines, but more frequently to redness, and other inflammatory changes in the gastro-intestinal villous surface; attended by pain in the region of the stomach extending over the abdomen, and by vomiting, followed by purging.

453. (*b.*) *The constitutional or remote effects* of tartar emetic and other antimonial preparations vary with the dose. In *small doses* emetic tartar increases the secretions of the liver and pancreas, and the secretions and exhalations of the gastro-intestinal villous surface; and as it passes into the circulation, it increases subsequently the perspiration and the mucous and urinary excretions. In *larger doses* it excites nausea and vomiting, relaxes the skin, and augments the mucous secretions and exhalations. In still larger quantities it depresses the organic nervous energy, relaxes the muscular structures, and all the tissues, and gives rise to general exhaustion. With its emetic operation it occasions distressing nausea, and sinking, and is sometimes uncertain in the amount of its effects, the emetic action being slight, whilst the depression and diarrhœa produced by it are extreme.
Excessive doses of this substance have acted as
violent irritating and depressing poison, and pr
duced death, especially in children, and infan
when it has been given frequently, and in t
large quantities for this class of patients; the sin
ing of vital power and death, which have in r
rare instances ensued, having been mistaken f
the progress and result of disease. Orfila stat
that in one case a scruple, in another, twent
seven grains nearly proved fatal, and that for
grains caused death. The symptoms in the
were vomitings, pain and tumefaction of the e
gastrium extending over the abdomen, hyp
catharsis, delirium, convulsions, and, in the fa
case, death on the fourth day.

454. The above should be viewed as the effe
of this substance on the healthy body only, for
has been found that, in states of inflammatory e
citement, in local inflammations, and fevers
tended by high vascular action, the system w
tolerate quantities of tartar emetic, which ha
been productive of the most dangerous effects
other conditions of the œconomy. This salt l
been given in enormous doses by Rasori in th
states of disease, and the statements of this ph
sician have been partially confirmed by Laenn
and others. I have attempted, however, to g
very large doses of it in pneumonia; but, if I a
vanced above five or six grains in the twenty-fo
hours, distressing diarrhœa and depression f
lowed the emetic action of it, and I have be
obliged to desist. Some source of fallacy m
exist, as regards either the purity of the medici
or the retention of it in the stomach and bowe
from either of which it may have been more
less completely rejected; or then we must inf
that an excessive quantity of it acts less energe
ally than a very small dose — an inference whi
receives no support from the external applicati
of it, or when it is administered or applied so t
its operation, especially as an irritant, may
subjected to the senses of the observer. It shou
however, be noticed, that in cases of oppression
the brain, and of coma, large doses of this s
may be given without producing vomiting, and
fever be also present, without occasioning a
very remarkable effect, until dangerous sinking
the powers of life, or diarrhœa, or both appe
This is the more apt to occur in children a
young subjects, and requires more attention th
it has received.

455. The symptoms produced by antimoni
taken in poisonous doses are, in the majority
instances, such as have been just described; l
when taken in states which may affect the mou
or palate, a strong metallic taste is perceiv
in the mouth, both at the time of swallowi
and afterwards; and even during convalescen
from large quantities, this taste sometimes co
tinues, with an aphthous eruption in the mou
and fauces. There are generally also synco
small, weak pulse, great prostration of streng
cold, clammy perspirations, vertigo or trem
spasms of the extremities, convulsions, in the m
dangerous cases; and these symptoms genera
precede death in fatal cases. Dr. Beck menti
an instance in which fifteen grains of tartar eme
killed a child. I am confident of having seen fa
effects follow the exhibition of a smaller quanti
given in divided doses, in cases of croup to whi
I had been called.

456. *b.* Tartar emetic, when injected into t

ge bowels, or into other mucous canals, produces irly similar effects to those already described; l is also, in these circumstances, absorbed into circulation, through the medium of which, as ll as when injected into the veins or introduced o wounds, it acts specifically upon the stomach, oducing, as M. MAGENDIE has shown, a very ided action on this organ, when thus employed. hen applied to the skin, in the form of powder, of strong solution, to produce an artificial iption, it rarely occasions any constitutional ects of a severe character, or resembling those asioned by the ingestion of a poisonous dose. t such effects have occurred, and have been ended by nausea and vomitings, and even by rrhœa.

457. *c. After death*, the villous surface of the mach and duodenum has been found reddened l covered by a slightly adhering layer of mus. Mr. TAYLOR states, that in a man who had en forty grains of tartar emetic within a period five days, and who then had died apoplectic, stomach was found much reddened and inned in irregular patches, the redness passing o a violet tint; but there was no ulceration of internal membrane; the duodenum was in a ilar state, and the small intestines were but htly inflamed. In animals poisoned by this stance it is usual to find inflammation of the tro-intestinal mucous surface.

458. *d. Treatment.* — The evacuation of the poin from the stomach by the stomach-pump, or by couraging vomiting by irritating the fauces, or the free administration of warm water, milk, or nulcents, should be enforced. Any vegetable usion containing tannin, or an infusion of green , oak-bark, or of the yellow cinchona-bark, may given freely; as the tannin combines with oxide antimony to form an insoluble compound, reby suspending the operation of the poison. t Dr. PEREIRA states, that although cinchona omposes emetic tartar, it does not destroy the ivity of this salt; for that, in many instances, n one to two grains of the salt were given with yellow bark, and nevertheless nausea or voing occurred. In most instances of poisoning the preparations of antimony, opium is most eficial, especially when conjoined with small es of camphor, and even of capsicum when the ression is urgent. Mustard epithems on the gastrium, and the warm bath, and several of the er measures advised for the removal of the cts of other substances already considered ler this class, will also be found of service.

459. *B.* BARYTA AND ITS SALTS are poisons of ich but little is known as to their operation on n. Pure baryta is met with only in the laboory of the chemist; but it is a caustic poison. e principal salts are the chloride, nitrate, tate, and carbonate, the last of which is inuble. The sulphate is said not to be poisonous it is insoluble; but, as Mr. TAYLOR remarks, vould be well to establish this by experiment, e insolubility ought not to be received as lence of the inertness of any substance, although erroneously assumed to be so, and is the chief is of the doctrine of chemical antidotes. enite of copper and calomel are as soluble as sulphate of baryta, and yet they act powery on the body. The instances of poisoning ich have occurred from baryta have been caused the chloride and the carbonate.

460. *a.* The *symptoms* produced by the *chloride of baryta* were a combination of irritation of the alimentary canal, and severe affection of the nervous system, especially vertigo, convulsions, and paralysis. In one case half an ounce was fatal in two hours. In another, one ounce destroyed life in an hour. It has been found to affect the system powerfully even in small doses. ORFILA has shown that the chloride of barium is absorbed, especially when given in small or moderate doses. He states that he has found it in the liver, spleen, and kidneys of animals killed by it.

461. The *Carbonate of Baryta* is said to have been fatal in two cases, in each of which one drachm only was taken. But, in a case recorded by Dr. WILSON, it appears not to have been nearly so virulent. A young woman swallowed half a tea-cupful of the powdered carbonate mixed with water. She had fasted for twenty-four hours. The powder had no taste. In two hours she had dimness of sight, double vision, ringing in the ears, pain in the head, throbbing in the temples, with a sensation of distension and weight at the epigastrium, and palpitation of the heart. She afterwards complained of pain in the legs and knees, and cramps in the calves. She vomited twice a fluid like chalk and water. The skin was hot and dry, the pulse frequent, full, and hard. These symptoms gradually subsided, and she recovered, although the pain in the head and epigastrium continued long. — (*Lond. Med. Gaz.* xiv. p. 488.)

462. *b.* The *morbid appearances* produced by the salts of baryta have not been described as they occur in man. In the lower animals the mucous membrane of the stomach is usually found of a deep-red colour, unless death has taken place very rapidly, and in this case the alimentary canal is healthy. In all the animals which in Dr. CAMPBELL's experiments were killed by the chloride applied to wounds, the brain and its membranes were much injected with blood; and in one of them the appearances were those of congestive apoplexy.

463. *c.* The *Treatment* of poisoning by the salts of baryta consists chiefly in the speedy administration of an alkaline or earthy sulphate, as the sulphate of soda or of magnesia. The poison is thus converted into the insoluble sulphate of baryta, which, if not altogether inert, is nearly so. But the alkaline sulphates are but of little service where he caabonate of baryta has been taken, unless in procuring the more rapid discharge of the poison by the bowels. In Dr. WILSON's case, just mentioned, the copious evacuations from the bowels consequent on the exhibition of the sulphates were evidently beneficial, and tended to the recovery of the patient. Unless the patient be seen early, any treatment will prove inefficacious. Where the carbonate of baryta has been taken, Mr. TAYLOR recommends recourse to emetics and the stomach-pump; or, as chemical antidotes, a mixture of vinegar with an alkaline sulphate.

464. *C.* COPPER, THE PREPARATIONS AND COMPOUNDS OF, have been considered above (§§ 205. *et seq.*) with reference to the corrosive and acute action of these substances when administered in large doses or quantities. But, in smaller quantities, or in repeated doses, they act locally as irritants of the gastro-intestinal villous surface, and constitutionally as sedatives or paralysers of nervous and vital power; this latter effect resulting both from

the influence primarily produced by them upon the nervous systems, and from their operation through the medium of the circulation, upon the heart and nervous centres. The cupreous compounds are most likely to act in this way, and in a chronic form, when they contaminate articles of food, as remarked on many occasions. The salts of copper which are the most frequently administered in large doses for the purposes of suicide and murder, are the *sulphate* and *subacetate*, and these act chiefly as corrosive acute poisons as stated above (§ 205.). But these, as well as the other compounds of this metal, may be so employed or administered, as to produce the symptoms most characteristic of *acro-sedative* poisoning.—*a.* Inmost instances the gastric symptoms are similar to, but not so severe as, those attending the corrosive operation of the poison, whilst the nervous symptoms are of longer duration. There are generally burning pain in the throat and stomach, anxiety, vomitings, acute pains and great swelling of the abdomen, but no diarrhœa; afterwards painful and difficult deglutition, with swelling of the throat and face, oppression of the pulse, salivation and ulceration of the gums, spasms, convulsions, or paralysis, sometimes jaundice, &c. The irritability of the stomach and cramps, or paralysis, often continue long, and are attended by costiveness and dysuria or suppression of urine.

465. *b.* The *sub-chloride of copper*, oxychloride or Brunswick green, is sometimes formed when common salt has been used in a copper vessel, and in this way, as well as when employed as a pigment, it has given rise to accidental poisoning. A boy of three years swallowed about a scruple of this salt. Vomiting and coldness of the extremities followed and continued until death. On dissection there was no change indicative of the action of an irritant poison, excepting slight congestion of the vesssels of the brain.

466. *c.* Copper vessels are acted upon by articles of food or drink, especially if these articles contain saline substances, or acids, or become acid whilst kept in these vessels. Thus wines which are more or less acid, substances containing vinegar, or any other acid, soups or broths, especially if they contain vegetable matters, and are liable to become acid, and fatty substances, when kept only for a short time in copper utensils, are not infrequently productive of accidental poisoning. FALCONER and others have shown that metallic copper undergoes no change by contact with water unless air be present, when a hydrated carbonate, mixed with oxide, is formed. When an acid, or an oily or fatty matter is in contact with the metal, then this change more rapidly takes place, and the liquid or fat acquires a green hue. Hence no acid, oily, or saline liquid, should be prepared or kept in copper vessels. Nor should fruits, pickles, or preserves, be either kept or prepared in them. The quantity of the poison which may be formed in these circumstances may not be sufficient to produce fatal poisoning, but they may be quite enough to cause severe gastro-nervous, or acro-sedative effects. GMELIN was consulted respecting a violent disease which prevailed among a whole brotherhood of monks. The symptoms were obstinate and severe cholic, retching and bilious vomiting, flatus, costiveness, burning pain in the pit of the stomach, under the sternum, in the region of the kidneys and extremities, with paralytic weakness of the arms. He found, on inquiry, th all the kitchen vessels—the pots, pans, milk pa and butter dishes, were made of copper. Simi instances of culinary poisoning have been me tioned by CHRISTISON and other writers.

467. *d.* It is stated by Mr. TAYLOR, that the u of the alloy called *German silver* which is a so of *white brass*, consisting of copper, zinc, a nickel, and containing about 50 per cent. copper, may be productive of acro-sedative poiso ing where articles, as spoons, made of this allo are allowed to remain in contact with acid, oi fatty, or saline substances. A lady in Paris, 1838, after having had eels for dinner, w awakened in the night by headach, nausea, f lowed by vomiting and colic. Her physician certained that the eels had been cooked with but and vinegar in an earthenware vessel; and found the spoon, which was of German silv presenting on different parts greenish spots. Ch mical analysis showed that a poisonous salt copper had been thus produced; and the fact w further proved by polishing the spoon and placi it in a similar mixture. Half an hour afterwar green spots were perceived on the spoon, and twelve hours it was quite green, as well as butter in contact with it.

468. *e. Arsenite of Copper, or Scheele's Gre* being extensively used as a pigment, both in t arts and in confectionary, has occasioned danger effects. Dr. GEOGHAGAN informed Mr. TAYL that fourteen children in Dublin, in 1842, suffe symptoms of poisoning owing to their having ea confectionary ornaments coloured with this su stance; and jaundice followed in two or three those cases. Three lives were nearly sacrificed a school near Manchester by the same cause: th suffered from violent vomiting, severe pains the stomach and bowels, and spasms of the e tremities.

469. The green colour of the matters vomite in cases of poisoning by the cupreous compoun has been mistaken by some for bilious vomitin But this colour is generally owing to the poiso and not to the presence of bile in the vomit matters; for the bile is generally obstructed, a the liver and intestines more or less paralysed the influence of the poison on the organic nerv as shown by the jaundice, and by the flatulent a colicky distention of the abdomen in these cases

470. *f.* The *modus operandi* of the cupreo compounds appear to vary with the preparatio with the quantity swallowed, and the state of t stomach at the time, as respects especially t quantity and nature of the contents of this visc They certainly produce, as shown above (§ 207 a corrosive action on this organ when taken large quantities, and in other circumstances favou able to that action; whilst, in other cases, th action is but slight, the fatal issue chiefly resulti from the change produced by them in the nervo system. Their organic action, or the disorgani tion produced by them locally, is mainly owing their chemical combination with the albumen, with one or more of the animal tissues. Th evidently also affect the nerves of the part wi which they come in contact, altering the innerv tion of the surface or viscus. They are also mo or less imbibed by the surfaces and tissues a carried into the circulation, thereby further d pressing and otherwise changing the irritabili and innervation of the structures, the poisono

tion of the cupreous salts being produced in this y chiefly, especially when given in repeated ses, or applied to a wound, as shown by the sence of corrosive or other local effects, and by e fact of these salts having been detected in the ood and viscera of animals poisoned by them. r. DUNCAN found that the application of the lphate to a wound produced death in twenty- o hours, and yet the body appeared every where a healthy state; but SMITH and ORFILA state at the acetate applied to wounds caused only cal inflammation.

471. *g.* The *diagnosis* of cupreous poisoning is of me importance, seeing that the symptoms caused it closely resemble those produced by arsenic d corrosive sublimate. According to ORFILA, e first symptoms occasioned by the compounds salts of copper is violent headach, which is fol- wed by vomiting and cutting pain in the bowels, d by cramps and pains in the legs and thighs. enerally there is a coppery taste in the mouth d throat, and an aversion from the smell of pper. Jaundice is a common symptom, and is ver observed in poisoning by arsenic or sub- mate. Fatal cases terminate with palsy, insen- bility, and convulsions. This order of the sym- oms is, however, by no means generally ob- rved; for the headach often does not appear til after the vomiting; and the paralytic state, ther of the sensibility or the power of motion, is ten early. The chief diagnostic signs on which y reliance can be placed, are the coppery taste the mouth, with a peculiar astringency and atering of the throat, with ulceration in the ore chronic cases; vomitings and eructations of eenish, or greenish-blue matters, and frequently undice, or slight yellowness of the surface, hich, however, does not appear in some cases ntil after death.

472. Cupreous substances, when taken in mi- ute quantities for a long time, or when used by orkmen who are inattentive to cleanliness, ac- ording to the observations of PATISSIER, MORAT, d others, are productive of a greenish sallow hue the countenance; of an infirm and decrepit state the body; and of severe attacks of colic, with artial or slight palsy; the children of persons thue ndered infirm being ricketty and puny.

473. *h.* The *appearances on dissection* of fatal ses are most varied and uncertain. In some, the rrosive action of the poison already described § 207.) is the most remarkable, especially in the omach and duodenum. In others, equally or even ore rapidly fatal, little or no structural change these viscera is observed; nor even inflam- atory appearances of the stomach and bowels are et with. In the majority of instances, however, e alimentary canal is more or less inflamed; nd it very commonly presents a greenish hue, pecially the stomach, œsophagus, and duodenum. he external surface is generally jaundiced or ightly yellow. The blood is of a dark hue, and uid in some cases, and coagulated in others. The ngs and the sinuses of the brain are more or less ongested; and the brain is sometimes more ascular than usual.

474. *i.* The *Treatment* of the slow or acro- edative form of poisoning by cupreous substances hould be based chiefly on the method stated above § 208, *et seq.*). After the evacuation of the poi- onous substances as there advised, albuminous nd saccharine substances should be given, and irritability of the stomach ought to be quieted, as it tends remarkably to lower the depressed vitality of the frame, by opium conjoined with camphor and creasote, and by external derivatives applied over the epigastric region. If inflammatory action be manifested, the usual local and general measures indicated by the state and associations of this condition ought to be prescribed.

475. *D.* SALTS OF POTASH.—*a. Chromate of Potash.*—*Crome—Bi-chromate of Potash.*— This salt is extensively used in dyeing; yet poisoning by it is rare; but instances have been recently recorded. A concentrated solution of it causes all the symptoms and structural changes of corrosive poisons. In small doses it occasions vomiting, diarrhœa, paralysis, and death in the course of some hours. It appears to be more or less absorbed, and to depress and otherwise affect nervous and vital power. In a case described by Mr. WILSON, of Leeds (*Lond. Med. Gazette,* v. xxxiii. p. 734.), where a large quantity of this poison had been taken, the poisoned person not having been seen until soon after death, the countenance was pale, placid, and composed; the eyes and mouth closed; the pupils dilated; no marks of vomiting or diarrhœa, nor discharge from any of the outlets of the body, nor any stain upon his hands or person, or upon the bed-linen, or furniture, could be detected. On *dissection,* a pint of turbid inky fluid was found in the stomach. The mucous membrane of this organ was red and very vascular, particularly about the cardiac orifice. The brain, its membranes, and all the other viscera were quite healthy. The contents of the stomach furnished the chromate or analysis. In this case, the chrome produced neither vomiting nor purging, and did not act by any irritating influence; but by its sedative action entirely. Hence it may be viewed as causing, according to the dose, state of the stomach, and other circumstances, either a decided corrosive effect, or an acro-sedative action, or even a purely sedative or fatally depressing operation. The *treatment* appropriate to poisoning with this salt is recourse to emetics or the stomach-pump, and to the administration of magnesia or chalk, mixed in water.

476. *b. Nitrate of Potass.*—TARTRA denies that this salt possesses any poisonous properties; and it is stated to have been given, for medicinal purposes, in doses varying from six to twelve or even sixteen drachms in the twenty-four hours.—(*Med. Chirurg. Rev. April,* 1844, p. 549.) As it is much employed in the arts, accidents occasionally occur from it; and, in a large dose, as when taken in mistake for some purging salt, serious or even fatal results may be produced by it, although its effects are somewhat uncertain. Two men swallowed each one ounce of nitre by mistake for Glauber's salts, and almost instantly experienced a sense of coldness in the course of the spine, trembling in the limbs, with vomiting and purging; the stools were bloody. They recovered in the course of a few days. In another case recorded in the same work an ounce of nitre was fatal in thirty-six hours.—(CASPER's *Wochenschrift, b.* xviii. 1841.)

477. The *symptoms* and *structural lesions* produced by a poisonous dose of this salt will appear from the following details:—M. ORFILA states that a lady took an ounce of nitre by mistake, and in a quarter of an hour suffered nausea, vomiting, and purging; and the muscles of the face were

convulsed, the pulse weak, respiration laborious, and the extremities cold; but there was a burning pain in the epigastrium. She died *three hours* after taking the salt. On *dissection*, the stomach was found inflamed and the villous coat detached in places. Near the pylorus the inflammation approached to gangrene. A large quantity of fluid, coloured with blood, was found in the stomach.—Dr. Geoghegan communicated to Mr. Taylor the following case. — A man took, by mistake for salts, from an ounce to an ounce and a half of nitre. Severe pain in the stomach followed with violent vomiting, but no purging. He died in about *two hours* after taking the salt. On examination a bloody mucus was found in the stomach; the villous coat was of a brownish red colour, generally inflamed, and detached from the subjacent coat in places. None of the poison was detected in the stomach; but its nature was determined by the analysis of the portion left in the vessel from which it was taken. It is evident that the rapidity of the fatal result in this case was owing to the extent of the local injury, to the shock sustained by the constitution, and to the absorption, in a very short period, of so large a quantity of the salt into the circulation; this salt being rapidly absorbed, especially in solution, and acting not merely as an irritant, but also as a powerful sedative.

478. *c. Sulphate of Potass*, according to Mr. Mowbray (*Med. Gaz.*, vol. xxxviii. p. 54.), is much employed in France as a popular abortive, and when thus administered has proved not infrequently poisonous. It has also been employed in this country with the same object, and in one case, at least, with the same results, as shown by Mr. Taylor. In one case two drachms acted most powerfully, and in another four drachms, administered to a lady after her confinement acted as an irritant poison. Another lady took, about a week after her delivery, about ten drachms of this salt, in divided doses, as an aperient. After the first dose she was seized with severe pain in the stomach, with nausea, vomiting, purging, and cramps in the extremities. These symptoms became augmented after each dose, and she died in *two hours*. On inspection the villous surface of the stomach and intestines was found pale, except the valvulæ conniventes, which were reddened. The stomach contained much erddish liquid, which was found to contain only sulphate of potass.

479. *d. Oxalate of Potass.—Salt of Sorrel.—Binoxalate of potass* is an active poison, owing chiefly to the oxalic acid. It is much employed under the name of "essential salt of lemons," and instances of poisoning have occurred from its having been taken by mistake, some of which have been adduced by Mr. Taylor. The following case is recorded by Mr. Jackson. A female, aged 20, took about an ounce of this salt in solution. About an hour and a half afterwards she was found on the floor quite faint, having been very sick. The nature of the poison was soon ascertained, and four ounces of mistura cretæ were administered. She was then in a state of extreme depression; the pulse could hardly be felt; the skin was cold and clammy; the lips and face were pale, and rigors continually affected the whole body. She complained of a scalding sensation in the throat and stomach, of pain in the back, of soreness of the eyes and dimness of vision. The conjunctivæ were injected and the pupils dilated. She w wrapped in warm blankets, æther, tincture opium and camphor were administered, and r action took place. The patient afterwards r covered. Most probably the greatest part of tl salt had been thrown off the stomach before sl was found. The treatment of this case throug out was as judicious as successful. — (*Med. Ga* v. xxvii. p. 480.) A lady, recently confined, to by mistake an ounce of this salt. She had scarce swallowed the dose when she was seized wi violent pain in the abdomen and convulsions; sl died in eight minutes. The mucous membrane the stomach and small intestines was found i flamed. A tea-spoonful of this salt was taken f three successive mornings, and produced seve vomiting; about an hour after the third dose tl patient expired. There was no examination of tl body. It is evident from these cases, that tl salt is a powerful acro-sedative poison; its d pressing operation being most energetic.

479*. *e. Bi-turtrate of Potass.—Cream of Tart* is a most useful medicine, even in large doses; b it may be poisonous if a too large quantity l given. I have prescribed as much as two drachr three times in the day, in cases of dropsy co nected with obstruction in the liver, with gre benefit; but this dose should not be continued lon and its effects should always be carefully watche Mr. Taylor states, on the authority of Mr. Tyso that a man took four or five table-spoonfuls cream of tartar, and was seized with violent v miting and purging, with pain in the abdome thirst, feebleness of pulse, and a paralysed state the thighs and legs. The fluid vomited was a dark green colour, and the motions had tl appearance of coffee-grounds. Death took pla in forty-eight hours, and, on *inspection*, the villo coat of the stomach and duodenum was four highly inflamed; the cardiac portion of the st mach being of a deep red colour, with spots black extravasation. This organ contained a thi brown fluid, coloured by bile. The intestin canal was more or less inflamed.

480. *f.* The *nitrate of soda*, the *sulphate of mag nesia*, the *biborate of soda*, the *chloride of sodiun* and other salts, which are harmless in small moderate quantities, are injurious, and act as i ritants and depressants when taken in large excessive doses, especially in states of disease of constitution which are favourable to their ir jurious operation.

481. vii. The Sulphurets of Potassium an Sodium. — *The alkaline sulphurets* have ver rarely occasioned poisoning in this country; bu they have caused fatal accidents in France, whe they are frequently employed for baths an for the manufacture of artificial sulphureou waters. They act as powerful irritants of th digestive mucous surface and depressants of nerv ous and vital power, exhausting at the same tim the irritability of contractile tissues. These latte effects are in great measure owing to their al sorption into the circulation. M. Orfila an M. Cayol have recorded cases of poisoning b these sulphurets. The quantity taken in each c these was three drachms and upwards. Two c the cases terminated fatally in less than *fiftee minutes*, the other patients who recovered wer dangerously ill for some days. The rapidly fata effects of these poisons were probably owing mor to the change produced by them in the state o

anic nervous influence, than to disorganization
he villous coat of the stomach.

482. *a.* The *symptoms* in these cases were burn-
pain and constriction in the throat, gullet, and
mach; frequent vomiting; at first sulphureous,
air of the chamber being tainted with *the odour*
sulphuretted-hydrogen, and afterwards sanquin-
ent; purging, at first sulphureous, afterwards
cous and bloody; sulphureous exhalations from
mouth; acrid taste on the palate; pulse quick,
erwards feeble, fluttering, and almost imper-
tible; followed, in the cases which recovered,
inflammatory reaction of the digestive canal,
ending to the œsophagus; and by mortal faint-
ss and convulsions in the fatal cases.

483. *b.* The *structural changes* in the fatal in-
nces were great lividity of the face and extre-
ties, and loss of the muscular contractility im-
diately after death. The stomach was red in-
nally, and lined with a crust of sulphur. The
odenum was also red. The lungs were soft,
rged with black fluid blood, and did not cre-
ate.

484. *c.* The *treatment* seems to consist in the
tant administration of any diluent at hand, and
quent doses of common salt. If inflammation
the stomach, &c. supervene, local and general
tiphlogistic measures and external derivatives
ll be required. Dr. CHRISTISON observes, that
e chloride of soda may be called the antidote
ainst this poison, as it decomposes the sulphu-
ted hydrogen which is evolved; the rapid dis-
gagement of which he considers to be the cause
death in the quickly fatal cases. The chloride of
ne is equally efficacious with the chloride of soda.

485. viii. TARTARIC ACID. — Oxalic acid in
all doses, and tartaric acid in large quantities,
e productive of nearly similar effects. *Tartaric*
id has, until lately, been regarded as not poisonous.
ut an instance lately occurred of this acid having
en given to a man instead of aperient salts, in the
se of one ounce, with fatal effect. The whole of
is swallowed at once dissolved in warm water.
e immediately exclaimed that he was poisoned;
mplained of a burning pain in the throat and
mach, and compared the sensation to that of
ing all on fire. Soda and magnesia were ad-
inistered with diluent drinks. Vomiting commen-
d and continued until his death, which took place
ne days afterwards. Tartaric acid was found in
e dregs of the cup; and the person who made the
istake admitted the act and the substance which
had thus given. On *inspection of the body,* nearly
e whole of the alimentary canal was found in-
med. — (See TAYLOR *in Op. Cit.* p. 104.)

486. The *Treatment* of poisoning with this acid
the same as that for *oxalic acid* (§ 166.), which
hen given in smaller quantities than those usually
oductive of the corrosive action described above
§ 160. *et seq.*), is partially absorbed, and, with its
cal irritating operation, occasions also marked
pressing and paralysing effects; and either an
ute, or sub-acute or chronic form of poisoning,
cording to the quantity taken, the circumstances
the case, and the treatment employed soon after
s ingestion. In the slower form of poisoning by
alic acid, as well as that by *tartaric acid,* as
on as the poison is removed by vomiting or the
omach-pump, remedial measures should not be
nfined to the removal of the local irritation
erely that is produced by it, but ought to be
tended to the restoration of the nervous and vital
powers which are more or less depressed by the influence of the poison on the nerves of the alimentary canal, and, by absorption, upon the heart, nervous centres and constitution generally; and with these intentions the means already recommended for the more energetic acro-sedatives will be found the most successful for the removal of the consecutive effects, and for the slower forms of poisoning caused by small doses of oxalic acid, and by large quantities of tartaric acid.

487. ix. THE NECROSCOPIC POISON. — POISON IMBIBED FROM RECENTLY DEAD BODIES. — *A. Source and nature of the poison.* The fluids of bodies recently dead, or that have not passed into an early stage of decomposition, not infrequently produce the most dangerous effects, especially when they come in contact with an abraded surface, or are inoculated in any way. The effects vary with the disease of which the person died, with the constitution of the infected individual, and with other circumstances. I have had several occasions of observing and treating the effects of this species of animal poison. Since I first published my views as to the nature and treatment of these effects, in 1823, and again in 1833, I have been more fully convinced of the accuracy of these views; and moreover, they have received the support of experienced observers, and especially of Mr. TRAVERS, in more recent publications. The poisonous action of the fluids of dead bodies is most acutely exerted when these fluids are inoculated; but they sometimes act upon the perfectly sound skin — there being no scratch, puncture, or abrasion through which they could be introduced; the existence of either of these greatly facilitating and aggravating their operation. In the observations I offered respecting this poison, (in the *London Medical Repository for July,* 1823,) I stated, — 1st. That this poison is distinct from any other animal poison, generated or transmitted during life; — 2nd. That it is different, in its nature and effects, from putrid animal matter; — 3rd. That it does not appear to exist in the blood, either during life or after death; — 4th. That it is produced during the changes which are more immediately consequent upon the loss of life; — and 5th. That it is present, chiefly, in the secreted and exhaled fluids on the surface of membranes, especially serous membranes, or in cellular or parenchymatous parts. I then remarked that, as respects the distemper inoculated from another body which has recently ceased to live, and as regards the nature of the animal poison which causes the distemper, and the manner of its operation, it may be inferred, that it is produced by the textures before their vital properties and cohesions are quite extinct, because putrid animal matters occasion different and less dangerous effects; — that as all morbid poisons possess certain properties bestowed on them by the organic nervous or vital influence of the vessels and structures secreting them, in consequence of previous disease either of these parts or of the frame generally, which properties they preserve for a time until the elementary particles composing them enter into different combinations, so may the secretions and fluid exhalations occasionally experience, during the period in which organic nervous influence and vitality are forsaking the tissues which secrete them, such a change as amounts to the acquisition of virulently poisonous properties, —

and that these fluids, thus changed, affect the nerves of the part to which they are applied, and, consecutively, the whole frame; the cellular tissue in the vicinity of the glands above the seat of inoculation generally evincing more or less disorganization, and sometimes, also, the integuments, the fasciæ and tendonous sheaths, the absorbents or veins, or both, and even the serous surfaces of adjoining cavities. This poison being productive of the most dangerous effects, and on numerous occasions, it is of the utmost importance, especially to medical men themselves, that its operation and its counteraction and treatment should be carefully investigated.

488. *a.* The poison communicated by recently dead bodies has been described, and illustrated by the details of cases, by Dr. Duncan, as constituting a form of diffusive inflammation of the cellular tissue, and by Mr. Travers, as occasioning a variety of constitutional irritation. But the doctrine inferred from these denominations is too restricted to be applicable to the distemper which this poison developes. Diffusive inflammation of the cellular tissue certainly often exists as a consequence of the contamination produced by the poison; but it is preceded and attended by constitutional effects — by states of the circulation and nervous system — of the most malignant or virulent description. Constitutional irritation is equally present, and is certainly more or less immediately consequent upon the local irritation, impression, or alteration, or whatever the local effect may be; but so are depression of organic and cerebro-spinal nervous power, changes in the states of vascular action and of the blood, asthenic inflammation of the cellular tissue, and often also of the integuments, or of the absorbents or veins, or of adjoining serous surfaces. The truth is, that this poison produces an almost specific effect upon the tissues in the vicinity of glands above the seat of its application; but this effect may be limited to the cellular tissue, or extended to several other tissues; it may be confined to the axilla, or extended to more deep-seated parts; it may not implicate, in a visible manner, any of the structures of the arm, although the poison was inoculated in the finger, and the cellular tissue in the axilla is most extensively diseased, no change between these situations being detected; and it may most virulently affect the nervous and vascular systems and depress vital power and resistance, when the local changes are the least extensive or apparent.

489. *b.* It is of some moment to know the *diseases which impart this poisonous property* to the recently dead body; but, as to this, we have no precise information. Although the distemper which is the result has most frequently been produced by the inoculation of the fluids of bodies which had died of inflammations of serous surfaces, or of erysipelas, or of puerperal diseases, yet has it occurred also after the inoculation of the fluids of bodies which have died of other visceral or inflammatory maladies — of enteritis, peritonitis, &c. More than one person have even been infected by the same dead body, this occurrence evincing a greater virulence of the poison in that body, owing either to the nature of the disease of which it died, or to the period after death at which the examination was made. That this has probably depended chiefly upon the former of these causes may be inferred from its frequent occurrence when the body has died of erysipelas, pu peral peritonitis, or other states of puerpe fever; whilst on the other hand, there is equal, not stronger, reason to believe that the poison i bibed in dissection is not the result of diseas action, simple or specific, in the living subje but is altogether generated immediately aft death; although certain diseases may favour generation at this period. That the poison is n the result of the disease of which the patient di is shown by the facts, — 1st. That this poison h been imbibed during the examination of bod of persons who have died suddenly, and in healt in consequence of accidents — that poisono effects have been produced by the fluids of body which has been killed by an accide or has died of a non-contagious disease: 2d. That the distemper developed by this pois presents a specific character, differing only in t degree of severity and the extent of the co tingent local inflammation, whatever may ha been the malady of which the subject whi furnished the poison died. Still the larger prop tion of cases of this distemper have their orig from the fluids of bodies recently dead from i flammations, by which an abundant exudation morbid fluids is accumulated, and in which t thoracic and abdominal viscera are examined a handled. In most instances which have fall under my observation, the bodies from which t poison was imbibed were still warm when e amined; and many of them had died of puerpe diseases. Mr. Travers remarks also, that t subjects were recent. Not one had been burie some were yet warm. Even of those in whi demonstration, not inspection, was the object, t bodies were in a perfectly fresh state; and he r marks a circumstance, which has also struck m namely, that when the dissection has been pe formed before the body has entirely parted wi its warmth, a faint and peculiarly oppressive odo is emitted, which is disagreeable, not to say r volting, even to persons habituated to dissectio and which not infrequently creates nausea.

490. *c.* The question may be asked, Whether not the poisonous fluid may produce its effe when applied to the *perfectly whole cutaneo surface*, or only when this surface is puncture or the cuticle abraded, in the part which com in contact with it? I can answer this question the affirmative from my own experience, and fro statements made to me by others, in the freque habit of making inspections. I have seen seve constitutional disorder of the specific kind pr duced by this poison in two instances, in whi the subjects had died of puerperal disease, t surgeons who assisted me in the examinatio and who thus imbibed the poison, having h no abrasion of the cuticle whatever. The flui accumulated in the serous cavities occasione in these two instances, a sensible smarting ov the surfaces with which they remained for a ti in contact. But I believe that such instanc are rare compared with those which are owi to some scratch, abrasion, or puncture of t cuticle.*

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* The following cases, abridged from Mr. Traver work, are remarkable, as they are examples of a d temper, in the local and constitutional symptoms, clos akin to, if not actually identical with, that produced the poison imbibed from recently dead bodies, althou the poison, in the second and third cases, was imbib from the secretions of the first case, whilst she still liv

491. *d.* Another question suggests itself, namely,
ether or no this poison is the same as the in-
tious emanation which caused the disease of
ich the person died — is allied to a specific con-
gion existing still in the body which has died in
sequence of it? We know that the poison
der consideration is frequently imbibed from
dies which have died from puerperal diseases,
m visceral inflammations, from erysipelatous
d other maladies. But the distemper produced
this poison is not in any respect the same as
y of these diseases, there being no further resem-
nce than in the febrile disturbance present in all
them, and in the vital depression and weak state
vital resistance. That small-pox, syphilis, ery-
elas, glanders, and even scarlet fever may be
nsmitted by the recently dead body; and that
power of transmitting these specific contagions
y be retained by the bodies which have died of
m for a considerable but an indefinite time, I
ieve; but when the body is surrounded by
thes of any kind, this power of transmission is
ained by the clothes rather than by the body
lf; for, as soon as the latter undergoes decom-
ition, the power of transmitting the specific
lady which caused death appears to have ceased,
ecially if there be a free admission of atmo-
eric air, because the contagious secretions are
o decomposed, and, by their decomposition,
e lost their specific and poisonous properties.
cannot, however, be inferred, that the distemper
duced by the poison imbibed from recently
d bodies is allied to any of the maladies which
most frequently caused the deaths of the bodies
m which the poison was imbibed.

492. *B. Symptoms.*—(*a*). In some cases, the following is the usual procession of morbid phenomena.— 1. A few hours after puncturing a finger in the examination of a body, pain is felt in the puncture. It soon increases to the utmost agony, and is attended by symptoms of constitutional irritation, the nervous system being agitated to a violent degree. No trace of inflammation, beyond slight redness of the puncture is observable; and no evidence of inflammation of the absorbents or veins can be detected. In a case recorded by Mr. TRAVERS, death took place forty hours after the puncture was received, with all the symptoms of agonising excitation of the nervous system, the distemper resembling hydrophobia.—2. In other cases, the puncture is also not attended by any evidence of inflammation, but, in ten or twelve hours afterwards, feelings of indisposition are complained of; violent rigors are soon experienced, followed by febrile reaction, nausea, or vomiting, and most rapid pulse. Severe pain is felt about the shoulder, axilla, or pectoral muscle; but no trace of inflammation can be detected between the puncture, generally of a finger, and the seat of pain. Anxiety, depression of spirits, delirium, profuse perspiration, singultus, most rapid and small pulse, insensibility and death supervene.— 3. In some instances, from ten or twelve to twenty-four hours after the imbibition of the poison, languor, depression, shivering, and sickness at stomach are experienced; a *vesicle*, or *pustule* resembling that of small-pox, is observed in the punctured or abraded part, and pain is felt in the shoulder or axilla, or both, but without any sign of inflammation of the lymphatics, or of any other tissue of the arm. The pain extends to the breast of the same side, and is attended by nervous excitement, thirst, watchfulness, headach, a hot and dry skin, a frequent and weak pulse, afterwards by delirium, irritability of stomach, by swelling, or redness about the axilla or pectoral muscle, by sinking of the powers of life, and often by death.— 4. In other cases, no vesicle or pustule forms in the seat of puncture, but severe constitutional symptoms are rapidly developed; the pulse in a day or two rises to 120 or 130, delirium soon appears; slight swelling and excruciating pain affect the axilla and breast, attended by diffuse swelling, patches of colour, and severe pain in different and distant parts of the body, by nausea and vomiting, by singultus, and sometimes by yellowness of the conjunctiva and skin; followed by a weak, small, and rapid pulse, exhaustion, laborious breathing, and death.— 5. In all the preceding *phases* of this distressing distemper, the puncture or abrasion by which the poison was imbibed, and the tissues in the vicinity have presented no alteration, excepting the superficial vesicle or pustule observed in some instances, and no local lesion or disorganization appears, until after the constitutional symptoms have been fully developed, and then it takes place near or on the trunk, in the situations already mentioned. But, in another class of cases the wound or puncture of the finger suppurates, not however until after severe constitutional symptoms have appeared, especially rigors, vomitings, pain in the axilla or shoulder, very rapid pulse, physical and mental depression, with white or loaded tongue, dry and hot skin, &c. The puncture or abrasion now begins to suppurate, and swelling extends along the finger and sometimes over the hand. Sphacelation of the cellular tissue, and often also of the tendonous structures, takes place; the pain in

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st *Case.* A female while suckling, had a poisoned
nd of the finger, followed by pain, fever, and de-
m. The pain extended from the finger up the arm,
g the neck, to the tip of the ear. Matter formed
hin the proper sheath of the flexor tendon of the
er, and the wound in the finger continued to dis-
rge freely after the sheath was laid open. Delirium,
id pulse, &c. continued, and was followed by rigors
profuse colliquative sweating, and soon afterwards
extreme depression, and death. — 2d *Case.* The
d-servant who fomented this woman's hand, on the
d day after the incision of the finger, complained of
and tension of the point of the fore-finger of the
t hand, with constitutional disturbance and delirium.
had neither wound nor scratch of any kind. Acute
ial inflammation of all the fingers, back of the hand
forearm followed, and abscesses formed, requiring
incisions. — 3d *Case.* A laundress who washed the
ts taken from the bed of the first of these patients,
rtly before her death, "had no sooner opened and
ersed them in water, than she was overpowered by
fluvium, which she described as peculiarly offensive,
instantly complained of a most severe darting pain
he axilla and shoulder. Nausea and faintness fol-
ed, and in the evening she had a rigor which lasted
e hours. In the morning she was much fevered, and
the two succeeding nights violently delirious. The
she now complained of affected the outer side of the
er arm, from the elbow to the shoulder, but there
neither redness nor swelling of this part." After-
ds the pain shifted to the axilla and pectoral region,
two days afterwards a deep pectoral abscess pre-
ed itself. She ultimately recovered. In neither of
second or third cases was there any breach of the
cle, by which absorption of, or contamination by, a
onous fluid could be facilitated. Mr. TRAVERS adds,
the laundress was attacked at the one and the same
ant with nausea and faintness from the stench, and
acute lancinating pain from handling the linen;
that a woman who was present informed him that
laundress turned as pale as death, and exclaimed
agony, from the pain she felt in the arm within two
utes of unfolding the sheets. I quite agree with this
able surgeon in remarking, that this was surely the
ation of a subtle poison on the nervous system; as
only through this medium, that it could operate so
antaneously.

the axilla or shoulder is followed by diffused and slightly coloured swelling, extending sometimes to she integuments of the same side of the body. As the disease continues, headach, watchfulness, delirium, irritability of stomach, thirst, and singultus, vary in severity; and, if no alleviation take place, these symptoms increase; the physical and mental exhaustion are extreme; restlessness, followed by insensibility and coma appears, and death takes place after periods varying from four or five to twelve or fourteen days.— 6. In other cases, a diffused swelling, tension and redness affect the wounded finger, subsequently to the occurrence of severe rigors, prostration of strength, frequency of pulse, and other constitutional symptoms. The swelling, tension, and redness extend to the hand, or up the arm, upon which numerous vesicles form, followed by tumefaction, and insulated patches of colour on the shoulder, breast, and back, on the same side of the body. The febrile and the nervous symptoms continue to increase with the development of local lesions; and the pulse, strength, and constitutional powers generally become weaker, death taking place in the majority of cases after periods varying as just stated.— 7. In some instances after the appearance of rigor, fever, nervous and other general symptoms, the axilla becomes painful and swollen. Diffusive inflammation proceeds extensively from this part through the cellular tissue, extending in some cases to both sides, and suppurates or sloughs; inflammation of and effusion into the pleura, often ultimately supervening. Death generally takes place in these cases, with the usual symptoms, and after the indefinite period already mentioned.

493. From the above brief account of the *several phases* of this dreadful distemper, it may be inferred that the local inflammatory action is an unessential and subordinate feature of the disease in its severest forms; that the distemper actually consists of prostration of the nervous influence and vital energy generally, the local irritation arising from the impression or imbibition of the poison occasioning slight change of structure in some instances, and more extensive inflammation and disorganization in others, as already noticed, and as will be more fully described; and that the contamination produced by this poison is characterized by preternatural excitement of the nervous and vascular systems, without power or vital resistance, that soon passes into rapid exhaustion. A circumstance deserving of notice in this distemper is the remoteness of the local inflammation, in the great majority of instances, and in all its above phases, excepting the sixth, from the part at which the poison is imbibed; and the absence of any sign of inflammation of the absorbents or veins in a great proportion of the cases between the seat of injury and that of pain and inflammation. But this phenomenon is also remarked in other maladies produced by a specific animal poison, as syphilis. It would appear that this poison, whether conveyed by the absorbents or by the nerves, especially those supplying the blood-vessels, affects the glands of the axilla, and probably also the axillary plexuses of nerves, in an especial manner, and that the surrounding cellular tissue becomes asthenically or diffusively inflamed in consequence, and the consecutive lesions are thereby produced.

494. C. *Prognosis.* — Much depends upon the severity of the constitutional symptoms at an ear period of the distemper, and upon the treatme then adopted. Those cases in which the loc affection is the least severe, and the nervous ar febrile symptoms most prominent, are the mc dangerous; and, if the disease be not arrested an early stage by most decided means, the symptoms, and with them the local inflammatio rapidly increase and pass beyond the influence any remedial means whatever. — *a.* The prognos is generally most *unfavourable*, when the irritabili of the stomach extends to the diaphragm and attended by hiccup; when the tongue becom brown or dry, or both; when the pulse rises abo 120 in a minute, and is weak or small; wh anxiety and mental depression are great, t features sunk, or the extremities cold; when lurid, dirty, cachectic or yellowish hue of t countenance and general surface is observed, ar more especially early in the distemper; when t individual has been previously out of health, cachectic, or the subject of disease of the heart, of a varicose state of the veins; and when deliriu becomes continued, and is attended by unconscio evacuations. In these circumstances, few or hopes of recovery may be entertained, but, neve theless, active measures, such as I shall recommen should not be relinquished. If these symptoms accompanied with signs of extensive local d organization, the chances of recovery are din nished, owing to the probable absorption of mort matter into the circulation. Still energetic me sures should be prescribed; but unless the measures are of a powerfully restorative kind th will be productive of no benefit, especially hiccup be present; and even when most restor tive they may fail, or may not be retained on t stomach, particularly at a far advanced stage the distemper.

495. *b.* A more *favourable* result may be a ticipated if the pain is less violent, if the pul becomes less frequent, and the delirium is on present at night. If sleep be obtained, if t tongue continue moist, if singultus be not preser and if medicines be retained on the stomach, mc sanguine hopes of recovery may be entertaine As respects the local affection, much will depe upon the rapidity and extent of its progress und the integuments and muscles of the affected sid and the amount of ease obtained from incisioı and the discharge of purulent matter. If the d charge be followed by a limitation of mischief disorganization, and if the inflammation of t deep-seated cellular tissue has not implicated t pleura, it may be hoped that such measures assist vital resistance may still prove successf not only by arresting, but also by remedying t already existing disorganization. Of eight ca which I have seen of this distemper, seven covered; but all these came under my care at early period. The fatal case occurred in a gent man who was the subject of varicose veins, a was otherwise cachectic. I saw him shortly l fore his death, which took place after a sh period from the imbibition of the poison during t examination of a recently dead subject; t local symptoms in his case having been slight, l the nervous and constitutional disturbance m severe and rapidly fatal.

496. *D. Appearances after death.* — These ha been but imperfectly described, and comparativ

w of the fatal cases have been examined. The sions observed are, 1st, Those which are found the external parts of the body; and 2d, those hich are detected in the cavities and in the iscera.—(*a*). In the former, the changes are in me instances very slight, or hardly appreciable, nless in the vicinity of the axillary glands, in hers most extensive. These changes may consist serous infiltration of the cellular tissue sur- unding these glands, which are generally more less enlarged or inflamed, or both, or of a sero- uriform, or puriform infiltration, with or without struction of the cellular tissue itself, as de- ribed in the article on diffusive inflammation of e CELLULAR TISSUE (§§ 20. *et seq.*). In some stances the disorganization proceeds so far be- een the pectoral and respiratory muscles as to plicate the pleura, the external surface of the *stal-pleura* being also inflamed. The *muscles* emselves are sometimes changed, especially in e vicinity of the sphacelated cellular tissue, or of e collections of puriform matter; the muscular res being of a dirty yellow colour, and devoid of hesion. The *veins* are sometimes implicated, t seldom to a great extent, unless those which ss through the inflamed and disorganized cel- lar tissue. The *absorbents* between the punc- re and the axillary glands sometimes betray change, neither the superficial nor the deep- ated. In some instances, these vessels appear ickened or enlarged, and are, in various places, rrounded by sero-puriform, or puriform collec- ons, in small quantities, in the cellular tissue. he *arteries* of the limb are rarely altered, ex- pting the smaller branches, which either supply e disorganized cellular tissue, or which traverse

The state of the *nerves* has not been accu- tely observed, or has been reported as not ma- rially changed; but in one or two instances the rves of the arm, especially the internal cutane- us nerve, have been found inflamed. The *oneuroses*, the *fasciæ*, the *thecæ*, and the *tendons*, ve sometimes been found inflamed, or sur- unded by, or covering, or containing puriform atter or pure pus. Lesions of one or more of ese structures are chiefly seen in those cases, hich are noticed as constituting the fourth, th, sixth, and seventh phases of the distemper 492.); in many of those cases, which are ranked nder the first, second, and third phases, these sions, excepting those of the cellular tissue and illary glands, are either wanting, or so slight as ot to be remarked. The lesions of these several ssues are generally most remarkable, when the mb and external parts in the vicinity of the illa present the more evident signs of disease or isorganization; and the symptoms during life ary with the texture, more especially implicated, shown in the articles upon the diseases of these xtures. In the majority of cases, and more pecially when the poison has been imbibed from very recent or warm subject, no alteration can e traced after death in the arm, or any connec- on between the abrasion or puncture of the nger and the changes existing in the vicinity of e axilla and pectoral muscles, more than could e observed during life.

497. (*b.*) If the external alterations have been ut superficially observed, the visceral changes onsequent upon this poison have been still more nperfectly described—if, indeed, described at all. The most prominent lesions have been observed in the *pleura*, particularly in that of the affected side, when the diffuse inflammation of the cellular tissue and its consequences have extended to the pleura. In these cases, the pleura is inflamed, generally throughout that side of the thorax, and the cavity contains a turbid serum, or a large quantity of bloody serum, with flakes of lymph floating in it. The inflammation extends from the costal to the diaphragmatic and the mediastinal pleura, and even to the pericardium, the pulmonary pleura being also inflamed. The *lungs* are rarely affected, but they have been found more or less congested. The *heart* has been seen somewhat flabby; and its right side and *vena cava* have presented inflammatory appearances. The stomach, intestines, liver, &c. are generally represented as natural; and the brain, spinal chord, and their membranes either have not been examined, or they are said to have been unaltered,

498. *E. Causes predisposing to infection by this poison.*—There are manifestly circumstances which predispose to the infection of this poison, and increase the virulence of the distemper produced by it. Attention to these causes may aid in preventing, or even in counteracting its effects. The operation of this, as well as of all animal poisons, is favoured by whatever lowers the powers of life or weakens the vital resistance to injurious agents, — by the depressing emotions, by fear especially, by disordered states of the digestive organs, or by accumulations of secretions and fæcal matters in the digestive canal; by a languid, impoverished, or an impure state of the circulating fluids; by general cachexia or anæmia; by fatigue, want of sleep or exhaustion of nervous energy; by excesses of all kinds; and by an irritable and susceptible state of the nervous system. Probably also idiosyncrasy, the nervous and irritable temperaments, a debilitated state of the frame, or natural delicacy of constitution or conformation, favour the morbid impression of this poison, and impart a greater intensity to its effects. My experience has shown that these circumstances are influential in the way now stated; whilst their opposites are equally influential in resisting the operation of the poison, or in rendering the effects less dangerous.

499. *F. Nature of the distemper.* — The constitutional symptoms are generally the same in all cases of this terrible malady, and differ merely in severity and the rapidity of their course. They always precede the more prominent local alterations, but become more severe with the progress of these. In addition to several other phenomena characteristic of this distemper, it is generally observed, in the more prolonged cases, that previously to a termination in death or recovery, swelling and inflammation affect a portion of the limb interposed between the original wound and the first seat of pain. The swollen parts present a redness very unlike that of erysipelas; for the tint is that of peach-blossom, and is very small in extent compared with the extent of the swelling, and is seen for a very short time — perhaps for a few hours only, never longer than a few days, on the same spot, and next is observed in some distant part, possibly even on the opposite limb. Besides, this peculiar redness, vanishing quickly from a part, does not leave any vesication or disquamation after it, as is seen in cases of erysipelas. When

the swollen parts are incised they yield only a small quantity of blood, or serum and blood, unless the incisions are delayed until the effused fluid assume a puriform character. On this topic Dr. Colles remarks that this peculiar disease, the effect of slight wounds received in dissection, presents much less of inflammation of the wound or its vicinity than occurs in the various diseases to which slight injuries more frequently give rise. Here the injury seems to produce mischief by exciting a fever, which in its turn induces a swelling and redness of very peculiar character, although at length (if the patient chance to survive) it will end in inflammation and suppuration of the wounded limb. (*Dub. Hosp. Rep.*, vol. iv. p. 247.)

500. Having seen the inoculation of this poison so frequently during examinations of puerperal subjects, and of persons who had died of erysipelas, the question suggested itself — Can the distemper which results be merely a form of erysipelas produced by inoculation? But this idea was met by the fact that it has been caused by wounds or abrasions received in the examination of recent subjects, irrespective of the disease which produced death, although my experience has shown that these maladies, and inflammations of serous membranes attended by fluid effusion, have most frequently occasioned it. There still remains much to be ascertained respecting it, before accurate views as to its nature can be entertained; for the changes produced in the nervous systems and centres, the appearances of the blood, both during life and after death, and the possibility of propagating a similar distemper by the serous fluids of the body of one who has died of it, or by the secretions during life, have not been investigated. Strongly impressed with the imperfect state of our knowledge of the pathology of this distemper, owing chiefly to the very superficial examinations of the bodies of those who have died of it; and to the general adoption of a very injurious practice in the treatment of it — a practice which has proved unsuccessful in the great majority of cases for which it has been prescribed, and which is yet persisted in with little variation, I would nevertheless suggest the following views as to its nature, especially as they have been the basis on which I laid my indications of cure in the cases which were treated successfully.

501. *a*. The poison communicated by, or imbibed from, a recently dead human body is of a specific nature, and produces a specific malady — specific more especially as respects the constitutional symptoms, and peculiar, as just shown, as regards the consecutive pain and inflammation in the axilla, arm and side.

502. *b*. This poison is connected with the secreted and exhaled fluids before they have undergone any change or decomposition, and before any of the properties imparted to them during life, or during the departing vitality of the frame has escaped from them; the loss during decomposition of properties derived from, or depending upon, the state of vitality, rendering them inert. In these respects — as regards the source of morbid properties, and the loss of those properties, the fluids producing this peculiar malady in every respect resemble the fluids infecting small-pox, measles, scarlet-fever, &c. — are identical with the infection of the exanthemata; decomposition or putrefaction destroying, whil
recent production increases, the poisonous pr
perties.

503. *c*. There is every reason to infer, fro
facts already before the profession, that this pois
exists, probably in various and varying grades
activity in the serous and exhaled fluids of
human bodies recently dead, whether from a
cident or disease, and irrespective of the nature
the disease; but that certain maladies, especial
those in which the serous membranes and t
circulating fluids are most liable to be especia
affected, as puerperal diseases, erysipelas, peri
nitis, &c. appear, in the present state of o
knowledge, to cause this distemper the most f
quently.

504. *d*. We do not possess evidence of this
fection being communicated by a person labouri
under the effects of the poison — by a livi
person*; and this may arise from the circumstar
of the fluids, which are more especially or s
cifically infectious or poisonous, being those whi
exist in shut or serous cavities or in viscera, a
which cannot hence be imbibed during life;
though other fluids, exhalations or secretions, whi
are probably less poisonous or infectious, m
communicate a modified or less virulent mala
as indeed seems to have been the case on so
occasions, as noticed below.

505. *e*. The morbid impression made by the p
sonous fluid imbibed from a recent subject, see
primarily to affect the nerves of sensation in c
nection with those of organic life; and, as th
nerves are intimately associated with the vessels
absorbents of the limb, on the one hand, and w
the ganglial system on the other, the morbid i
pression or irritation produced by the poison
followed by a general disturbance or tumult of
the functions actuated by the ganglial or

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* Dr. Nelson states, in his account of the illness
Mr. Newby, who died from the effects of this pois
that Mr. N.'s assistant had an erysipelatous inflam
tion of the fauces, and the pupil an attack of low fe
during the latter part of Mr. Newby's illness; that
housemaid was severely affected with cynanche ton
laris; that the nurse had a slight attack of pyrexia, w
pain and stiffness at the back of the neck, followed
erysipelas, which proved fatal; and that another
assisted just after Mr. N.'s death had also erysipelas,
recovered. Dr. Nelson adds, "Was the disease wh
destroyed Mr. N. erysipelas produced by inoculat
and affecting the cellular substance of the breast
parts adjoining? Did the five cases which occur
during his disease and after his death, arise from er
pelatous contagion?" — (*Med. and Phys. Journ.*, A
1823.)

Mr. Delph, surgeon, imbibed this poison from a
man who had died a few hours previously of visc
inflammation; the body being still warm when it
examined. The woman who nursed this person
washed the linen was seized with fever. Mr. Smart,
assisted Mr. Delph in this examination, was also
tacked with symptoms of low fever on the second
afterwards, and with numbness and inability to m
the right arm. The side became tender and swoll
the fever typhoid, and the sensorium much affect
During the early part of Mr. Smart's illness he
taken care of by a servant who happened to wound
index finger of the right hand. The wound beca
inflamed, swollen, and livid; and although early oper
much pus was discharged, and the extensor tendon
suffered. A tumour soon afterwards formed in the axi
which was also opened. This man was removed to
father's house, and was nursed by his mother, who
an attack soon afterwards of inflammation of the ha
with much fever. In none of the above cases "were
absorbents of the arm inflamed, showing the red
which usually marks the track of the mischief from
punctured part into the system." — (Travers, *Op.*
p. 327.)

ganic nervous system, — by excessive vascular tion, without nervous energy, or vital resistance, ese states passing into exhaustion, with sinking vital power, and contamination of the cir- lating fluids.

506. *f.* The primary impression of this poison is t only irritating, and productive of exquisite pain, many instances, and of inordinate excitement in st, but it is also of a depressing nature, inas- ich as it often is followed by a numbness in the inity of the puncture, or by aching, or feeble- s of the limb; the local change thus primarily duced being probably a chief cause of the secutive changes which take place, especially er the frame is infected, in the glands and other uctures in the axilla and its vicinity of the culated side.

507. *g.* The constitutional commotion, generally eloped from ten to twenty hours after the im- ition of the poison, is displayed by all the ans actuated by the ganglial system, and by brain, — both the organic and the cerebro- nal nervous systems evince much disorder, and disorder is characterised by altered or excited sibility, and by deficient energy; the functions vital organs being co-ordinately affected, vas- ar action, remarkably excited, and the blood, all the secretions from it, ultimately more or altered, as in malignant distempers.

08. *h.* The nature of the constitutional com- ion — of the vascular excitement, in this ma- , has been misunderstood by most practitioners writers, and the character of the pulse misinter- ed; and, because there have been very acute , and remarkable frequency of pulse, often delirium, many have most unwarrantably rred the existence of sthenic or true inflam- ory action, instead of its opposite, and had urse to large vascular depletions, which have avated the pain, increased the frequency and kness of the pulse, and induced or rendered e severe and continued, the delirium. Oh! ignorance would be less presuming, and not ally inflict the death it is blindly attempting revent.

9. *i.* The state of predisposition of the poi- d person, depending upon temperament, con- tion, and the existing health, is most probably ential in developing the primary impression, the consecutive effects, or in aggravating their rity. This has been proved by cases which come under my own observation, where eons, who have aided me in the inspection of recent bodies, have either without any wound brasion of the cuticle, or after such injury, plained only of comparatively slight con- tional symptoms, which yielded to treatment, out the local symptoms having appeared.

10. *k.* In most cases no morbid connection be traced between the puncture, or the point oculation, and the subsequent alterations h take place in the axilla and vicinity — no ge is observed in any of the tissues between situation and the puncture or scratch in the r or hand; unless the change exist in some e nervous fibriles, and be of such a nature as o admit of recognition by the unaided senses. constitutional commotion is generally ushered altered sensibility of the poisoned part, and arm, but is unattended by any visible change, ugh in some cases the absorbents, either superficial or deep-seated, appear to be affected, and is characterised by its early appearance and by remarkable physical and moral depression and anxiety, followed by rigors, which are succeeded by reaction and excessive nervous and vascular excitement, devoid of energy or vital power. The alterations which occur in the axilla and vicinity never commence until the constitutional disturbance is produced, generally after the rigors and consequent reaction, and are preceded by exquisite pain, often extending to the shoulder and arm.

511. *l.* The inflammatory changes in the axilla and vicinity do not take place in some of the most violent and dangerous cases; the poison, apparently not being intercepted by the glands, or affecting chiefly the nerves and exerting its noxious influence upon the nervous systems and constitution generally.* These changes are merely contingent upon the majority of cases, and do not constitute the disease; the constitutional affection not only preceding them, but being also overproportioned to them. They are, moreover, in some instances, entirely absent, as in the first phases above specified (§ 492.). I therefore agree with Mr. Travers in stating "that the local inflammatory action is an unessential and subordinate feature of the malady in its severest form; the disease itself consisting in a direct prostration of the vital forces, marked by preternatural excitement and rapid exhaustion."

512. *G. Treatment.* — It has been justly remarked by Dr. Colles that, "whatever difference of opinion may be entertained as to the nature of this affection, it will be allowed that, although some few have escaped, yet the plans of treatment hitherto pursued have all proved quite unequal to contend with so formidable a disease." But the plan which he proceeds to advise has nothing to recommend it in preference to those which have been previously adopted, if, indeed, any definite or rational plan had ever been prescribed. The means which had usually been employed, consisted of blood-letting, general and local, opiates, fomentations, purgatives, &c. — the blood-letting having been prescribed for the insufficient reasons, that the pulse was rapid, and the febrile symptoms and delirium excessive — reasons more correctly indicating the propriety of adopting very different

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* The following case illustrates this rapid and violent form of the malady: — Mr. E., medical student, punctured his finger in opening a body recently dead. This occurred at noon (of Monday), and in the evening of the same day he found the wound painful. During the night the pain increased, and symptoms of high constitutional irritation were present on Tuesday morning. No trace of inflammation, however, was apparent, beyond a slight redness of the spot at which the wound was inflicted, which was a mere puncture. In the evening he was visited by several physicians; but no local change could be discovered. The nervous system was agitated in a most violent and alarming degree, the symptoms nearly resembling the universal excitation of hydrophobia; and in this state he expired at three o'clock on Wednesday morning, forty hours from the injury. (Travers *on Const. Irritation*, p. 262.) — This case, and other instances of a less violent character, seem conclusive of one of two things, namely, either that the poison acts upon, and affects the constitution through the medium of the organic nervous system, or that it is absorbed into the circulation in some cases without inflaming the absorbents or glands, or veins, occasioning the most severe effects upon the nervous system and vital energy, although inflammation of these structures, more especially of the glands and the surrounding cellular tissue, is often produced in consequence of the affection of the nervous system, or of the absorption, or of both.

measures. Dr. Colles knowing that this treatment was most frequently followed by an aggravation of the malady, simply advises calomel, in doses of three grains every three or four hours, with the intention of quickly exciting ptyalism. But, despite of the magic number, three, he might consider himself most fortunate if he succeed at all in this intention, and "fortunate beyond compare" if he succeed either quickly or with a perfectly favourable issue.

513. The virulent poison imbibed from a recently dead body invades the healthy frame with a rapidity and intensity proportionate to the deficiency of vital power opposing the invasion; and whatever means are administered to the person infected by this poison, calculated to lower vital power and resistance, will only aggravate the effects by accelerating the absorption, and facilitating the operation of it upon the frame. All animal poisons exert more or less of an asthenic influence upon the healthy body — an influence which is not only morbid, not merely an alteration from the healthy condition, but also one of depression, a condition characterised by an imperfect as well as altered manifestation of the functions of life, and tending to the extinction of those functions. But when this primary effect is not so intense, relatively to the powers of life, as to overwhelm these powers altogether, they re-act against it, oppose it, resist its extension, and often completely overcome it. In many instances the impression made by the poison on the nervous system, and the contamination induced in the circulating fluids, lead to a violent struggle between these changes and the powers which resist them; the struggle ultimately terminating either in the removal of these changes or in the annihilation of the powers which have opposed them. Now, if I have observed and interpreted aright the phenomena produced by the poison in question, this is what actually occurs after the imbibition of it by the healthy frame, — *first*, asthenic and morbid action; *secondly*, vascular excitement, the morbid influence on the nervous and vital powers still continuing; and *thirdly*, disorganization and death, which are rapid in proportion to the invasion of the cause, and the failure of the vital powers of resistance. If it were asked — What are the measures which are most likely to increase not only the first and third of these effects, but also the second, I could not hesitate to answer, those very measures which have been hitherto too generally adopted to remove them. It may, however, be contended, that the re-action which supervenes requires to be moderated by blood-letting in order to prevent its exhaustion; but I have shown that the re-action is most morbid — is a tumultuous excitement, deficient of power or constitutional resistance; that the pulse is that of irritation — of what John Hunter would call constitutional alarm; that the blood is not inflammatory, and the coagulum is not firm; and, moreover, that the rapidity of the pulse, and the severity of the delirium, and all the other symptoms are aggravated by this measure; and are of such character, and are attended by such phenomena, as ought to suggest a very different method of cure.

515. When treating of *diffusive inflammation* of the Cellular Tissue, I pointed out the means which should be employed, both as *prophylactic* and *curative* in the treatment of this disease, when connected with, or consequent upon, poisoned wounds. Since that article was written, my further experience has proved the correctness o my views, in respect both of the prevention and cure of the effects arising from the poison imbibed in the dissection of recently dead bodies, as stated in that article (§ 34. *et seq.*); and, therefore, I now only more strenuously advise the adoption o the principles and means of treatment there re commended.

516. *a.* The *prophylactic* means should b promptly applied, and should consist chiefly of *ligature* applied above the puncture, scratch, o abrasion, when the situation of either admits of i application, or a cupping-glass, or even a commo wine or ale-glass, may be applied in other circum stances, the air being excluded in the usual wa or suction and pressure may be employed. Afte wards the wound should be carefully washed, ar a pledgit of lint, wet with spirits of turpentin placed over it. This application I have foun more efficacious than any other, and it is not pr ductive of any local irritation. When these me sures have not been taken, or not taken sufficient soon, the part wounded should be viewed as st containing a portion of the poison, and be su jected to them, although several, or even man hours may have elapsed; and the constitution powers ought to be fortified by means of pure and generous living.

517. If *constitutional disturbance* should appe notwithstanding, or if it have already appear owing to a neglect of prophylactic treatment, should be promptly met, by stimulating diapl retics conjoined with tonics; and by warm stomachic aperients, conformably with the pr ciples maintained when discussing the treatme of diffusive inflammation of the *cellular tis* (§§ 34. *et seq.*), and of the *lymphatics* (§§ 17. *seq.*). The decoction of cinchona therefo should be given with liquor ammoniæ acetatis a full doses of the sesqui-carbonate of ammoni and the bowels evacuated by means of a drau with equal parts of the spirits of turpentine a castor oil, and of an enema, containing the sa substances, with, or without ten grains of ca phor. These may be subsequently repeated cording to circumstances.

518. *b.* The chief *intentions of cure* are, *first* prevent infection; *secondly*, to resist the extens of the mischief if infection have actually tal place; and, *thirdly*, to relieve the urgent sympto both constitutional and local, which usually pear when the disease is fully and unfavoura developed. The *first* of these having been mised, the *second* should be energetically ployed, notwithstanding the tumultuous stat the vascular excitement, or the delirium, wh may be present. The medicines just recommen ought to be early prescribed, and the dose of ammonia suited to its effects. Instead of combination of the cinchona now mentioned, decoction may be given with the chlorate of po and the hydrochloric æther; and either of t combinations may be aided by the additio camphor, by warm aromatics, by spices, &c., r especially by capsicum, which often prevent alleviates the sickness and irritability of the mach, and even the singultus of a more adva stage of the distemper. If these do not relieve disorder of the stomach, creasote should be g

th camphor, capsicum and small doses of opium,
se medicines being generally indicated, when
tlessness, watchfulness, or delirium supervenes.
hen, however, this last symptom appears, the
ses of these substances ought then to be in-
ased ; and the morphia substituted for the pure
um or its tincture ; full doses of these being
en shortly before bed-time. Morphia or opium,
such of the preparations of opium as may be
scribed for the nervous symptoms of this
lady, should be given in a very full dose, and
njoined with camphor or with capsicum or other
rm spices, a full dose being given in the even-
, and a smaller one in the morning. The
usion or decoction of cinchona may be also
njoined with other medicines, as the bicarbonate
potash, or soda, or ammonia, and be taken in a
te of effervescence with citric acid or lemon-
ce ; but the carbonate should be in excess, and
warm spices or aromatic tinctures be added.
the advanced stages of this malady, and for the
al lesions which supervene in the course of it,
treatment should in all respects be such as
eady advised in the article on diffusive in-
nmation of the CELLULAR TISSUE (§§ 34. *et*
.).

519. x. PUTRID ANIMAL MATTER is produc-
of injurious effects when taken into the sto-
ch ; but these effects are much more serious
en such matter is applied to an abraded sur-
e, or to a wound, and more especially if it be
cted into a vein.—*A.* As to the *ingestion* of this
tter, Dr. CHRISTISON well observes, that " to
se who are not accustomed to the use of tainted
at the mere commencement of decay is suf-
ent to render meat insupportable and noxious.
me only decayed enough to please the palate
he epicure has caused severe cholera in per-
s not accustomed to eat it in that state. The
ver of habit, however, in reconciling the sto-
ch to the digestion of decayed meat is incon-
vable. Some epicures, in civilized countries,
fer a slight taint even in their beef and mutton ;
there are tribes of savages who eat with im-
nity rancid oil, putrid blubber, and stinking
l. How far putrefaction may be allowed to
ance without overpowering the preservative
dency of habit, it is not easy to tell." Some-
ng, however, is due to the nature of the bever-
s taken along with the articles in this state, and
he powers of digestion and assimilation pos-
sed by those who partake of such food, in
bling them to resist the injurious effects pro-
ed by it in others.

520. *B. The exhalations produced by putrid or*
ying animal matter have generally been viewed
most noxious, until Dr. BANCROFT, the apostle
modern non-infection, endeavoured to prove, in
most ponderous volume, their very harmless
ure. The present state of information, and the
d sense, not only of medical men, but of all
npetent observers, have completely disproved
absurd and injurious opinion. These exhala-
ns are generally more or less noxious, es-
ially when inhaled into the lungs for some
e, or in certain states of predisposition to be
cted by them, or in grades of considerable
centration, or when dissolved in the humidity
the atmosphere. M. MAGENDIE demonstrated
t dogs confined over vessels in which animal
ter was decaying, experienced similar effects
to those observed in the experiments performed by him and M. GASPARD upon the introduction of putrid animal matter into the veins. These effects resembled, in every respect, the *putrid form of fever*, described in the Article FEVER (§§ 472. *et seq.*). The fact that putrid effluvia generate fever in man has been sufficiently demonstrated to require any illustration at this place, and has been sufficiently proved by evidence referred to in various parts of this work, and by proofs which have come under my own observation. The instances which have been adduced in opposition to it by Dr. BANCROFT, PARENT-DUCHATELET, and others, prove only that these exhalations are not poisonous in every case or occasion of exposure to them, and that habit and other circumstances may impart to some persons an immunity from their usual effects. These exhalations have often produced not only *putrid* or *adynamic fevers*, but also an *adynamic form of dysentery;* and in some cases, which I was lately called upon to treat, I had every reason to infer, that these exhalations may produce dysentery by their action upon the mucous surface of the anus, when resorting to such privies as contain large accumulations of fæcal matters, especially during warm seasons. An asthenic form of irritation and inflammation, with adynamic fever, was observed in these cases, the local affection extending from the margin of the anus upwards along the mucous surface of the rectum and colon ; and, in three instances, affecting also the vagina and uterus in a similar manner, and with similar discharges.

521. *C.* When putrid animal matters or fluids are *inoculated* or inserted into *wounds*, or applied to *abraded surfaces*, extensive local inflammation, of a diffusive or spreading kind, with very low or adynamic fever, is developed, owing to the rapid contamination produced locally as well as in the circulating fluids, and death takes place, unless the mischief be early arrested by a very active stimulating, antiseptic and tonic treatment. The injuries received from dissection of putrid bodies, and by cooks when dressing very high game, are of this kind, they being generally attended by a diffusive cellular inflammation and adynamic fever; and are different, in both the local and the constitutional phenomena, from the injuries received in the dissection of recent bodies, although allied to them in many respects. (See CELLULAR TISSUE — *Diffusive Inflammation of.*) — Putrid animal matters occasion somewhat different effects, according to the nature of the matter, the degree of putridity, and the constitution of the individual, but these effects are more or less allied to those produced by poisons which I have viewed as septic, and classed accordingly. (See CLASS SEPTIC POISONS.)

522. *D.* The *treatment* of the effects produced by putrid animal matters received into the stomach is in every respect the same as that recommended for the poison of pork or of sausages, &c. (§§ 443. 450.). After the offending matters have been evacuated, either by encouraging vomiting, or producing it by the means just advised, *creasote* may be given with the warm spices already mentioned, and these may be mixed with powdered charcoal, or in solutions of the chlorides, and taken in doses which the urgency of the case will suggest. If dysenteric symptoms supervene, these medicines may be conjoined with ipecacuanha and opium,

or may be administered in enemata; and the rest of the treatment recommended in DYSENTERY, according to the form which the case may assume, may be adopted. I have lately given in some dysenteric cases which have been produced by putrid animal exhalations, small and repeated doses of creasote, and a weak solution of the chloride of zinc, with marked benefit. The chloride of lime may also be given in small but often repeated doses; and lime-water, with milk, or in effervescence, or Carara-water, may be used as beverages. The effects caused by the *inhalation* of putrid effluvia require similar means to those prescribed for the adynamic or putrid forms of fever. (*See Arts.* DYSENTERY and FEVER.) — The treatment of local contaminations by putrid matter is not different from that about to be recommended for *septic poisons*.

523. xi. TOBACCO. — *Indian tobacco* — *Lobelia inflata.* — *Virginian tobacco* — *Nicotiana tabacum.* — The poisonous operation of these two plants closely resemble that of each other, the latter being the most energetic.—*A.* In doses exceeding fifteen or twenty grains, the *Lobelia* causes speedy and severe vomiting, with distressing nausea, and sense of sinking at the epigastrium; sometimes purging, cold perspirations, giddiness, headach, tremors, and great relaxation and prostration of strength; failure, with intermissions of the pulse, sometimes a prickly sensation through the body to the extremities, and a smarting in passing the urine. In doses above thirty or forty grains of the powder, it produces death in a few hours, if it be not thrown off the stomach by the speedy vomiting induced by it. The most prominent symptoms are then, according to Dr. WOOD (*Lancet*, April, 1837, p. 144.), extreme prostration, great anxiety and distress; and ultimately death preceded by convulsions. Fatal effects have often resulted from the empirical use of this plant in America, owing chiefly to its not having been rejected by vomiting as is sometimes the case. The effects produced by it are the same as those now described when it is administered in an enema.

524. *B. Virginian tobacco*, in the present state of society, is one of the most important plants in nature, and one of the most deleterious poisons furnished by the vegetable creation. In whatever way tobacco is used — whether chewed, smoked, or snuffed, — habit impairs and even modifies its effects. Sir B. BRODIE found that the infusion of tobacco thrown into the rectum, paralyses the heart and causes death in a few minutes; but if the head of the animal be previously removed, and artificial respiration kept up, the heart remains longer unaffected; proving that tobacco disorders this organ through the medium of the nervous system. On herbivorous animals the effects of tobacco are less marked than on man.

525. *a.* In small doses, tobacco causes heat in the throat and warmth in the stomach; followed, especially if the dose be somewhat greater, by nausea, giddiness, and vomiting. In *larger doses*, it occasions nausea, vomiting, purging, a distressing feeling of sinking at the epigastrium, but rarely any pain. It seldom promotes sleep or evinces any narcotic influence beyond what depends upon its sedative action. In poisonous doses, its most remarkable effects are languor, feebleness, great and depressing anxiety, fainting, relaxations of the muscles, trembling of the limbs; vision and all the senses are enfeebled, the ideas confused. The pulse b comes small, weak, irregular, or intermittent; t respiration laborious; the surface and extremiti cold and clammy. Recovery generally tak place if the symptoms proceed no further; but the vomiting continue, or if the purging be fr quent, the tendency to faint becomes urgent, t features sunk, the muscular powers paralyse the pulse progressively weaker, the extremiti and surface colder, and covered by cold sweat and, ultimately, convulsive movements, gener paralysis, torpor, and death take place.

526. *b.* Tobacco is used in various ways, t effects produced by it being remarkably influenc by *habit* in whatever way it may be employed, least up to a certain amount or dose. In the for of *snuff* it acts locally chiefly. The habitual u of snuff blunts the sense of smell, and, if it taken in excess, dyspepsia, with peculiar sympton and a cachectic appearance of the surface produced by it. Dr. PROUT considers the dy peptic symptoms caused by snuff to be pecul and severe; and that malignant diseases of t stomach and liver are sometimes occasioned this practice, when excessive or long continued.

527. *c. Smoking* tobacco in any way produc many of the symptoms described above if it long continued by a person unaccustomed to Dr. M. HALL detailed a case which nearly t minated fatally; the subject of it having, for first essay, smoked two pipes. Dr. CHRISTIS refers to two cases recorded by GMELIN, whi were fatal; seventeen pipes in the one, a eighteen in the other having been smoked at sitting. This practice has been adopted by so with the idea that it is a prophylactic agai endemic, epidemic, and contagious diseases; there are really no grounds for this opini Smoking, especially when very frequently indulg in, weakens the digestive and assimilating fu tions, lowers the tone of the nervous system, i parts a pale, sallow, and cachectic hue to countenance and skin, and induces functional order of the stomach, liver, and bowels. T soothing and flattering visions, with which practice of smoking feasts the weak and effemin mind, lead to its adoption by most classes; it is an enervating and an emasculating luxu the offspring of those who indulge in it in exc being weak, puny, or stunted in growth; or o nervous, susceptible, and scrofulous conformati It often also induces a desire for spirituous liquo

528. *d. Chewing tobacco* is even a more de terious habit than that of snuffing or smoki It is practised chiefly by sailors and the nati of the United States of America. In sailors, sea-air probably counteracts its injurious fluence; but when commenced in boyhood, is often observed in this class, it stunts growth, and in all circumstances it weakens organic nervous energy and the mental pow impairing also the powers of application. Pers habituated to this mode of using tobacco are ir able, restless, and miserable when deprived of and feel a distressing sinking at the epigastriu If they continue long to indulge in it, they l their healthy appearance; and, although they n not evince any severe or specific disease, the n vous system — the mental powers especially, weakened by the habit, and they become p maturely aged and short-lived.

529. *e.* The application of tobacco to a *recent* *und*, to an *abraded surface*, or to *sores*, is often tended by serious or even fatal effects. Mr. Eston has recorded a case in which the ex-essed juice of tobacco was applied to the head a boy, aged eight years, for the cure of tinea pitis. Death took place three hours and a half ter the application. Three children were seized th giddiness, vomiting, and fainting, from the plication of tobacco leaves to the scalp for the re of an eruption. (*Ephemer. Cur. Nat.*, Dec. Ann. iv. p. 467.)

530. *f.* Tobacco has not infrequently been emoyed fatally in an *enema*. I have witnessed is result from half a drachm of the infusion ving been thus prescribed. An instance is adiced in the British and Foreign Medical Reew (vol. xii. p. 562.), in which the decoction of elve grains in six ounces of water, used as an ema, was fatal. Cases of a similar result from rger quantities of this plant, administered in this iy, have been recorded by Desault, Grahl, oper, Bell, and others; and it has not inquently caused death when thus employed by pirics. The symptoms produced by it, thus ministered, are similar to those already deribed; nausea, relaxation of the muscles, faile of the pulse, tremors, faintness, cold sweats, d excessive sinking, or fatal syncope, being e most characteristic phenomena.

531. *g. The appearances on dissection*, as described Dr. Grahl, are thus stated by Dr. Christison. reat lividity of the back, paleness of the lips, xibility of the joints (two days after death), difse redness of the omentum, without gorging of e vessels, similar redness with gorging of vessels both the outer and the inner coats of the intines; in some parts of the mucous coat patches extravasation; and unusual emptiness of the ssels of the abdomen. The stomach was natural, e lungs pale, the heart empty in all its cavities, d the brain was natural.

532. *h.* The *operation* of Virginian and Indian acco is nearly the same. The action of Virian, or *common tobacco*, is similar to that of *rglove;* but it is slightly irritant of the digestive ucous surface, and much more paralysing, using more decided relaxation and depression muscular power, with trembling. It, moreer, acts more decidedly upon the secretions and on exhaling surfaces. The action of this poison ffers from that of *Belladonna*, and from that of *ramonium* or *Hyoscyamus*, in the contraction of e pupil when applied locally or taken in poisons doses, and in the absence of any affection of e throat, and of delirium or other cerebral mptoms. The influence of tobacco differs also om that of *aconite*, in its more decided effect on the muscular system, whilst aconite parases the sentient nerves, occasioning numbness d tingling, which are not observed after the adinistration of tobacco.

533. *i. Treatment.*—Poisoning by swallowing is plant, or preparations of it, is very rare; a few ses only being recorded. The discharge of the ison from the stomach, by the means usually sorted to, should be as speedy as possible. here is no chemical antidote to it yet known; ut Dr. Pereira thinks that, the vegetable acids d astringents, the infusion of nut-galls, of green a, &c., may be employed with benefit. In order to allay the vomiting and depression of vascular action, ammonia, brandy, capsicum and other spices, with small doses of opium; the cold affusion on the head if congestive or apoplectic symptoms occur; the use of strong coffee; sinapisms over the epigastrium, and the other means advised for the other poisons of this class, are chiefly deserving adoption.

534. xii. Vegetable Acro-sedatives of different species, besides those already noticed, have produced serious effects; but their operation, and the symptoms they occasion, have not been satisfactorily observed. The chief of these are the following:—*A.* Castor Seeds. — The seeds from which castor oil is extracted contain in the embryo a most active acro-sedative poison, a few of them being sufficient to produce violent purging and death. Mr. Taylor adduces the following illustration of their effects. A lady, aged 18, ate about twenty of these seeds, one of her sisters ate four or five, and another two. In the night of the evening on which this took place, they were all taken ill. The deceased, who had taken the largest number, felt faint and sick about five hours afterwards, and vomiting and purging came on, and continued through the night. The following morning she presented all the symptoms of malignant cholera. The skin was cold and dark-coloured; the features contracted, and the breath cold; the pulse was small and wiry; there were restlessness, thirst, pain in the abdomen; and she lay in a drowsy half conscious state. Whatever liquid was taken was immediately rejected, and the matters passed by stool consisted chiefly of a serous fluid tinged with blood. She died in five days without having rallied.—On *inspection* a very large portion of the mucous membrane of the stomach was found abraded and softened in the greater curvature. There was general vascularity of the organ, and the abraded portion presented the appearance of a granulating surface of a pale rose-colour, and was covered by a slimy mucus. The small intestines were inflamed, and their inner surface abraded. The two sisters recovered. Two or three of the seeds act as a violent depressing cathartic. The irritant poison resides in the embryo, and is not expressed with the oil, which in its fresh, or non-rancid state, is a mild purgative.

535. *B.* Iatropha Manihot—*Ianipha Manihot.* —The fresh root, or the juice of this plant has been long known as a violent poison. It produces nausea, vomiting, and purging; pain, tenesmus, swelling of the body, loss of sight, coldness of the extremities, faintings, and death. Dr. Beck refers to cases in which the juice had produced these effects within an hour. The *dissection* of one case furnished no alteration, excepting that the stomach was found shrunk to half its natural size. The noxious property of this plant is destroyed by heat.

536. Class VI. Irritant and Alterant Poisons. — Acro-alterant Poisons. — This class of poisons is very closely allied to the *fifth.* It comprises those substances and preparations which, either in acutely or chronically poisonous doses, not only irritate the digestive surfaces, but also alter the vital properties and manifestations of the tissues — not so much dynamically, as in the preceding classes, as in character or kind. When administered in large doses the alterative effects may not become very apparent if they produce death in a short period — if they are so given as to

prove *acutely* poisonous; but during their *slower* or more *chronic* operation, and during recovery from their acute action, the alterative effects are more fully evinced. Several of the substances comprised under this class are much employed medicinally, and have been, and even still are, prescribed, although much more rarely, so as to produce most injurious effects, owing to the alterant influence exerted by them upon the functions of several surfaces and organs, and not upon the functions merely, but even upon the organization of the structures ultimately and remotely. There are several substances which have been already considered, that produce also an *acro-alterative* effect, when administered in smaller quantities or in repeated doses. But as these, when employed as poisons or in large quantities, act either as *corrosive* poisons or as *acro-sedative* poisons — in the one case corroding or disorganising the tissues to which they are applied, and in the other depressing, or altogether annihilating nervous influence or vital power — I have thought it preferable to treat of them under these classes. Even the same poison, however virulent, does not act in a certain definite manner and specific mode, but in different ways, according to the amount, repetition, or continued exhibition of it; and to the various modifying influences already described (§ 51. *et seq.*). Poisons are not to be viewed as specific entities, producing certain and determinate results, but as powerful agents affecting nervous influence, vascular action, vital power and resistance, and even the organization of the frame, in varying modes and grades; the more manifest effects furnishing, by their prominent features especially, such characters as enable us to arrange and classify them. And thus we find that many poisons, as corrosive sublimate, the concentrated acids and alkalies, several mineral and other saline substances, and even the vegetable acrids, act as corrosive and acute poisons, and destroy life, chiefly by the intensity of their local action, when taken in sufficient quantity in certain states of the stomach, whilst the same substances, when administered in smaller or repeated doses, or in states of greater dilution, or when their exhibition has been too long continued, are fatal, or are injurious owing to different modes of action, and to their remote and secondary effects produced by different channels, their effects having a very intimate reference not only to their quantities and modes of exhibition, but also to the constitution and states of the sufferer at the time. Hence many corrosive poisons when thus, or otherwise exhibited, act as sedatives, or as irritants, or as acro-sedatives, and produce effects similar to those classed under these several heads, or act as acro-alteratives, and operate in nearly similar modes to those substances now about to be noticed.

537. i. Belladonna. — *Deadly Nightshade.* — *Atropa Belladonna.* — *Atropia* — has usually been classed as a narcotic, or acro-narcotic poison; but although the last stage of poisoning by it is often attended by sopor or insensibility, it is not strictly a narcotic, as will appear from the symptoms produced by it. The leaves, roots, and berries of the plant are poisonous, and produce nearly the same effects in equally powerful doses. On dogs, this plant causes dilatation of the pupil, plaintive cries, efforts to vomit, staggering, weakness of the posterior extremities, frequent pulse, a state resembling intoxication, and death (Pereira).
have seen dangerous, and in one instance nea
fatal effects result from the medicinal use of p
parations of this plant.

538. *A.* The *symptoms* vary remarkably with
dose and the frequency of its repetition,
the mode of administering it, and the consti
tion of the sufferer. The most rapid appe
ance, and the most comatose state, of the syn
toms have followed the administration of
infusion or extract of this plant in an ene
Dr. Scharf states, that four ounces of an infus
of the root injected as a clyster produced co
and death in five hours. In a case to which I
called, the extract had been introduced into
rectum as a suppository, but the exact quan
I could not learn. Apoplectic coma soon
lowed, from which the patient recovered
difficulty, delirium both preceding and follow
the coma. The poisonous operation of bellado
is most rapidly and fatally developed, when
of the preparations of it is administered as
enema.

539. *a.* The *local* or *irritant action* of this p
is not very intense, and is exerted primarily u
the upper portion of the digestive canal, especi
the fauces and œsophagus, causing dryness
redness of the throat with slight difficulty of sw
lowing, and but seldom vomitings or purging.
some instances soreness of the throat, difficult
glutition, and even aphthous inflammation of
fauces have been more remarkable; and in r
cases, bloody stools, strangury, and even blo
urine have appeared consecutively, or have
companied the nervous symptoms. The irrita
of, and eruption on, the skin, characteristic of
poison, appears chiefly after a frequent or
longed use of small doses of it. This eruption
been observed by me in several instances whe
had employed belladonna. It has been likene
that of scarlatina; but it has as frequently
sembled the eruption of measles. It has someti
followed the use of the extract in ointments w
I have prescribed for irritable states of the
tum, or uterus.

540. *b.* The *alterative operation* of the preparat
of belladonna is varied and uncertain, and is
erted chiefly on the nervous systems, more p
cularly upon those portions which are most
timately connected with the manifestations of
sibility and intellect. Thus we observe dilat
of the pupils, insensibility of the irides to li
dimness of vision, diminished feeling, ver
staggering, delirium, and occasionally sopor,
cessively follow the excessive use of them.
alterative operation of this poison on others o
systems or organs of the body is problemat
although the uterine functions have been sa
have been influenced by it. This plant, espec
the tincture and inspissated juice or extract
is a valuable remedy, not merely as an anod
but also as an alterative in several diseases;
if exhibited without due caution, especiall
children, or in hooping-cough, it is liable t
followed by injurious or even dangerous ef
Accidents from this poison most frequently
observed in children, who sometimes eat
berries.

541. The husks and seeds of the berries
very indigestible, and may remain long in
stomach or bowels, whether the case recov

rove fatal, especially if free vomiting has not een early procured. In one case the seeds ere vomited towards the close of the third day. Med. Obs. and Inq. v. vi. p. 224.) In another ise, the black husks appeared in the stools after e use of laxatives on the second day. In several her cases adduced by M. Boucher, fragments the fruit were vomited on the second day, and assed by stool on the third, although actively eated from the commencement. But this can ccur only when the fruit has been taken accientally or by mistake; but all cases of poisoning y belladonna are not of this kind. Even the dministration of preparations of this plant for edicinal purposes may be such as to occasion ither dangerous or fatal effects, especially in hildren; and the juices of it may be given with lonious intentions. They have been so employed, ither mixed in wine, or in other fluids, in the ommission of murder; and even to aid the comission of thefts or robberies; decoctions and inisions of various parts of the plant having likeise been used for the same purposes, as recorded numerous works of the preceding two centuries. r. Christison remarks that other species of *tropa* are probably similar in their properties to elladonna. Wilmer quotes instances of frantic elirium having occurred among shepherds as well s their cattle from eating the *atropa mandragora*, hich was used by the ancients in medicine.

542. *B. Atropia*, the active principle of this plant, s not likely to be employed as a poison. Given o the lower animals it produced the same sympoms as the berries or the leaves. One tenth of a rain caused in the human subject dryness of the outh, constriction of the throat, difficulty of wallowing, dilatation of the pupil, headach, and tupor.

543. *C. Diagnosis.*—Whatever part or preparaion of this plant may have been taken into the stoach, or otherwise administered, *dilatation* of the upil is always observed, if the dose is poisonous. This symptom precedes the *delirium*, the character f which is peculiar and *diagnostic*, especially when iewed in connection with the state of the pupil, nd the dryness, soreness, or constriction of the hroat. The delirium is generally gay, extravagant, leasing, talkative, more rarely furious. It is ometimes attended by uncontrollable laughter, nd occasionally by loss of voice. Vision is obcure, the iris is insensible to light, and the eyeall sometimes red and prominent. A state reembling somnambulism has in rare cases been bserved. The sopor or lethargy produced in the nore severe cases, generally does not appear for a considerable time after the poison has been taken. *Giddiness* first occurs, and is followed by the deirium, which may continue for several hours before *sopor* takes place; but, in some instances, the sopor has occurred more early, and has been followed by delirium. Occasionally, even in the same case, the delirium, which preceded the stupor, returns when the stupor goes off; *and very frequently the stupor is not distinct at any stage*, showing that this poison should not be classed with narcotics. *Convulsions* are not frequently produced by it, unless in children; in adults they are slight, or confined to the muscles of the face; but *subsultus tendinum*, or catching of the extremities are frequent. The periods at which the symptoms appear vary much. Giddiness may appear in a few minutes, or not until two or three hours, and the affection of the eyes about the same time, or soon afterwards. The delirium may be delayed for some hours. These symptoms may continue for two or three days. They generally persist much longer than in cases of narcotic poisoning. In some instances these symptoms, especially the blindness and state of the pupil, giddiness, tremors and other nervous affections continue for several days, or even weeks.

544. *D.* The *appearances after death* have not been observed in many instances. In a case described by Gmelin, the subject of it died twelve hours after eating the berries. The body was examined twelve hours after death, and yet putrefaction had commenced, so that the abdomen was swollen, the scrotum and penis distended with fœtid serum, the skin covered with dark vesicles, and the brain soft. The blood vessels of the head were gorged, and the blood every where fluid, and flowing profusely from the mouth, nose, and eyes. M. Roques describes somewhat similar changes to the above, and states them to be usually found after poisoning by this plant, especially the swelling of the abdomen, livid spots on the surface, exudations of blood or of a bloody froth from the mucous canals, especially the mouth and nostrils, and sudden and rapid putrefaction, preceded by general intumescence of the body. When the berries, husks, or seeds have not been vomited or passed by stool, they are sometimes found in the alimentary canal, and furnish evidence of the nature of the case; when they have been evacuated and are detected in the discharges, they assist the diagnosis, which is seldom difficult when any part of this plant has been eaten accidentally, or otherwise administered. — (See M. Roques, *Phytographie Médicale*, t. i. p. 229. *et seq.*)

545. *E. Treatment.* — The speedy and complete evacuation of the poison from the stomach, by means of an emetic of zinc, to which capsicum may be added in order to arouse the paralysed organ, should be first attempted, especially when the fruit has been eaten. In these cases the stomach-pump ought not to be confided in alone, although it may be required in aid of the emetic, the free operation of which should be duly promoted. The older writers strongly advised recourse to vinegar, and either it, or other vegetable acids, will prove serviceable after the poison has been evacuated. The cold effusion on the head and neck is indicated for the removal of the delirium or sopor; but it should not be continued too long at a time. In some cases, tepid affusion may be substituted for the cold. Dr. Pereira suggests the administration of nut-galls or green-tea. I found full doses of camphor and chloric æther successful in a case in which the inspissated juice administered by the rectum proved nearly fatal, tepid affusions having been also administered.

546. ii. Cantharides — *Cantharis Vesicatoria — the Blister Beetle or Spanish Fly, — Cantharidin — Vesicatorin.* — Cantharides may be poisonous in any of the forms in which they are employed in medicine, — in that of powder, or of tincture, of vinegar, of cerate, ointment, or plaster. Applied *topically* they excite the nerves of the part, and irritate and inflame the capillaries, occasioning first a sense of heat, followed by pain, redness, and slight swelling. They are readily absorbed into

the circulation — or their active principle — *Cantharidin* — and, in addition to their local action, they produce very energetic effects upon the vascular and nervous systems, especially on the spinal cord, and upon the urino-genital organs.— *A.* Their *local action* is irritant and inflammatory; their *remote operation* is alterative, exciting, irritating and inflaming, according to the amount and repetitions of the dose; their *primary* influence being exerted on the nervous systems, their *secondary* or consecutive operation being produced chiefly through the medium of the blood. They are eliminated by the kidneys, on which and on the urinary bladder and passages they produce the effects just described. They are thus closely allied in action to several substances comprised under the class of acrid and corrosive poisons, on the one hand, and to many of those belonging to the excitant and irritating classes, on the other. The local action of cantharides is nearly the same wherever they are applied; and their remote effects are also the same whether they are taken into the stomach, or applied to the skin, denuded of its cuticle, or to a wound, or thrown into a vein. They have destroyed life, when taken as an aphrodisiac, or to produce abortion, or accidentally. They are very rarely employed to produce murder or suicide.

547. *B. Symptoms.*—*a.* These vary with the mode of exhibiting this poison, and the quantity of it administered. When it is taken in large or repeated doses, or to an amount sufficient to produce a *sub-acute form* of poisoning, heat and pain in the throat, stomach, and intestines, are experienced. To these are soon added thirst and pain in the loins, extending along the ureters to the bladder, with a burning sensation in this viscus, a frequent desire to evacuate the urine, which is passed frequently, in small quantity, with difficulty, and sometimes more or less tinged with blood. The pulse is frequent and hard, the skin hot, and the respiration quickened. The nervous system is somewhat excited; painful priapism, with or without satyriasis, being also present. In still larger quantity, the effects are more *acute.* A violent burning is felt in the throat, gullet, and stomach, with pain and tenderness in the epigastrium, extending over the abdomen, with sickness and vomitings. To these are added extreme thirst, and pain in the loins and bladder; dryness and heat of the mouth, sometimes with fœtor or with ptyalism; and incessant desire to void urine, the attempts to evacuate it being attended by excruciating pain, and nothing but drops of blood or of bloody urine being passed; and excessive tenderness of the whole abdomen. The heat and constriction of the throat increase, and are attended by distressing difficulty of deglutition. Violent griping pains of the bowels, with purging or with tenesmus, bloody stools, &c. are generally experienced. The difficulty of deglutition is often accompanied with a dread of fluids, although the thirst is urgent; and the matters vomited consist chiefly of mucus or flakes of lymph streaked with blood. The priapism is painful and constant, the genital organs being swollen and inflamed. In some instances maniacal delirium, tetanic convulsions, and coma supervene and terminate life; in others the delirium is less marked; giddiness, faintings, sinking of the pulse and vital powers, and other symptoms of gangrene consequent upon acute inflammation being present. *Death* is mor immediately produced either by the inflammatio and consequent gangrene of the alimentary canal or of the genital and urinary organs, or partiall of both; or, if the patient live somewhat longe by the intensity of the nervous symptoms.

548. *b.* The *duration* of the symptoms depend upon the susceptibility of the individual to the actio of cantharides, upon the preparation of it administered, and upon the treatment. The tinctur is followed by a more immediate effect than th powder. Even in fatal cases, death seldom take place before three or four days, and it may nc occur until after two or three weeks, — from th consequence of the inflammation produced in th alimentary canal, or in the urinary passages, c even in the brain, or spinal cord or their membranes. Sometimes the nervous symptoms do nc appear until several days after the ingestion c the poison. The *quantity* which may be considered sufficient to destroy life depends upon th nature and strength of the preparation. Orfil has seen twenty-four grains of the powder prov fatal; but as abortion was first produced, is probable, that this circumstance not onl accelerated but also aided this result, whic occurred on the fourth day. The smalles quantity of the tincture which has caused deat is one ounce, the individual having live fourteen days. But, whilst smaller quantiti may occasion dangerous or even fatal result much larger may fail of producing very serio effects, the circumstances so frequently referre to remarkably affecting the issue. Instances hav occurred of *blistering plaster* having been swallowed by mistake. In one case, half an ounce c the plaster, containing two drachms of the powder, was taken, and death occurred in twenty-fo hours (*Edin. Med. and Surg. Journ.*, Oct. 1844 the shortest period in which cantharides hav been fatal.

549. *c.* The application of cantharides to th skin, as a *vesicant*, or external irritant, being ver generally adopted, is in many cases productive c fatal consequences; owing to the severity of th local alterations, to the intensity of the inflammation and sphacelation they sometimes occasio and to the spreading of these effects; and, mo rarely, to their influence upon the urinary orga and nervous system. The mischief thus produce occurs chiefly in infants or young children, of cachectic habit of body, or in those with either deficiency or an exuberance of blood; or whe the application is too long continued, or is followed by injudicious topical dressings. It is mo likely to occur when the blister is applied c children infected with the more adynamic c malignant forms of the exanthemata, especial measles and scarlet fever, and is allowed remain too long upon the part, or after redness produced. The admission of the air to the denude surface, and the application of rancid ointmen as dressings, are also often concerned in pr ducing these serious local effects.

550. *C. Appearances on Dissection.*—In the acu cases, and when death has taken place after a fe days, the mouth, œsophagus, stomach, and sma and large intestines, as well as the kidneys, urete bladder and genital organs, have been found in flamed: and, even in rare instances, sphacelate in parts. In an instance where an ounce of the tin

ure had been taken, and death did not occur until the fourteenth day, the villous coat of the stomach was not inflamed, but it was pulpy and easily detached; but the kidneys were inflamed. In the most rapidly fatal cases, the powder may be detected adhering to the villous coat of the stomach. In more prolonged cases, congestion or increased vascularity of the brain, cerebellum, spinal cord, and their membranes, have been observed. Ulceration of the bladder in some instances, and even sphacelation of the genitals, have been mentioned.

551. *D. Treatment.*—Cantharides are productive of severe irritation passing into acute or sub-acute inflammation, according to the quantity administered; and their absorption is followed by inflammation of the urinary organs, and by excitement, and sometimes by inflammatory irritation of the nervous centres. The indications of treatment are hence obviously — 1st. To remove the poison by emetics, and by encouraging vomiting; and, 2d. To allay the inflammatory action in these parts. When the sufferer is seen sufficiently early, and vomiting has not commenced, ipecacunha should be given in copious emollient and emulcent draughts, and its operation promoted by tickling the fauces, by the tepid infusion of hamomile, &c. The inflammatory symptoms reuire general and local bloodletting; but if there e reason to infer that any of the poison still remains on the stomach, the discharge of it should e procured or attempted previously to resorting to depletions, lest absorption be promoted. When loodletting is prescribed, it should be employed n a decided manner, and aided by demulcents ontaining small or moderate doses of camphor nd nitre, with opium, henbane, &c. Emollient njections into the large bowels and into the bladder, and warm baths, hip-baths, fomentations, &c., e always beneficial. Oil was once supposed to ave been an antidote to cantharides; but there no known antidote to this poison; and oil is ow ascertained rather to aggravate than to alviate the symptoms, by dissolving the active rinciple of cantharides.

552. Poisoning by the external application of ntharides requires the same treatment as now dvised. In these cases, the urinary organs are enerally more affected than the digestive canal, nd diluents, demulcents, opium with camphor, e chiefly required, unless in the more severe ses, when bloodletting is necessary. But these ses generally soon recover, unless the poison be pplied to a very large surface or to a recent ound; and in these the protection of the surface om the air and full doses of opium are requisite. uring recovery the digestive and urinary organs ng remain irritable, and the nervous system susptible, therefore a bland farinaceous or vegetable *et* should be adopted, and continued for some onsiderable time, and flannel worn nearest the in.

553. iii. CHLORINE AND THE CHLORIDES. — *A. hlorine gas* produces violent spasm of the glottis it be *inspired* in a pure state.—*a.* Mixed with air causes a sense of tightness of the chest, of sufcation and violent cough, owing to the irritation the bronchi and spasm produced by it—a state artificial asthma. This effect, if not excessive, enerally passes off with increased mucous exectoration. When much more diluted with air, occasions a sensation of warmth in the chest, and promotes expectoration. As a principal fumigating and disinfecting agent, it is liable to produce injurious effects, when air too strongly impregnated with it is breathed; but it is chiefly in manufactories that it is most likely to be hurtful, although the irritating effects of chlorine are less powerful on those accustomed to inhale it. Dr. CHRISTISON was told by a chemical manufacturer in Belfast, that his workmen can work with impunity in an atmosphere of chlorine, where he himself cannot remain above a few minutes. The chief effects produced by inhaling this gas by the workmen are more or less emaciation from the absorption of fat, acidity and disorder of stomach, which are usually corrected by chalk.

554. *b.* When diluted with air, or aqueous vapour of 116° F., and applied to *the external surface*, it produces peculiar sensations similar to the stinging of insects, accompanied with copious perspiration and determination of blood to the skin, and sometimes followed by an eruption of minute papulæ. In a pure form, its action on the skin is similar, but more energetic. A repeated or prolonged application of the gas to the skin is followed by soreness of the gums and mouth, or fauces, occasionally by slight ulceration, and generally by a more abundant as well as altered state of the salivary and biliary secretions. Mr. WALLACE believed that it tranquillizes whilst it excites nervous power; and Professor ALBERS, that it is stimulating locally, and antiphlogistic remotely. Many years ago I examined its operation with Mr. WALLACE in London (in 1823), and subsequently in Dublin (in 1834), and inferred that it is *locally* irritant or stimulating, according to the amount of dilution, and *remotely* alterative, as regarded nervous power and glandular action. Whether inhaled or applied to the external surface, it is absorbed as shown, and ascertained by Mr. WALLACE and myself, by the state of the urine.

555. *c. Treatment.* — It is chiefly owing to its accidental inhalation in too strong a state of dilution that injurious effects have arisen from this gas. The inhalation of the vapour of warm water, of the spirit of wine, or of æther, has been recommended for the removal of the effects of chlorine; but Dr. PEREIRA states, that he has tried these when suffering himself without the least benefit. In a case related by KASTNER, sulphuretted hydrogen was said to have afforded great relief; but this agent should be used with great caution, as it is itself a powerful poison.

556. *B. Chlorate of Potash* was supposed to be an active stimulant and antiseptic, and, in large doses, an irritant poison. I have frequently employed it, since 1816, both in public and private practice, especially in the more malignant states of disease, as an antiseptic, disinfectant, and tonic; but I have been much disappointed in its effects, which I have not found such as I expected, or by any means certain. It, however, diminishes the fœtor of the excretions, even those from the skin, as evinced in the putrid and adynamic states of fever, and it is absorbed into the circulation, from which it is excreted chiefly by the kidneys; and it may be detected unchanged in the urine. I have employed it in large doses without obtaining other effects than nausea and vomiting. It appears to be locally irritant, and remotely alterative and diuretic.

557. *C. The chlorides and the hypochlorides of*

soda and lime produce effects much resembling those caused by chlorine; but these vary remarkably with the degrees of dilution. In concentrated states they are caustic and irritant; in states of dilution, irritant or stimulant, antiseptic and alterative. I employed these substances largely in practice, especially public practice, and when they were first discovered, and found them useful in dysentery and malignant forms of disease; the secretions and excretions in which they remarkably corrected and improved, whilst they appeared, particularly when aided by appropriate medicines, to support the powers of life. I am, however, unacquainted with injury from the administration of them. When taken in excessive doses they are most likely to occasion gastro-enteric irritation, for which albuminous fluids, the whites of eggs, milk, and oleaginous or mucilaginous diluents are the most suitable remedies. If these salts have been taken in very large quantity, emetics, or the stomach-pump may be required; and, after they have been evacuated by these means, these fluids should be abundantly exhibited. Acids must be avoided, lest they should disengage chlorinic gas in the stomach (Pereira).

558. iv. Iodine, the Compounds of. — The *corrosive* action of pure iodine, and of strong solutions, or rather tinctures of it, has been already considered (§§ 179. *et seq.*). It remains only to notice the locally irritant and remotely alterative injurious effects of the compounds of this substance, or of small doses of it, when either too long employed, or given in such forms as produce *slow* or *chronic poisoning*. The preparations most likely to produce these effects are, the *tinctures* and the *iodides*, as the iodide of potassium, or the ioduretted iodide, the iodide of sulphur, and the iodide of iron. In some constitutions, any of the preparations of iodine occasion, even before a few doses of either are taken, and although the doses are very small, remarkably depressing effects, and generally without any signs of local irritation. I have met with several instances of this very unusual and severe effect of these preparations, in practice, and in three of these, the preparations of colchicum were also injurious in very small doses. In general, iodine is not hurtful unless the dose is considerable, or be repeated too frequently, or its use too long continued.—*a.* The *irritating operation* of iodine is most readily manifested by irritable temperaments, and dyspeptic persons. In these, and in other persons in larger doses, it occasions nausea, loss of appetite, cardialgia or heat of stomach, subsequently colicky pains, relaxation of the bowels, diarrhœa, salivation, diuresis, &c. If this substance, or any of its compounds, be still administered, these effects go on increasing, and are attended by soreness of the mouth, severe colic with diarrhœa, emaciation, rapid absorption of the fat surrounding the mammary glands in females; headach, vertigo, sometimes drowsiness or stupor. When iodine is taken in smaller doses, so as not to cause injurious irritation, it acts as a tonic and alterative, and improves both the strength and flesh. But, if too long persisted in, several of the above effects afterwards appear.

559. *b.* In *larger or more frequently repeated doses*, the effects are more severe, and amount to what have been designated *iodism*. These are generally severe vomiting and purging, colicky pains, thirst, and fever; a frequent, small pulse, sometimes a dry
cough; cramps of the extremities; rapid ema -
tion, with occasionally a darker hue of the n
and hair, especially if the iodine has been ta n
for a long period. In some instances wastin f
the mammæ or testes; and most of the sympt s
of chronic gastro-enteritis. It is rare, howeve o
meet with instances of these effects from iod ,
unless it have been given in a most impru t
manner, or too long persisted in, and even t n
something should be imputed to idiosyncrasy.

560. *c. In still larger doses* the symptoms ei r
approach, or are identical with, those attending e
corrosive form of poisoning by iodine (§ 18 .
When iodinic preparations have either been l g
continued, or often repeated, especially in l e
doses, so as to produce not merely an irritant o -
ation but also a constitutional change — a mar d
alterative effect, various contingent phenomen f
a more or less severe character, referable eithe o
the nervous system or to the heart and lungs, e
apt to appear, especially stupor, tremors, vert ,
faintness, irregularity of the pulse, alarming s -
ing, shortness of breathing, restlessness, and e n
death. In these cases the system may be vie d
as saturated with the iodine, notwithstanding t
the kidneys have been eliminating it from the -
culation, as proved by its presence in consider e
quantity in the urine; for it has been detecte n
the viscera and tissues in such circumstances, d
even several days after the administration of io e
had been relinquished. The *appearances in f l*
cases have been already described (§ 183.).

561. *d.* The *treatment* of the more *chronic* or *a* -
alterative form of poisoning by any of the prep -
tions of iodine, consists in the removal of gas -
enteric irritation by local depletions and coun -
irritation. Demulcent and mucilaginous -
stances should be given with the preparation f
opium or of poppy; and starch or emollient -
mata, with syrup of poppies or the tinctura i
composita, should be thrown up from tim o
time. Warm baths are generally useful. e
diet should be chiefly farinaceous or amylace ,
with or without milk; and during convalesce ,
the regimen and diet recommended for *gas* -
enteritis and the more inflammatory states of -
digestion ought to be adopted.

562. v. Mercury, the Preparations of -
The poisonous operation of the *bi-chloride* s
been already considered (§ 215.). But life ma e
destroyed or put in jeopardy by an excessiv r
prolonged recourse to any of the preparation f
this metal.—*A. Fluid mercury* is inert when sw -
lowed as long as it retains its pure metallic st ;
but it may be slightly oxidized in the alimen y
canal, and thus acquire activity, especially if i e
long retained in the bowels. Many years ag t
was the fashion to swallow fluid mercury, ,
more recently, large quantities of it were o a
given in order to remove obstructions. It rar ,
however, produced unpleasant effects from ha g
become oxidised. Zwinger states, that r
ounces occasioned profuse salivation four s
after swallowing it; and Laborde records e
case of a man who retained seven ounces for f -
teen days, and was attacked with profuse sal -
tion, ulceration of the mouth, and paralysis of e
extremities. I was lately called to a man who l
taken, some time previously, seven pounds' we t
of fluid mercury with a suicidal intention. s
medical attendant informed me that it produce a

painful sense of weight and constriction in the abdomen, the body having been bent forwards; but it caused no further disorder, and continued to pass off at intervals for some days.

563. It was not unusual, during the last and preceding centuries, to wear belts with fluid mercury around the body for months, or even years; but the practice was not always devoid of harm; for, in some cases, profuse salivation, and other specific effects of this metal appeared either suddenly or with great severity.

564. *B.* The injurious effects of *mercurial vapours* have been shown in the article on Arts and Employments, *as causing disease* (§§ 24. *et seq.*); and the *tremor mercurialis,* with the several cachectic and cerebral symptoms associated with it, is there described. This form of *shaking palsy,* — *tremblement mercuriel* — is chiefly met with in workmen whose employments subject them to mercurial vapours. If the emanations still continue to operate, in any circumstance of their evolution, various cachectic symptoms, vertigo, loss of memory, imperfect and unsteady action of the muscles, slight atonic convulsions, and even delirium, epilepsy or apoplexy, terminating in death, are the not infrequent results. Salivation, ulceration of the mouth and gums, hæmorrhages, and emaciation, are frequently also produced by mercurial vapours. In 1810, the Triumph Man-of-War, and a small vessel, received on board several tons of quicksilver at Cadiz. Owing to the rotting of the bags the mercury escaped, and the whole of the crews became more or less affected. In the course of three weeks 200 men were salivated, and two died. All the lower animals in the vessels — cats, dogs, sheep, fowls, rats, mice, and cock-roaches, were destroyed.

565. *C. The mercurial compounds* are all injurious, not excepting even the sulphurets, when taken in excessive quantities, or when their use, even in small doses, is very long continued. — *a.* The *local action* of mercurials is irritant and alterant; but the bi-chloride and nitrates, in states of more or less concentration, pass beyond this state of action, and are, as shown above (§§ 215. *et seq.*), caustic and corrosive, although when very much diluted, they, as well as the chlorides, diminish both irritation and vascularity in the surfaces to which they are applied.

566. *b. The consecutive and remote* operation of mercurials vary with the preparation and the modes of employing it. When taken internally in *small doses,* they promote all the abdominal secretions and excretions, especially the biliary and pancreatic secretions. If the doses be *repeated,* these effects are not only increased, but others are also added; the mucous surfaces and skin manifest an augmented exhalation, the gums become red and tender, the urinary secretion is increased, and the catamenia promoted; absorption proceeds more rapidly, the pulse becomes somewhat accelerated, and the strength slightly impaired. The repetition or number of the doses, as well as the amount of each required to produce these changes, vary with the constitution and idiosyncrasy of the individual, and the amount of action upon the bowels. If the mercurial be continued longer, or after these effects commence, or if the doses be larger than are necessary to produce them, the redness and tenderness of the gums pass into swelling, the tongue, which was at first broad and soft at its edges, becomes flabby and swollen; a coppery taste is perceived in the mouth, which, with the gums, is sore and tender; *salivation* more or less profuse supervenes; the salivary glands are tender and swollen, the teeth are loosened, the breath betrays a peculiar odour and fœtidity; the pulse is now more accelerated, the strength much impaired, and emaciation more rapid as the salivation proceeds and increases; the quantity of saliva discharged sometimes amounting to several pints in the twenty-four hours. Such may be said to be *the first stage* of chronic poisoning by mercurials, as frequently produced formerly for the purpose of curing certain diseases, especially the venereal disease; but now very rarely required either for this or any other distemper. During salivation, the urine, according to Dr. Pereira, does not contain a trace of albumen. The mercurial action alters the secretion of the salivary glands, and causes it to approach more nearly the fluids exhaled from inflamed serous membranes.

567. *D.* The *first stage* of poisoning by mercurials is generally such as now described; but occasionally other and more serious phenomena appear after a more or less liberal recourse to any of them, and *assume the features of distinct maladies.* An acquaintance with these contingent effects of the constitutional action of mercurials is of great importance to the practitioner. They are not so much owing in most instances to the preparation employed as to the idiosyncrasy, or the state of health of the individual; a scrofulous constitution, the venereal taint, and other causes favouring their occurrence. The maladies which may be ranked under the first stage of chronic poisoning by mercury are, *first,* what has been called *mercurial disease* — *Morbus mercurialis, hydrargyrosis, cachexia mercurialis, &c.,* and which presents various *forms* or *states;* — and *second,* what has been named *pseudo-syphilis,* or *cachexia syphiloidea,* or what is supposed to be syphilis modified by the mercurial disease.

568. 1st. *Mercurial disease* may be viewed as the generic appellation of several morbid conditions resulting from mercurial preparations — from a few grains only of blue pill or of calomel in some constitutions, or from large and repeated doses of these or of other compounds of the metal in others. — (*a.*) *Excessive salivation* — *Ptyalismus mercurialis* — *Stomatitis mercurialis* — may occur from a small dose of any mercurial, or from large or excessive doses. It is oftenest met with after small or moderate doses, and is then the result of peculiarity of constitution. The mouth rapidly becomes violently affected; the tongue is swollen so that it hangs out of the mouth, and prevents the patient from speaking and eating; the gums are tumefied and ulcerated, ulceration often extending to the cheeks; the teeth are loosened or drop out, owing to the sloughing of the gums; the salivary glands are enlarged, tender, painful, and the surrounding cellular tissue congested or infiltrated; and the quantity of salivary discharge remarkably increased, sometimes ten or twelve pounds being secreted in the twenty-four hours. With the progress of these symptoms debility and emaciation make rapid progress; and, with sloughing of the gums, caries of the alveolar process not infrequently takes place. If the mercury be continued, involuntary movements of the muscles, or states of incomplete palsy may appear, and the

patient sink from extreme vital depression. Even when the mercury is relinquished, the inordinate salivation and other symptoms may still continue, and be arrested with the greatest difficulty. Indeed such is the case whenever this effect follows the use of a small dose of mercury, and depends upon idiosyncrasy. In some intances, the ulceration and sloughing are followed by contraction of the arches of the palate, and by inability to open the mouth sufficiently. Occasionally the salivary glands become remarkably enlarged, tender, and inflamed, and the surrounding parts swollen (*Parotitis mercurialis*), and the mouth ulcerated, before the salivation commences, the salivary discharge relieving the extreme swelling and pain of the glands; but this most frequently occurs when the patient has been exposed to currents of cold air or to cold and humidity upon the accession of the mercurial action.

569. (*b.*) *Mercurial Purging.* — *Diarrhœa Mercurialis.* — Excessive purging occurs sometimes after a moderate dose of a mercurial; and may arise from an excessive accumulation of bile in the gall-bladder and ducts having been suddenly let loose, in which case the evacuations are greenish or dark; or from an excessive secretion of the pancreatic fluid having been produced, and then the evacuations are pale, watery, frothy, or ropy, and are attended by pain, heat, or tenderness in the region of the pancreas. (See Pancreas, *diseases of.*) Excessive diarrhœa after mercury has been ascribed by Dieterich (*Die Merkurialkrankheit*, Leipz. 1837) to a species of pancreatic salivation caused by mercury, and called by him *ptyalismus pancreaticus mercurialis*, or *ptyalismus abdominalis*, *diarrhœa salivalis*, *&c.*

570. (*c.*) *Mercurial Fever* — *Febris Mercurialis* — *F. Salivosa* — is generally caused by the excessive use, or by very large doses of mercury, and seldom appears until after some days. It is attended by dryness of the mouth, redness and swelling of the gums and tongue, great acceleration of pulse, with restlessness, headach, hot and dry skin; swelling or tenderness of the parotids, sometimes extreme, as already noticed (*Parotitis Mercurialis*), and loss of appetite and nausea. This state of irritative fever generally terminates with a profuse salivation, more rarely with purging or sweating, or with some form of cutaneous eruption (§ 574.).

571. (*d.*) *Mercurial Cachexy.* — *Cachexia Mercurialis* is a more frequent consequence of the prolonged use of mercury, and even of the repeated exhibition of calomel, than is generally supposed; and as far as my own observation extends, it constitutes, in various modifications, the most frequent form of slow poisoning by mercury. It is not infrequently produced by prolonged efforts to effect the salivary glands in the treatment of hepatic or other diseases, and is *characterised* by the usual symptoms of irritative fever, without flushings, but with great pallor, emaciation, and manifest anæmia. There are, also, loss of appetite, depression of spirits, disordered bowels, with offensive stools; and occasionally swelling of the salivary glands, redness or sponginess of the gums or ulcerations of them and of the mouth, cheeks, &c., but rarely any salivation. It usually passes almost insensibly into tubercular phthisis.

572. (*e.*) *Mercurial erethism.* — *Erethismus Mercurialis.* This alarming affection, thus denominated by Mr. Pearson, has been viewed Dieterich as adynamic mercurial fever — *Fel mercurialis adynamica.* — Since Dr. Dieteri wrote, one case of it has come under my obser tion; and my examination of that case, as well my recollection of former cases, has not furnisl evidence of the accuracy of this view. The *syn toms* of this affection are, rapid depression strength with a sense of sinking and anxiety, ferred chiefly to the præcordia; with partial general tremor, frequent sighing, universal se of coldness, and diminished temperature of surface. The pulse is small, quick, and wea the countenance is pale, collapsed, and express of anxiety and alarm. Vomiting sometimes pervenes, and favours reaction and recovery. the case just alluded to I could detect nothing, the aid of the stethoscope, beyond absence of impulse of the heart, and very weak, frequent a occasionally irregular contraction. A fatal t mination has followed muscular exertion. T affection appears to consist of extreme depress of vital power, and of muscular irritability, ma fested chiefly by the heart, and of congestion of lungs; and hence it might be more appropriat called *Asphyxia cardiaca mercurialis.*

573. (*f.*) *Neuroses Mercuriales.* — Various *nerv* and *mental disorders* are sometimes produced mercury, especially when any of its preparati have been long persisted in, owing to the depre ing and alterative action on the nervous syster probably aided also by other influences. *M lancholia*, sometimes attended by delusions, a various states of partial insanity, in which fears impending or future calamities more or less p dominate, and even sway not only the feelings a sentiments, but also the volitions and actions, not infrequently produced by a frequent recou to mercurial preparations. Tremors or tremblin (*tremor mercurialis*), sometimes passing into pa (*paralysis mercurialis*), hyponchondriasis, & are also not infrequently occasioned by this caus and are duly considered at other places.

574. (*g.*) *Various affections* of the exter surface and of other parts of the body are son times produced by an excessive use of mercur yet it is extremely probable that they are owing to this cause alone, but to peculiarity constitution, or to some pre-existing taint or lo vice. — *Certain acute* and *chronic eruptions on skin* sometimes appear as the effects of mercur but are now more rarely met with since sev courses of this mineral have been much less f quently resorted to. — *Eczema Mercuriale. Erythema Mercuriale.* — *Lepra Mercurialis. Erysipelas mercurialis* — *Hydrargyria* — are names which have been given to an acute erupti which has sometimes appeared during a sev mercurial course, and been attended by conside ble danger. This affection has been described Pearson, Alley, Moriarty, Stokes, Spe Cullerier, Lagneau, Rayer, and others. generally consists of innumerable minute pellu vesicles, which give a diffused red appearance the skin, and a sensation of roughness to touch: it is generally preceded and attended more or less febrile disturbance. In two or th days the vesicles attain the size of pin's heads, a the contained serum becomes opaque and mil The eruption soon extends over the body, and accompanied by swelling, tenderness, and itchi

t usually terminates by disquamation; but a opious discharge sometimes takes place from the xcoriated surface; and, with the epidermis, forms arge flakes. In some instances the hair and nails all off, and the eyebrows become denuded Pereira). There also is more or less internal lisorder, especially tightness and oppression in the hest, dry cough, with indications of congestion of he lungs and bronchial irritation. Alley saw orty-three cases of this eruption in the first ten ears of this century, and of this number eight vere fatal; more recently Rayer met with only hree cases; and Pereira only with two. I have een only two cases, and these occurred at an arly period of my practice. Other cutaneous ruptions have been said to be sometimes caused y mercury, especially a *miliary eruption*, *Herpes*, *mpetigo*, *Psydracia*, &c.; but this origin is loubtful, and most probably other causes concur, f not entirely produce them.

575. *h.* Congestions and inflammations of various arts, especially of the eyes, or certain tissues of he eye, as the iris, the retina, the conjunctiva, xc.; congestions and inflammations of the pe-iosteum, (*mercurial periostitis*) and caries of the ones, especially of the more spongy bones; and imilar diseases of the pericranium, bones of the ranium and dura mater, have also been ascribed o mercury; but are often owing more to a vene-eal taint, to the scrofulous diathesis, or to idio-yncrasy, than to this mineral; although expo-ure to cold and vicissitudes of temperature and veather in a cold or variable climate sometimes roduce those diseases, which assume a peculiar haracter during the mercurial saturation and ction, especially when aided by the constitutional aints just alluded to.

576. 2nd. In this way also may be explained he several morbid conditions which are comprised nder the denomination of *Cachexia syphiloidea*—*seudo-syphilis*. The modes, also, of employing nercury in the cure of venereal or other maladies, nd the various grades or states of saturation of he system, which these modes induce, may have ome influence in producing various affections of peculiar or anomalous character; for it may be nticipated that the large doses of calomel, given n a warm climate, will affect the constitution nuch less, and somewhat differently from, the arge inunctions of mercurial ointments, sometimes nore or less altered by long keeping, so often em-loyed in this and other cold climates, especially n former times; and that even the blue-pill may e so changed by keeping, particularly in hot and umid countries, as to act differently from the ecent preparation.

577. *E. Acute Poisoning* by excessive or large loses of mercurial compounds — by single or re-eated doses — is generally attended by symptoms f acute gastro-enteritis; but these, as well as the nore remote effects, vary with the preparation ad-ninistered. In general they are altogether the ame as are described when treating of the *cor-osive operation of the salts of mercury* (§§ 216—28.), or differ merely in severity, and as re-pects the liability to any of the consecutive effects ust described.

578. *F. Intolerance of Mercury*.—The injurious ffects now described are usually produced by a rolonged or an excessive use of any of the pre-arations of mercury, excepting probably the ulphurets; but in some constitutions very small doses may occasion excessive salivation and some of the other slighter effects, and even a single small dose may have the same result. When salivation follows a single dose it usually appears on the second or third day, and rarely sooner, but occasionally later. It may, however, appear much sooner, and with great severity, considering the dose, when the preparation, as calomel, is allowed to remain in the mouth for some time. In an instance mentioned by Dr. Bright, five grains of calomel put on the tongue in apoplexy, and not washed down, excited in three hours most violent salivation. Dr. Ramsbotham states, that fifteen grains of blue-pill, taken in three doses, one each night, produced fatal salivation (*Med. Gaz.* i. 75.). Dr. Crampton records a case where two grains of calomel caused ptyalism, extensive ulceration of the throat, exfoliation of the lower jaw, and death. (*Trans. of Dub. Col. of Phys.*, iv. 91.) Dr. Christison says that three drachms of mercurial ointment applied externally caused violent ptyalism and death in eight days. (*Op. Cit.* p. 379.) I have seen one grain of the bichloride divided into twenty doses, of which one was to be taken thrice daily, produce very severe ptyalism before more than two thirds of the grain was taken. I have also seen one grain of blue-pill cause very serious ptyalism; and the same quantity of hydrargyrum cum creta occasion most severe diarrhœa, the smallest doses of any mercurial having this effect with that individual. During the present epidemic influenza (1847) nine grains of blue-pill in three doses, caused sloughing, ulceration of the mouth, and extreme prostration in a case to which I was called.

579. *G.* On the other hand, *some constitutions resist the specific effects of mercury most obstinately.* But it must not be supposed that, although the specific effects do not appear, the mercurial has no effect. It may produce some one or more of the injurious effects above described, or it may affect the bowels, and be carried off by diarrhœa, or excite organic disease of the colon or rectum, especially the latter, or occasion mental disorder with irritative fever. It has also been erroneously supposed that calomel and other preparations of mercury are not injurious to infants and young children, because the specific operation very rarely appears in them. But this is not altogether the case, for the constitutional powers and the digestive organs often suffer more or less, although not manifestly, or at the time; and in older children several of the injurious effects which I have mentioned not infrequently occur, especially ulceration or even sloughing of the cheeks and gums, and irritative or hectic fever, with remarkable pallor, anæmia, or chronic irritation of the bowels, with enlargement of the mesenteric glands.

580. *H. The diagnosis of mercurial salivation* is always difficult, unless the exhibition of some mercurial shortly before the appearance of the discharge be admitted or ascertained. And even when the admission is made, the quantity may be so small as to allow of doubts as to its influence. In certain constitutions, and especially in depressed and debilitated states of such constitutions, after exhausting discharges, and during cold, humid, and north-easterly winds, with more or less exposure to such weather, a small dose of a mercurial may cause excessive salivation; and, if this discharge be attended by much soreness of throat, it is most difficult to determine whether the salivation is

actually the result of the mercurial, or merely symptomatic of the sore throat and cold. If it proceed from the mercurial, there will generally be some tenderness of the gums, a soft and flabby state of the sides of the tongue, and it will generally be more obstinate. A patient under my care took, under the circumstances of general health and exposure just mentioned, five grains of blue-pill. In two or three days afterwards he was attacked with salivation and sore throat. He possessed, however, no constitutional tendency to be affected by mercury; and yet this dose, in his existing state, and from exposure to cold and humidity, appeared to have occasioned the attack, which probably also the sore throat aided to develope. When severe and prolonged salivation has been once produced by a course of mercury, a very slight cause may reproduce it a long period after it had ceased. A common sore throat or cold is sometimes alone sufficient to have this effect. But in this case, as well as in others not caused by mercury, there is no mercurial fœtor; for, although the breath is often very offensive in non-mercurial salivation, the peculiar mercurial fœtor is absent. A very severe or even dangerous effect may be produced on the mouth by a very small dose of mercurial, when conjoined with or given at the same time as tartarized antimony or colchicum.

581. *a.* It ought also to be recollected, that several medicines and poisons occasionally excite salivation. The preparations of gold produce this effect as certainly as those of mercury. Those of copper have often a similar operation; and those of iodine and antimony occasionally exert it. Digitalis and prussic acid sometimes occasion the same effect, and even croton oil and opium have increased this secretion; but this operation, as respects these last, has been loosely observed and recorded.

582. *b.* An *idiopathic*, or spontaneous form of profuse salivation, has sometimes been met with, no medicinal or poisonous cause of it having been detected. Several cases of this form have been recorded, and have continued for months, or even for two or three years, many ounces of saliva having been discharged daily; but in many of these cases the mouth was not affected, and other characteristics of mercurial salivation were wanting. The imagination may excite salivation. Dr. Christison met with an example of this, which, with other cases of spontaneous chronic salivation, he has noticed in his work. I have seen an instance of profuse salivation follow the contemplation of a disgusting object, but it did not continue longer than a few days. Some of the cases recorded as instances of idiopathic salivation have probably been symptomatic of chronic or structural disease of the *pancreas*, as noticed in the article upon that organ.

583. *c.* Dr. Christison very correctly remarks, that, in general, mercurial salivation may be *distinguished* from all other varieties, if its progress has been traced from the first appearance of brassy taste and fœtor to the formation of ulcers and supervention of ptyalism. Its characters are also quite distinct at the time salivation just begins. The fœtor of the breath and sponginess and ulceration of the gums at this stage distinguish it from every other affection. But if the mouth is not examined until the ulcers have existed several
days, the characters of the mercurial action
much more equivocal. They may not, for
ample, be distinguished from spontaneous
ceration of the mouth, depending upon gene
cachexia or unsoundness of constitution, a
characterized by extensive ulceration, or slou
ing, with ptyalism and gangrenous fœtor. T
diagnosis of mercurial salivation demands in
cases much attention, not only in a medical
practical, but also in a medico-legal point
view; and, in both regards, there are ot
questions connected with it which require a spec
attention.

584. 1st. *May salivation not appear until a lo*
period has elapsed after the administration of
mercury has been abandoned? — Mercury adr
nistered in small doses is a cumulative poison, a
often produces no effect upon the salivary glar
or gums until a certain amount of saturation
produced, this amount varying with different c
stitutions, or with the same constitution at differ
times. Hence it may be inferred, that merc
may accumulate in the system without produci
its specific effects, and may still remain, in so
instances, for a considerable period, being
excreted, or only partially excreted, but, bef
its elimination is accomplished, a change in
state of vital power, or of the constitution, tal
place, or some new influence comes into operat
and developes the specific action of the merc
existing in the frame. Thus may be explai
the occurrences of salivation not until some mon
after mercury has been relinquished. Swedia
has met with instances where the interval
several months; Cullerier with an insta
where it was three months.

585. 2d. *What is the duration of mercur*
ptyalism, or how long may salivation continue a
the use of mercury has been abandoned? — R
instances of very prolonged salivation have b
met with by most practitioners—instances of e
several months' duration. But cases have be
recorded by Linnæus, Swediaur, Colson, a
others, of its continuance for periods varying fr
one to five or six years. These, however, are v
rare. Most commonly the mouth and saliv
glands return to their healthy states in the cou
of a fortnight or three weeks; but it is not
usual to observe the period protracted to a mon
or even longer.

586. 3d. *May ptyalism, and other specific eff*
of mercury, recur after a complete intermission,
in other words, reappear after having entir
ceased, mercury having been discontinued?—I ha
above (§ 580.) admitted this occurrence.
has not infrequently been observed by th
practitioners who, in former days, were very c
versant with the effects of severe or prolong
courses of mercury. Dr. Christison belie
that the occurrence of salivation after two or th
or four months have elapsed, without the rep
tion of mercury, is exceedingly uncommon.
certainly is so at the present day; but it m
probably was not so many years ago, when p
longed and severe courses of mercury were of
prescribed; and that it was not so formerly,
reasons assigned above (§ 584.), as well as
testimony of Hamilton, Mead, Male, Fordy
Colson, and others, sufficiently show.

587. 4th. *In what manner does small or ot*
doses of mercury prove fatal? — Death may en

om the mildest preparations, and even from
omparatively small doses, generally in con-
quence of severe salivation, or of gangrenous
estruction of parts of the mouth and fauces, and
e vital depression produced by the mineral and
y the local disorganization. The most obvious
anner in which death takes place is by extension
f sloughing or gangrene of the throat, mouth,
heeks, face, and neck. This result is seldom seen
t the present day. But cases are met with in
onsequence of peculiarity of constitution, or of
rge doses given to children under the belief
at they are much less susceptible of the specific
ffects of this mineral than adults. In general,
hen gangrene is the cause of death it begins
ithin the mouth or in the throat, and spreads
om thence until it reaches the face. This is most
equently seen in children. But I have seen the
lceration both commence in and extend to the
harynx, and thence to the larynx, producing
estruction of this latter part, and death. Some-
mes, especially in children, the sloughing begins
n the external surface, at a distance from ulcera-
on of the gums and mouth, appearing in the
ourse of a few days after salivation. A small
esicle generally appears on the skin, on one or
oth sides near the mouth, and is succeeded by a
angrenous or sloughing ulcer, which spreads over
e cheek, and proves fatal in a few days. In
ases of this nature, both the local disorganization
nd dissolution are the results of the depression of
ital power produced by the mineral. When
alivation is excessive or prolonged, death may
nsue from the exhaustion thereby produced.
But even in this case the mercury has occasioned a
oisonous vital depression, the first manifestations
f which have been the salivation caused by it;
ut with this depression, and the exhaustion con-
equent upon the discharge, the changes produced
y mercury in the constitution and the physical
ppearances and the alterations of the blood should
e taken into the account. Mercury may also
xcite pulmonary and laryngeal phthisis, and
ause death, as just mentioned, by the ulceration
f the epiglottis and glottis, and the attendant
xhaustion and hectic. It may occasion a fatal is-
ue by inducing any one of the several affections I
ave described above (§§ 569. *et seq.*) as contingent
pon the administration of mercurial preparations.
When the corrosive preparations of mercury have
een administered, death is generally the conse-
uence of the local corrosive action, — of the
isorganization caused by them, when taken in
arge quantity. If this effect is not produced, or
s recovered from, they may still cause death from
heir consecutive effects now described.

588. *I. Of the Physiological Action of Mercury.*
— All the preparations of mercury are more or
ess readily absorbed and carried into the circula-
ion; but it is not ascertained in what state they
are absorbed, or by what particular channel, al-
hough the lymphatic and lacteal vessels are most
probably the chief media. In whatever state the
mercurial may be when it has arrived in the
blood, it evidently accumulates there, and in the
solids, to some extent, especially in some constitu-
tions or conditions of the frame, producing, amongst
others, the effects above described. Having arrived
in the circulation, it is carried out of the system,
either without deposition or accumulation in the
solids, or after having been for a time thus deposited, by means of the several emunctories, more especially by the salivary glands, the skin, the pancreas and liver, the intestinal canal, and kidneys. When the mercurial, owing to either the modes of administration or inaction of the emunctories, accumulates in the blood, the tissues may be so saturated with it as to give rise to the changes described, or to admit of the detection of it in the excretions, or even in the structures themselves. In whatever state it may exist in the *blood*, it is so intimately combined with this fluid as to escape detection by the ordinary tests; and destructive distillation is generally required. By this means it has been detected by Zeller, Buchner, Schubarth, Colson, Deiterich, and others. In the same way mercury has been found in the *secretions* and *excretions* — in the saliva, the perspiration, the urine, the intestinal secretions, and even in the discharges from ulcers, as shown by Christison, Pereira, and the writers just named. Dr. Pereira remarks, that the blackening of the skin mentioned by Harrold, Rigby, and others, as having occurred from the use of mercury after the employment of sulphur, shows the presence of mercury in the cutaneous transpiration. The sulphur and the mercury having been thrown out of the system by the skin, and beyond the sphere of the vital power, had entered into union and formed the black sulphuret of mercury, which was deposited on the integument in a pulverulent form. The existence of mercury, in the *reguline state*, in the organic solids, has been asserted by some, and denied by others. Wibmer, Colson, Dieterich, Pereira, and others, say that it has been found in this state in the bones, brain, synovial capsules, the pleura, the humours of the eye, the cellular tissue, &c. In what part of the system reduction is effected is not ascertained; or whether it has occurred during life or after death. I have seen the mercury in the fluid state in bones which have been long in contact with the surrounding earth, and have viewed the reduction as a *post mortem* phenomenon; but it may have been otherwise.

589. Mercurials, having been carried into the circulation, and even to some extent into the tissues and organs, as they undoubtedly are more or less, certainly affect the states of organic nervous and vital power; changing not merely dynamically, but also otherwise *altering* the innervation of the several organs and structures. The *alterative influence* is displayed, and can be estimated only, by its results, by the effects just described. But, in addition to the altered state of general innervation, and chiefly as a consequence of it, the *blood* evinces marked changes. If salivation be easily produced, the blood either shows no very material change at the commencement, or it exhibits merely a slight inflammatory crust. But after salivation has continued some time, the blood becomes darker, coagulates less firmly, and the proportion of the coagulum to the serum diminishes. If salivation be protracted, the red globules decrease in number very remarkably, and *anæmia* is often very considerable, and always supervenes when salivation is either excessive or protracted. Dieterich says that the electrical condition of the blood changes from the negative — the healthy state, to the positive state. With this change in the blood, the soft solids are impaired in their vital cohesion, and all

the exhalations and secretions from surfaces and mucous follicles are increased. The heart and lungs are also more or less affected, as Sir B. Brodie has shown; although more as respects their organic nervous energy, or state of innervation, than as regards the structure. The *structural changes* produced by mercury have been chiefly observed after death from acute poisoning by the corrosive preparations, and have been described above (§ 218.).

590. *K. Treatment.*— When the symptoms are those of *acute poisoning* (§ 216.), then the treatment recommended for that form should be adopted with promptitude and activity (§ 221.); but the varieties of *chronic poisoning* by mercurials require very different measures. — *a. Salivation*, when either excessive or prolonged beyond the intentions of the physician, is that variety which most frequently calls for aid, the means most successful in removing it being also the most beneficial in the treatment of the other varieties of chronic mercurial disease. The patient should be removed to a large, airy, dry, and moderately cool apartment, about 60° Fahr., and entirely apart from those who are subjected to a mercurial treatment. All the linen should be frequently changed, and vicissitudes of temperature avoided. Thus circumstanced, the remedial means may consist of three classes, which may be distinguished as the *antidotal or constitutional*, the *derivative*, and the *local*, which may be successively or contemporaneously employed, or in such succession and combination as the peculiarities and form of the mercurial disorder will suggest.

591. (*a.*) The *constitutional and antidotal means* are limited; but such as they are, they should not be overlooked; for, as the injurious effects of mercury, in any of the forms noticed above, often depends upon the actual presence of mercury in some noxious state, in the circulation, and even in the tissues, and not infrequently upon the irritation this mineral causes in the several emunctories concerned in eliminating it from the system, it is important to resort to such means as are the most likely, by combining with it in the blood and tissues, to render it less deleterious, or even inert. There is probably no substance which may be more beneficially employed with this intention than sulphur, inasmuch as it is readily carried into the circulation, and as readily combines with mercury, whose injurious operation it thus prevents, the sulphuret of mercury being either inert, or nearly so. *Sulphur*, therefore, should be given internally; whilst *sulphur baths*, both warm and fumigating, or as either may suit the peculiarity of the case, may also be called into aid. Formerly the *sulphurets* were given internally for the removal of excessive salivation, but they are very much inferior to the simple precipitated sulphur; and are now employed chiefly in warm medicated baths. Next to the internal use of sulphur may be mentioned the diluted *sulphuric acid*, taken in quantity sufficient to render the drink pleasantly acid; but in cases of very long protracted salivation, or when anæmia has supervened, neither it nor any of the other acids, whether mineral or vegetable, has appeared to me to be of any service, unless combined with an oxide of iron. In these circumstances, the sulphate of iron may be taken in small doses, dissolved in the drink acidulated with the sulphuric acid ; or the citrate of iron m
be given in fluids containing the citric acid.
treating most of the injurious effects of mercur
the local mischief, in whatever form it may a
pear, attracts the chief notice ; and to it chiefl
and not to the states of the blood and of vit
power, which are of the greatest importance,
our remedial measures directed. Various oth
constitutional means have been recommende
but there are comparatively few which deser
adoption. The most serviceable are the prepar
tions of sarsaparilla ; those of iodine ; the iodi
of iron, and some other combinations of iodi
with sarza ; the decoction of cinchona, or t
sulphate of quinine with sulphate of iron,
common alum, or with the citrate of iron, a
cording to circumstances, or to the amount of d
bility or of anæmia. In most of the remote
consecutive states of poisoning by mercury, a
more especially in mercurial cachexia and affe
tions of the skin, and mercurial periostitis t
iodide of potassium, and other preparations
iodine, with sarza, &c. will prove most beneficia

592. (*b.*) The *derivative measures* which a
most serviceable are purgatives and warm bath
and these are serviceable chiefly when salivati
has occurred suddenly or unexpectedly ; when
is recent, and the patient not much reduced.
these circumstances, the best purgatives are t
neutral sulphates dissolved in the compound i
fusion of roses, to which some additional su
phuric acid, and small doses of the sulphate
iron, may be added : these may be administer
at intervals, so as to keep up an action on t
bowels ; or a full dose of precipitated sulph
may be taken at bed-time, and the saline aperie
in the morning, and at mid-day if it be require
Warm medicated baths may likewise be used,
pediluvia. If constipation continue or becon
obstinate, other more active purgatives may
required, if a recourse to purgative enemata do
not accomplish fully the object entertained.

593. (*c.*) The *local means* should have refe
ence to the state and stage of salivation, and
the other symptoms. If salivation be commen
ing ; if it be acute ; if it have occurred une
pectedly, or from a small dose of mercury, a
be attended by an inflammatory state of the mou
or salivary glands, the topical remedies ought
be soothing, and the local excitement should
calmed by means of demulcent gargles, contai
ing cooling and anodyne substances, as the nitra
of potash, or the hydrochlorate of ammonia, wi
extract or tincture of opium ; or by gargles co
taining the acetate of lead and acetic acid, wi
tincture or wine of opium. If the swelling a
tenderness around the salivary glands be co
siderable at the commencement, a few leeche
followed by fomentations, may be prescribe
and the other means assiduously employed.
the more chronic or atonic stage or state of s
livation, the gargles should be astringent a
tonic ; as the decoction of cinchona or of oa
bark, with alum and sulphuric acid ; or with t
tincture of krameria. The chlorides, especial
the chloride of lime in solution, with creasot
solutions of the chloride of zinc, or of the nitra
of silver ; the tincture of myrrh in camphorat
demulcents, &c., may severally be employed
gargles. I have seen strong tar-water of gre
service when used as a gargle, a weaker form

aving been drank as a constitutional re- ly.

594. (*d.*) *The other varieties of chronic poison-* by mercury are benefited most by the con- utional or antidotal means advised above 591). But, in these varieties, the states of the od and of nervous energy should receive par- lar attention. In order to remove the existing ression of vital power, to improve the assi- ating processes, and to resist the changes in the od, especially the progressive anæmia, the de of iron in syrup of sarsaparilla, the several parations of iron, or the mineral chalybeates, tates of combination which the peculiarities of case will suggest, and many of the usual ve- able or mineral tonics and antispasmodics will ve of essential service. When the nervous em, or even when the mental manifestations ray disorder, the means just mentioned, pre- ed or attended by the constitutional treatment ve recommended (§ 591.), are then also uired; change of air and scene, travelling, a , bracing air, generous but light diet, aided by asional recourse to tonics, to chalybeates, to iodine, and to the natural mineral waters, ng also beneficial.

95. vi. STRAMONIUM—THORN-APPLE—*Datura amonium.* — Poisoning with this plant is not equent, and is generally accidental. But the rn-apple has been used on the continent for purposes of aiding the commission of crimes. e whole plant is probably poisonous, but the ds are the most virulent. It is very slightly tant, its poisonous action being exerted chiefly the brain and nerves of sensation. Its operation rly resembles that of belladonna. The active perties of the plant reside chiefly in an alkaloid ciple, described by GEIGER and HESSE, and ned *daturia*, or *daturium*; and probably partly an empyreumatic oil which it contains, resem- g that of digitalis. It acts chiefly by absorption, probably also by its local influence or im- ssion on the nervous systems; for the applica- of the leaves of the plant to burns or sores e occasioned dangerous effects.

593.* *a.* The *symptoms* produced by stramonium e been most accurately observed and described Dr. PEREIRA. *In small and gradually increased es*, it impairs sensibility, thereby alleviates n, and hence is *anodyne*. Although it allays n it does not usually produce sleep. Dr. PE- RA remarks that it has no direct tendency to uce sleep, and hence it *cannot be called soporific*. t indirectly, by alleviating pain, it often dis- es to sleep. It usually does not affect the se: it slightly and temporarily dilates the il, and has no tendency to cause constipation, rather relaxation. *In larger doses* it causes ness of the throat, thirst, nausea, giddiness, tation of the pupil, obscurity of vision, headach, vous agitation, disturbance of the cerebral ctions, perspiration, occasionally relaxation of bowels, and sometimes diuresis. *In fatal doses* chief symptoms are flushed countenance, irium — usually maniacal — dilatation of the il, dryness of the throat, loss of voice, dif- lty of deglutition, hot perspiring skin, convul- s, and sometimes palsy. But the symptoms y in different cases with the dose, and the part preparation of the plant administered. Of the merous instances of poisoning by this plant, the following will suffice to illustrate the symptoms: —

594.* In two cases related by VICAT and SWAINE, the chief symptoms were furious delirium and palsy of the extremities. In three instances adduced by ALIBERTO there were delirium, restlessness, constant incoherent talking, dancing, and singing, with fever and flushed face. In a case described by Dr. TRAILL, about eighteen grains of the extract were taken by mistake, and were followed by dryness of the throat, giddiness, dilated pupils, flushed face, glancing of the eyes, incoherence, resembling intoxication, and incessant unconnected talking like that of demency. Emetics were given without effect, and little amendment was obtained from blood-letting, cold to head, or purgatives. But after a glass of strong lemonade vomiting took place, and the patient soon recovered. BOERHAAVE states, that a man gave the powder of stramonium in coffee to a female. It occasioned redness of the features, delirium, nymphomania, loss of speech, followed by fixedness of the eyes, tremors, convulsions, and coma; afterwards tetanic spasm and slow respiration. She was with difficulty roused by the action of emetics, and recovered. In another dangerous case adduced among others by Dr. CHRISTISON, free blood-letting effected a speedy cure. Of a case well described by Mr. DUFFIN, the symptoms were exactly as above stated (§ 593.*). One hundred of the seeds were swallowed; but although the treatment was judicious, death took place in twenty-four hours. Of several cases adduced by GMELIN, six hours were the shortest duration.

595.* *b. Diagnosis.* — VOGHT says, that stramonium is distinguished from belladonna by its affecting more the ganglia, spinal chord, and brain, — by the circumstance of the pulse being little affected by it, and by slowness more frequently than acceleration of pulse being produced by it,—and by its exciting the organic nervous system more strongly, and more directly promoting all the secretions, especially those from the skin. Its operation may be briefly characterised as slightly irritant and energetically alterative as regards sensibility and innervation, whilst it influences less remarkably the irritability of muscular structures.

596. *c. The morbid appearances* consist chiefly of congestion of the brain and sinuses, especially in those cases which terminate early with maniacal excitement and determination to the head. When life has endured for eighteen hours or upwards, the congestion within the cranium is less remarkable. In Mr. DUFFIN's case, the brain was healthy and not congested. The stomach and intestines were natural. There were a slight redness over the pharynx, larynx, and upper third of the gullet, thickening and swelling of the rima glottidis, and a semi-coagulated state of the blood.

597. *d. The treatment* should consist chiefly of vascular depletions, the cold or tepid affusion on the head; emetics or the stomach-pump; lemonade drinks; and the other means advised for *belladonna* (§ 545.).

598. CLASS VII. NARCOTICS, OR STUPEFYING POISONS.—HYPNOTICS.— Several substances have been classed as narcotics, although they are not directly or really narcotic or hypnotic, and produce this effect only contingently upon their anodyne or sedative action — not infrequently as

a consequence of the vital depression or exhaustion which they occasion in a large dose. This error of arrangement, so intimately allied to inaccurate views as to the operation and effects of both medicines and poisons, has been perpetuated by most writers on juridical medicine. But it is of great importance, in a practical rather than in a theoretical point of view, that substances which are simply *anodyne* — which remove pain or paralyse sensibility — should be distinguished from those which exert a more extensive effect, and are *sedative* — which lower nervous and vascular excitement, and depress vital action; and that those substances which are simply *hypnotic* — which merely procure sleep — should also be distinguished from *narcotics* — which do more than procure sleep, which stupefy the senses and occasion a state of lethargy, into which the patient lapses immediately after having been momentarily and with difficulty roused. There is no doubt that several substances produce effects so complicated as to render classification founded on these effects most difficult — that there are some which are not only anodyne, but also sedative or depressing, and withal both hypnotic and narcotic; and it is hence the more difficult to arrange them. Still the difficulty should be met; and, by careful observation, the more prominent effects of these substances should be recognised and assigned to each. I have had occasion to show that several substances which have been classed as narcotics are not actually such, but occasionally manifest more or less of this effect merely as a consequence of the vital depression they produce when taken in excessive doses.

599. The operation of narcotics was once a source of dispute between the chief supporters of the medical doctrines adopted towards the close of the last century. The term *narcotic*, being applied substantively and adjectively to medicines which have the power of stupefying, and impairing the energy of the nervous system, the mode in which this power was excited became the subject of inquiry. As most narcotics have a stimulating influence in small doses, and as the narcotic effect is produced chiefly, or only when they are given in full or large doses, the question was, as to the way in which this latter effect was developed. Cullen contended that the stimulating effect is owing to the resistance offered by the *vis medicatrix naturæ* to the sedative influence of the substance; and hence, that a large dose is immediately sedative, because this resistance is overpowered. Brown, on the contrary, maintained that narcotics are in reality highly diffusible stimuli, which exhaust the excitability by the rapidity of their action. Thus Cullen regarded them as directly sedative, and indirectly stimulant; and Brown as directly stimulant, and indirectly sedative. The discussions connected with this subject, which may be viewed as constituting an epoch in the history of medicine, are now nearly forgotten, although the topic is not altogether destitute of practical importance. If both doctrines were closely investigated, neither would be found correct; but it is sufficient that we attend to the effects, and observe them correctly. The exact modes in which they are brought about require too minute an investigation to be entered upon at this place.

600. i. Carbonic Acid Gas — *and admixtures of it with other gases.* — This is the ost important of the deleterious gases. It is, as Dr. Christison remarks, the daily cause of acci ts; for it is extricated in great quantity from bu ng fuel, during the calcination of lime stone or lk, by the fermentation of beer, and in pits, es, wells, &c. It is generated during respirati by all animals, and is accumulated to a dang ous amount in apartments where due ventilat is neglected. Owing to these and other so es, being such as admit of the accidental and en-tional operation of this gas on the human su ct, poisoning by it is of frequent occurrence. me doubts had been entertained whether it is a si-tive poison, or simply an asphyxiating gas. ut, independently of its action, when concentrat or pure, in irritating and constricting the la x, and thereby producing suffocation, it is posi ely and energetically poisonous. This is shown a variety of circumstances: — 1st. Poisonin by this gas is more rapid than immersion in h ro-gen or azote. Immersion in carbonic aci gas will kill an animal outright in twenty-five sec ds, and a small bird in fifteen seconds. — 2d. in-stead of the nitrogen gas contained in air ar-bonic acid be mixed with oxygen in the me proportion, symptoms of poisoning will app in two minutes in animals which breathe this a ix-ture. Persons have become apoplectic i an atmosphere containing carbonic acid gas in ch less proportion, and which has appeared ite respirable upon first entering it. — 3d. Pro or Rolando (*Archives Gen. de Med.* t. v. p. .) found that the land tortoise sustained little i ry when the great air-tube of one lung was d; but instead of tying this tube, he contriv to make the animal breathe carbonic acid gas thr gh it, and death took place in a few hours. — h. The symptoms caused by inhaling the gas ch diluted may be produced by the application it to the internal surface of the stomach, or ev to the skin. It is well known that aërated er not infrequently causes giddiness and a pa ng intoxication when drank too freely, especiall y persons unaccustomed to it. The sparkling es owe to this gas a portion of their power of id intoxication. M. Collard de Martigny f ad that, if the human body be enclosed in an a o-sphere of this gas, whilst respiration is ca ed on by the common air, the usual symptor of poisoning with carbonic acid are produced; d, if the same experiment be made on ani s, death will ensue if continued long enoug — 5th. It has been shown by Dr. G. Bird at death may follow the inspiration of this gas l-though the usual changes are produced by e oxygen in the air on the blood, which even y still retain its florid colour. (*Guy's Hosp.* vol. iv. p. 79.)

601. *A.* When a person attempts to *inhale* e *carbonic acid gas*, the throat is irritated so stro y that the glottis closes, and inspiration is im -sible. Sir H. Davy and Dr. Christison e-marked, that the gas causes an acid taste in e mouth and throat, and a sense of burning in e uvula; hence, when a person is immersed in s gas, he dies at once of suffocation. The eff s, however, are very different when the gas is i-luted, the symptoms resembling those of apop y or poisoning by opium, but varying some t according to the source from which the g is

rived, and the vapours or other gases or admix-
res consequently breathed with it. It is of
portance to recollect that fatal poisoning by
s gas may occur where the quantity pre-
nt is quite insufficient to produce much
ect at first, or for some time, or to extin-
ish a lighted candle; and, consequently, we
authorised in concluding that a gaseous mix-
e, capable of extinguishing a lighted taper or
ndle, will almost inevitably prove fatal to ani-
l life. No odour nor taste, also, is perceived
en this gas is much diluted.

602. *B.* The *symptoms* experienced by persons
osed to an atmosphere loaded with charcoal
nes, or with carbonic acid emanating from any
er source, and mixed with more or less of
er gases, are well marked and constant; al-
ugh, as Dr. Golding Bird remarks, they are
from being distinctly characteristic of the ex-
ng cause, as they are very similar to the pre-
nitory signs of apoplexy. A person exposed
these fumes at first experiences an intense,
etrating, and throbbing headach, with a sense
weight and heat, especially about the occipital
gion; pulsation in, and sense of tightness across
temples; giddiness, confusion of ideas, and
lure of memory; increased action of the heart
d often violent palpitations, sometimes attended
a disposition to nausea and hysteric sobbing.
the individual be now removed into a current
cool pure air, with warm applications to the
t, which usually in such circumstances become
d, the symptoms gradually vanish. But if he
ntinue exposed to the poisoned atmosphere, a
zzing noise in the ears, partial or total loss of
ion, an undefined, vague feeling of intense
ad or horror succeed, and are rapidly followed
somnolency or syncope. Subsequently, ac-
rding to Dr. G. Bird, all power of volition
appears; the pulse, which was previously above
0, falls to 40 or 50; respiration becomes slow
d laborious; the surface universally cold,
d often livid; the lips blue or violet; the
es retaining, in most cases, their lustre.
adually these symptoms increase in intensity,
quently with the accession of tetanic convul-
ns, and, in a few instances, raging delirium.
hite or bloody foam appears before the mouth
d nostrils, vomiting takes place, and the suf-
er sometimes expires in the act; but he as fre-
ntly breathes his last without vomiting, and,
this case, the tongue is protruded, or firmly
nched between the teeth. He is usually found
a calm and sleep-like attitude, the countenance
ays retaining a placid expression, which even
vomiting, that often occurs in the last mo-
nts, had not disturbed.

03. Persons who have been exposed to an at-
sphere vitiated by carbonate acid gas, "until
ensibility, cessation of pulsation in the smaller
rial trunks, and suspension of respiration su-
vene, frequently exist for a considerable time,
emoved from the poisoned atmosphere — ap-
ring partially to survive; exciting hopes too
quently fallacious: as such persons almost
ays sink, even after living for several days in a
e of somnolency." A case, however, is re-
ded by Dr. Babington, in which a singularly
icious treatment was successful; and others
e since recovered from this very dangerous
e.

604. *C.* A small quantity of *the mixed gases,* proceeding from the slow combustion of tallow or oily substances, will produce dangerous symptoms. Dr. Blackadder ascertained (*Edin. New Philos. Journ.*, i. 224.), that the vapour into which oil is resolved, previously to its forming flame round the wick excites, even in minute quantity, intense headach. The emanations from the burning snuff of a candle are probably of the same nature, and very poisonous; and an instance of such effect is adduced by Dr. Christison. A party amused themselves by holding under the nose of a boy asleep, the smoke of an extinguished candle. At first he was roused a little each time; but after half an hour, during which this was repeated, he began to breathe laboriously, and was attacked by incessant epileptic convulsions, and died on the third day. The effects of these emanations are probably partly owing to the presence of an empyreumatic volatile oil, which is an active poison (§ 668.).

605. *D. The admixture of sulphurous acid gas with the carbonic* being inhaled in a diluted state, is extremely deleterious. When, however, the sulphurous acid gas is present in any quantity, the irritant effects produced by it, especially on the lungs and air-tubes, will often prevent accidents which might have occurred if carbonic acid gas only had been present. Instances have been recorded where the admixture of these gases have proved fatal, especially in mines. The symptoms produced by these gases, and those caused by *the gradual contamination of the air in a confined apartment,* in which a number of living beings are inclosed, are very nearly the same, although the causes are not identical. It was found in the instances which occurred in mines, that, although the lights continued to burn, the men were poisoned; the symptoms being difficulty of breathing, pain and beating in the head, giddiness and ringing in the ears, palpitation and anxiety followed by vomiting, weakness and pains in the limbs, and finally loss of recollection. To these succeeded frantic delirium in some, terror in others, and insensibility in the rest. Many retched and vomited. In some the pulse was quick, in others it was slow; in many irregular, and in all feeble. (*See Edin. Med. and Surg. Journ.* xiii. 353, xxxii. 345.)

606. *E. Appearances of the dead body.* — *a. Externally,* these vary with the circumstances of particular cases; but the surface is generally sprinkled with livid spots — often bluish or reddish brown, passing into violet; and these are most numerous in the most depending parts. The limbs are, in some cases, very flexible, in others as rigid. The fingers are often irregularly bent; sometimes stiff and extended. The arms are occasionally thrown across the chest, especially if spasms have preceded death. Opposite statements have been made as to the persistence of the animal heat, and as to the rapid or slow development of decomposition. The tongue is found projecting, and often clenched between the teeth, unless vomiting preceded death, and then it is usually in its natural position. The mouth is often covered with a white or bloody foam. The face is in some cases red and bloated, in others pale and placid. The eyes generally retain their vivacious aspect; they are sometimes injected. The pupils are dilated. The features are always in a state of repose. The interior of the

nostrils, in some instances are lined with a black fuliginous deposit. The abdomen is distended with air. (Dr. G. Bird.)

607. *b. On dissection* the coverings of the *head* are found injected with blood. The vessels of the dura mater, arachnoid, and piă mater, as well as the sinuses, are found turgid with blood ; and serous effusion often exists beneath the arachnoid. The surface of the brain is always injected —often reddish ; occasionally the cerebral substance is somewhat softened, and presents the appearance of recent inflammation. The lateral ventricles generally contain fluid, sometimes limited to one side ; and serous effusion is met with at the base of the brain. In addition to this congested state of the brain and cerebellum, extravasation of blood is found in a few instances — in one case, universal effusion of blood between the arachnoid and piă mater, and extending to the cerebellum ; in another, into the lateral ventricles. Dr. G. Bird states that the blood found in the cerebral vessels is black in some cases, and florid in others ; and even black in some vessels, and florid in others, in the same case. Occasionally the blood is fluid, and very thick ; in others remarkably thin ; and in some coagulated. Effusion of reddish serum into the *pleura* and *pericardium* is frequent. The *lungs* are sometimes expanded, and full of air and blood, in others collapsed. In many, their tint is blackish violet ; in others red, spotted with black ; and in some quite natural, and presenting merely the usual cadaveric turgescence and blackness posteriorly. The blood in their vessels is often black, sometimes florid, and even both ; the vessels are frequently turgid, but occasionally nearly empty. The cavities of the *heart*, and the *blood* found in them, present as opposite appearances, in different cases, as have been described in respect of the lungs. The same remark applies to the larynx and trachea. The pharynx and œsophagus are usually healthy, and sometimes contain food, as if the patient had expired in the act of vomiting : but in the last moments of life, the contents of the stomach are regurgitated without effort, rather than vomited. The *abdominal viscera* are generally healthy ; whatever lesion they present being referable to other causes. The veins are most usually congested, and more or less of serous effusion into the peritoneal cavity is sometimes seen. The blood in the abdominal veins is coagulated in some cases, and fluid in others. The *muscles* are stated to be extremely lacerable, owing to the absence of irritability or vital cohesion ; but Dr. G. Bird contends that such is not the case in some.

608. *F. The modus operandi of diluted carbonic acid gas.* — This physician, who has paid much attention to the subject, concludes from his researches, that an atmosphere containing carbonic acid gas will produce death, although it may contain a sufficient amount of oxygen to support life, *per se*, and to allow the arterialisation of the blood to proceed. On which account, no dependence can be placed on the dark or florid colour of the blood, as arguments for or against poisoning by carbonic acid gas. He considers that this gas, when diluted, acts primarily upon the nervous system ; and secondarily, but by no means essentially, upon the circulating fluid : that death is caused by the accession of apoplexy, often attended by serous effusion into the ve - cles, or on the surface of the brain, and so - times even by the extravasation of blood ; d that no importance can be attached to the st es of the surface, of the features, of the blood of the limbs and muscles, and of the thoracic d abdominal muscles, as proofs of poisoning by - bonic acid gas. I need only add to this st e- ment, that during the inhalation of this gas, of admixtures of it with other gases, the injur s action may be produced not only through e medium of the nerves, but also by the passag of the gas itself into the circulation, where it y act more directly on the ganglial nerves of e brain, influencing its innervation, its circula n, and vital manifestations, and thereby gi g rise to the symptoms and structural le s above described. These lesions are chiefly n- gestion of the vessels of the brain, with co a- gent serous effusion, and, more rarely, sanguin s extravasation. Beyond these, but little struct al change, at least of a precise and obvious nat e, is met with, either constantly or generally l- though various alterations in the colour d states of both the fluids and soft solids are o- served ; but they are so different, or even o o- site, in different cases, that no importance ca e attached to them.

609. *G. Treatment.*—This should consist of o- ping, or general blood-letting—but cuppin n the nape of the neck generally, and prefera ; of an occasional recourse to cold or tepid a- sions on the head and neck ; of the applicati of derivative means to the lower extremities, a of stimulative embrocations to the chest and li s; and of the administration of enemata, contai g camphor or asafœtida, with active purgative as turpentine, castor oil, &c. The quantity of b d, which should be taken by cupping, ought t e regulated by the symptoms and the progre of the poisonous effects. When these means e inefficient, owing to the existing torpor and i n- sibility, artificial inflation of the lungs, and n recourse to electricity, or to electro-galva n, should not be neglected ; more especially a e progress of such cases is not generally so r d as to preclude the adoption of these me s. When the temperature is much depressed, v m baths, with salt, mustard, &c. in the baths, sh d not be neglected. In Dr. Babington's case e- cided benefit was derived from the inhalatio of oxygen gas. But much will depend upon e adaptation of the various means to the stat of the nervous system, and of the circulation a e time of their administration. As many o e cases of poisoning by this gas are of conside le duration, sufficient time is generally afforde to ascertain the efficacy of remedies.

610. ii. Carbonic Oxide Gas. — When is gas is thrown slowly into the veins, it gives e arterial blood a brownish tint, and induces, a short time, a state resembling intoxication (s- ten). But it is certainly more deleterious n the experiments of Nysten would seem to i- cate. An assistant of Mr. Higgins, after n- haling this gas two or three times, was seized h giddiness, tremors, and approach to insensibil ; succeeded by langour, weakness, and head n. Another assistant, having previously exha d his lungs, inhaled the pure gas three or four ti s, and was suddenly deprived of sense and mo t,

d continued insensible for half an hour; during hich time he was apparently lifeless, with the lse nearly extinct. Various means were tried r rousing him, without success; till, at last, ygen gas was blown into the lungs. Animation en returned rapidly; but he was affected for e rest of the day with convulsive movements, upor, violent headach, and quick, irregular lse; and after his senses were restored, he sufed from giddiness, blindness, nausea, alternate ats and chills, succeeded by feverish, broken, t irresistible sleep.

611. iii. CARBURETTED HYDROGEN GAS — AL GAS. — *The several species or admixtures of rburetted hydrogen gas* are more or less narcotic d injurious, although much less noxious than lphuretted hydrogen. — *A.* Sir H. DAVY found t, when he breathed a mixture of two parts of and three of *carburetted hydrogen,* he was atked with giddiness, headach, and transient akness of the limbs. When he breathed this s in a pure state, the first inspiration caused a se of numbness in the muscles of the throat; e second, an overpowering sense of oppression the chest, and insensibility to external objects; ring the third, he felt sinking into death, and e mouth-piece dropped from his hand. On revering his senses, which happened in less than minute, he continued to suffer for some time m a suffocating feeling, extreme exhaustion, d feebleness of the pulse. Throughout the rest the day he was affected with weakness, giddiss, and rending headach. Colliers, however, eathe the air of coal-mines without apparent ury, although strongly impregnated with this s; and NYSTEN found it inert when injected o the veins. Probably the concentration of the s, or the impregnation of the air with it, reires to be carried up to a certain point before poisonous operation is produced.

612. *B. Coal gas and oil gas,* which are mixed d variable gases, appear to be inert, or nearly , when very much diluted; but since their induction for the purposes of illumination, many al accidents have occurred from the respiration air contaminated with them. *Coal gas* consists hydrogen, proto-carburetted hydrogen, bi-carretted hydrogen, carbonic oxide, nitrogen, and rbonic acid in varying proportions. Several ses of poisoning with this admixture, owing to e contamination of a large proportion of air th it, are recorded. The *symptoms* were vero, cephalagia, confusion of intellect, with loss consciousness; nausea, with vomiting; general akness and vital depression; partial paralysis, nvulsions, and the usual symptoms of general phyxia. In illustration of the effects of coals, Mr. TAYLOR adduces the following. In nuary, 1841, a family in Strasburg respired for rteen hours an air contaminated with coal-gas, ving to its escape from a pipe. On discovery of e accident, four persons were found dead. The ther and mother still breathed; but the father ed in twenty-four hours: the mother recovered. -An old lady and her grand-daughter, who had en annoyed by the escape of coal-gas during e day, retired to bed, and were found dead out twelve hours afterwards. In the case of e Strasburg family, there was probably not ore than 8 or 9 *per cent.* of coal-gas contained the air of the rooms, because, when the proportion is a little greater, the mixture with air becomes explosive; and a candle was burnt out, and a fire burning in the stove, showing that no explosion had taken place. In the other cases, a strong smell of coal-gas could be perceived when the bodies were found, though the air could be breathed. Coal-gas, therefore, like other gaseous poisons, may destroy life if long respired, although it be so much diluted as not to be injurious at first, or for a short time.

613. *C.* On *dissection,* the appearances have been observed chiefly in the instances just mentioned. Of the five bodies poisoned by this cause in Strasburg, the *post mortem* examination evinced a great difference in the appearances; but the chief alterations were congestion of the brain and its membranes, remarkable engorgement of the pià mater, and intense redness of the whole surface of the brain. In three of the cases, there was an effusion of coagulated blood on the dura mater of the spinal canal. The lining membrane of the air-passages was strongly injected; and there was spread over it a layer of thick viscid froth, tinged with blood. The substance of the lungs was of a bright red colour, and the blood was coagulated. In the other cases, recorded by Mr. TEALE (*Guy's Hosp. Rep.* No. viii.), there was also congestion of the brain and its membranes, with injection of the lining membrane of the air-passages; but in these cases the blood was remarkably liquid.

614. *D. Treatment.*—The odour of this gas will generally lead to the detection of it, and to prevention of its injurious operation; but it may penetrate into dwellings and apartments in a very insidious manner; and if this takes place where persons are asleep, the results may be fatal in a few hours. The exact proportion of this gas to the air respired which will destroy life has not been ascertained; but from 7 to 12 *per cent.* of this gas in air will most likely be sufficient, as this proportion has killed rabbits and dogs in a few minutes. Indeed, a quantity a little below the explosive proportion, or 7 or 8 *per cent.*, may be sufficient. The treatment where poisoning has taken place is the same as I have advised for the effects of carbonic acid gas (§ 609.).

615. iv. CHLOROFORM —*perchloride of formyle —chloric æther, and æther-vapour.* — I have already made mention of *æther-vapours* (see §§ 322. 336—340.) in connection with their effects as an *intoxicating* and *paralysing* or *anæsthetic agents.* I shall now notice them as powerful *hypnotics,* or *narcotics,* their hypnotic operation being the most speedily developed, and the most remarkable of known substances. When the effect of sulphuric æther as an anæsthetic agent was first ascertained the advantages to be derived from it in surgery and midwifery were certainly over-estimated, and the dangers contingent on a recourse to it were not always admitted or even recognised. It certainly could not have furnished entire satisfaction to Dr. SIMPSON, who was amongst the most zealous in recommending it in obstetric practice, otherwise he would not have sought for another anæsthetic agent; and he was successful in finding one still more energetic, and probably more safe. But a few months of trial of the sulphuric æther inhalation was thus followed by the discovery of the advantages of inhaling *chloroform.* In February, 1847, Mr. JACOB BELL first employed chloroform, or perchloride of formyle (*Pharmaceut. Journ.* for

February 1847, p. 357.), as a substitute for sulphuric æther, as an anæsthetic or hypnotic agent; and in November 1847, Dr. SIMPSON, apparently unacquainted with Mr. BELL's recommendation, had recourse to it for the alleviation of the pains of parturition. That chloroform, even in small quantity, poured upon a sponge or handkerchief, and held to the nostrils, produces the most profound sopor and insensibility, in a very short period — from a few seconds to a very few minutes — cannot be disputed; and that it may be employed in surgical operations, and in midwifery, so as to prevent any painful sensation, has been already shown on numerous occasions. It has likewise been proved that it is more rapid and certain in its effects than sulphuric æther, and even more safe, thus admitting that the latter is not always quite harmless. I have already pointed out the dangers attendant upon even a prudent recourse to sulphuric æther inhalation, especially in the parturient process (§§ 337, 338.), and I have no reason to infer that the danger is much reduced by the employment of chloroform. Time and close observation will decide as to the amount of benefit or of mischief which may result from the use of this latter. That it may be applied to injurious, to poisonous, and even to felonious purposes, may be anticipated from the facility of its administration, and from the communications respecting it which were instantly made to all the daily and weekly papers in the kingdom. All these hypnotic or anæsthetic agents, if breathed for too long a time, without such intermissions in their administration, or without such precautions as a prudent physician will adopt, may be followed by the most dangerous effects, in respect both of the constitution of the blood and of the nervous masses, especially the brain and medulla oblongata. Time and observation have not yet been sufficient to show the results as to chloroform; but a recourse to it should be made with caution, as an effect so potent as it produces cannot be undergone without some risk in certain states and constitutions. At the moment of writing the above, experiments made and published by Mr. T. WAKLEY, (*Lancet*, Jan. 1. 1848) demonstrate the poisonous operation of chloroform and the æthers when inhaled by the lower animals, and the following case was published by Dr. GULL.

616. A boy aged eleven, in good health, but his nervous system a little weakened by confinement to bed, his heart and lungs sound, was about to have the flexor tendons of the knee-joint divided, in GUY's Hospital, and chloroform inhalation was adopted. "A small quantity of chloroform, not exceeding thirty drops, was put upon a cone of bibulous paper, and placed over his mouth and nose. In less than a minute he was entirely insensible, the pupils becoming widely dilated, and the pulse small and frequent. As the operation was being proceeded with, his consciousness partly returned, and a few drops of the chloroform were put upon a handkerchief and applied to the nose. He was instantly affected, and to such a degree that there was the greatest apprehension of his never rallying. The pulse was very feeble, 56; the breathing so indistinct as hardly to be distinguished; the face pale, lips congested; the symptoms of collapse extreme. Ammonia was employed, and, after about five minutes, he gave two or three deep inspirations: it was, however, more than fifteen minutes before he was out of
danger. Subsequently a small quantity of bran
was administered. He complained of heada
For a long time after he recovered his spec
senses and power of motion, general and perf
anæsthesia of the surface existed, The follow
day he was quite well." — (*Lond. Med. Gaz.* I
cember 10, 1847, p. 1036.) The above case s
ficiently illustrates the injurious action of this su
stance; and, in the present state of our knowle
and experience of the inhalation of this and ot
preparations of æther, it is unnecessary to m
any further observation.

617. v. CICUTA VIROSA — *Water-hemlock.*
This indigenous plant has sometimes produced
cidentally the most noxious effects. The ro
and the rest of the plant are poisonous, but
roots especially. Among other instances rela
by WEPFER, eight children ate the roots inst
of parsnips. Two of them died. The first syr
toms in these two were swelling in the pit of
stomach, vomitings, or efforts to vomit, total
sensibility, involuntary discharge of urine,
lastly severe spastic convulsions. One died
half an hour, the other soon after. One who
covered, had convulsions, followed by deep co
from which she could not be roused for twen
four hours.—*a.* According to GUERSENT (*Dict.*
Sciences Méd. t. v. p. 205.) the first *symptoms*
poisoning with cicuta are dimness of sight, verti
acute headach, pain in the stomach, anxi
dryness of the throat, thirst, and vomiting;
lowed by eneuresis, epileptic convulsions, lethar
and insensibility, in some cases; and by deliri
unconsciousness, or convulsions with tumefact
of the face, protrusion of the eye-balls, &c.
others.

618. *b. On dissection* METZDORF met only w
congestion of the blood-vessels of the brain and
membranes. GUERSENT, in addition to congest
of the cerebral vessels, mentions flaccidity of
parietes of the heart's cavities, and congestion
the lungs and liver with a dark fluid blood. T
body is sometimes swollen, the abdomen disten
with air in the intestines, and the surface cove
with livid spots. But the only changes which
constant are the congestions now mentioned. T
same *treatment* as recommended for *belladon*
(§ 545.), or *opium* (§ 657.) is required for p
soning with this plant.

619. vi. CONIUM — *Hemlock* — *Conium macu*
tum—*Conia.*—This plant may certainly be view
as the *κώνειον* of Greek writers, — the celebra
Athenian state poison, by which SOCRATES and P
CION died, — the *cicuta* of the Romans. NICAN
states that this plant brings on obliteration of
mental faculties, dimness of sight, giddiness, st
gering, stifling, coldness of the limbs and death
asphyxia. "A view of its effects," says Dr. CHI
TISON, "which differs little from the mod
notions of the poisonous action of the spot
hemlock." Dr. PEREIRA adds, that the ancie
regarded *κώνειον* as having the power of disc
ing tumours — a virtue which has been assig
to hemlock by writers of the present day.
effects of conium upon animals and upon man
somewhat different, the action on the former m
closely resembling that of its alkaloid, *conia.*

620. *A. Symptoms.*—*a.* In *small doses* it produ
but slight or hardly manifest effects. But it so
times causes, when long continued, disorder of
digestive organs or nervous system, dryness of
throat, thirst, and occasionally the reduction

ings or of tumours, and an eruption on the If the dose be gradually and much increased, ffects are often more severe; delirium, syn- or coma supervening. The ancients believed hemlock exerted a specific influence over the mæ and testicles, preventing the develop- of the former, and causing wasting of the r, especially in girls and boys respectively. Arabians entertained similar ideas. These ts have even been imputed to it in modern s.

1. *b*. In *large or poisonous doses* the symptoms ate a dangerous affection of the cerebro-spinal m. In some of the best-recorded cases, coma the prominent symptom, the effects being ar to those of opium. In other instances, ulsions or violent delirium, or both, were inent. A soldier had partaken, with others, soup containing hemlock leaves, and soon wards fell asleep. In the course of an hour a half, his comrades became alarmed on find- hemselves affected with giddiness and head- and the surgeon was sent for. He found soldier, who had fallen asleep, in a state of sibility, from which, however, he could be ed for a few moments. His countenance was ed, tumid, and bluish; the pulse only thirty, the extremities cold. The insensibility in- sed until he died, three hours after taking the . Two cases are described by Dr. Watson, h were fatal in the same short period. Gid- s, coma and convulsions were the principal toms. When the dose is not sufficient to e fatal, there is occasionally paralysis at- ed by slight convulsions. Sometimes there is ic delirium.

2. *B. Conia*, *Conein*, *Cicutine*, or the alkaloid onium, in which the active properties of the t chiefly reside, exists in it in combination an acid — the *coniic?* Its effects are known by experiments on the lower animals. On it acts as a powerful paralysing agent; ting first the muscles of voluntary motion, the respiratory muscles of the chest and ab- en, lastly the diaphragm, and thus producing h by asphyxia (Christison). Convulsive ors, and twitches of the limbs are also some- s observed. Dr. Pereira remarks that "the ary seat of the action of *conia* is probably the l chord (probably also the medulla oblongata brain)." "In this conia and strychnia agree; n the nature of the effect, as Dr. Christison observed, to be the opposites of each other. a exhausts the nervous energy of the cord, causes muscular paralysis; strychnia irritates d produces permanent spasm of the respiratory cles." These effects of conia suggest its em- ment in convulsive and spasmodic diseases.

23. C. *On dissection*, the chief alterations which observed are congestion of all the vessels in the cranium, and a very fluid and dark of the blood. In a case examined by Drs. istison and Coindet, the vessels within the l were not particularly turgid, but the blood every where remarkably fluid. Death in this was produced in an hour, by two ounces of a g infusion of hemlock leaves with the same tity of whisky, which was swallowed in the ning fasting, at the suggestion of one of those dling persons who are so very kind in pre- ing for their acquaintances that of which they know nothing. The symptoms in this case were coma and slight convulsions. The fluidity and dark hue of the blood are merely the results, as Dr. Christison suggests, of the asphyxia, which is the proximate cause of death in poisoning by conium.—The same *treatment* as is recommended for *belladonna* (§§ 545.) or for *opium* (§§ 657.), is appropriate for the effects of conium.

624. vii. Henbane—Hyoscyamus Niger—*Hyoscyamia*, &c. — All parts of this plant are poisonous, especially the seeds and roots. They produce somewhat different effects upon animals and upon man, being more hypnotic in the former than in the latter.—*A*. In *small doses* they are calming, se-tive, and slightly narcotic. Mr. Houlton has shown that their effects vary much with the age of the plant, the season at which the several parts of it are gathered and prepared, and the mode of preparation and preservation. *Large doses* sometimes procure quietude and sleep, but with no certainty; for they not infrequently occasion dimness of sight with dilatation of the pupil, headache, giddiness, and a state of half-sleeping and half-waking, with a tendency to delirium. In some cases, thirst, nausea, clamminess of the mouth, feverishness, griping and relaxation of the bowels are induced. *Very large doses* much more frequently produces delirium than sound sleep. In *poisonous* doses it causes loss or disturbance of vision, dilatation of the pupil, coma with muttering delirium, distortion of the features and loss of speech, paralysis, with irregular convulsive movements, and occasionally violent delirium, and irritation of the stomach and bowels, with vomiting, griping, and purging.

625. *B*. The special effects of *hyoscyamia*, the alkaloid in which much of the active properties of the plant are believed to reside, have not been fully shown. Dr. Morries has ascertained that, like other narcotic and sedative vegetables, as opium, hemlock, tobacco, stramonium, digitalis, &c., hyoscyamus also yields by destructive distillation an *empyreumatic oil* of great activity; its poisonous properties depending upon a volatile principle which is not essential to the oil, and is productive of coma, convulsions, and speedy death.

626. *C*. *Hyoscyamus*, especially its juice and extract, is most actively poisonous when injected into the blood, less so when applied to the cellular tissue, and still less when taken into the stomach. It is sometimes very active when administered in an enema. It has even produced serious effects when applied to the sound surface, in the form of a poultice. Wibmer was called to a lady affected with sopor, dilated pupils, flushed face, loss of speech, full pulse, and swelling of the abdomen, and found that these symptoms were caused by a poultice of henbane leaves applied over the abdomen to relieve strangury. It *acts* chiefly on the brain, and by absorption into the circulation.

627. *D*. *Diagnosis*.—The effects of hyoscyamus differ from those of *opium* in being more sedative in small doses, by the affection of the sight and dilatation of the pupils, by the much less, and more uncertain, soporific operation in large doses, and by the delirium, loss of speech and paralysis, with irritation of the bowels, in poisonous quantities. Hyoscyamus differs from *belladonna* and *stramonium* by the less frequent and less remarkable occurrence of gastro-intestinal irritation from it, and by the more manifest appearance of

narcotic or soporific action. It differs also from *hydrocyanic acid* in producing delirium and paralysis, whilst the acid occasions insensibility and convulsion, and more rapid results.

628. *E.* The *other species* of hyoscyamus, as the *albus, aureus, physaloides,* and *scopolia* are said to be equally poisonous with the *H. Niger.* Professor FODÉRÉ states, that the *H. Albus* was boiled and distributed by mistake among the crew of a French corvette. But in a short time after eating it they were all seized with giddiness, vomiting, convulsions, colic, purging, and violent delirium. They were all relieved by emetics and purgatives. The *appearances* in fatal cases have not been described.—The *treatment* is the same as in other cases of narcotic poisoning.

629. *Lactuca virosa, L. sativa,* and *Humulus lupulus,* are not likely to occasion dangerous effects from accident or otherwise.

630. viii. OPIUM AND ITS PREPARATIONS—MORPHIA AND ITS SALTS. — The operation and effects of opium have been investigated by numerous able inquirers, but most satisfactorily by CHRISTISON, PEREIRA, and CHARVET. Since 1821, when I first resorted to the cold affusion in the treatment of poisoning by opium, I have devoted much attention to the medicinal and poisonous properties of this substance, probably the most valuable of all the articles of the materia medica.

631. *A.* The *local action* of opium is exerted chiefly on the nerves of the part, more especially on the sentient nerves, but the irritability of contractile tissues is also affected. When a watery solution, or fluid extract, of opium was applied to a painful part, or to a surface denuded of its cuticle, I found that the morbid sensibility was removed in the one case, and numbness caused in the other; and that the intestinal movements were arrested by the application of the same preparation to the mucous surface of the intestines. This latter result was also remarked by Dr. W. PHILIP. Dr. MUNRO found, that opium injected into the cellular tissue caused palsy of the hind-legs of a frog. Several physiologists have shown that, when opium is applied to the internal surface of the heart of a frog, this organ ceases to beat.

632. *B.* The *remote effects* of opium have been fruitful topics of discussion. It was formerly believed that the impression made by opium upon the nerves of the stomach, or of any other part, is conveyed sympathetically to the brain; but it has been conclusively proved that the poison itself enters the circulation, and acts directly either upon the brain, or upon the ganglia and ganglial nerves, supplying the brain and its blood-vessels; this latter alternative appearing to me the most probable. (See § 654. *et seq.*) According to ORFILA's experiments, the action of opium is most energetic when injected into the veins. Opium is more active when applied to a wound, than when taken into the stomach; and it often acts, when thrown into the large bowels, with as much energy as when taken by the mouth; and sometimes even more energetically. Much, however, of the effect produced by it, when thus administered, depends upon the state of the large bowels, as respects fœcal accumulations, &c., upon the period of its retention, and the mode of its exhibition.

633. *a.* It has likewise been shown by ORFILA and others, that a large dose of opium affects the lower animals somewhat differe y from man, causing in the former accelerated culation, vertigo, palsy of the hind legs, con- sions, varying from tremors to violent spas , and a wakeful kind of slumber, attended by c - vulsions upon the least excitement; whilst n man simple sopor and coma are most commc y produced, and convulsions much less frequer . According to CHARVET's researches, opium s as a poison to all animals, when given in a l e dose; and, on the lower animals, it prodi s congestion of the brain and consequent so , irritation of the nervous centres and convulsi , and a directly sedative effect on the muscles.

634. *b.* The *effects of opium* in the human ject are of great importance in a practica s well as in a toxicological point of view. n *small doses,* opium acts at first as a stimulan of the heart and arteries, causing also a slight e hilarating effect upon the mind, and sens of fulness in the head. A pleasurable state of e whole system is experienced, and a capabili of greater exertion. These symptoms are follo d, in about two hours, by a diminution of musc ar power and of susceptibility to the impressio of external objects, and by a desire of repose tendency to sleep. The mouth and throat generally become dry, thirst is increased, desir of food is impaired, and costiveness produced. T se effects are much diminished by frequent re- tition, and an increase of the dose is requir to produce them in an equal degree.

635. *c.* In a *larger dose,* or full medicinal e, or from two to four grains, the stage of ex e- ment is sooner followed by depression. r CRUMPE (*Inquiry into the Nature and Prope es of Opium,* 8vo. 1793, p. 85.) took two grains d a half of opium when his pulse was at 70. er a quarter of an hour his pulse rose to 74, d after half an hour to 80. After fifty minutes e pulse had fallen to 64; but in an hour a a half it returned to 70. With the acceleratio of the pulse, the skin becomes hot, the mouth d throat dry; thirst is increased, and the app te diminished. But the symptoms of excite nt are soon followed by indisposition to exertio y sluggishness of the senses, confusion of ideas, d an irresistible desire to sleep, which is gene ly attended by dreams, sometimes pleasing, at er times frightful. Upon waking, especially if ee or four grains have been taken, nausea, or en vomiting, headach, furred tongue, listless s, and costiveness are complained of; but the c- cession of these may be prevented by repeti ns of the dose, and by even a gradual diminuti of it. Dr. BURNES states, that he had made a ry fatiguing night march in India with a Cut ee horseman, and assented to his proposal of ha g for a few minutes, which he employed in sh g about two drachms of opium between himsel d his jaded horse. The effect of the dose was n evident on both, for the horse finished a jou y of forty miles with great apparent facility, d the rider became more active and intelligent.

636. *C.* The *poisonous effects of opium,* or he *symptoms of poisoning,* where opium is give in a single dangerous dose, begin with giddiness d stupor, generally without any previous ex e- ment. The stupor rapidly increases; the p on becomes motionless, and insensible to ext al impression; he breathes slowly, generally es

uite still, with his eyes shut and his pupils con- acted—occasionally remarkably contracted; the ornea is dull or no longer glistening, and the hole expression of the countenance is that of pose. In this stage he may be slightly or mo- entarily roused by violent excitement, as pinch- g, &c. As the poisoning advances, the features re ghastly, or slightly livid; the pulse feeble nd irregular; respiration shallow, slow, or gen- le, and sometimes catching; the muscles ex- ceedingly relaxed; and, lastly, the pulse becomes markably slow, unequal, and irregular, and eath rapidly ensues, if assistance is not promptly dministered. If recovery takes place, the sopor succeeded by prolonged sleep, which is fol- owed by headache, giddiness, nausea, and vomit- ng, loathing of food, distressing languor, and onstipation.

637. *D.* OPIUM-EATING.—*The excessive use of pium, habitually,* produces a species of slow oisoning, of so long duration as not to be generally iewed as poisoning, although the effects are al- owed to be injurious. The habit is usually cquired by persons who have derived advantage rom opium in various states of disease, especially ainful affections, hysteria, diarrhœa, and nume- ous other disorders. The habitual opium-eater nay be instantly recognised by his appearance; y the emaciation of his body; by a withered, ellow, or sallow countenance, and sunken, glossy yes; and by the bending of the spine and lame ait. His digestive functions are remarkably im- aired, his appetite is lost, and he hardly eats. He scarcely has more than one evacuation in the veek. As the habit becomes more confirmed, his strength diminishes, and the craving for the timulus becomes even greater; and to produce he desired effect, the dose must constantly be ugmented. The mental and bodily powers are ultimately destroyed, and a universal impotence s the last result.

638. I have met with in practice several in- tances of opium-eating, in which the symptoms were less severe. In these, however, although he quantity taken was excessive, the appetite vas not materially, or even at all impaired; and he bowels were often regular, unless when de- prived of the usual dose of the opium. The pulse varied from 80 to 100; and the skin was occasionally dry, but more frequently perspira- ble, or perspired very freely. The effect pro- duced by a desired ordinary dose upon the mental aculties of the opium-eater is usually described as hat of calmness, comfort, serenity, and happi- ness; and a capability of supporting mental ex- ertion and bodily fatigue.

639. When deprived of this substance, the opium-eater is miserable and distressed; and the whole frame betrays the want of it, by the hollow, dark, and sunken orbits; by the haggard appearance of his features; the general weakness and tremulousness, especially of the hands; by the dry and parched state of the mouth and throat, anxious voice and manner, and by loss of appetite and sleeplessness. Many thus affected are anxious to abandon the practice, and make numerous efforts to accomplish it, but they rarely succeed.

640. If the habit be commenced early in life, the person who is its subject seldom becomes older than forty years; and he may die at an earlier age, if the practice has been excessive. When the quantity of opium taken habitually is comparatively moderate, when it is not increased in quantity or frequency of dose, but little injury to the general health often appears for many years; and even an improvement of the health is often remarked when the practice has originated in the use of opium for painful affections, obstinate diarrhœa, certain states of hysteria, &c. Several persons thus circumstanced have been under my care for various disorders, and they described themselves in better health than before the acquisition of the habit. But in most of these the quantity was not remarkably large, and was generally not materially augmented. But in others, who take very excessive quantities, either of laudanum or solid opium, and still more remarkably in those who do not confine their indulgence to opium, but have recourse also to other intoxicating beverages to excess, visceral disease slowly and silently supervenes, with its usual consequences; the constitutional powers sink, and death sooner or later takes place. I have thus met with organic diseases of the liver and stomach, of the heart and kidneys, palsy, and tubercular phthisis slowly appear, and ultimately terminate in dropsical effusions, which treatment could not control. I lately attended a gentleman, a graduate of Cambridge, of most Herculean frame, with my friend and former pupil, Mr. PYPER. That gentleman took habitually the largest amount of opium that I have heard of having been taken by one person; but, not content with this, he indulged also in several bottles of wine in the course of the day, and sometimes in strong ale and in spirits. Although scarcely above thirty years of age, his powerful constitution and frame were broken down, his liver was enlarged, and dropsical effusions had supervened.

641. *E.* OPIUM-SMOKING is rarely practised in Europe. But it is not infrequent in numerous countries in the East; and it is the favourite mode of intoxication in China. Dr. PEREIRA has collected most instructive accounts of this practice. MARSDEN states, that the *smokeable extract* is made into pills, about the size of a pea. One of these being put into the small tube that projects from the side of the opium-pipe, that tube is applied to a lamp, and the pill being lighted, is consumed at one whiff or inflation of the lungs, attended by a whistling noise. The smoke is never emitted by the mouth, but by the nostrils, and sometimes, by adepts, through the passage of the ears and eyes. Mr. SMITH, surgeon, of Pulo Penang, states that, although the practice is most destructive to those who live in poverty and distress, or who carry it to excess, yet it does not appear that the Chinese in easy circumstances, and who have the comforts of life about them, are materially affected, in respect of longevity, by the private addiction to this vice. It would appear that, as in *opium-eating* so in *opium-smoking*, a moderate addiction to the habit is not attended by remarkable injury to the constitution; and that it is excess in either that is productive of injury.

642. *a.* The *first effect* on opium-smokers is to render them more animated and loquacious. "Gradually the conversation drops; laughter is occasionally produced by the most trifling causes, and to these succeed vacancy of countenance,

pallor, shrinking of the features, so that the smokers resemble persons convalescing from fever, followed by a deep sleep for half an hour to three or four hours. An inordinate quantity causes headach, vertigo, and nausea. The Malays are rendered outrageous and quarrelsome by the opium-pipe." It is extremely difficult to discontinue this vice; yet there are many instances of its being done. This destructive practice deteriorates the physical constitution and moral character, especially of the lower orders. Its effects on the system are manifested by stupor, forgetfulness, impairment of the mental powers, emaciation, debility, sallow complexion, lividity of the lips and eyelids, langour and lack-lustre of the eyes, loss of appetite, sweatmeats or sugar-cane being most relished.

643. In the morning the opium-smoker has a most wretched appearance, and is unrefreshed by sleep, however profound. He experiences a remarkable dryness and heat in the throat, with depression and restlessness, which incite him to have recourse to the opium-pipe; and if it be not resorted to, there is great prostration, torpor, vertigo, discharge of water from the eyes, &c. If the privation be complete, coldness of the body, aching pains in various parts, feelings of bodily and mental misery, and sometimes diarrhœa, are complained of. Total privation has even been followed by death, if the habit has been long continued and excessive. A close resemblance may here be traced between the effects of *opium-smoking* and *tobacco-smoking* (§ 527.). The latter is as injurious as the former, when as excessively practised; and the one habit, as well as the other, occasions more or less general and sexual impotence, and entails on the offspring a weak, decrepit, and stunted growth, and a delicate and strumous constitution. How weak and debased must be the mind that, by the selfish and excessive indulgence of a petty vice, sacrifices not only his own health, but also the health and constitution of his offspring, and the ability of perpetuating his name and lineage!

644. *F. Diagnosis of poisoning by opium.*—The effects of this drug may be mistaken for *apoplexy* or *syncope*, or for the *stupor* consequent upon an attack of *epilepsy*, or upon *suppression of urine.* But the sopor of opium is different from the coma of these, inasmuch as the individual is capable of being momentarily roused from the former, unless death be very near, by means of pinching, tickling, brisk shaking, or loud talking. The state of restored consciousness is, however, frequently imperfect, and is speedily followed by lethargy. When convulsions attend poisoning by opium, the difficulty of distinguishing it from *epilepsy* is greater; but even then the patient may be momentarily roused, which is impossible in the epileptic paroxysm. In all the maladies, moreover, just enumerated, the pupils in the majority of instances are dilated or natural; and partial paralysis, or even more complete palsy, attends many cases of them; whereas in opium-poisoning the pupils are remarkably contracted.—Sopor from *intoxication* may be confounded with opium-poisoning, but the redness of the conjunctiva, the ferrety eyes, the full and rapid pulse, and the odour of alcohol in the breath, will generally indicate the nature of the case. Poisoning by opium is not infrequent in *infants* and *children;* and it is in them very generally attended by convulsions. It with great difficulty distinguished from *infanti convulsions*, proceeding from cerebral or othe affections. Contraction of the pupil is almos the only indication of this poison having bee given; the history of the case, and other circumstances which his acumen will suggest, will i some measure guide the physician. The diagnos of poisoning by other narcotics than by opium noticed where they are treated of.

645. *G. The quantity of opium which may be fat* will necessarily depend upon the state of the sto mach and of the nervous system at the time of takin it.—*a.* During painful or spasmodic disorder and in states of mental excitement or irritatio very large doses of opium may be taken with comparatively little effect. A lady in a state of grea excitement and irritation took an ounce of laud num when going to bed, with a suicidal intention but she was surprised in waking in the mornin and finding herself alive with rending headac nausea, and feeling of general disorder, from whic she soon recovered, no aid having been adm nistered. I have repeatedly prescribed, and onc taken, as much as four grains; but I would n advise a larger dose to be given; and even th dose may be followed by unpleasant effects i some constitutions, especially the susceptible an delicate, and when the system is depresse or where there is a tendency to apoplexy; ar even a smaller dose may be serious when a ministered in an enema or in a suppository. M Taylor states that a man was killed by ten grai of solid opium; and a woman of middle age l eight grains given in two doses. Dr. Christisc says that the *smallest dose of solid opium* whic has been known to have proved fatal to an adul was four grains and a half mixed with nine grains camphor, death having taken place in nine hour In a case recorded by Dr. Skae, it is doubtful whe ther death was caused by two or by four drachn of the tincture. A lady suffered very serious sym toms from twenty drops of the tincture administere in an enema; and Dr. Steinthal states that or grain of opium, in a clyster, occasioned alarmir effects. Idiosyncrasy may be the cause of th danger produced by small quantities of the dru On the other hand, recovery has taken place fro very large doses, when vomiting has soon occurre or been procured by treatment, or when they hav been taken on a full stomach, or in states nervous excitement. In such circumstances eve as much as four ounces of the tincture has faile to produce death, as in a case mentioned b Mr. Taylor.

646. *b. Infants and children* are remarkably su ceptible of the influence of opium, and instanc of poisoning among them by over-doses of th preparations containing opium are very frequent met with. An instance is reported (*Lancet, Feb* 1842) of an infant, two days old, having bee killed by one minim and a half of the tincture; ar that of another by two drops. A child four mont old was nearly dead in consequence of havi taken one tenth of a grain of opium. Less tha half a grain was given to a child four years and half old: it soon became comatose, and died seven hours. Dr. Merriman met with an i stance of excessive stupor produced in an infa a month old, by a single drop of laudanum; ar he met with two instances of death caused by

ll dose of Godfrey's Cordial, which contains um. Even twelve or fifteen drops of paregoric ir may prove fatal in an infant. In most fatal ances in children of poisoning by opium, the mortem examination affords little or no information; congestion of the brain, and of the gs, with fluidity of the blood, have been the ef appearances, which I have remarked.

47. *H. The periods which elapse from the administration of the poison until the commencement of effects* is various. A large quantity in the form a tincture taken on an empty stomach begins ect in a few minutes. Coma seldom comes on ore half an hour has elapsed. The interval is etimes considerable even when the tincture has n taken. Dr. CHRISTISON refers to a case ere it was considerably more than an hour after ounces and a half of the tincture and a drachm the extract had been taken. Opium in the d form generally requires a longer time to than the tincture. DESRUELLES, however, reds a case where two drachms of solid opium duced sopor in fifteen minutes; and in a case lished in America, the largest quantity of it r known to have been taken at once, did not asion this effect until an hour had elapsed. e interval may doubtless be prolonged if the um be taken by a person already excited by itous liquors, or intoxicated. Mr. SHEARMAN ates the case of a man who, in a state of inication, took two ounces of laudanum, and had material stupor for five hours; but he ultimately l.

48. *I. The period at which death takes place* varies n *two hours*, the shortest period, to *forty-eight rs*, the longest period; but most fatal cases minate between six and twelve hours after the estion of the poison. Those who live above lve hours generally recover, if they be judicily treated. Instances, however, have occurred ere an apparently efficacious treatment has n too soon suspended or relinquished, owing to earances of rapid recovery, and a relapse has ervened and carried off the patient. In eight l cases of poisoning by opium, reported by BECK, the smallest quantity taken was one chm, the largest one ounce and a half. The rtest time between the taking of the poison and th was eight hours, the longest twenty hours.

49. *K. Several preparations containing opium* e produced fatal effects, especially when administered by ignorant or careless persons to infants hildren.—(*a.*) *Paregoric elixir*,—the compound cture of camphor, which contains somewhat than one grain of opium in half an ounce, has sed death. A child between five and six years age was killed by a dose which contained about grain of opium; and another aged seven nths by a dose equal to a quarter of a grain of um. (See *Pharm. Journ., April*, 1845, p. 464., (*b.*) *Dover's Powder.* — Pulvis ipecacuanha npositus has also been fatal to children. In case, four grains of this powder, equal to twohs of a grain of opium, caused death; and in ther, ten grains caused the death of an infant twenty-four hours. — (*c.*) *Syrup of Poppies* is d to contain one grain of the extract of English um to one ounce. The common dose of it to infant of six or seven months is half a drachm. t this should be the largest dose allowed. ving, however, to this dose, or its equivalent for other ages, being much exceeded, and owing to a mixture of tincture or infusion of Turkey opium, the strength of which is often variable, being substituted for the true syrup of poppies, poisoning has often occurred from this medicine. Seven children died from this cause in 1837. In a case alluded to by Mr. TAYLOR, half a teaspoonful of this syrup caused the death of an infant six months old. The narcotic symptoms were developed in three quarters of an hour. The syrup in this case was probably prepared with tincture of opium in excessive quantity. — (*d.*) *Decoction of Poppies* has not infrequently been fatal to infants. A teaspoonful of it has been fatal to a healthy child. A woman boiled two poppy heads in a quarter of a pint of milk, and gave two small spoonfuls of this decoction to her infant. In an hour the child fell into a deep lethargic sleep, the breathing became stertorous, and in ten hours it died. A maid servant gave an infant two teaspoonfuls of a decoction of one poppy-head in a small pot of water. The child was found dead in the morning. The brain and its membranes were much congested, and the ventricles contained bloody serum.—(*e.*) Several *nostrums*, especially the "*black drop*," and Battley's "*sedative solution*," which are much stronger than the officinal tincture, have produced fatal effects. Mr. STREETER states that a drachm and a half of the latter was fatal to a lunatic, and 20 minims killed an old woman. "*Godfrey's Cordial*," and "*Dalby's Carminative*," which contain a small quantity of opium, have caused, in some instances, the death of infants to whom they had been given in large doses.

650. *L. Morphia and its salts.*—Poisoning with the salts of morphia has occurred in several instances. The *acetate* and the *muriate of morphia* have been the salts usually employed. The symptoms differ but little from those produced by opium, but spasms or convulsions are more frequently observed after morphia than after opium. The acetate of morphia has been estimated at four times the strength of pure Turkey opium; but I believe that pure morphia, and especially either of the salts just named is five times the strength of opium. It is difficult to determine the quantity which may be injurious. I have seen one-third of a grain given for the first dose produce unpleasant or even distressing effects. It singularly happened, that the lady, whose case was alluded to above (§ 645.), as having taken with a suicidal intention, during extreme mental excitement, a large quantity of laudanum, and recovered from it without any assistance and without any suspicion of the act, had prescribed for her by me, many years afterwards, one quarter of a grain of the acetate of morphia, and although she had then recovered from so large a quantity of opium, this dose of the morphia produced very distressing effects, with a sense of sinking and symptoms of vital depression, requiring powerful stimulants to remove. Dr. KELSO (*Lancet, Sept.* 1839), suffered dangerous symptoms from having taken about half a grain of the muriate; and Mr. TAYLOR was informed that an adult was killed by three grains taken medicinally; and he adds that there is reason to suppose that half a grain of the acetate caused the death of a lady to whom it had been given medicinally when in a state of ill health. Dr. CHRISTISON mentions a

fatal case from the ingestion of ten grains, death taking place in twelve hours, although the stomach had been completely cleared of the poison within half an hour from the time when it was taken. One-fifteenth part of a grain applied, *endermically*, produced severe cerebral symptoms in a case alluded to by Mr. Taylor.

651. The effects of either of the salts of morphia will depend much upon the state of the person at the time, who takes it. A large dose, from half a grain to a grain, may be of service, or at least not injurious, even when given for the first time, in states of nervous or vascular excitement, during excessive pain, and in several spasmodic diseases; but either of these quantities may be dangerous or even fatal, if it be given to a person morally and physically depressed, or to one possessing weak vital resistance, or in a state of marked debility and ill health. These salts should never be given to children under ten or twelve years of age. I speak generally, some exceptions being admitted among children not much below this age. The observations offered above, as to the operation of opium when administered by the rectum (§ 632.), equally apply to the salts of morphia.

652. I am acquainted with seven ladies, who have either lately been, or are still occasionally, under my care, and who *habitually take excessive quantities of the acetate of morphia*. The acetate is the salt which they all employ; and they all take it in solution, with the addition of acetic acid, and, in some instances, of an aromatic spirit or tincture. The quantities taken at one dose in these cases, vary from two to six or seven grains, which are generally taken thrice daily. In three of these cases, the quantity has not been materially increased for eight or nine years; but during that time sundry efforts have been made gradually to diminish the quantity, but they have never been steadily persevered in, a gradual increase, and return to the larger quantity, having soon followed. The effects have not appeared in these cases materially different from those of laudanum.

653. *M. Appearances after death by opium or its preparations.*—In a case of poisoning by opium in a child four years old, death having taken place in eleven hours, I found the following appearances. There was considerable lividity of the back, and more depending parts of the body. The vessels and sinuses of the brain were much congested, with a dark fluid blood; and more serum than usual was found at the base of the skull, and in the ventricles. The vessels of the medulla oblongata and spinal chord, and the vertebral sinuses were remarkably engorged. The lungs were congested with fluid blood. The right cavities of the heart also contained blood. There was slight redness of the villous coat of the stomach and duodenum. In a case referred to by Dr. Christison nearly similar changes were observed in the brain and lungs; but, although the body had been kept only two days in the month of February, the belly emitted a putrid odour when opened. Congestion within the cranium, with more or less serous effusion, and congestion of the lungs, the blood being dark and fluid, have generally been observed. Dr. Bright and Mr. Taylor met with a spot of ecchymosis on the surface of the brain in addition to unusual turgescence of the vessels. Dr. Christison remarks that congestion and serous effusion are by no means universal, for i case which proved fatal in seven hours, and wh he examined, neither of these changes was v apparent. Extravasation of blood within the nium is a rare effect of opium. In the case o female, who died eight hours after taking ounces of laudanum, Dr. Jewel found sev clots of blood in the substance of the brain, one, which lay in the anterior right lobe was inch long. (*Lond. Med. and Phys. Journ.*, F 1816.) Redness of the stomach is by no me general, and no inflammatory changes are served. Lividity of the external surface of pending parts is commonly observed, and is ow to the fluid and dark state of the blood. But blood is not always fluid, at least in all parts the body. It is chiefly, however, in the cavi of the heart, where it has been most freque found coagulated. In four cases referred to Dr. Christison there were clots found in b ventricles. This physician has particularly ticed the rapid passage of the body into putref tion, both in cases which have come under own observation, and in those recorded by oth Of a body, which had been kept only thirty ho in a cool place in December, the cuticle ea peeled off, and the joints were flaccid, an smell being exhaled. In other cases, the e progress of putrefaction has been observed, not constantly or even generally. The poi may sometimes be found in the stomach, or smell may be detected; but as frequently neit can be detected, especially when a considera time has elapsed before death has taken pl owing to the absorption or partial digestion of it to its discharge by vomiting, or the stomach-pu In the latter case, the opium may be detecte the matters evacuated from the stomach.

654. *N. Modus operandi of Opium.*—That active and odorous principles of opium are sorbed is proved — 1st, by the opiate odour be often perceived in the breath of persons who t opium, and according to Barbier, in the pers ration and urine; 2d, by the narcotic influenc the milk on infants when the nurses have ta opium: this I have observed on several occasio and 3d, by the assertion of Barruel, that has detected morphia in the blood and urine, a the ingestion of large doses of opium; but requires further proof. That the effects of opi upon the frame are due chiefly to the absorpt of it, is shown by the following circumstances The effects produced by the injection of opi into the veins are the same in kind, but more tense in degree, as those which follow the ad nistration of it by the mouth; and the consti tional effects produced by the drug are prop tionate to the absorbing powers of the surfac which the drug is applied. The effects of opi are, 1st, *primary and local*; 2d, *secondary* *remote*.

655. *a*. The *direct* or local action is on the nerv as already shown (§ 631.). It most probably cites or stimulates the nerves primarily; but influence is only temporary and of short durati and is followed by anæsthesia and paralysis — a privation of energy or power. The *remote* o ration is exerted chiefly on the brain, medulla longata and spinal chord; or rather upon t portion of the ganglial system and nerves supp ing the nervous centres, and the blood-vessels

e centres, and their membranes, through the lium of the blood, either principally or altoge- ; or partly also by the propagation of the ct or local impression, or influence produced the drug. That the remote effects are pro- ed upon, or by means of, that portion of the glial system supplying the large nervous cen- , and consecutively upon the brain, rather 1 upon the brain more immediately and inde- dently of this part of the ganglial system, is cated by the fact of the structure of the brain ig itself as insensible of, and, as far as our ses enable us to judge, as little influenced by ants applied to it, as is the structure of any er secreting organ — of the liver, kidneys, &c. vell as by various other considerations and logies, and more especially by what is known presumed of the functions of the ganglial tem.

56. *b.* As to *the nature* of the effect thus pro- ed upon the nervous system — upon the gang- and the cerebro-spinal, it may be inferred, h tolerable truth, to be primarily *exciting*, en the dose is small or moderate, and consecu- ly *hypnotic*, *narcotic*, and *alterative*; but that, en the drug is taken in excessive quantity, the iting operation is not recognised, whilst the con- utive effects are most prominent and intense; alterative effect, however, being evinced efly in cases of chronic poisoning by opium by opium-eaters and opium-smokers, and where um in any form or dose, is taken frequently a long period. The *proximate cause of death* opium may be referred partly to the extreme gestion of the brain and medulla oblongata sed by it, and partly to the gradual extinction the influence exerted by the ganglial system on the cerebro-spinal centre. Most probably depression or exhaustion of this influence ses the congestion, which, in its turn, aggra- tes and ultimately extinguishes the influence of part of the ganglial system; or, the presence the poison in the blood of the cerebral vessels y so congest them by depressing the energy of ganglial nerves supplying them, as to paralyse brain, and gradually arrest all the functions re immediately depending upon the cerebro- nal system. According to either of these ws, which differ but little from each other, the ralysis of sensation, and motion — the extinc- n of consciousness and volition, — is soon fol- wed by paralysis of the respiratory move- nts; and asphyxia, with its usual results—con- stion of the lungs, and a dark and fluid state of e blood — is the manner in which death takes ace.

657. *O. Treatment of poisoning by opium, or its eparations.* — The obvious intentions are, 1st, remove the poison as promptly as possible; and, l, to counteract and remove the effects which ve been produced, and prevent the aecession of hers.—*a.* The stomach-pump should be resorted as speedily as possible, and the stomach com- etely emptied and washed out by means of it. hen the stomach has power to act, emetics may employed. The best emetics are the sulphate zinc, mustard mixed in water, or a strong solu- n of salt; but, in order to excite the paralysed omach more completely, camphor and capsicum ay be given with the sulphate of zinc, this last ing administered in a dose of half a drachm or two scruples, which may be repeated in a short time, if the first dose fails to act. When the stomach-pump is not at hand, a long tube or a catheter with a bladder attached to it, as advised by Mr. BRYCE, may be substituted. After the stomach has been filled with warm water from the bladder, the tube is to be turned down so as to act upon the contents of the stomach as a syphon. When emetics are inoperative, and the stomach-pump or its substitute cannot be obtained, then it has been recommended to inject tartar-emetic in the veins; but more than a grain should not be ventured on, and care must be taken not to allow the introduction of air. This, however, is a hazardous practice, and seldom required, when the means already, and those about to be advised, are duly employed.

658. (*b.*) The removal of the lethargy already produced by the opium, is best accomplished by affusion of cold water on the head and neck, as first recommended, and its effects illustrated, by Mr. WRAY and the Author. (See *Lond. Med. Rep.* xviii. 26.) Children may be placed in a warm bath, to which mustard is added, and the cold affusion on the head momentarily adopted. In all cases, the cold affusion should not be continued too long at a time, but employed at intervals, or with the return of the lethargy. It will often be found that, when emetics have been given without effect, owing to the paralysed state of the stomach produced by the narcotic, the cold affusion will have the effect of rendering them sufficiently operative, especially if the fauces are tickled with a feather at the same time, or soon after the affusion has been employed. Other means of rousing the patient should not be overlooked, and may be resorted to, in the intervals between the affusion. Flagellation on the palms of the hands, on the feet, or back; making the patient to walk between two assistants; stinging with nettles, pinching, &c. have severally been found of more or less service. Various internal excitants may be exhibited, as asafœtida, ammonia, musk, capsicum, camphor, and may even be administered in enemata; and various exciting odours or vapours, as those of ammonia, aromatic vinegar, may be held at interval, near the nostrils. If these means fail, electricity galvanism, or electro-galvanism, may be adopted. As death is evidently proximately caused by asphyxia (§ 656.), artificial respiration should be resorted to, in extreme cases, especially if the case is too far advanced to be benefited by cold affusion, or when this latter fails, which, however, will rarely occur, if judiciously employed. Frictions over the chest, with stimulating embrocations — with camphor, ammonia, capsicum, &c. will be found to aid the influence of artificial inflation of the lungs. Instances have been published by Dr. WARE, of Boston, United States, and Mr. WHATELEY, of the good effects of artificial respiration, in almost hopeless cases of poisoning by this drug.

659. *c.* The subject of *antidotes against the effects of opium* has been examined by ORFILA, and he has found all those which have been proposed, at various times, quite unsuccessful as long as the poison still remains in the stomach, the only exception being the decoction of galls. When the poison has been as completely removed as possible, camphor, green-tea, and strong coffee have been found of service in keeping the patient awake,

or in reviving him, and are suitable aids to the cold affusion, or even to the tepid affusion, when the coma is not profound.

660. *d.* As to the propriety of prescribing *local* or *general blood-letting* in cases of poisoning by opium and other narcotics, it may be remarked that cases will occasionally present themselves in which, at some period of their progress, either the one or the other may be practised with advantage. When the patient is plethoric, young, and strong; when there is stertorous breathing, with other symptoms of congestive apoplexy; and when the countenance is bloated, the eyes injected or suffused, then general or local blood-letting, especially the latter, and preferably by cupping on the nape or on the mastoid processes, to a considerable amount, will generally be most beneficial. But before vascular depletions are prescribed, the evacuation of the poison should be attempted or procured. In a case detailed by Dr. YOUNG (*London Med. Gaz.* vol. xiv. p. 655.), of the United States, about thirty ounces of blood were taken from the arm at three bleedings: cold was applied to the head and sinapisms to the legs, and the patient recovered, although an ounce of laudanum, in a teacupful of whiskey, had been taken and remained upon the stomach. In cases which admit of doubt as to the propriety of blood-letting, advantage will be derived from *dry cupping* on the nape. I have prescribed it in one case of poisoning by opium with success. During the coma produced by this drug, or by other narcotics, the loss of a small quantity of blood often produces serious depression. Therefore depletions, of every kind should be cautiously employed, and not be attempted unless the breathing is stertorous, puffing, slow and regular, and the pulse still possesses some degree of power. The effect of either bleeding or dry-cupping will be greatly aided, and the necessity of having recourse to either frequently superseded by a due recourse to the *cold affusion*, which generally prevents the distressing headaches, and other cerebral and nervous symptoms, usually experienced for some days after recovery, when it has not been employed.

661. ix. SULPHURETTED HYDROGEN GAS.— NYSTEN found that a few cubic inches of this gas caused almost immediate death with convulsions when injected into the veins, although at once absorbed by the blood; and that the same quantity was almost as rapidly fatal when injected into the cavity of the chest. Similar results were obtained when it was injected into the cellular tissue, or even when left for some time in contact with the sound skin. According to THENARD and DUPUYTREN, air impregnated with 1500th part of this gas kills birds in a short time, and with the 800th part soon kills a dog. CHAUSSIER found that, in a moderate quantity it was quickly fatal, whether it was inhaled or injected into the cellular tissue, stomach or rectum, or simply applied to the skin. Nine quarts of the gas thrown into the rectum of a horse, killed it in one minute; and a rabbit, whose skin was exposed to it, died in ten minutes. (CHRISTISON and SEDILLOT's Journ. xv. 28.) Dr. CHRISTISON and Dr. TURNER found that it appeared to cause in plants a state analogous to narcotic poisoning in animals.

662. *A.* The *symptoms,* in cases where the vapours, consisting of an admixture of those of a monia with this gas, such as they exist in the of the Parisian necessaries, are described HALLÉ and others, are those of extreme vital pression and of asphyxia, and often termin fatally in a very short time. If the person but slightly affected, he complains of nausea a sickness; his skin is cold, his respiration is gular, the pulse is frequent, and the muscles, pecially those of the chest, are affected w spasmodic twitchings. If he be more sever affected, he becomes soon deprived of sense a motion; the surface is cold, the lips and f assume a violent tint, the lips are covered wit sanguineous mucus; the respiration is hurri laborious, and convulsive; the pulse is sm weak, irregular, and hurried; and the musc and limbs are relaxed. If still more intens attacked, death either takes place immediatel or, in addition to these symptoms, there are viol twitchings of the muscles, or violent spas When the person is sensible after exposure these vapours, he often complains of severe pai and the pulse is very frequent and irregular. the symptoms are very severe, recovery rar takes place.

663. Instances of poisoning by sulphurett hydrogen unmixed with other vapours or gas are not of frequent occurrence. Mr. TAYL states that the men excavating the Thames tun suffered severely from the presence of sulph retted hydrogen, which he found both in the and in the water. The gas issued in sudd bursts, so as to be at times perceptible by odour. By respiring this atmosphere, the strong men were in the course of a few months, duced to a state of extreme exhaustion, and seve died. The *symptoms* with which they we first affected were giddiness, sickness, and gene debility. They became emaciated, and fell in a state of low fever, accompanied with deliriu (*Op. Cit.* p. 623.)

664. In the more *acute states* of poisoni with this gas, the symptoms vary with the co centration of the poison. When breathed in moderately diluted state, a sense of weight oppression is felt at the epigastrium, and in t temples, with giddiness, nausea, sudden wea ness, and sinking, soon followed by a loss of se sation and motion. If removal to a pure air effected immediately upon the occurrence of the symptoms, and if stimulants, the cold affusion, moderate depletion, and other suitable means employed, life may be restored. If, howeve the patient remain but a short time unassiste and especially if the gas be breathed after inse sibility has taken place, recovery is almost hop less. When the air contains less of this gas, a the respiration of it continues for some time, vit depression, pains through the frame, convulsio or spasms, delirium, coldness of the surface, borious respiration, a weak and irregular puls followed by coma and tetanic spasms or convu sions, are the prominent symptoms. "When th air is only slightly contaminated with this gas, may be breathed for a long time without produ ing any serious symptoms." Sometimes there nausea or sickness, with pains in the head or the abdomen: these are often complained of persons engaged in chemical manipulations wi this gas. Sulphuretted hydrogen is readily

bed into the blood, to which it gives a brownish-
ck colour.

665. The admixture of this gas with other
es and vapours render them remarkably dele-
ious. Probably a small portion of it exists in
noxious emanations disengaged from cess-
ls, privies, drains, &c. The presence of it in
such emanations is well shown by exposing to
m a piece of filtering paper moistened with a
ution of lead. Dr. Christison remarks, that
smell alone should not be relied upon, as pu-
scent animal matter exhales an odour like that
sulphuretted hydrogen, though none be pre-
nt. This gas may be so abundant as to prove
ickly fatal where lights burn with unimpaired
lliancy; and in places where it is apt to accu-
late, the contamination by it may vary so
ich as to render the air either unrespirable
a few minutes after it has been respired with-
t risk, or respirable soon after fatal effects
it.

666. *B. The appearances after death.*—A highly
ensive odour is exhaled from all the cavities
the body, and if inhaled into the lungs of the
sons making the inspection unpleasant symp-
ns, chiefly syncope, or even asphyxia, are oc-
ioned by it. The mucous membrane of the
e and fauces is covered by a brownish viscid
cus. The muscles are of a dark colour, have
t their contractility, and are insusceptible of the
vanic stimulus. The lungs, brain, and liver
congested with black fluid blood. The right
ities of the heart are also congested with fluid
ck blood. The body rapidly undergoes putre-
tion. When polished silver, or white lead, is in-
duced into the cavities, or under the skin, it soon
omes blackened. — The *treatment* of poison-
by sulphuretted hydrogen, or by admixtures of
with other gases or vapours, is the same as that
ommended for the effects of carbonic acid gas
its admixtures. (See §§ 609. *et seq.*).

667. Class VIII. Narcotic and Irritant
isons — Narcotico-Acrid Poisons — Acro-
rcotics. — The designations of this class of poi-
ns indicate their operation. Certain of these sub-
nces are injurious in consequence of their irritat-
rather than of their narcotic action; whilst others
duce a more prominent narcotic, than irritant
ect. Some, and probably most of them, conjoin
th these modes of action, more or less of a vitally
pressing or exhausting operation. Owing to the
ects of these poisons being thus complex, and
re especially to either of their effects being
re prominent than the others, these poisons have
en variously classed, but chiefly as narcotics,
as irritants, or as acro-narcotics; and in this last
tegory I now consider them. I shall, however,
tice only those which are most likely to prove
isonous owing to their possession of these pro-
rties in a marked degree.

668. i. Empyreumatic Oils. — The em-
reumatic oil of *tobacco*, and of various other
isonous plants, are active poisons. Several other
pyreumatic oils are used in medicine which act
werfully as stimulants and antispasmodics, and
hich are more or less injurious when admi-
stered in excessive doses. The chief of these are,
of amber, oil of wax, beech-oil, Dippel's
imal oil, the oil procured by the destructive
stillation of lard, &c. Dr. Christison states
at this last oil, when freed of adhering acid by rectification from quick-lime, is limpid and very volatile, has an insupportable smell, and diffused in the air it irritates the eyes and nostrils, and occasions giddiness. Buchner found it to possess narcotic properties when its vapour was inhaled; but it is less powerful when taken into the stomach, although it then causes symptoms of irritation and insensibility. An instance of poisoning by the oil of Dippel, or the rectified empyreumatic oil of hartshorn, is mentioned by Chaussier, who states that the person took a spoonful by mistake, and died almost immediately. No morbid appearances could be detected in the dead body.

669. ii. Fool's Parsley—*Æthusa cynapium*, has occasioned serious accidents owing to its resemblance to parsley. Professor Ficinus discovered in it an alkaloid, soluble in water and alcohol, but not in æther. Mr. Stevenson (*Lond. Med. and Phys. Journ.* xiv. 425.) has recorded the cases of two ladies who ate of this parsley in a salad, and were soon afterwards seized with nausea, vomiting, headach, giddiness, somnolency, pungeant heat in the mouth, throat, and stomach, difficulty in swallowing, numbness in the limbs, tremors, and frequent startings. Dr. Christison mentions the case of a child, recorded by Gmelin, that died in eight hours after having eaten the æthusa. The symptoms were spasmodic pain in the stomach, swelling of the belly, lividity of the surface, and difficult breathing. In two children who recovered, complete insensibility, dilated insensible pupils, staring of the eyes, and in one vomiting, in the other convulsions, were the prominent symptoms. The treatment consisted in the administration of milk, sinapisms to the legs, and cold sponging with vinegar.

670. iii. Fungi, Poisonous. — Poisonous Mushrooms. — Poisonous mushrooms and the effects produced by them, have been fully discussed by Fodéré, Orfila, Decandolle, Roques, Greville, Christison and others, to whose works I must refer for many interesting details, and for the characters which distinguish the several poisonous species from the edible. —*A.* The poisonous species enumerated by Orfila are the *Amanita muscaria, alba, citrina,* and *viridis;* the *Hypophyllum maculatum, albocitrinum, tricuspidatum, sanguineum, crux-melitense, pudibundum,* and *pellitum;* the *Agaricus necator, acris, piperatus, pyrogalus, stypticus, annularis,* and *urens;* and to these may be added *Agaricus semiglobatus* and *campanulatus.* It is probable that other species are also injurious, or may become injurious owing to season and other causes about to be noticed.

671. Numerous circumstances influence the properties, not only of those which are ascertained to be injurious, but also of those which are esculent. Climate, season, soil, and manure, age, or period of the year when they are gathered, cooking and drying, severally change the properties of both the poisonous and esculent species; and in certain constitutions and idiosyncrasies, even the latter class disagree, and are more or less injurious, causing diarrhœa, nausea or vomiting, colic somnolency, &c. It is even believed that the best mushrooms, when taken in too large a quantity, or too frequently, or for too long a time, are deleterious. The writers mentioned above (§ 670.) have given general directions for distinguishing the

wholesome from the poisonous species; but these cannot be relied on, for the former may become injurious owing to the circumstances just stated, and to others not fully recognized or explained, if their appearances be not duly observed. Much of the unpleasant effects produced by them has been owing to the carelessness of the collectors who have gathered some of the poisonous species, as well as of the esculent species, when they have become old or sickly, and mixed them with those which are wholesome. This is not infrequently the case when mushrooms are gathered from the fields for the manufacture of ketsup. The surest *tests of deleterious fungi* are, an astringent, styptic, hot or pungent taste, and a disagreeable pungent odour, an orange or rose-red colour, or a blue tint soon after being cut; and the circumstance of their growing in tufts or clusters from the stumps or trunks of trees. The poisonous properties of fungi have been supposed to reside in a certain principle which has been called *fungin*, but its nature and physical properties are imperfectly known.

672. *B.* The *symptoms* produced by poisonous fungi vary from those of extreme irritation of the gastro-intestinal mucous surface to those of fully developed narcotism; but generally they are an association of both classes, either predominating in different cases. A man ate by mistake several of the *Agaricus campanulatus*, but, before ending his repast, and not above ten minutes after he began it, he was attacked with dimness of vision, debility, giddiness, trembling, and loss of recollection. On obtaining assistance his countenance expressed anxiety; he reeled about and could hardly articulate; his pulse was slow and feeble. He soon became so drowsy that he could hardly be kept awake. Vomiting was produced by sulphate of zinc, and he gradually recovered. (*Lond. Med. and Phys. Journ.* xxxvi. 451).

673. Several soldiers ate a quantity of the *amanita muscaria.* In the evening, some hours afterwards, they began to complain of anxiety, a sense of suffocation, frequent fainting, burning thirst, and severe gripes. The pulse became small and irregular, the body bedewed by a cold sweat, the features changed, and the nose and lips of a violet tint. To these supervened tremblings, tumefaction of the abdomen, and a profuse fœtid diarrhœa. The extremities became cold and livid, the pain of the abdomen intense, delirium and coma took place, and death followed. In the former case the symptoms were those of narcotic poisoning; in the latter, those of irritation and vital depression. In other instances the symptoms are those of gastro-intestinal irritation, conjoined with narcotism, or with narcotism and extreme vital depression.

674. Six persons ate carp stewed by mistake with the *amanita citrina.* Three of these had vomiting, followed by deep sopor, but recovered. One had violent cholera, but recovered also. Two (children) became profoundly lethargic and comatose; emetics had no effect, and death soon ensued. Six persons ate a quantity of the *hypophyllum sanguineum*, and from twelve to thirty hours after the poisonous meal they experienced pain in the stomach, a sense of impending suffocation, and violent efforts to vomit. To these were added sopor, and several hours afterwards tetanic spasms and convulsions; other severe symptoms, varying in character with the quantity which l been taken, also supervening in the progress of cases. In one profound lethargy and gene coldness of the surface; in another vomiti bloody stools and yellowness of the skin; i third, delirium, tremblings, coma, and convulsio in a fourth loss of speech and severe dysente and in a fifth colic and inflammation of the bow without diarrhœa. Those who recovered mained long in a state of delicate health.

675. Dr. Christison ascribes the tardines the approach of the symptoms in some cases the indigestibility of most of the fungi, which some instances is so great, that portions of th have been discharged by vomiting as late as fi two hours after they were swallowed. But slowness of operation is not generally obser for the effects sometimes appear in a few minu The most immediate effect produced by poison fungi is paralysis of the vital actions of the stoma the symptoms afterwards appearing with a rapi in proportion to the development of the mo action. An important characteristic of poiso by mushrooms, as this physician has remarked the great *durability of the symptoms.* Even narcotic effects of some fungi have lasted ab two days; and Orfila has adduced instance which the gastro-intestinal irritation has contin from a fortnight to three weeks after the n acute symptoms had subsided.

676. When wholesome mushrooms disag owing to idiosyncrasy, the symptoms are chi those of severe indigestion, following upon, often continuing a considerable time after, an tack of vomiting and purging. "There is s reason for suspecting that even the best mu rooms, when taken as a principal article of for a long time, will prove injurious," and ind a peculiar depraved habit of body, leading to ternal suppuration and gangrene. Dr. Christi adduces from Rust's Magazine an instance family who were seized with an intermittent fe and an eruption on various parts of the body abscesses which discharged a thin ill-conditio pus, passed rapidly into spreading gangrene, proved fatal to two persons. No other cause co be assigned for the concurrence of these sympt in six persons in one family, than the circumsta of their having lived for two months almost tirely on mushrooms, the only person who esca having merely slept in the house, but had his where he worked.

677. Dr. Christison has directed attentio a fact, of which medical men should be aw that poisoning may be, and actually has b perpetrated by the intentional admixture of getable or mineral poisons with wholesome mu rooms; and that when the murderer is dexterou the choice, and mode of administering the poi such cases may readily escape suspicion, and e when suspected might not be cleared up with difficulty. But, in these cases, the only dec proof of poisoning by some other substance m with mushrooms, or with preparations of them the actual discovery of another poison.

678. *C. The appearances in fatal cases.* — surface of the body is generally stated to be li and the blood to be fluid; and exudation blood are observed from the natural openi The digestive canal is distended by fœtid air, in some cases presents inflammatory appearan

p ing in places to gangrene. The stomach, u ss there has been vomiting or diarrhœa, often c tains fragments of the poison; and these fragm its may be found as late as the second or tl d day, either in the stomach or in the intesti s. The liver is often congested. The lungs a generally gorged. The vessels of the brain a its membranes are commonly turgid. In a c referred to by Dr. Christison, the arteries, a vell as the sinuses, were distended with blood; tl pia mater and arachnoid were of a scarlet c our, and the substance of the brain was red. T choroid plexuses were excessively gorged; a a clot of blood, as large as a bean, was found in e cerebellum.

79. *D. Treatment.* — Dr. Clendinning, in a le ned and interesting lecture on poisonous fungi (*nd. Med. and Surg. Journ.* vol. vi. p. 168.), re arks, that the remedies recommended by Nic der consist chiefly of emetics and wine. H se-radish and mustard are amongst his vegeta e means. White vitriol is also advised by hi ; and for drink or vehicles for solid medicines, o erate and wine. The first object is to effect th expulsion of the poison; and as there are no p onous substances of equal power that take so lo a time in developing their action as fungi, so th e is none against which emetics may be adm istered with equal prospects of advantage at ad anced stages, or after so long a period from th ingestion of the poison. There is no antidote to e poison of fungi known, and hence the exp ion of them should be the chief intention. A r this end is attained, the inflammatory irritati , and the narcotic and other nervous sympto s should be allayed by means appropriate to th prominent features of the affection; by the m ns required for gastro-intestinal irritation and in mmation, when these predominate; and by th measures recommended for narcotic poisoning w n this is the prominent character, more especi y by cold affusions, external derivatives, and ot r means suggested when treating of opiump oning (§ 658 *et seq.*).

80. iv. Hemlock-Dropwort — *Œnanthe cr ita.* — Orfila states that this plant may be m aken for hemlock, and that a single medicinal d of the extract taken instead of the extract of h lock might prove fatal. The *symptoms* are h in the throat and stomach, delirium, stupor, a convulsions. Dr. Pickells has collected t y cases of death from eating the root. The s ptoms were insensibility, delirium, and tetanic c vulsions. Mr. Howell has mentioned eleven c s, of which two were fatal. The symptoms w chiefly convulsive, both in these and in eight o rs detailed by Mr. Ray. In a case described b Mr. Houlston, they were at first giddiness, r dly followed by coma and violent convulsions. I one of the fatal cases was life prolonged bey l four hours; and in several death took place w in an hour. The *post mortem* appearances a generally slight, consisting of inflammatory r ess of the internal surface of the digestive c l and congestion of the brain. Portions of t roots are sometimes found in the stomach, as ir e cases of four persons who were lately killed b his poison, out of fourteen who had eaten it b mistake. (See *Lond. Med. Gaz.* May, 1844.) T *treatment* is the same as in cases of poisoning b fungi (§ 679.).

681. v. Grain, of various kinds, is sometimes poisonous, owing to disease.—*a. Spurred rye — Secale cornutum*, or *ergot* — is most commonly a cause of slow poisoning, in the form of a disease which is described, according to the form it assumes, under the articles Gangrene and Spasm. (See also Ergotism.) — *Unripe grain, spoilt grain, mouldy bread* or *biscuits*, or grain or bread of any kind, which has become injured from keeping too long or otherwise, will produce disease of a chronic or slowly developed form — a true state of slow poisoning — when made a principal article of diet, or when partaken of for too long a period; and if the grain, either before or after its preparation as food, be much injured, severe symptoms may appear from having taken it at a single meal.

682. *b.* The *symptoms* usually produced by spoilt grain or bread are generally those of gastro-intestinal irritation, and but slightly or contingently those of narcotism; and, according to the nature and state of these articles, the symptoms may assume the form of *acute* or *chronic diarrhœa*, or *dysentery*, or of *scurvy*, or *scorbutic dysentery*, under which diseases the subject is fully entertained. Grain, however, may be injurious from other causes, — from the presence of the ova of insects, or of a variety of minute insects; and from the admixture of some vegetable poison, as the *darnel-grass*, or some *poisonous leguminous seeds.*

683. vi. Laburnum — *Cytisus Laburnum.* — The bark and seeds of the common laburnum contain an active poison called *cytisine.* Dr. Traill met with two cases of poisoning by the seeds; and Dr. Christison has reported an instance of chronic poisoning caused by the bark, the symptoms being chiefly those of gastro-intestinal irritation, of which the patient did not recover for some months. The symptoms in Dr. Traill's cases were coldness of the whole surface, lividity of the face, and complete insensibility. MM. Chevallier and Lassaigne, who discovered the active principle, *cytisin*, in the seeds, gave eight grains in four doses to a man, which occasioned giddiness, violent spasms, frequency of the pulse, and consequent exhaustion. (Christison.)

684. vii. Leguminous Seeds, especially the *Lathyrus cicera* and the *Ervum ervilia*, or bitter vetch, have been found in France, productive of chronic poisoning, chiefly in consequence of the accidental adulteration of flour with them. The *symptoms* have been usually weakness of the limbs, partial or complete palsy, or stiffness of the joints, and weakness and tremors of the lower extremities. They more properly belong to the class of *depressing and paralysing poisons* (§. 261.).

685. viii. Lolium Temulentum — or *darnel-grass.* — The seeds of this plant are irritant and acrid, and powerfully narcotic. They have proved deleterious, and even fatal, owing to accidental adulteration of flour or grain with them. Dr. Christison states, that when mixed in bread, darnel-grass has caused headach, giddiness, somnolency, delirium, convulsions, paralysis, and even death. M. Cordier found, by experiment on himself, that very soon after eating bread containing the flour of darnel-grass, he felt confusion of sight and ideas, languor, heaviness, and alternate attacks of somnolency, and vomiting. The bread

was commonly vomited soon after he ate it. Seeger has related cases in which the somnolency was more deep, and general tremors also present. Many years ago, the inhabitants of the poor's house at Sheffield were attacked with symptoms of poisoning by porridge, which was supposed to have been made of meal accidentally adulterated by the darnel. The chief symptoms were a piercing stare, quivering of the lips, frontal headach, dilated pupil and confusion of sight, small tremulous pulse, violent agitation of the limbs, twitches of the muscles, and palpitation. In twelve hours all those attacked were well, but two, who had strong convulsions in the subsequent night; they also eventually recovered. (*Lond. Med. and Phys. Journ.* xxviii. 182.) In some instances, loss of speech and somnolency are the most prominent symptoms; whilst in others gastro-intestinal irritation predominates, occasioning vomiting and purging.

686. ix. Yew-tree — *Taxus baccata.* — The berries and leaves of the yew-tree are extremely poisonous, and sometimes act without either vomiting or purging. Dr. Percival states, that a table-spoonful of the *fresh leaves* was administered to three children, of five, four, and three years of age, as a vermifuge. Yawning and listlessness followed. The eldest complained of pain in the abdomen, and vomited a little; but the other two suffered no pain. They all died within a few hours of each other. Mr. Taylor adduces a case by Mr. Hurt of poisoning by the *berries* of this tree. A child, aged three and a half years, ate some yew-berries, and, about an hour afterwards, appeared ill, but did not complain of pain. It vomited part of its dinner, mixed with some of the berries. A medical man was sent for; but the child died of convulsions before he arrived. On *inspection*, the stomach was found to contain mucus and half-digested pulp of the berries and seeds. The mucous membrane of the organ was reddened and softened. Other instances of death by this poison are recorded, but they furnish no additional information. I believe that this poison acts as an *acro-sedative*, rather than as an *acro-narcotic;* but its effects have been very imperfectly observed.

687. Class IX. Septic Poisons. — This class of poisons has been doubted, or rather the operation of certain poisons in rapidly dissolving the vital cohesion of the tissues, to and near which they may be applied, has been disputed; and, certainly, if any one were inclined to surrender the reports of more than one of his senses to the inferences of hypothesis, to such a one may doubts of the existence of this particular action appear reasonable. It is true that the poisonous agents which are thus capable of loosening, with more or less rapidity, the cohesion of living tissues, and of disposing them to enter into different physical conditions, are few; although many possess this power indirectly, or by giving rise to a succession of morbid actions, of which a septic condition, or a state of loosened or almost entirely dissolved vital and physical cohesion, is the most advanced. These latter, however, fall not under the present category; although the rapidity with which this ultimate result is produced, as respects some of them, might countenance such an arrangement. I may, nevertheless, allude to some of these incidentally. Dr. Christison observes, when noticing this topic, that "if we w e to trust the impressions the vulgar entertain of e effects of the bites of serpents, the poisons r r mentioned would be considered true *septics* r putrefiants, for they were once universally - lieved, and are still thought by many, to ca e putrefaction of the living body. This prop y has been assigned them, probably on no o r grounds than that they are apt to bring on dif e subcutaneous inflammation, which frequently r s on to gangrene." (*Op. Cit.* p. 575.). I confess - self possessed of the vulgar belief that the l l effects of the bites of serpents are not inflam - tory, however this much used and abused ap - lation may be qualified by certain adjunct s diffusive or diffuse, gangrenous, destructive, slou - ing, phlogistic, sthenic, asthenic, dynamic, a - namic, and twenty others, employed to con y certain ideas of morbid conditions, as they y suit a theory, or subserve an hypothesis. But y one, who has witnessed the bite of a poiso s snake, who has seen the swelling, infiltratio f the tissues, the coldness, the arrest of capil y circulation, the softening and almost dissolu n of the textures, and the subsequent rapid dec - position of the part and of those in its vicinit - all which takes place in a few minutes, an is consummated in an hour or two in some insta s — may not consider the word *septic* as altoge r misapplied — at least until a better one is supp l, or unless we submit to a periphrasis. But e more local alterations are not the only phenom a, for the remote effects, the extreme depressio f organic nervous influence, and of the vital m i- festations generally, are equally rapid and - markable.

688. The poisons which most undoubtedl - long to this class are chiefly the secretio f snakes and other reptiles, although there is re n to believe that several other secretions or mo d matters will produce analogous changes in e healthy body when inoculated with them, — at the secretions from small-pox, from plague, n- gangrenous sores, from glanders and farcy, m erysipelatous parts, and from sloughing, gang - ous or putrid animal substances, will so cont i- nate the parts into which they are inserte r inoculated, as to produce either a constituti al disorder specifically the same as that of whi it is the product, or a state of local disorganiz n rapidly passing into vital destruction, accompa d by dangerous, and often fatal, constitutional s- turbance. The inoculation of small-pox in e Negro constitution produces, in many insta s, on some occasions — in the majority of cases in r- tain circumstances, as I have myself witnesse a putrid or septic condition, the confluent eru n consisting of a black sanies contained in e softened dermis, which, with the circulating f ls and soft solids, rapidly deliquesce, as it were, to dissolution, before even respiration had ce l, and without any indication of antecedent ex e- ment, or unusual re-action.

689. I have seen the foul secretion from e throat of a patient about to die of scarlet r produce sloughing of that portion of the int - ments of another person with which it ha e- mained for some time in contact, although e cuticle was stated to have been unabraded b re the morbid secretion came in contact with it. e experiments of the French pathologists, al y

ferred to, sufficiently prove the septic and disganizing effects of putrid animal and vegetable atters when introduced into the healthy textures. is supposed that, when a morbid secretion, or trid animal secretion, occasions more or less of scular injection of the part with which it comes contact, or pain in connection with vascular jection or tumefaction, before disorganization sues, this ultimate result is then the consequence erely of the morbid action more immediately eceding it, and that this action—more properly ant of action, is inflammatory. But the truth is at the septic agent, applied to the living part, prived of its natural protection, or otherwise posed, depresses the vital or the organic nervous dowment of that part, diminishes the tone of its pillaries, and weakens the vital cohesions of its sues. As these changes proceed, the vessels are ngested, the circulation through them is impeded, d ultimately ceases, and the part dies; although, many instances, where the contaminating or isonous agent is not sufficiently active thus to erpower or to annihilate the vitality of the part, d of the whole body, various attempts are made, means of the vital resistance of the body to opse these changes, and to develope vascular retion, whereby they may be the more successlly resisted. According to the intensity of the use, relatively to the state of vital power and sistance, either of the part or of the body genelly, or of both, will the effects, both local and neral, thus vary; the more virulent or intensely ntaminating or septic agents, destroying not only e part, but also the whole frame, and even hasteng the physical dissolution of the body, without ther vital resistance or vascular re-action being anifested, the less intense agents admitting of the velopment of both, in more or less efficient rms. In this latter case the septic tendency may hardly apparent; and during the procession of orbid changes which the septic agent produces, ngestion of, serous effusion into, and destruction , the cellular tissue, and spreading inflammation d disorganization of the adjoining tissues are the ost prominent organic lesions. My limits will t permit me to pursue the consideration of this bject, which, however, is discussed at length nder other heads, especially under Cellular issue (§§ 9 *et seq.*), Disease (§§ 87 *et seq.*), Erypelas (§§ 26 *et seq.*), Infection (§§ 11 *et q.*), and Inflammation (§§ 54 *et seq.*); whilst arious specific maladies furnish illustrations, ot only of the subject, but also of the principles r which I have contended, more particularly the Æmagastric, and the Septic or Glandular estilences, Scarlet Fever, and Small-pox. therefore conclude with a brief notice of the ffects produced by the poison of serpents, &c.

690. i. Poisonous Serpents. — Many of this lass of reptiles are more or less poisonous. The *iper*, or *coluber berus* — *vipera berus*—is the most ommon poisonous serpent in Europe; the *cobra e Capello*, or *coluber naja*, in the East Indies, nd the several species of the *rattlesnake*, or *rotalus*, in America. But our information as to e genera and species of serpents or snakes which re actually poisonous is limited, notwithstanding hat has been adduced by Fontana, Redi, twell, Horner, Orfila, and others. The bite f the *viper*, which is the only poisonous snake in ritain, seldom occasions death, although in other countries of Europe its poison is often much more virulent than in this; but the season of the year varies the intensity of the poison, which is greatest in summer and autumn.

691. *A.* The *symptoms* are acute or lancinating pain in the part wounded, commencing either instantly, or not for several minutes after the infliction of the injury, according to the intensity of the poison. The pain extends rapidly towards the trunk or centre of the body; and swelling, with redness or discolouration, passing to a livid hue, supervenes. These local changes are followed by faintness, or full syncope, bilious or convulsive vomitings, difficulty of breathing, copious cold sweats, dimness of vision; a small, quick, weak, and irregular pulse; yellowness of the skin; disturbance of the mental faculties, and, in the most dangerous or fatal cases, the rapid progress of these symptoms and gangrene of the wounded part. Death may ensue, either rapidly or slowly; or recovery may take place, according to the virulence or activity of the poison, relatively to the powers of the individual, or the aid and treatment he has received. Dr. Wagner mentions two cases where the injury was on the toes, and death took place before assistance could be procured. In a case referred to by Dr. Christison, a burning pain was felt in the bitten foot, followed by intense pain in the belly, vomiting, incessant thirst, and death in three hours. Dr. Braun (*Rust's Magazine*, b. xxxii. p. 361.) states, that a man who professed to be a snake-charmer, put the head of the *coluber chersea* into his mouth, but suddenly threw the reptile from him, finding that he had been bitten near the root of the tongue. In a few minutes he became so faint that he could not stand. The tongue swelled a little; the eyes became dim; some saliva issued from his mouth, rattling respiration succeeded, and he died within fifty minutes after he was bitten. On the other hand, death may not take place until one, two, or even three days after the inoculation of the poison. The poison of the common viper is said not to be so dangerous in France as that of the *red viper*, which may cause death in a very few hours.

692. The activity of the poison of the viper, and indeed of all serpents, depends upon a variety of circumstances. When long confined, or after the animal has bitten frequently in rapid succession, and during cold seasons, when it loses its activity, the poison also loses its virulence more or less, owing either to a scantier, or a weaker, or an exhausted secretion. Serpents are most poisonous in warm, humid, and malarious climates, and are there most numerous. In those parts of Africa, which were chiefly of this description that I visited, accidents from them were very frequent; but, owing to my residence at any place being short, I did not succeed in obtaining any of the poisonous species. The most dangerous bites are inflicted on naked, or imperfectly covered parts, particularly the extremities; and the more severe and virulent, the more rapidly are the symptoms developed. The poisonous properties of the fluid contained in the reservoir do not cease with the animal's life; but may continue, like some other poisonous fluids, as that of small-pox, &c., even when the fluid is dried and kept for some time. Professor Mangili has demonstrated that it may be swallowed without injury. The *Fetish-men*, or native doctors in Africa, have in my presence, when sucking the

wounds made by a poisonous serpent, swallowed the fluids thus drawn from the wound to show their powers and invulnerability.

693. The *Crotalus horridus*, or *rattlesnake*, produces effects which vary with the circumstances noticed above. Sir E. Home states, that when the poison of this reptile is active, its local operation is so sudden and violent, and its effects upon the frame so great, that death soon takes place; and that, on examination after death, the only alteration of structure is in the parts close to the bite, where the cellular membrane is completely destroyed, "and the neighbouring muscles are very considerably inflamed." But I can add, that the appearances of the muscles which are assumed as inflammatory are not actually such; but those of congestion and softening from loss of the vital and physical cohesion of the tissues.

694. When the poison is less virulent, the shock to the frame is rarely fatal. The pain in the part bitten is very severe, and in about half an hour swelling takes place from the effusion of serum into the cellular tissue, and continues to increase more or less rapidly for about ten or twelve hours, extending during that period to a greater distance from the wound. The blood afterwards ceases to circulate in the smaller vessels of the swollen parts; the skin over them becomes quite cold; the action of the heart is so weak that the pulse is scarcely perceptible; a slight delirium is present, and the stomach is so irritable that nothing is retained on it. If the patient does not sink, these symptoms disappear in about sixty-hours, and inflammation and suppuration take place in the injured parts, and when these are great the result is often fatal. The symptoms of those who recover go off more readily and completely than the symptoms produced by a morbid poison which has been received into the system. When the bite is in the fingers or toes, the part often immediately mortifies; and when death takes place in these cases, the absorbent vessels and glands present no change, nor has any part lost its natural appearance excepting those in the vicinity of the wound. The following cases illustrate the symptoms and morbid changes produced by this poison.

695. A person who took rattlesnakes from America to Europe for exhibition was bitten by one in Paris, and died in nine hours. On *dissection*, all the internal organs were found healthy, "excepting that the membranes covering the brain and spinal cord had a reddish tinge, and the venous blood on the affected side was curdled or clotted." (*Edin. Journ. of Science*, vii. 86.) — Dr. Horner states that a patient, whom he saw some hours after having been bitten in the arm by a rattlesnake, had the arm from the thorax to the fingers swollen to twice its natural size, and it was very painful when moved. The pulse was almost imperceptible; the extremities were cold; the eyes were muddy and heavy; the face bloated. Death took place twenty-four hours after the receipt of the injury, and *five hours* after death the body was examined. The face was then much bloated; the neck tumid and purple; the bitten arm was still swollen and purplish. The internal organs presented no lesion beyond congestion, which was most apparent in the vessels within the cranium and spinal canal. The cellular and adipose tissues of the injured arm were infiltrated with serum. The blood was fluid, and of a very dark colou (*American Journ. of Med. Sciences*, vol. viii. p. 397

696. A man was bitten in London by a rattl snake which was being exhibited. In less tha half-an-hour the injured hand began to swell, ar pain and swelling extended rapidly along the ar to the axilla. In two hours afterwards the mar answers were incoherent, his skin cold, his pul 100 in a minute, and he was sick at stomach. I eight hours the pain was extremely violent, tl swelling very great, and he had frequent attac of faintness. The following morning his pul was remarkably feeble, 132 in a minute, and slig swelling had extended from the arm along th side to the loins, with a mottled appearance fro the exudation of blood under the skin. His who arm was very cold and painful, presented sever vesications, and "had a livid appearance, simil to what is met with in the dead body after p trefaction has commenced." On the third da his pulse was scarcely perceptible; the extremiti were cold, and the vesications were larger. I rallied for a few days, but gangrene of the ar took place, and he died on the eighteenth da Sir E. Home, who records this case, adds, th Dr. Russell communicated to him the details of case of a man who had been bitten by the *cob di Capello*, and the symptoms were nearly the san as now stated. He also refers to two experimer he made on a couple of rats, which he caused be bitten by a venomous serpent. The one fi bitten died in one minute after the bite; and up dissection he found the cellular tissue under t skin of the side bitten entirely destroyed. T second rat was not so rapidly nor so severely a fected, but it died in six hours. — (*Philosop Trans.* 1810.)

697. The *Coluber fulvus Australicus*, or "*Co per-coloured Snake*," has sometimes caused dea or dangerous effects in Australia, where it ar other allied species abound. In a case detailed l Mr. Bland (*Lancet*, Jan. 1848), the bite near proved fatal, although ligatures were instant placed upon the limb above the injury. Tl *symptoms* were pain in the region of the hea with a feeling of constriction in the chest; acc leration of pulse; giddiness, jactitation, dimness sight, and general distress, which continued f some time; but were ultimately removed by tl very judicious and active treatment adopted.

698. *B. Treatment.* — When the situation of tl bite allows of the application of a ligature abo it, then this practice should be instantly adopte and even two ligatures ought to be applied, esp cially if a considerable time is likely to elapse b fore professional aid can be obtained. When tl situation of the injury admits not of the applic tion of a ligature above it, then a cupping-glass, any vessel or cup which may be applied wi sufficient exhaustion of the contained air to produ pressure around the bite, as well as to draw tl fluids through it, should be resorted to and ke applied, or re-applied, as efficiently as possibl When medical or surgical aid is obtained, *excisi* of the bitten part, if the situation admit of its pe formance, should be adopted, especially if tl symptoms are urgent and the local contaminati manifest. But when these means cannot be r sorted to, and even when they have been alrea employed, *suction* of the wound should be as i stantly instituted as possible, and continued wit

ut intermission for a considerable time. The oderns have certainly not materially improved pon the treatment recommended by the ancients r the bites of serpents and other reptiles. If we efer to NICANDER, DIOSCORIDES, CELSUS, and ther Greek and Roman writers, as well as to the rabians, we shall find them all recommending e means now advised, with several others. Mr. DAMS, in his most valuable translation of PAULUS EGINETA, has given an excellent epitome of the eatment prescribed by the ancients for poisonous tes and wounds. They all recommend ligatures, pping, suction, and, in urgent cases, excision or nputation. After sucking and cupping the wound, ey advise stimulating dressings; and the ap- ication of the flesh of fowls, whilst still warm, the part. They also recommend bleeding when the poison is distributed over the body;" ut at the same time they give wine and stimulants, netics, and sudorifics; and agree in GALEN's logy upon the virtues of the theriaca. I must, owever, refer the reader to Mr. ADAMS's work, r a very full account of the practice of the an- ents in these and in all other cases of poisoning.

698*. In Mr. BLAND's case (§ 697.), bleeding om the arm to the extent of sixteen ounces was lopted "in conformity with his experience in ese cases, and was followed almost immediately the entire removal of both the pain and con- riction." At ten the same evening the patient as again bled to ten ounces, some pain and con- riction in the chest having returned. Besides e means already mentioned, Mr. BLAND advises the exhibition of stimulants, as oil of turpentine, omatic spirit of ammonia, brandy or other spirits, u-de-luce, port, sherry, champagne, or other nes." In addition to these, the head and face ould be frequently sponged with cold fluids, as negar, rose-water, &c. I have seen, in Africa, here accidents from poisonous serpents are not frequent, the juice of the citron with capsicum ded to the other stimulants which were taken, d applied to the wound after suction had been ntinued for some time. The bowels were opened means of olive-oil, taken by the mouth with mulants, or administered as enemata with cap- um and salt. In the more intense states of isoning by venomous snakes, bleeding can hardly resorted to, owing to the extreme depression of e powers of life; and it is only when re-action is ing developed by the aid of powerful stimulants, at the loss of blood tends to relieve the vascular ngestion produced by the poison, especially of e lungs and large vessels, and, by reducing the ass to the low amount of moving power, thereby restore and equalise the circulation.

699. Various substances have been recom- ended as *antidotes* to the poison of serpents. UMBOLDT and BONPLAND mention a New Gra- da plant, the *guaco, Mikiana guaco*, the juice of hich is said to deter snakes from biting persons whom it is applied; the leaves being also ap- ied to the wound to prevent the usual effects hen a person is bitten. (ORFILA, *Toxicologie*, ii. p. 441.) *Arsenite of potash*, and other pre- rations of arsenic, as the Pill of Tanjore, have en used in the East as an antidote to this poison. r. RUSSEL states that it was taken sometimes with ccess, but that it failed in other cases. Mr. IRE- ND (*Trans. of Med. and Chirurg. Society*, vol. ii. 397.) and Dr. PHILLIPS (*American Journ. of Med. Sciences*, vol. viii. p. 540.) have furnished satisfactory evidence of the efficacy of arsenic, even in the worst cases of poisoning by the bites of serpents. Mr. IRELAND relates five cases in which he prescribed the arsenic in very large doses. He states, that upon his arrival at St. Lucia, where venomous serpents are numerous, chiefly the *Coluber carinatus*, an officer and several men of the 68th regiment had died within a few months from bites of these reptiles; and notwithstanding the treatment, the patients had sunk in six to twelve hours from the time of their receiving the wound. The following case will show the symptoms and treatment of it and all the others: —

700. A soldier was bitten in the hand, the middle finger being much lacerated, and it was immediately amputated at the joint with the metacarpal bone. He was seen ten minutes after he received the wound. He was then so torpid and senseless, as to feel little or no pain during the operation. The hand, arm, and breast of the same side were much swollen, mottled, and of a dark purple and livid colour. He was vomiting, and appeared as if intoxicated. Pulse, quick and hard. The wound being dressed, a cathartic clyster and the following were administered immediately: — "℞. Liq. Arsenicalis ʒii. Tinct. Opii, gtt. x. Aquæ Menthæ pip. ℥iss." This medicine was added to half an ounce of lime juice, and taken immediately. It remained on his stomach, "and was repeated every half hour for four successive hours. In the mean time the parts were frequently fomented with common fomentation, and rubbed with a liniment composed of Ol. Terebinth. ℥ss. Liq. Ammon. ℥ss. and Olei Olivæ ℥iss. The cathartic clyster was repeated twice, when the patient began to be purged; the arsenical medicine was now discontinued." From that time he gradually recovered. The next day he appeared very weak and fatigued; the swelling gradually diminished, and he soon recovered and returned to his duty.

701. The administration of large doses of *ammonia* and *eau-de-luce* has been advocated by many, and numerous instances of their success have been recorded, whilst HOME and ORFILA doubt their virtues. They are, however, useful in rallying the powers of life, and in promoting perspiration. And in this way other stimulants, as alcoholic fluids in large doses, have also been of use. Many plants have likewise been much praised as antidotes to the bites of serpents, especially the *Aristolochia serpentaria*, the *Prenanthes alba* and *altissima*, the *Polygala senega*, the *Eupatorium ayaparia*, the *Ophioxylon serpentinum*, *Nux vomica*, &c.; but probably they possess no further specific influence than in enabling, by their stimulating action, the vital powers to resist the injurious influence of the poison.

702. ii. VARIOUS INSECTS AND REPTILES, especially the *scorpion*, the *tarantula*, the *hornet*, the *spider*, the *wasp*, and the *bee*, produce serious effects in some constitutions by their stings. The effects of these, however, vary much. In some they resemble those produced by the bite of a viper; in others they are more slight, and are merely irritant locally, whilst they occasion more or less severe nervous symptoms. — *A.* The sting of the *scorpion* has, in some instances, produced severe diffusive local inflammation, with pain, fever, tremor, and depression. Dr. GRAPERON saw two

cases in which the sting of the *tarantula* proved fatal in the Crimea—one in forty-eight hours, the other in six days. The sting, which was inflicted in the patient's neck, was very painful, and had left a brownish violet mark. The neck, head, and shoulders were swollen; the thorax from the clavicle to the false ribs was of a bluish colour; and respiration became difficult forty-four hours after the injury. Scarifications, the actual cautery, oil externally and internally, and ammonia, were all employed in vain. — (*Quart. Journ. of For. Med.* i. p. 215.)

703. *B.* Dr. Beck refers to a case in which the sting of a *bee* caused vomiting, fainting, sweating, trembling, and great difficulty of breathing; and the sting of the *wasp* has caused similar effects, and sometimes even insensibility with spasmodic twitchings. Dr. Beck refers in a note to a statement that Dr. King, of Stratford-on-Avon, died on the 14th June, 1833, in consequence of a sting which he received on the 8th of the same month from a *hornet.*

704. *C.* The *treatment* of the stings of these insects should be the same in principle as that advised for the bites of venomous reptiles; which is similar to that prescribed by the ancients, an epitome of which will be found in Mr. Adams's work, already referred to. In the less severe cases, emollient and anodyne applications to the wound are of use, after the sting is extracted; and the volatile alkali, or the other stimulants and restoratives mentioned above, should be given internally in large and repeated doses, when vital depression is alarming, or the other general symptoms are severe.

☞ In this article it will be seen that I have ventured upon a different classification of poisons than has hitherto been proposed; and that I have based this classification upon what I believe to be the operation of such substances as have been found to be more or less injurious to the living human body. It may be some reason for this arrangement, that there is scarcely a poison which is not, or has not been, employed as a medicine, and therefore some reference should be had, in our consideration of the *modus operandi* of poisons, to the nature and effect of these substances when employed medicinally; and, in fact, it is upon what is known, and upon what I believe, to be the influence and action of these substances that I have founded my *arrangement.* I offer it to the examination of the closely observing and profound pathologist, therapeutist, and medical jurist; and to several such I have been much indebted in the preceding pages. There are numerous substances, both medicinal and poisonous, which are arranged with great difficulty according to their operation and more prominent effects, owing to the circumstance of their operation taking place through different media and channels; and to the fact that the effects upon the different vital organs vary in different persons, from causes already stated, and even in the same person at different times, seasons, and states of the digestive organs, and of the economy. Hence substances which may appear to some to belong to a certain class, may seem with equal justice to others to belong to a different class. But this objection is one to which all arrangements are liable, where the objects to be arranged present not sufficiently distinctive characters on which specific differences may be based. There may be some imperfections in my views, and I may have to modify certain of them, especially as respects those substances the nature of which has been insufficiently investigated; but I have endeavoured to be as precise and correct as the extensive range of the subject and my limited powers allowed me to be; and I have endeavoured to do justice to all who have furnished me with information in their able and classical productions.

The reasons for my excluding chemical and juridical disquisitions from my treatise have already been given; but I may again state that they are not comprised by the scope of my work, or by its limits; and I am desirous that they should be referred to in the practical and able sources which I have already indicated. My object — and, indeed, my duty — was to describe the *operation*, the *effects*, the *diagnosis*, and the *treatment* *of poisons*, as a *most important part of Practical Me cine*, — as, in truth, *states of disease*, although produ by art, or with the intention of destroying life, — as mean or small part of *medical practice and usefulnes* and as contributing in no small degree to the med practitioner's knowledge, not only of the sources course of the most intense and rapid states of mor action and of their results, but also of the operation effects of our chief medicinal agents in alleviating in removing spontaneous or natural maladies.

In order to facilitate reference to the principal to and to the individual substances comprised in article Poisons, I add the following synopsis, with *number of the paragraph* at which the consideratio f them commences.

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ii. The bites of various poisonous serpents, § 690.
iii. The stings of insects, &c., § 702.

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OLLUTION.—SYNON.—*Pollutions* (Pollutio —the act of polluting or defiling, corrupting or tainting); *Spermatorrhœa*; *Gonorrhœa vera, G. libidinosa*; *Anaplasmus, Manustupratio, Masturbatio*; *Onanismus*; *Tabes dorsalis, Profluvium seminis*, Auct. Var.; — *Samenfluss, Onanie, Selbstbeflekung*, Germ.; — *Incontinence de Sperme, pertes seminales, Onanisme, Spermatorrhée*, Fr.; — *Pollutions, voluntary and involuntary*; — *Self-pollutions*.

CLASSIF. — GENERAL PATHOLOGY — *Ætiology*. — SPECIAL PATHOLOGY.

1. DEFIN. — *Voluntary and solitary excitement the sexual organs, occasioning emissions or the nereal orgasm* (self-pollution — voluntary pollun): — *Discharge of the seminal fluid, with or thout the venereal orgasm, involuntarily or dur- sleep* (involuntary pollutions).

2. Under the designations, *voluntary and inuntary pollutions*, I propose briefly to consider ose moral and physical disorders which have en variously denominated according to the ms in which they have been presented to the dical adviser, or which they have assumed in progress of moral depravity; not infrequently connection with outward moral observances d hypocritical sanctity. That form of pollun, in either sex, which was at first voluntary, nerally becomes involuntary when the evil bit is persisted in, although the latter, in cern circumstances, may occur primarily. It comes, therefore, necessary to consider the different states of this important disorder in succesn, inasmuch as the moral vice is generally the use of the physical disease. Both states of the order should be viewed with a due regard to their special relations and consequences; for so remarkably important are these consequences — so numerous are the ills, both of body and mind, which this disorder induces — and so certainly are those ills entailed upon the subsequent life of the person who is its subject, and upon his offspring to the third and fourth generation, if, indeed, he possess the power of propagating his species, even in the most imbecile forms, that it becomes the duty of the medical instructor to point out its forms, relations, and consequences. The subject has been improperly neglected by both instructed writers and scientific physicians, because it is one frequently involving indelicate ideas, and requiring unpleasant revelations — as the due consideration of it unveils the innate and concealed depravity of our nature. But the vice, the moral depravity, of which the disorder at first cônsists, soon creates for itself, in actual and often incurable physical disease, a necessity for disclosure — a necessity which is not confined to the person concerned, but extended to his family and his offspring. This being the case with disorders and their usual consequences, which involve so extensive and important considerations, should they be relinquished by the only persons who are able to investigate them aright, and to restore the mental and the physical imperfections upon which they depend, and be handed over to ignorant harpies, who prey upon the wretched sufferers, who take the utmost advantage of the fears which torment them, of the moral and physical debility which sinks them, and of the circumstances in which they are involved, to deceive, to plunder, and to swindle them, and who have neither the knowledge, nor the ability, nor even the intention, to render them any aid?

I. SELF-POLLUTION—VOLUNTARY POLLUTION.— SYNON. — *Masturbation* — *Manustupration* — *Onanism, &c.*

CLASSIF. — GENERAL PATHOLOGY — *Ætiology*. — *Pathogeny*.

SPECIAL PATHOLOGY.

I. CLASS. II. ORDER (*Author*).

3. i. OCCASIONS, CAUSES, &c. — I have already noticed, in a few sentences, the consequences of the too early and inordinate excitement of the genital organs in both sexes (see art. DISEASE, § 53.); but the real importance of the subject induced me to mention merely certain prominent matters, and to reserve the fuller consideration of it to a more appropriate place. Self-pollution is generally a vice of *puberty*, but it frequently is often practised at the earliest appearance of this epoch; and, in females, even long before the usual accession of this change. In both sexes, the habit is not infrequently continued through a considerable portion of after life. Several writers whose works I have perused have stated that they have known instances where this vice had commenced in females as early as three or four years of age; and cases of it have come before me when this age was hardly passed. At this early age, the practice has generally been acquired from the girls to whom the care of children has been committed. In a case of nymphomania, in a patient to whom I was called in consultation, and who was sixteen years of age, the intelligent mother, the wife of an eminent physician in India, stated that the disease originated in manustupration acquired from a native Indian nurse, when

the child was only four years old. It is difficult to determine how early in life this vice may commence in the *male sex.* A patient who lately consulted me respecting his presumed impotence, stated that he commenced this vicious practice as early as eleven years of age; and I find upon referring to my African memoranda, that it is common among negro boys of nine and ten years of age. But in this country, from thirteen years of age to twenty-five, and even upwards, is the period in which it is commonly indulged in; although its evil consequences are often found out before or soon after this latter age. At whatever period commenced, the habit is carefully concealed from parents and others; and is often not detected, nor even suspected, although both mind and body are reduced by it to the lowest state of imbecility.

4. It is requisite to be aware of the early *age* at which this vice may commence, as well as of the *circumstances* in which it commonly originates. One chief occasion of its early appearance has already been noticed; and this should suggest precautions, especially as respects the persons with whom children are allowed to sleep or to associate. Boarding-schools and other seminaries or institutions, where a number of children or young persons are brought together, and especially where several sleep in the same apartment, or more than one in the same bed, are the places where this vice is most frequently acquired, by both sexes; but it is not infrequently practised by those who have never entered these places, it being either suggested by the local irritation and physical excitement often present during early puberty, or soon after this epoch, or acquired from tutors and governesses. The neglect of *circumcision* in Christian countries is certainly no mean physical cause of the prevalence of this vice, and of many of the consequences which follow. The institution of this rite for the descendants of Abraham, and the faithful observance of it to the present day not only by them, but also by the followers of Mahomet, have tended, amidst numerous countervailing influences and persecutions, to perpetuate an enduring and healthy race; the beneficial results of circumcision being experienced not only by the individual himself, but also by his offspring, and even indirectly by the female sex, as may be inferred from various physiological considerations.

5. Although this vice is most prevalent amongst young persons, its ill effects generally becoming apparent to them with riper years, yet it is not infrequently indulged in, by persons of both sexes, during advancing years; and is genenerally the cause of most of the complaints observed in unmarried persons after the age of twenty-five years, as well as sometimes before that period. It is certainly the chief cause of the lives of this class of persons being of much less mean duration than those of the married.

6. There are few causes of this disorder more influential than idleness — than the want of such occupations for youth as require early rising. A full and active occupation of the mind generally shuts out all ideas which suggest this mischief, whilst the pleasures, in which idleness favours the indulgence, tend to encourage those ideas. Lying in bed after being awake is another occasion of no small importance — of much greater than is generally attached to it. Although this an several others of the foregoing causes, may no have first occasioned this vice, still they remarkably favour a frequent recurrence to it, and ofte render the morbid impulse to it too strong for th self-control of the person who has fallen into th evil habit.

7. ii. The Symptoms and Signs of Mas turbation are in some cases obvious, almost o the first glance; in others, they require clos observation, aided by experience of the severa phases they assume. When the mischief has nc been long indulged in, then the injury sustained b the organisation is seldom such as to be manifes But when it is commenced at an early period c puberty, or with the first indications of puberty then its injurious effects show themselves muc sooner than when the frame has previously bee fully developed; and are much greater, espe cially at this early age, than the due congress of th opposite sexes. That the injury done to the const tution by this vice is always much greater than th caused by sexual intercourse is certainly th case, although the act may not be oftener repeate in the former, than in the natural way. A respects the female sex, this result may be easil accounted for; but it also obtains, and may l explained, as respects the male sex; for, ind pendently of its being an act opposed to the di tates of nature and religion, it is one which e hausts the nervous powers more completely tha the orgasm consequent upon reciprocal enjo ment, and the interchange of nervous eman tions. But, it should be recollected that sel pollution is often commenced at an earlier c more immature age, than that at which the i tercourse of the sexes can take place, in the usu states of civilised society; and that hence it the more injurious, because it impairs or inte rupts the due development of both mind an body, at a period when such development r ceives, in the healthy frame, its chief impetu and full consummation from the genital orga and secretions. There can be no doub however, that the individual who has once d voted himself to this Moloch of the species, b comes but too frequently its slave to an almo incredible degree. A patient who was sent London for my advice, confessed that he ha practised this vice seven or eight times daily fro the age of thirteen until twenty-four; and l was then reduced to the lowest state of ment weakness, associated with various bodily infirm ties — indeed, both mental power and physic existence were nearly extinguished.

8. *a.* The more prominent symptoms of sel pollution are readily recognised; but tho which indicate an early stage of the habit a less manifest. In females, who often commen it long before, or with the earliest appearance c puberty it is indicated chiefly by pallor or lo of colour, a desire to be alone, a somewhat d jected manner, listlessness and indolence, a d sire to go soon to bed, and to lie long after havi been awake; a darker mark than usual under th eyes, or of the lower eyelids; a near or wea sight; slight emaciation, although the appetite good or even ravenous; the habit of biting t nails, which are generally very short; warts c the first or second fingers, slight sores about th roots of the nails, &c., are signs often observe

l when several of them exist in the same case,
picion of self-pollution may be entertained;
l may be viewed as confirmed, if slight leu-
rhœa, with redness and considerable develop-
nt of the clitoris and nymphæ be present, and
ecially if the linen or sheets betray any marks or
ins. Several of these symptoms may be observed
males; but the night-linens most commonly
nonstrate this vice in them. They, however,
en prevent it from being thus detected, and
npletely conceal it until their appearance
ficiently betrays them.

9. When self-pollution is not frequently prac-
d it may be very long before it is detected
if detected at all: but, when it is a frequent
bit, the above symptoms then are not of long
ration without being followed by others, which
re decidedly indicate the mischief. The signs,
wever, vary with the age. When early prac-
d, or before the frame is developed, or whilst
frame is in course of development, this pro-
s is more or less impaired, or even interrupted.
e organic nervous influence and vital power
determined chiefly to the immature sexual
gans, and all the other vital manifestations
guish more or less. The functions of diges-
n and assimilation are weakened, the blood is
or and deficient in red-globules and hæma-
in, and a state of anæmia is more or less com-
tely produced. The muscles become flaccid;
d the tendons, ligaments, and capsules relaxed
d easily stretched. The nervous systems are
ak, susceptible, readily excited or depressed,
d ultimately betray further disorder. Hence
se weakness of the joints, flexures of the spinal
lumn, chlorosis, chorea, epilepsy, rheumatic or
uralgic pains, nervous headaches, and a general
ght of the constitution, often associated with
rms in the intestinal canal, and always attended
mental and bodily indolence, chilliness and
sceptibility of cold, and by incapability of in-
lectual and physical occupation. At this early
e, or when puberty is either not commenced or
just appearing, the patient is often stunted in
owth by this habit, or is rendered decrepit and
becile, the ovaria and the testes are imperfectly
veloped, and even waste more or less; and the
ard in males hardly appears. I was first consult-
by the parents of a young lady when she was
out twelve years of age. She was then suffering
m debility and slight anæmia; and subse-
ently she was the subject of chlorosis and tuber-
lar consumption, of which she died about
e age of twenty. She had never menstruated.
hen the body was examined after death, the
aria were remarkably small and changed to a
nse fibro-cartilaginous state. It was ascertained
ring my attendance, that she had become early
dicted to masturbation; she ceased to grow at
early age; and was of a small and weak con-
rmation — although her parents were large and
rong persons. Most of those who thus early
come addicted to self-pollution, are soon after-
rds the subjects, not merely of one or more of
e ailments already noticed, but also of enlarge-
ents of the lymphatic and other glands, ulti-
ately of tubercular deposits in the lungs and
her viscera, or of scrofulous disease of the ver-
bræ or bones, or of other structures, more espe-
ally of the joints.

10. *b.* When self-pollution is commenced at a more mature age, or when puberty is advanced or completed, the mischief which the constitution sustains is not so remarkable, nor so rapid in its progress, as when practised earlier; for the frame is then further developed, and more consolidated; and the powers of life furnish a greater resistance to the evil. Nevertheless, the consequences are generally most serious, especially when the vice is often indulged in; and, in some respects are similar to those already mentioned, whilst those most frequently observed at this more mature age, are not unfrequently seen also in younger persons. Stooping and roundness of the shoulders, with a falling inwards of the thorax below the clavicles; emaciation and weakness of the joints; pallor of the countenance, with sunk orbits, the eyes being surrounded by a darker circle; a weak or dim sight, or nearness of the sight, weakness and pains in the eyes often preceding the change in the focus of distinct vision; eruptions on the face; a falling out of the hair, and baldness of the crown and forehead; pains in the head, lowness of spirits, and aching of the back and loins, with inability of sustaining long an erect or even a sitting posture without support; marked aversion from leaving bed in the morning, and indisposition to enter upon any mental or bodily occupation, are the earliest indications of self-pollution, at the more mature periods of life. To these succeed, sooner or later, loss of colour, a pallid state of the gums, tongue, and prolabia; sometimes a dusky hue of the countenance, with sores of the face, which are frequently picked and irritated by the patient; leucorrhœa and delayed, or suppressed, or interrupted, or painful and difficult, or scanty menstruation; in some females protracted or frequently recurring catamenia; numerous hysterical symptoms, often irregular or anomalous, and attended by painful, or spasmodic, or slightly paralytic symptoms, and with all the phenomena noticed when treating of HYSTERIA and SPINAL IRRITATION. Ultimately, all the bodily functions betray increasing disorder; and special forms of disease succeed, particularly epilepsy, glandular and tubercular maladies, phthisis; palpitations of the heart from the slightest mental and physical causes, often protracted and excessive, and not unfrequently followed by organic changes of the parietes of the cavities, or of the orifices and valves of the heart; morbid states of the urinary functions and passages; hypochondriasis, and a morbid concentration of the attention upon the various changes and states of sensibility or of disorder, thereby aggravating these forms; melancholia attended by various delusions, by unfounded fears, and a state of mental misery; and, at last, complete prostration of the powers of both mind and body, in various forms of partial or general insanity, or of incomplete or complete palsy; this latter affection often commencing as partial paraplegia, and advancing to incomplete general palsy of motion, the movements resembling those of chorea, and ultimately terminating in complete general palsy, with marked disorder of the urinary secretion and excretion.

11. *c.* During the progress of the ills which self-pollution entails, the digestive and the assimilating functions suffer more or less; the amount of disorder which these betray, varying with the advantages enjoyed as respects food, air, exercise,

and sleeping arrangements. But, generally, these functions and nutrition languish remarkably; and the bowels become habitually, sometimes obstinately, costive. Amongst the most certain signs of self-pollution, especially in males, is premature baldness; but it should be admitted that it not unfrequently is also produced by low fevers as well as by venereal excesses. Abuses of the sexual organs are soon followed, not only by one or more of the maladies enumerated and by constitutional exhaustion, but also by more or less disorder and debility of these organs themselves, frequently amounting to temporary impotence and sterility. The frequent and unnatural excitement of these organs occasions an increased secretion of the prostatic fluid, and often, also, acute or chronic inflammation and enlargement of the prostate gland, and all the usual consequences; increased susceptibility and impaired or exhausted function of the virile organs; irritation of the seminal passages, and ultimately involuntary emissions, and wasting of the testes.

12. *d.* The mischief is seldom so rapidly manifested in the female as in the male; unless the practice commence before the full evolution of puberty. After this period, however, the evils which result depend much upon the frequency of the habit; but these vary accordingly, the state of the constitution, temperament, and predisposition, also, modifying the effects. These effects have already been enumerated; but they either cause, or are connected with sterility, which is generally owing to the changes produced in the ovaria by excessive, frequent, and unnatural excitement, and sometimes, also, in the uterus and Fallopian tubes. Independently of changes in the ovaria and tubes, and often antecedent to these, leucorrhœa is frequently present, and is sometimes followed by ulcerations of the os uteri, and numerous sympathetic ills which this state, in connection with irritation of the ovaria and uterus, generally entails. The occurrence of ulceration, and the aggravation of it, are remarkably favoured by the means too frequently and officiously resorted to in ascertaining the nature of the uterine disorder; for, by these means, the access of air to the seat of irritation, oftener increases the mischief than the remedies prescribed tend to allay it.

13. *e.* The *evil consequences* of self-pollution are, however, not confined to the individual; but, as already stated, *are transmitted to the offspring*, when the effects have not been such, as to kind and degree, as to prevent procreation. But when the constitutional powers, and more especially the sexual organs, of either sex are much weakened by this vice, either sterility is the consequence, or the offspring is delicate, puny, decrepit, or the subject of various congenital maladies, especially of the nervous system — to idiotcy from deficient development of the brain, to hydrocephalus, to epilepsy, convulsions, palsy. The scrofulous diathesis, tubercular and glandular maladies, diseases of the vertebræ and of the joints, hydrocephalus, softening of the central portions of the brain, and tubercular formations in the membranes, palsy and convulsions, chorea, inflammations of the membranes or substance of the brain or of the spinal cord, and numerous other affections to which delicate infants and children are liable, very commonly result from self-pollution having been practised by either of the parents, previously to the married state. But the evil does not alwa
stop at this epoch of existence; it often exter
throughout the life of the offspring; or it appe
only with puberty and mature age. The seve
diseases actually proceeding from tubercular
posits; insanity, or mental weakness, or imbecilit
pulmonary consumption, chronic debility,
faulty or impaired development of the fram
diseases of the spine and joints; hysterical a
neuralgic affections, epilepsy, and irregular for
of convulsion, partial or complete states of pal
and various other affections, not unfrequently
pear, in consequence of the constitutional p
disposition arising from the vice of the parent, a
the faulty development and impaired nerv
energy of the offspring.

II. Involuntary Pollutions. — Synon.
Involuntary discharges of spermatic fluid.
Sphermatorrhœa. — Involuntary seminal
charges.

14. *A.* This form of pollution is of very frequ
occurrence, and generally follows the foregoi
When self-pollution has been practised at
early age, or so frequently as to induce debili
or an irritable state of the sexual organs,
voluntary discharges of spermatic fluid
often—indeed generally—the consequences of
relinquishment, or even of a temporary cessat
of the voluntary acts. It has been believ
since the appearance of M. Lallemand's w
on this disease, and of Mr. B. Phillips's excell
papers on the same subject, that these dischar
"are for the most part, if not altogether, caused
irritation set up in or about the ducts connect
with the testicle," especially at the termination
the seminal ducts in the urethra. Such is, dou
less, the case in many instances; but it is mu
more generally only a part of the mischief;
whole genital apparatus, more particularly
seminal ducts and vesicles, the ejaculator musc
and the prostate gland, having acquired, from
vicious practice above exposed, an irritability a
susceptibility beyond the control of the individu
This practice is the chief cause of this morbid c
dition — of this often serious disease, which, if
corrected, generally induces other maladies,
though when it is only of occasional occurren
in robust persons, it is sometimes productive
little injury. Yet self-pollution is not the o
cause. The next to it in importance are exces
in sexual intercourse; the constant excitement
the sexual organs ending in a morbid susceptibili
debility, and irritability of the whole sexual ap
ratus, manifested especially by the parts just nam
Gonorrhœa, gleets, discharges, and strictures
the urethra are also, although much more rare
concerned in the production of this disorder. T
irritation of ascarides in the rectum, of hæm
rhoids, of fissures of the anus, &c. has also be
considered as one of the causes of these d
charges; but I suspect that these morbid sta
are more frequently associated effects of the sa
causes, — of masturbation and sexual excesses,
than the actual occasion of the seminal emissio
even in those cases in which they co-exist. Ho
ever, whether the irritation of the rectum b
cause or a complication of the disorder now bei
considered, is practically of the less importan
that in either case it equally requires to be remov
by suitable treatment.

15. *B. The evidence of involuntary sperma*

diarges is, as Mr. Phillips correctly remarks, siciently clear; but ultimately, and as the weakn of the organs increases, the ejaculation is unatnded by the usual sensations, and the patient m then be unaware of the extent of the evil. Its not unusual, in such far-advanced cases, to fi the spermatic fluid passed with the urine, or ding efforts at stool, especially when the bowels arcostive. In the latter circumstances, the fluid is queezed out by the pressure on the seminal vecles. The patient is, however, generally awre of the evil, when the fluid is passed with th urine; because it almost always passes with the la drops, and can then be detected, and is atteed by a certain sensation about the neck of th bladder. When the urine is examined soon af it is passed, small granular diaphanous partis are found floating in it, or at the bottom of th vessel. Mr. Phillips states, that when the ev is far advanced, no peculiar sensation is expeenced, and the granular matter may be undected, or may assume a more uniform cloudy apearance. The microscope most certainly detes the seminal fluid in the urine; for by its mns the spermatic animalcules may be perceived in e deposit or cloudy portion of the urine. As dlity of the constitution or of the sexual orgs increases, owing to the great frequency of th discharges, or to other causes, "the fluid becoes thinner, and the animalcules much less nuerous, and they may be almost if not altogether wting."

6. C. *The general symptoms or consequences* of inluntary pollutions are necessarily, in most respts, the same as I have above stated with refence to self-pollution, for as the involuntary is gerally caused by, or is a sequela of, the volunta discharges, the results, as respect both mind a body, will generally be the same. One of the m distressing of these to the mind of the patient is state approaching, if not actually amounting to npotency. In some cases, the impotency is owg more to the fears and anxieties of the suffe, than to the physical state of the organs. Mr. Pllips has described this complaint so well, that I ll adopt nearly his own words. It is not that th seminal fluid is deteriorated, or incapable of dermining fœcundation, but it is that the orga are wanting in the energy necessary for projeng the fluid into the vagina; erection, if it exs at all, being momentary. The digestive futions become deranged, the bowels constipad, nutrition languishes, respiration is troubled, th voice fails, the heart's action is interfered with, ev to such an extent as to induce belief of acal disease of that organ, and hypochondriasis bomes complete. These symptoms do not advace far without causing disorder of the nervous syem, especially weakness, or failure of one or me of the senses; headach, with a sense of wght or pressure, loss of memory, timidity, appension, and various other affections and diases, either similar to, or identical with, those alady mentioned (§§ 9 *et seq.*).

7. But the impotency which distresses the pent is not so often imaginary as it is real. T frequent seminal emissions are followed by a tner and less fully elaborated secretion, with a mbidly increased prostatic fluid; and the imperfe and momentary erections, and the rapid emissis, are insufficient to excite the female orgasm requisite to procreation in most cases, or at least to a healthy impregnation and offspring. The impotency, however, is not the only evil; for it soon becomes associated with others if the seminal discharges continue, most generally with epileptic or convulsive affections, with palsy, with pulmonary consumption, with mental delusions, or general insanity, with distaste of life, and thoughts of, or attempts at suicide, or with some other of the various maladies which I have already shown to follow frequent self-pollutions (§§ 9 *et seq.*).

18. III. Treatment. — i. *Of self-pollution.* — It is obvious, that treatment must necessarily fail, or at best only lessen the ill consequences, as long as this vice continues to be practised. It should, however, be recollected, that it is not only most necessary that this vice, in all its moral and physical consequences, ought to be exposed to the patient, and the entire relinquishment of it insisted upon, but that those who have, or ought to have, control over him or her, should ascertain whether, or not, the prohibition be strictly observed; for the control of reason generally becomes so weak in these persons, as to be quite insufficient to restrain those impulses which the occasions mentioned above (§§ 4—6.) too frequently favour or excite. It should not be overlooked that physical conditions and local irritations are often the causes of many of our most uncontrollable desires and passions; and that professional inquiries ought to be directed to the state of those organs, which, not only are influenced by these desires, but which instinctively excite the desires themselves, independently of reason and volition. There can be no doubt, as I have above stated, (§ 4.) that the occurrence of this vice is remarkably favoured by the physical condition of the male genitals, especially as regards the neglect of circumcision. I am convinced, that the abrogation of this rite among Christians has been injurious to them, in religious, in moral, in physical, and in sanitory and constitutional points of view, — that circumcision is a most salutary rite, as respects not only the individual, but also the female whom he marries, and his offspring. He who devotes himself to self-pollution — to this modern Moloch of the species, — should duly consider the severe denunciations and punishments which it provoked from the Jewish legislator, and observe its enervating effects upon himself, both mentally and bodily.

19. It is necessary, not only to procure a complete relinquishment of this vice, but also to restore the several functions — sexual, digestive and assimilative, nervous and mental — to their healthy conditions. As the manifestations of these several functions are more or less debilitated by this vice, the advice which I have given at full length in the article Debility (§§ 29 *et seq.*) should be adopted and strictly followed in all its various details. Tonics, suited to the peculiarities of the case, ought to be prescribed, especially the chalybeate tonics and mineral waters; and these should be aided by residence in a healthy air, by regular exercise, by full occupation, and by early rising. The patient should get out of bed instantly upon awaking in the morning, and have recourse, either to a shower-bath, or to the cold douche, or to the affusion on the loins or genitals of sea-water, or water in which salt has been dissolved being preferred. He should sleep on a hair mat-

tress, and not be allowed a longer period than seven hours for repose. If he or she be much weakened, two or three hours rest on a sofa may be allowed in the middle of the day, but sleep ought not to be permitted, as it must be reserved until bed-time. The diet should be sufficiently nourishing without being heating or stimulating; and the amusements and the reading be such as will not excite sexual desires. The mind, as well as the body, ought to be fully, agreeably, and profitably occupied, without inducing more fatigue than will favour sound sleep during the hours devoted to repose.

20. During the course of this treatment, the digestive functions should be duly promoted and the bowels regulated. Costiveness will be best prevented by means of stomachic aperients, as the compound infusions of gentian and senna conjoined, taken either early in the morning or at bed-time; and the impaired tone of the sexual organs and nervous system will be the most certainly remedied by the tincture of the sesquichloride of iron, with tincture or infusion of calumba, &c.; or by the sulphates of iron and quinine with the compound galbanum pill, or a vegetable extract; or by the iodide of iron in the syrup of sarsaparilla, or by such other preparations of iron and their combinations as the peculiarities and complications of the case will suggest. In many instances, and more especially in those which manifest a tendency to pulmonary disease, to disordered action of the heart, or to nervous headaches and affections, the mistura ferri composita will prove an excellent remedy; and, if there be any tendency to glandular or tubercular disease, the liquor potassæ and tincture or extract of conium may be added, or the iodide of iron or the iodide of potassium may be substituted. When self-pollution has been early or long practised, the consequent states of anæmia and of nervous exhaustion require either an immediate recourse to chalybeates, or the adoption of them after vegetable bitters and tonics have been taken for a few days with alkaline carbonates, or with the mineral acids, according to the peculiarities of the case. — (*See further the Treatment advised in the Article* DEBILITY, §§ 29 *et seq.*)

21. *B. Involuntary Pollutions*, or *Spermatorrhœa*, generally originating in self-pollution, or in venereal excesses, require the same means as have been just advised. But these may not suffice to prevent the occasional or even the frequent recurrence of involuntary pollutions; for, although the *voluntary* emissions are discontinued, the *involuntary* may replace them in some form or other. LALLEMAND, PHILLIPS, and others, have shown that the passage of a bougie armed with lunar caustic, down to the seat of irritation, at or about the mouths of the seminal ducts, will remove this often distressing complaint. The application of the caustic is made by means of LALLEMAND's instrument, which conceals the caustic until it has arrived at the seat of pain, which is usually a little in front of the prostate, and a little more than six inches from the orifice of the urethra. When the instrument has reached this point, then the caustic is uncovered, and that portion of the urethra brushed over with it. As soon as this has been done, the caustic is again covered and the instrument is withdrawn. This application occasions little uneasiness; with slight smarting upon pass-
ing the urine, and a discharge, which is sometim
considerable, and at first is thin and watery,
gradually becomes thicker, and in the course o
few days ceases. A feeling of improvement
stated by Mr. PHILLIPS to be early manifest
most instances, but the effect of the remedy ca
not be estimated until the irritation has subsid
If by the end of six weeks, he remarks, from
application, a very decided amendment, or a cu
be not produced, it may be concluded, either t
an insufficient application of the caustic has b
made, or that the fatal habit of self-pollution
still persisted in. He has more than once appl
too little, but he has never had to accuse him
of having applied too much. In any case a seco
application is indicated when the desired effec
not obtained from the first. He has never
occasion to make more than two applications,
circumstances might render a further recourse
the remedy proper.

22. If the affection have been caused by
flammation of the urethra — by gonorrhœa or
gleet, or if it be consequent upon stricture, it
cease upon the removal of the primary dise
But if this result be not procured, then LAL-
MAND's treatment ought to be tried. When th
is stricture then the mechanical obstacle ough
be removed before this treatment is employ
but the existence of gleet need not prevent its
mediate adoption. Mr. PHILLIPS states, that
has scarcely ever had recourse to a second
plication until five or six weeks have passed
given the assurance that the first has been in
ficient. Of 109 cases, 84 were under twenty-
years of age; 97 admitted that they had pract
masturbation, and they referred this complain
that cause. Every one, however, asserted that
habit had been discontinued — by some for a
months, by others for years; but in many case
suspected the accuracy of the assertion.

23. I have been consulted by a number
persons of various ages, from seventeen or ei
teen up to between fifty and sixty, who have b
subject to this complaint. The most common
was from twenty to thirty-five; but almost
every case abuse of the sexual organs was
fessed. In several instances the patient was
ried, and, in the majority of these, there was
family. Some of the patients were widow
One gentleman, aged about fifty, married, for
or twelve years, to a young and healthy wom
and has had no family, was addicted to
pollution when young; but being of a rol
constitution, and indulging in field-sports, he
not appear to have suffered. When he consu
me, he was liable to frequent involuntary
charges, and sometimes to two in one night,
although he may have had intercourse with
wife soon after going to bed. This, and sim
cases, have shown that marriage, which will p
a cure of the complaint in many instances,
not always prevent its occurrence, or remov
when it depends upon chronic irritation of
mouths of the seminal ducts, and upon conges
and enlargement of the prostate gland, t
morbid conditions co-existing in that case, but
it may even induce this disorder, and associated
ease of the prostate, if sexual intercourse be
frequently indulged in.

24. In young and otherwise healthy pers
when the complaint has not occasioned com

otency, although the patient may fear the stence of this state, or dread the accession of loss of all sexual power, marriage will gene- y bring about the healthy state of the sexual ans, if they be very moderately and regularly rcised at the promptings of sincere affection connection with sexual desire. But it is always ferable that the complaint should be removed ore the married life is commenced; and it uld be imperative, when impotency more or complete exists in consequence of voluntary, l its sequent, involuntary pollutions, that this e should not be entered upon until the sexual vers are restored. When involuntary pollutions complicated with enlargement, congestion, or ammations of the prostate gland, or with gleets, ctures, or affections of the rectum, these must altogether removed before marriage is advised; l in no case ought it to take place where the tes are soft and wasted, and the spermatic veins icose, these lesions being often consequent on, and associated with, the impotency following untary or involuntary pollutions.

25. Although Lallemand's treatment is very quently successful, especially in the cases where itation exists about the mouths of the seminal cts, and in such as the one now mentioned, en it occurs in the married state, or is caused venereal excesses, yet several cases have come der my care in which it had failed in the hands expert surgeons; and the difficult task was im- sed of removing, by strictly medical treatment, at surgical means aided by medicine had failed remove. In most of such obstinate cases, the re or alleviation of the complaint depends much on the patient himself; for it is not alone suf- ient that he has relinquished the vice in which evil originated; but it is also requisite that should so regulate the state of his feelings d passions — so direct his mind, as not to en- urage sexual desires, and not to contemplate disgusting consequences, as either kind of ntal rumination will only increase the evil. It ll generally be far preferable for the patient to omote his general health and strength by regular ing and by regular and sufficient occupation, ntal and bodily, avoiding fatigue and *ennui*; to gulate and promote the several digestive and similating processes; to increase the tone of e sexual organs by the means suggested above § 19, 20), and to proceed patiently for a time in s course, without injuriously exciting his ima- nation and desires, and as injuriously directing s attention to the disorder. During a life of libacy, the discharge may occasionally occur thout material injury; and as long as it is not oductive of debility, of pains in the back and ins, or weakness of the limbs and joints, or other sorder, and does not recur often — or more fre- ently than once in ten days or a fortnight, the jury done to the constitution will not be great.

26. It has been supposed by some physicians, at the occasional occurrence of involuntary nissions must necessarily occur to a man who is rfectly continent. This is certainly the case ry generally, if the individual have devoted mself to self-pollution in early life, or been arried, or been addicted to sexual intercourse, d has afterwards become continent; but a rson who has lived chastely during puberty d subsequent manhood, and occupied his mind and body rationally and usefully, without indulging prurient ideas, may pass these, the most likely epochs of life to be subject to this complaint, without experiencing it. The seminal fluid is secreted nevertheless, collects in the seminal vesicles, but, as the susceptibility of these parts and of their associated organs is neither weakened by abuse, nor inordinately increased, nor unnaturally excited so as to produce the venereal orgasm, no anormal discharge of it takes place, although the vesicles continue charged, absorption of the secretion taking place co-ordinately with its elaboration; and thus, instead of proving *excrementitious* and weakening the frame by its absence or loss, it is actually *recrementitious*, and promotes nervous power, the cerebral manifestations, and all the organic and assimilative functions.

27. In young persons, especially those who indulge prurient ideas, or have devoted themselves to weakening self-pollutions or venereal excesses, the constant or frequent desire excites the sexual organs, distends the seminal vesicles, and augments the prostatic secretion, so that the simple contractions of the sphincters after fæcal or urinary evacuations, or the passage of hardened fæces, press out a portion of the contained fluids, which is partly at least seminal, as shown by the presence of spermatozoa, and partly prostatic, mixed with the last drops of urine from the membranous part of the urethra, when passed after micturition. In this class of cases the disorder ceases upon a due regulation of the mind, of the feelings, emotions, &c.; and after the mind and body are duly and healthily employed. For these, especially when no disease of the prostate gland is present and the testes are quite natural, marriage may be safely advised. Although the patient may suppose himself almost impotent owing to the prevalence of the discharge; and may actually be so for a time from his fears, or the impression on his mind that he will be found incapable, yet after marriage his fears subside, his powers return; and no longer is any sexual deficiency or disorder complained of.

28. It is often necessary, both as respects the mind of the patient and as to his scruples respecting marriage in his existing state, that medical treatment should be adopted, and some amendment procured, before this state is entered upon, or even without reference to this state. If the means and regimen above advised (§§ 19. *et seq.*) fail after a due trial, other remedies should be prescribed. The muriated tincture of iron is usually recommended with the tinctura cythe; but they often fail; and in many cases the latter tincture is not appropriate. I have often given the former with the compound tincture of camphor and the infusion or tincture of calumba, and sometimes with decided benefit. When, however, there is pain or heat about the anus, with uneasiness or fulness in the perinæum, or any indication furnished by the excretion of urine or of fæces, of irritation about the seminal ducts or prostate gland, or congestion of the latter, or any affection of the rectum, then local depletions from the perinæum and anus, soothing and gently aperient clysters, and much of the treatment I have advised for inflammation of the prostate gland, should be adopted. I some time ago attended a case of successive self-pollution, involuntary seminal discharges and retention of urine,

in which I had the excellent aid of Mr. Fergusson. In this case there was superinduced, at an early age, enlargement of the prostate, spasmodic stricture of the urethra, mental weakness, and, as often seen in similar cases, the most cowardly fears of the introduction of a bougie. The nature of the complications, the habits of the patient, and his defective self-control, rendered both medical and surgical treatment only partially successful. In the simpler cases, and where debility and susceptibility of the parts are the chief causes of the complaint, the tonics and stimulants already mentioned, the tincture of iodine in small and very gradually increased doses, the iodide of iron; a cautious trial of powdered nux vomica or its extract or tincture, or of strychnia, or of stramonium; a recourse to blisters over the perinæum or over the sacrum; the application of the emplastrum thuris compositum over the loins; and various other restorative remedies, may be severally advised.

29. If the complaint be associated with ascarides in the rectum, or with hæmorrhoids or other disorders of the rectum, these complications should be removed by the treatment appropriate to them. Pills containing the sulphate of iron, camphor, and assafœtida may be taken, and afterwards oleaginous clysters with salt, camphor, and assafœtida may be occasionally administered for the removal of worms; and associated disease of the *prostate gland* and *hæmorrhoids* should be treated as recommended under these heads.

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POMPHOLYX.—See Pemphigus.

PORRIGO.—See Tinea.

PREGNANCY. — The Pathological and Therapeutical Relations of. — Disorders incidental to Pregnancy.

Classif. — General Pathology. — *Semeiology.* — General Therapeutics.

1. A change is produced in the uterine organs
by impregnation, which affects, sympathetically, t
female constitution variously, according to te
perament, diathesis, habit of body, predispositic
and age. The more constant and slight chang
may be viewed as *physiological*, or as the natu
and healthy consequences of the new action i
parted to the uterine organs; those which a
characterised by more or less derangement
function, may be, with equal justice, consider
as *pathological*. But there are other conside
tions, besides these which relate to the physiolo
cal and pathological relations of pregnancy, tl
will engage the mind of the physician when he
required to treat these disorders, to which pr
nancy may predispose, or which it may more
rectly occasion; and these considerations ha
strict reference, not only to the treatment requi
in the particular circumstances of the case, but a
to the effects which such treatment may produ
upon the state and progress of utero-gestati
Moreover, the pregnant female is not only lia
to certain disorders, incident to this state, but a
to others, in common with the species — to ot
maladies which attack all exposed to their caus
Even in the course of several chronic diseas
pregnancy may take place, with or without m
dification or change of that progress and ter
nation; and thus, the pregnant state is m
important in respect of the course, termination a
treatment of diseases which occur during
course, as well as of those which had previou
existed. The propriety, therefore, of devot
due consideration to the subject cannot be
puted. I have, however, to regret, that my lin
admit only of a very succinct account of
several topics which the subject comprises.

2. I. The Local and Sympathetic Chan
consequent upon Pregnancy. — Impregnat
induces a remarkable change in the state
the uterine organs. The nerves with which th
organs are supplied experience a more contin
state of excitement, and probably even an
creased development. The blood vessels a
lymphatics increase in size, and their actions
augmented; and whilst these organs becor
generally, more vascular and more excitable,
uterus itself augments in volume with the progr
of the contained embryo. The ganglia and pl
uses, supplying the sexual organs are intimat
associated, as I have shown in the article Sy
pathy, and in the Croonian Lectures (p
lished in the Medical Gazette, vol. xl.) by me
of communicating branches of nerves, with
other ganglial and sympathetic nerves, and w
the spinal cord and its nerves, both sens
and motory, — with, in fact, the ganglial and
cerebro-spinal nervous systems, from both wh
these organs derive their energies, and upon,
well as through the media of, these systems, tl
produce their numerous and varied sympath
That the uterine nerves, plexuses, and ganglia
perience, with the development of the ovum
the uterus and of the uterine vessels, an augm
tation of their size, was an opinion entertained
W. Hunter, and subsequently confirmed
Tiedemann and R. Lee. With this remarka
increase of vital action, and of material or str
tural development of all the constituent tis
of the organ, a more exalted degree of sensibi
is imparted, through the media of the organic
cerebro-spinal nervous systems, to the wh

ame, which thus participates, more or less, in ie excitement and vital activity of the uterus.

3. When it is considered, that during preg- ancy, the uterus, and consequently its consti- ient tissues, are undergoing a process of de- elopment, which Dr. Montgomery has shown amount, at the full period of utero-gestation, 519 times its virgin capacity, and to twelve mes its solid substance, it cannot be a matter surprise, that so remarkable a change should e attended by numerous sympathetic pheno- ena, and that this organ, having become the entre of most important vital actions, should also e the source of various influences and derange- ients, manifested both by adjoining and by re- iote parts, during the progress of that change id of the development of the embryo with which is associated. The remarkable increase of the inctions of assimilation, circulation, and nu- ition observed to follow the appearance of pu- erty, is often exceeded during pregnancy; the xcitement of the uterine functions, tending even iore remarkably, than the first evolution of these inctions, to develope all the vital actions and ianifestations — to increase the general sensi- ility and susceptibility, to augment vascular ful- ess and plethora, and to promote the several se- retions and excretions, excepting that excretion irnished by the uterus itself. As consequences f these sympathetic changes, and of various pre- ispositions depending upon temperament, diathe- s, habit of body, and previous disorder, nu- ierous ailments arise in the course of pregnancy, s well as others which this state is not concerned producing.

4. Other disorders also occur in the progress f pregnancy, which depend, more or less, upon ie mechanical influence which the increased size f the uterus exercises upon the adjoining viscera, nd probably also upon sympathetic excite- ient, or upon irritation, caused by vascular de- ermination to this organ. As the uterus enlarges, vithin the pelvis, the rectum, neck of the bladder nd urethra experience increased pressure, and ome disorder of the functions of excretion is often hereby produced, with pain in the back, and arious sympathetic affections of a transient or arying character. As the uterus enlarges further nd rises above the brim of the pelvis, the urinary ladder is often pressed upon so as to diminish its apacity, and to occasion frequent calls to pass irine, or even some degree of incontinence of urine. When the womb has nearly, or altogether acquired its utmost size, the mechanical effects produced by it may not be limited to the abdominal viscera, but may extend to the thoracic cavity, occasioning thus disorder of the functions of one, or of several organs. The stomach, duodenum, biliary organs, kidneys and colon, have their functions impeded or disordered; and indigestion, jaundice, constipation, and pains in the back and loins, and changes in the state of the urine are often complained of. The mechanical disturbance extends upwards, the diaphragm being pressed so high as to diminish the thoracic cavities, and to disturb the functions of the lungs and sometimes also of the heart, occasioning dyspnœa, short breathing on slight exertion, and embarrassed circulation through the cavities of the heart. The pressure also upon the veins and absorbents within the pelvis occasions a varicose state of these vessels, œdema, pains of the limbs, numbness, or neuralgic affections. In some cases, especially in females having a small pelvis or abdomen, or who have borne several children, the muscular and integumental parietes become relaxed or pendulous, admitting of mal-positions of the uterus.

5. II. Affections of the Uterine and Genital Organs and of the Mammæ, caused by Pregnancy. — Disorders of related Parts. — i. Œdema of the Labia Vulvæ occurs chiefly in females far advanced in pregnancy, — during the 7th, 8th, and 9th months. It disappears immediately after delivery, and is caused chiefly by the pressure of the gravid uterus, especially when descending into a large pelvis. It is much augmented by a sitting or standing posture, and is characterised by a tense colourless swelling, of equable density, often pitting on pressure, and by absence of throbbing and of increased heat. The œdematous labia may be attacked with erysipelas, shortly before or after delivery, and the utmost danger, or even death may result; or they may be the seat of simple excoriations.

6. *Treatment.* — A mild aperient, repeated occasionally, the recumbent position, and bathing the parts with a suitable lotion, will generally remove the affection. In some instances, diuretics may be necessary: or even puncturing the œdematous parts, so as to allow the discharge of the fluid. If inflammation or erysipelas occur, the treatment should depend upon the peculiar features and circumstances of the case.

7. ii. Pruritus of the Vulvæ.—This is often a very troublesome affection, and frequently connected with a leucorrhœal discharge, or with an aphthous state of the vulva and lower part of the vagina, or with a state resembling an eruption of small papulæ. It is generally referable to the active vascular determination to the sexual organs, consequent upon impregnation.

8. *Treatment.* — Lotions of acetate of lead, or of nitrate of silver have usually been prescribed for this affection. I have generally added a little vinum opii to these. Lotions, consisting only of tar-water will generally prove efficacious. In the summer of 1826 I was consulted by a surgeon in an obstinate case, for which the usual means had been employed. I advised a saturated solution of borax in rose-water; and this proved successful. Since that time I have generally prescribed this substance for similar cases. Dr. Churchill states, that a decidedly antiphlogistic treatment may sometimes be required — as venesection, leeches applied to the vulva, and one or two smart purgatives.

9. iii. Leucorrhœa is generally caused by the increased determination of blood to the uterine organs during pregnancy, and probably, also, in part, by the pressure of the gravid uterus. It sometimes occasions great debility, and increases the aching of the back often complained of during pregnancy. It may, when excessive in the early months, cause abortion; but, at an advanced period, it is not very injurious, otherwise than by producing or increasing debility.

10. *Treatment.* — The propriety of removing or suppressing this discharge ought to be considered before any treatment is ordered for it. In many cases, the inconvenience is not so great as to require treatment. But, in some instances, the discharge is so exhausting as to require to be

moderated, if not altogether arrested. To strong, plethoric females, and where the disorder proceeds from active determination of blood to the uterine organs, a moderate venesection and cooling aperients will prove beneficial. In weak or delicate females, and when the digestive organs are disordered, the bitter infusions, as those of cheyreita or of calumba, with small doses of the muriated tincture of iron, or with a mineral acid, will be of service. If the discharge occur in connection with any pulmonary affection, it may be moderated by internal remedies; but it should not be arrested by powerful astringents. (See art. Leucorrhœa.)

11. iv. Menstruation during Pregnancy, or rather a periodical discharge of a sanguineous fluid from the vagina, have been occasionally observed. This discharge may occur once or oftener during utero-gestation, and after irregular intervals, but it most frequently takes place at the menstrual periods, and, in some instances, it returns for three, four, five, or six months, or even for the whole period of pregnancy. Drs. Denman and Hamilton have doubted the occurrence of these discharges, a scepticism the more remarkable considering the great experience of these physicians, and the frequency of the phenomenon according to the observation of very eminent practitioners. Although I have never been engaged in the practice of midwifery, yet I have been consulted in two cases, in which this discharge was stated to have occurred regularly during four or five successive menstrual periods; and not in one pregnancy only, but in each of several occasions of utero-gestation. Neither of these patients had ever had an abortion. The discharge was represented to have continued from three to four days, to have become paler than usual after the second day, and to have passed into a moderate leucorrhœa. It does not appear to be attended with any inconvenience to the patient, beyond increased aching of the back and loins. The growth of the child is not affected by it; although, judging from the instances which I have seen, the constitution is rendered more delicate; so that the aphorism of Hippocrates, "that the children of women who menstruate during pregnancy cannot be healthy," appears partly true. The discharge probably proceeds from the vessels of the cervix uteri and vagina, in consequence of the more than usual vascular determination to the uterine organs during pregnancy, the periodic recurrence being the consequence either of ovarian excitement and influence, or of habit.

12. *Treatment*, in most instances, is unnecessary, or nearly so. In one of the two cases which I have alluded to, the lady who was its subject had four children, and this discharge occurred during each pregnancy. Nothing beyond the recumbent posture, and quietude as long as the discharge continued, was prescribed. Three of the four children are living and well, but are of delicate constitutions. Hippocrates advises cupping over the mammæ, and Mauriceau bleeding from the arm. Neither of the cases which I saw required any depletion.

13. v. Watery Discharges from the Vagina have caused some discussion as to their source or sources. The fluid has been referred to the glands of the cervix uteri, but they cannot be supposed capable of furnishing so abundant and so clear a fluid; although these glands and those of the vagina often furnish a copious mucous secretion. The fluid is more probably collected between the amnion and chorion, or between the chorion and decidua, and evacuated during the advanced stage of pregnancy, or some time before the commencement of labour. In rare instances, the fluid may be actually the liquor amnii. Dr. Burns remarks, that he has known cases where a considerable discharge of water has taken place after fright o exertion, with subsidence of the abdominal tumour, a feeling of slackness, and irregular pains and yet the woman has gone to the full time. Other writers have made the same observation Dr. Davis mentions these discharges, especiall when they occur "in dribbling quantities week or months before labour," as indicative of grea consequent danger. But in this, other authors d not quite agree with him. The source of the flui can be inferred only from the quantity and th recurrence of the discharge, and the effect produced upon the abdominal tumour. If the discharge be great, sudden, and affecting the tumour it may be referred to the escape of the liquo amnii. If it be gradual, small in quantity, an does not affect the abdominal tumour, it may proceed from the other sources pointed out.

14. The *treatment* consists in keeping the patient dry, clean, and perfectly quiet. An anodyn may be given as circumstances may suggest recourse to it; and the bowels kept gently ope by cooling aperients. Injections *per vaginam* similar to those advised for *leucorrhœa*, have bee recommended, but they are of doubtful efficacy all perturbations, whether mental, physical, o medical, being much more injurious than beneficial.

15. vi. Dropsy of the Amnion. — See art Dropsy, § 113. *et seq.*

16. vii. Rheumatism and Spasm of th Uterus have been described chiefly by Germa and French pathologists. Rheumatism may attack the uterus, as well as other fibrous structures, although much less frequently than thos of more superficial or external parts.—It is *characterised* by severe pain, increased on motio and the contraction of the abdominal muscles by augmented sensibility and tenderness; and b symptomatic fever and restlessness.—*a.* It is *cause* by cold, currents of cold air, and the usual cause of rheumatism acting upon a rheumatic diathesis Velten states that it was observed during a epidemic of rheumatism; and Wigand, Joerg and others, that it was caused by the projection c the clothes, during advanced pregnancy, by th enlarged abdomen, producing exposure of th lower part of the body. It may occur at an period of gestation, but is much more frequen in the latter months. The slighter states of it ar very probably, as Dr. Churchill suggests, wha have commonly been called "false pains."

17. *b. Symptoms.* —The milder attacks consis chiefly of shooting pains in the region of th uterus, occurring at intervals, and either limite to a small space, or affecting the organ mor generally. The severer attacks occur often suddenly, and without any apparent cause; are attended by violent pain in the region of the uteru the duration and the character of the sufferin distinguishing them from the commencement c labour, even although there may be distinct con

tractions of the uterus, and slight dilatation of the os uteri. In the milder forms there is little or no constitutional disturbance; but the more severe are attended by quickened pulse, hot skin, sleeplessness, and restlessness. Rheumatism of the uterus is generally accompanied with spasm, or irregular contraction of the organ, which is sometimes extended to the lower limbs. The irritation is occasionally also propagated to the bladder, causing frequent and painful micturition, and to the bowels, occasioning colic, tenesmus, or diarrhœa. " The motions of the child are a source of great torment, owing to the increased sensibility of the womb; and from some sympathy with the mother, it not infrequently happens that these motions are peculiarly lively."

18. When the affection occurs during parturition, WIGAND, DEZEIMERIS, and CHURCHILL state that the natural pains are arrested, or become tedious, ineffective, sudden or interrupted, and more distressing than usual. The patient is hot, thirsty, and irritable, or restless; the pulse being quick, and either full, soft, and undulating, or small and hard. The uterus is very tender, the weight of the bed-clothes occasioning much pain; and the cervix and os uteri are often tender and painful on examination. If the case be left to itself, the pains become weaker, or suspended for hours. If the patient falls into perspiration and sleep, the natural pains recur, and delivery is favourably terminated.—(CHURCHILL.)

19. *c.* The *diagnosis* between rheumatism and inflammation of the uterus consists in the more limited and continued pain of inflammation, and in the more sudden, spasmodic, and paroxysmal character of the pain of rheumatism. It is not improbable that some cases, occurring in the eighth or ninth months of pregnancy, are merely spasmodic paroxysms, or irregular contractions of the body of the organ, and not truly rheumatism affecting its structure.

20. *d.* The *prognosis* is generally favourable, when the patient comes early under treatment; but if she be neglected, abortion or premature labour may follow the continuance of the attack, and the repeated contractions of the uterus and spasm attending the complaint. Slight dilatation of the os uteri usually attends the period of severe suffering; but this part regains its natural state upon the subsidence of the attack. JOERG states, that the child is less frequently injured by rheumatism than by inflammation of the uterus.

21. *e.* The *treatment* consists of venesection varying in amount from six to twelve or sixteen ounces, when the patient is young, strong or plethoric, and when there is fever with a hard or full pulse; of sedatives and diaphoretics; and of anodyne enemata. Opium with ipecacuanha may be given at bed-time, or DOVER's powder; and after opening the bowels by a suitable aperient an emollient and anodyne clyster should be administered. An opium or belladonna plaster may be applied over the abdomen or loins; and diaphoretics should be administered at intervals conjoined with an opiate or some other narcotic. The warm embrocation containing spirits of turpentine, with a considerable proportion of the wine or tincture of opium, may be applied over the abdomen. If the attack occur at the commencement of parturition, this embrocation, without the opium, will generally prove efficacious. The bowels ought to be kept quietly open so as to prevent fæcal accumulations; and the diet duly regulated.

22. viii. INFLAMMATION OF THE PREGNANT UTERUS. — Inflammations of the womb in the unimpregnated state, and after delivery, are described in the articles UTERUS and PUERPERAL DISEASES. I have merely to notice such peculiarities as hysteritis presents during gestation. As may be anticipated from the physiological conditions of the uterus, inflammation attacks the impregnated organ more frequently than the unimpregnated, although less so than after delivery. — *a.* It is *caused* by exposures to cold, by injury, by concussions of the trunk, by the abuse of spirituous liquors, and by the extension of inflammation from adjoining parts. Hysteritis during pregnancy and after delivery, as observed in the metropolis, is chiefly caused by the abuse of spirituous liquors, more especially of gin. It is said to be most frequently observed in the sanguine and irritable temperaments, and scrofulous diathesis, and seldom to occupy the entire uterus unless in the very early months. In the latter months of pregnancy, it is more limited, affecting chiefly the lower portions or cervix. At earlier periods it is commonly seated in that part to which the placenta is attached. The inflammation is seated in the muscular structure, but the peritoneal coat may also be implicated; in which case partial or limited adhesions may form between the fundus or body of the uterus and adjoining parts, as I have observed in several instances.

23. *b. The symptoms* are a severe, constant or aching pain in some part of the abdominal tumor, increased upon pressure, upon sudden motion, walking or descending stairs quickly, and by the movements of the child. It often extends to the back and groins. Sometimes dysuria, or a frequent desire to pass urine, or tenesmus, or pain on going to stool, is complained of. More or less sympathetic disturbance is produced, especially heat of skin, quickened pulse, thirst, nausea or vomiting. " If the disease be very limited, the child may escape injury, and gestation be completed; but, if more extended, the fœtus will probably perish in utero, or be prematurely expelled." Unless the disease be completely removed, and the womb restored to a healthy condition, the consequences during parturition may be very serious. Dr. GASON informed Dr. CHURCHILL that, in three cases of inflammation of the womb during pregnancy, rupture took place during labour in the exact spot previously diseased. Dr. E. MURPHY states that most instances of rupture of the uterus may be traced to lesions either previously existing or produced by inflammation. The wife of a respectable tradesman, for whose family I was often consulted, complained of hysteritis at an advanced period of pregnancy. She had had several children, and her constitution was much injured by gin-drinking. She sunk almost instantly upon delivery from sudden and profuse flooding. Inspection of the body was not allowed.

24. *c.* Hysteritis during pregnancy may *terminate* — 1st. In resolution, the patient going her full time and being safely delivered: — 2d. In effusion of lymph and the firm adhesion of the placenta to the uterus: — 3d. In softening of the structure of the organ, favouring rupture or

dangerous or fatal hæmorrhage: — 4th. In the production of an abscess or small abscesses in the inflamed portion of the uterine parietes: — and, 5th. Even in gangrene, as described chiefly by the German writers on diseases of the uterus.

25. *d.* The *prognosis*, as shown by these terminations ought to be guarded, especially when the disease occurs in females addicted to the use of spirits, to whom it is frequently fatal in one of the ways now indicated.

26. *e.* The *treatment* should depend upon the habit of body, strength, and habits of the patient, and upon the extent and severity of the local symptoms and of the constitutional affection. Although the local suffering is generally less severe than in rheumatism of the womb, the constitutional disturbance is greater, and a more decided and prompt treatment is often required. In other respects the treatment is much the same as recommended for rheumatism of the organ. Local vascular depletions are generally beneficial; and calomel, camphor and opium are also of service. In other respects the treatment should be the same as advised for inflammation of the womb, in the other articles comprising it. (See UTERUS and PUERPERAL FEVERS.)

27. III. AFFECTIONS OCCURRING SYMPATHETICALLY DURING PREGNANCY.—The general systems and the more remote organs may experience more or less disorder in the course of pregnancy, arising either directly from the altered state of the uterus; or indirectly, as from fæcal accumulations in the large bowels, that are apt to form during the earlier periods of gestation.—i. THE DIGESTIVE ORGANS often experience more or less disorder. The slighter or less important of them may be only mentioned.—*A.* TOOTH-ACH is frequently complained of; but is owing to the common causes of the affection; for it is not usually felt when these causes have not existed before conception; pregnancy either directly or indirectly aggravating merely a pre-existing evil. The bowels generally require moderate but repeated doses of stomachic aperients, and afterwards anodynes, locally and internally, preparations of iron, narcotics and antispasmodics, &c. The question as to the propriety of extraction or of other painful operations for this complaint during pregnancy may be considered as set at rest by having recourse to æther or chloroform inhalation.

28. *B.* SALIVATION is sometimes troublesome; but it is rarely of great importance. It will generally be moderated or removed by a judicious use of stomachic or cooling aperients; by cooling and astringent gargles, and attention to the states of the gums and teeth. Rinsing the mouth often with tar-water, or with mucilaginous fluids containing creasote or spirits of turpentine, will generally be useful, and also benefit the teeth and gums. *Capricious or morbid appetite* is not infrequent during pregnancy; but this topic suggests nothing of any importance in addition to what I have stated in the article APPETITE. If, however, carried to an extreme, it may, as well as frights and violent mental perturbations, affect the development of the fœtus.

29. *C.* NAUSEA AND VOMITING generally occur at some period of gestation, — most frequently from the third to the sixth week after conception, although occasionally only a few days after this act; and sometimes not until the seventh or eighth months of gestation. At the earlier periods these symptoms are merely sympathetic. In the latter months they may in some measure be caused by the pressure of the uterus. — *a.* The patient usually finds her stomach uncomfortable on rising in the morning, and the discomfort soon amounts to nausea or vomiting. Whether the stomach be evacuated or not, the nausea ceases after a few minutes or within an hour; and, after some delay, breakfast is taken with the usual or good appetite, and without subsequent inconvenience. These attacks are renewed every morning for six weeks or two months, when they gradually subside. In some cases, vomiting does occur until a full meal is taken. It may also take place at any time of the day, or in the evening. Instead of gradually ceasing about the third or fourth month or after quickening, it occasionally continues during pregnancy, causing great distress and some risk. If carried beyond certain limits, it may occasion miscarriage. When vomiting follows a meal the constitution of the patient languishes from a want of due nourishment as well as from the continued irritation, the patient even sinking from inanition or exhaustion. Several instances of this issue are recorded in the works referred to in the *bibliography*. When the progress of pregnancy is arrested by the death of the fœtus, then the vomiting ceases spontaneously. Instances have occurred of an internal organ, the uterus, stomach, &c. having been ruptured by the violence of the vomiting. The matters thrown off the stomach may be thin, watery, glairy, colourless; or consist partly of bile, or of blood. In severe cases they are greenish or blackish, owing to an admixture of bile or an exudation of blood. The vomiting is generally attended by tenderness at the epigastrium, prostration of strength, a weak, small, quick pulse, constipated bowels, and sometimes a loaded tongue.

30. *b. The causes* of the serious cases of vomiting during pregnancy have not been duly investigated even by those physicians who believe themselves the sole depositories of the knowledge of female maladies. Writers on these maladies have not even shown whether or not this vomiting may not result from disease of the uterus or of the ovum; and they have not always attended to the existence of disease of the liver and biliary apparatus, or of the duodenum and pancreas, or of the stomach itself; or to the presence of scybala, or of irritating substances locked up in the cells of the colon. They even furnish no information as to the states of the kidneys or of the ovaria, — so little has a division of labour hitherto tended to advance this department of medical science. Cases, however, have occurred when dangerous or fatal vomiting has been caused chiefly by lesions seated as just stated, or by retained irritating matters, pregnancy merely developing and perpetuating a sympathetic disease, which in most of its morbid relations had previously existed, but had been latent, until it became aggravated or excited by the change in the uterine organs.

31. *c.* The *diagnosis* of vomiting should not be overlooked, with reference to its dependence or non-dependence on pregnancy. The chief circumstances indicative of its dependence on this cause, are its occurrence and daily recurrence in connection with the disappearance of the catamenia, the speedy return of appetite and of the

appearance of good health in the intervals, the changes apparent in the nipple, areolæ and in the mammæ, and the absence of any sign of disease of the stomach itself, or of any other organ.

32. *d. Treatment.*—In slight cases, and especially during the early months, little or no treatment is necessary; time will remove the disorder. But the bowels should always be kept gently open, as any accumulation in the large bowels aggravate the complaint. If nausea be distressing and unaccompanied with vomiting, an ipecacuanha emetic will often be of use, at an early period of gestation; and, after having evacuated the bowels, the infusion of calumba, or of cheyreita may be given. If the patient be very robust or plethoric, a moderate bleeding will be serviceable at the commencement; but at a later period, or when she is reduced by the duration of the disorder, it is inappropriate. Gentle, stomachic or cooling aperients, suited to the circumstances of the case, are generally beneficial. The most useful are, the confection of senna with magnesia; the infusions of calumba and of senna with tartrate of potash, with an aromatic spirit; the compound infusion of roses with sulphate of magnesia, a little dilute sulphuric acid, and tincture of orange peel; and, if the bowels are not much confined and the sickness more urgent, from a scruple to half a drachm of sulphate of magnesia with fifteen grains or a scruple of magnesia, and four or five drops of tincture of opium, in spear-mint water, taken once, twice, or thrice daily. In several cases, the nausea or the vomiting is aggravated or perpetuated by acidity, especially if flatulency is complained of. The infusion of calumba, with magnesia and ammonia, is then very beneficial. Small morsels of ice are sometimes of use.

33. In more severe cases, the application of embrocations over the stomach, or mustard poultices, or terebinthinate epithems, or blisters, may be resorted to. When the matters thrown off are acid, acrid, or attended by flatulent eructations, powdered charcoal, magnesia, ammonia, or other alkalies, are severally of use. The hydrocyanic acid may also be given; or creasote, either in pills or in mucilaginous mixtures. The several preparations of opium, or of morphia, conjoined with other medicines — either those already enumerated, or warm aromatics and spices, as capsicum, aromatic confection, &c. — are sometimes of service, and embrocations or epithems with laudanum over the stomach afford relief in the more urgent circumstances of the case. During the use of these means, the bowels ought to be preserved in an open state, either by such aperients as are most likely to be retained on the stomach, or by laxative and anodyne clysters. When the bowels are sufficiently evacuated, starch enemata, containing syrup of poppies, or the compound tincture of camphor, will then be of service. In all circumstances the horizontal posture ought to be adopted, and strict attention paid to diet, the patient's desire for articles of food being indulged, if there be no reason to the contrary. When all other means fail, and the case admits of the measure, the induction of premature labour may be contemplated, or even attempted.

34. *D.* HEARTBURN, PYROSIS, SPASMODIC AND COLICKY PAINS, are often complained of during pregnancy, and are severally relieved by antacids, conjoined with tonics, antispasmodics, and anodynes, and by a due promotion of the intestinal secretions and excretions, as just advised for *nausea* or *vomiting*, or as they are more fully directed in the articles INDIGESTION, COLIC, PYROSIS, and STOMACH.

35. *E.* CONSTIPATION OF THE BOWELS is very common during pregnancy, and always aggravates the disorders of the stomach, which have been noticed above. — *a.* It is *caused*, in some instances, by the pressure of the gravid uterus on the rectum and sigmoid flexure of the colon; by impaired action of the bowels, in others, owing to vital and vascular determination to the uterus; and not infrequently it is increased by the impaction of hardened fæces in the cells of the colon. Fæcal accumulations in the cells may exist, and may even endure for weeks or months without the constipation being remarkable; and in this way many of the disorders of pregnancy may be produced or aggravated; not merely those already mentioned, but also headaches, restlessness, watchfulness, colicky pains in the abdomen; weight, flatulence, and distension in this cavity; hæmorrhoids, and sometimes diarrhœa or tenesmus. If these ailments continue or increase, owing to the retention of fæcal collections, inflammation of the bowels or dysentery, or abortion may supervene. If constipation, and the collections of fæcal matters in the bowels consequent upon it, take place during the latter months of gestation, or be retained until the period of delivery, the diseases incidental to that period are very readily produced.

36. *b.* The *treatment* consists of the occasional recourse to the aperients already mentioned; to rhubarb and magnesia; to the infusions of gentian and senna, with such adjuncts as may suggest themselves; to confection of senna with sulphur and magnesia; to castor oil, or olive oil taken in small and frequent doses; to the compound rhubarb pill with extract of henbane and Castile soap, and sometimes also a little ipecacuanha; to emollient and laxative enemata; or to soap or oleaginous clysters. In obstinate cases, more active means may be employed, with due reference to the situation of the patient; and for these I must refer the reader to the Article CONSTIPATION AND COSTIVENESS.

37. *F.* DIARRHŒA is often met with during pregnancy as a consequence of improper food, &c., and of neglect of the bowels, or of constipation. It may be kept up by the presence of hardened fæces in the cells of the colon. — *a.* It may occur at any period of pregnancy, and may arise from cold, from mental perturbation, from the state of the secretions and excretions, and without any assignable cause. The acidity consequent upon imperfect digestion often occasion it. Very recently I was consulted respecting a case which resisted absorbents, astringents, tonics, opiates, &c. The patient accidentally mentioned her addiction to the use of immoderate quantities of sugar. This substance was interdicted, unless in small quantity; and within three or four days afterwards, the same medicines as were previously taken without benefit removed the complaint.

38. *b.* The *Treatment* consists of small doses of hydrarg. cum creta with DOVER's powder; or of small quantities of rhubarb with ipecacuanha and dried sub-carbonate of soda; of ipecacuanha with

the extract of hop, or with the compound soap pill; of cretaceous mixture with compound tincture of camphor, or tincture of hop; and of flannel clothing worn next the skin, and suitable diet. (See also Art. DIARRHŒA.)

39. *G.* JAUNDICE is not of frequent occurrence during pregnancy. It may appear at any period of gestation, but more frequently during the later months, and in females who have had several children, or are advancing in life. It generally continues until after delivery. It may be *caused* by the pressure of the gravid uterus, but more frequently by some one of the several pathological conditions assigned in the Article JAUNDICE. The symptoms vary with these conditions; and the *Treatment* should have strict reference to them, as well as to the stage of pregnancy and other peculiarities of the case. Although laxatives, or even chologogue purgatives, may be cautiously employed and repeated more or less frequently; yet active cathartic, or other heroic measures, should not be prescribed. If nausea or vomiting occur, or diarrhœa, the remedies advised above for these may be employed; and the more urgent symptoms, as pain and spasm, should be palliated by means of narcotics, &c. If the symptoms indicate active congestion or inflammation of the liver, bleeding and other antiphlogistic means must be adopted.

40. ii. VARIOUS DISORDERS OF THE HEART AND RESPIRATORY ORGANS sometimes occur during pregnancy. These are apt to appear in hysterical or nervous females, and during a first pregnancy. — *A.* FAINTNESS, FAINTING, or full syncope, is most apt to occur at the period of quickening, but it may take place at any period, or may recur occasionally or frequently. Delicate and weak females are most liable to it. "Towards the end of pregnancy, fainting is regarded with much suspicion, not so much for the immediate consequences as for its effect upon convalescence after parturition." (CHURCHILL.) It may prove a serious affection if it depend upon passive dilatation of any of the cavities or orifices, or other organic disease of the heart — lesions which consultation will detect.

41. *B.* PALPITATIONS OF THE HEART are often connected with faintness or syncope, either of these preceding or following the other; and both affections often depending upon the pressure of the gravid uterus upon the digestive organs, and of these latter upon the diaphragm. The embarrassment thus occasioned to the circulation through the heart is often increased by collections of flatus in the stomach, and even in the œsophagus, as well as in other parts of the digestive canal, these collections being often retained by spasm of adjoining parts of the canal. These symptomatic affections are usually *caused*, developed, or aggravated, by mental emotions and perturbations, by errors in diet, by startling noises or occurrences, by disordered states of the stomach and bowels, and by a susceptible and hysterical diathesis. The *Treatment* is nearly the same for both affections. During the paroxysm of faintness the patient should assume the horizontal position; during that of palpitation, the sitting. Antispasmodics and stimulants are beneficial for both, — especially those which are prescribed for HYSTERIA. Between the attacks, tonics, restoratives, quinine or cinchona, the bitter infusions or decoctions, stomachic aperients, with due attention to diet and regimen, will generally prevent a return of disorder.

42. *C.* COUGH AND DYSPNŒA may occur in the early months from sympathy. Either of these may then assume an hysterical character; the cough depending chiefly on sympathetic irritation of the larynx or trachea, and dyspnœa arising either from the same cause or from affection of the bronchi or respiratory nerves. In these circumstances, both cough and dyspnœa are nervous, spasmodic, or hysterical. But in the advanced stage of gestation, both affections may be caused and continued by the pressure of the gravid uterus, and aggravated by flatulence, indigestion, and costiveness. The *diagnosis* should, however, be established by means of the stethoscope and percussion, and by an attentive consideration of the several rational symptoms, lest these symptoms proceed from pneumonia, bronchitis, tubercular disease, or some other malady that has supervened, or been developed, in the course of pregnancy. When these affections are merely nervous and sympathetic, the *treatment* should be antispasmodic and anodyne. The bowels ought to be freely evacuated, and kept duly open; and acidity of stomach and flatulence prevented by means of tonics, antacids, and carminatives, as already advised, the diet and regimen being duly regulated. If these affections occur in full and robust females, they may be connected with pulmonary congestion, and then blood-letting is requisite. When the cough is severe, the use of narcotics and anodynes is of service, in order to moderate it and to diminish the risk to the fœtus. If it be attended by dyspnœa, pain, or fever, or by adhesive or glairy expectoration, blood-letting is also proper, with antimonial and other diaphoretics.

43. *D.* HÆMOPTYSIS may occur with or without either or both of the affections just noticed. It is not often observed; for pregnancy more frequently removes than induces this complaint. When, therefore, it is met with during pregnancy, it should be viewed as a most serious evil, and the means advised for hæmorrhages promptly employed, according to the state of the case, especially blood-letting, cupping over the back or thorax, acetate of lead with opium, digitalis, acids, antimonial diaphoretics, turpentine epithems applied over the chest, &c.

44. iii. DISORDERS OF THE NERVOUS SYSTEM DURING PREGNANCY. — *A.* HEADACHES are frequently experienced during utero-gestation, and chiefly by two classes of constitution: — 1st, by the delicate, nervous, hysterical, and those deficient in blood; 2nd, by the plethoric and robust. In the earlier months, the nervous character of headach is most pronounced, in the later months the congestive or plethoric. This latter form is often connected with impeded circulation through the heart and lungs, in consequence of the pressure of the gravid uterus, and in this case more particularly it is aggravated by indigestion, flatulency, and costiveness. The *nervous* form of headach is often limited, as to the vertex — the *clavus hystericus*, — or to one side — *hemicrania.* It is oftener felt in paroxysms, than without intermissions; and it is unattended by flushings of the face, heat of scalp, or injection of the conjunctivæ. *Congestive* or *plethoric* headach is attended by flushing, increased heat of scalp, in-

cted eyes, a sense of throbbing, distension or lness, by intolerance of light and sound, and it sually commences in the forehead, and extends ually to both sides; it is also continued and metimes increased by a meal; whilst the nervous ariety is relieved by a meal and by stimuli.

45. The *Treatment* is different in either case. The *ervous form* requires stimulants, antispasmodics, d tonics, as ammonia, camphor, valerian, casarilla, &c.; the *congestive*, moderate bloodtting, general, or local, according to circumances, purgatives, diaphoretics, &c. In all ases, the diet and regimen ought to be suited to e form of headach which is complained of; d the uses of all stimulating or restorative everages either allowed or disallowed accordgly.

46. *B.* Sleeplessness is sometimes a distressg complaint of nervous, hysterical, and delicate males, especially as pregnancy advances. It is ost liable to affect those who shut themselves -doors, and deprive themselves of exercise in e open air, and who sleep in too warm and ill-entilated chambers, or with too much bed-clothes. t is often attended by restlessness, by anxiety specting trifling matters, and ultimately by deondency, and even by hypochondriasis. It is lso intimately allied, and often associated with, *ervous headaches.* It is much more rarely assoiated with plethoric headach.

47. *Treatment.* — Besides the means already dvised for *nervous* and hysterical headaches § 45.), I have seen decided benefit result from draught at bed-time, containing a drachm of he tincture of hop, with five or six of the caronate of ammonia, or from twelve to twenty rains of the carbonate of potash, or soda, or agnesia. When the sleeplessness is attended by dications of *plethora* and active determination of lood to the head, and with the usual indications f *congestive* headach (§ 44.), then vascular epletions, purgatives, and other antiphlogistic eans, and low diet, are required.

48. *C.* Despondency and Hypochondriasis re not infrequent in hysterical females, especially luring a first pregnancy, and more especially in nmarried females. In married females, these noral affections are most commonly seen in the lelicate constitution and hysterical diathesis, and re often attributable to no other exciting cause han the contemplation of the future pains and ontingencies of child birth, or the private conrarieties and anxieties of married life. In the unmarried, numerous and painful reflections serve to develope these mental conditions, and even to carry them on to a state verging on insanity, and subversive of due control. In many such cases, the sentiments and emotions excite the cerebral circulation, and this in its turn augments the despondency, or carries it beyond the limits of sane judgment and conduct.

49. The *Treatment* depends upon the peculiar circumstances, moral and physical, of each case. If the despondency proceed from fears of the dangers of child-birth — a cause which seldom exists alone — a true statement of the small amount of that risk will generally allay such fears, for there are very few females, however inxperienced, who indulge such fears after knowing the truth, especially when their hopes are excited and promoted by affection. If the disorder of the mind is truly nervous or hysterical, agreeable society, change of scene and of air, gentle exercise, mental occupation of a pleasant kind, healthy air, and restorative treatment will generally remove it. If the temperature of the scalp, the appearance of the eyes and countenance, and the action of the carotids, indicate increased determination of blood to the head, then moderate bleeding, especially if the patient be strong or plethoric, cold sponging the head frequently, mild purgatives, derivatives, warm clothing on the lower parts of the body, and light digestible food will be requisite, with such other means as the peculiarities of the case may suggest.

50. *D.* Convulsions during pregnancy assume one or other of these forms — the *hysterical*, the *epileptic*, or the *apoplectic*. The *first* of these is confined to utero-gestation, and is much more frequent during the early months than at an advanced stage. It is chiefly dependent upon the vital excitement and vascular determination to the sexual organs, and affects chiefly the weak, delicate, and hysterical constitution. The character and treatment are in all respects the same as described in the article Hysteria. *Epileptic convulsions* are the most frequent forms of convulsions at an advanced period of pregnancy; and the *apoplectic* during or after parturition. They are fully discussed in the articles Convulsion (§§ 27—88.) and Epilepsy.

51. *E.* Painful affections of the Mammæ — *Mastodynia* — often commence during pregnancy with pricking or tingling sensations in them, followed by shooting pains, with slight soreness of the nipples, and increased size of the mammæ themselves and especially of the glandular structure. The pains may be either of a neuralgic character, and owing to sympathy with the increased excitement of the uterus, or altogether consequent upon the stretching of the fibrous envelope by increased development of the glandular structure. In the latter months the pain is often dependent upon active vascular determination, which may go on to inflammation and abscess.

52. The *Treatment* consists of fomentations, or frictions with oleaginous and anodyne liniments, or emollient poultices. In many cases no treatment is necessary. In the severer attacks, if these means fail, anodynes, cooling aperients, and antimonial diaphoretics may be prescribed: blood-letting, general or local, is seldom required, unless great tension, enlargement or increased heat exist, and then the application of a number of leeches, or even venesection, should not be delayed, especially in plethoric females, lest active determination and congestion should go on to inflammation and its usual consequence, abscess. (See Art. Mammæ.)

53. *F.* Various other symptomatic Disorders, and even structural diseases, occasionally supervene in the course of pregnancy, owing either to the sympathy existing between the parts affected, or to the pressure of the gravid uterus. To the former of these states anomalous affections of the organs of sense, especially of sight and hearing, altered sensibility of various parts, occasional spasms, slight attacks of singultus, eccentricities of conduct or of sentiment, &c. are chiefly owing. To the latter cause, hæmorrhoids, incontinence, or retention of urine, varicose veins, cramps or

spasms of the lower limbs, œdema, anasarca, ascites, &c. are chiefly to be referred, and are noticed in their relations to the pregnant state in the articles in which these several maladies are described.

54. III. Influence of Pregnancy upon the Course, Termination, and Treatment of Chronic or Pre-existent Diseases.—*A.* Various pre-existent maladies have no influence in preventing conception; a very few have even the effect of favouring the act, especially tubercular and scrofulous diseases when not very far advanced; glandular enlargements, slight hæmorrhages, hysteria, &c. Several of these maladies, indeed most of them, and especially those now named, are either altogether arrested in their progress, or impeded or rendered latent, owing to the vital determination to, and increased vascular action developed in, the sexual organs, and to the salutary influence exerted thereby, throughout the œconomy. Pulmonary affections, especially tubercles in the lungs and hæmoptysis are generally arrested, if not too far advanced; the pulmonary symptoms often almost disappearing during the continuance of pregnancy; but, soon after parturition, they often re-appear with much greater severity, and sometimes with various associations. When pregnancy occurs at an advanced stage of phthisis, the disease is only partially abated, or rendered somewhat more latent; and, in this case, not only is the child born with tubercles already formed, as I have ascertained by inspection in three instances, but the mother sinks in a short time after delivery with remarkable increase of the pulmonary symptoms, either granular degeneration of the kidneys with anasarca, ascites, &c., or delirium, or some other complication, besides the more common one of colliquative diarrhœa, rapidly appearing, and accelerating a fatal issue. When the pulmonary symptoms are only slight, the tubercles not having gone on to softening, then not only may pregnancy arrest the further progress of the malady, but also may subsequent lactation, if duly managed so as not to impair the strength, exert a similar preservative influence, until pregnancy again recurs; and thus the disease, which had appeared before marriage, and had even been attended by hæmoptysis, be kept at bay for several pregnancies, or until the cessation of child-bearing, when it generally reappears and runs its usual course. I have seen a lady who had experienced an attack of hæmoptysis before marriage, have nine children, and enjoyed tolerably good health, and, having ceased to become pregnant, die of consumption two or three years after the birth of her last child.

55. Although pregnancy thus arrests the progress of chronic maladies in most instances, yet, if these maladies are of so severe a character as not to be removed altogether, as some of them are, by this state, and by the changes induced by it in the frame, they may be very remarkably aggravated after parturition, or during the last stage of gestation. Epileptic seizures may be rendered fewer or slighter during pregnancy, especially in the earlier periods; but they may be more severe at an advanced period, or even fatal during parturition. Paralytic affections, even hemiplegia, or paraplegia may be complete, and yet the patient become pregnant, bear a child at the usual period, and even become pregnant several times; but there is an increased risk of apoplectic seizures, or convulsions, during advanced pregnancy, and during parturition. Pregnancy has generally a beneficial effect upon hysteria, leucorrhœa, and dysmenorrhœa, but there are not infrequent exceptions; and, in several other diseases, so many circumstances tend to vary the results, provided pregnancy actually occur in their course, that nothing precise can be advanced respecting them During chlorosis and anæmia, particularly the former, pregnancy may not take place; but i it occur in either, a very beneficial change generally results.

56. *B. As to the management or treatment of pregnancy thus occurring during chronic maladies*, bu little can be said. The suggestions of good sense guided by pathological knowledge, will point ou what ought to be done and what avoided, in the different and ever varying circumstances in which medical advice will be required. In most instances officious interference will be more prejudicial than beneficial; and the operations of nature, aided by suitable diet, pure, temperate, and dry air, and a gentle promotion of the several vital and excreting functions, will do more than any plan that can be laid down. Heroic or even active remedies should be avoided. They are out of place in these cases and are only employed by charlatans and pretenders in and out of the pale of the profession In these, as well as in other circumstances, it i not only the probable good which may be done but the possible evil also which may follow, tha should engage our minds and guide our determinations as to the use of any remedy and the adoption of a particular plan of cure.

57. IV. Influence exerted by Pregnancy on the Production, Course, and Treatment of Acute Maladies. — *A.* During pregnancy, th increased manifestations of vital action throughou the frame tend to ward off many of the slighte causes of disease; and even others of a more energetic kind which would have, in other circumstances, been productive of disease, fail of causing it, or cause it in a less degree, during this state Various epidemics have been observed to affec a smaller proportion of pregnant women than o others, and even endemic diseases have been les frequent among them. Epidemic diseases of a malignant character, or those which often assume a malignant form, as smallpox, scarlet fever measles, erysipelas, typhous and adynamic fever are liable to become not only malignant but rapidly fatal when they attack pregnant females although this class of females are less predisposed to them than others. If these maladies appear a an early stage of gestation, abortion is likely t occur, and the danger is thereby increased; if the appear at an advanced period, or shortly befor parturition, premature labour often takes place and a fatal issue very frequently results, soon afte delivery. Other acute diseases, as inflammation of any of the viscera, although occurring less frequently in pregnant than in other females, are also attended by much increased risk, not only o abortion, but even of dissolution; although th danger is upon the whole not so great from these attacks as from exanthematous and malignan fevers. Hippocrates (*Aphorism.* L. v. 30.) says that "pregnant females seized with an acute disease never recover." This inference, however, i too general, for recoveries take place, in some instances, from most of the acute maladies which

ve been now enumerated, but the danger is vays great, even in cases of inflammation of the spiratory organs or pleura; and it is not less so, not even greater, when inflammation of other portant or vital organs takes place during preg- ncy.

58. *B.* The *Treatment* of acute maladies attack- g pregnant females should be appropriate to the ture of the disease, to the pathological conditions the case, to the progress it has made, and to e circumstances of the patient and the stage of r pregnancy. In most epidemic, or exanthe- ntous, or febrile maladies which are not truly lammatory, violent or perturbating remedies ould be avoided; vascular depletions, the pro- otion of the abdominal and cutaneous excre- ns, and due support of the vital powers, being verally prescribed as the nature of the disease d the circumstances of the case may require. every instance the malady should be carefully atched, remedies cautiously administered, and e various offices of the nurse assiduously per- rmed. The numerous details which a due scussion of this subject might involve are beyond y limits. They will readily suggest themselves practice to the observing physician, who will t in all things appropriately to the peculiar cir- mstances both of the disease and of the patient.

Bibliog. and Refer.: — Hippocrates, Γυναιχειων, *Op.* 600. — *Galen*, De Causis Sympt. i. 7. — *Pliny*, Hist. at. xxiii. 56. — *Aëtius*, xvi 10. — *Paulus Ægineta*, l. i. 1. — *Sydenham Edit.* p. 4. Mr. Adams has given ferences to several of the ancients, and has added the lowing directions, given by Aspasia (apud *Aëtium*, i. 12.) for the management of pregnant females:— Women who have conceived are to be guarded from ghts, sorrow, and all violent mental perturbation. ey are to avoid gestation in carriages, severe exercise, ordinate breathing, and blows about the loins: also e lifting of heavy loads, dancing, and sitting on hard ats. Likewise all acrid and flatulent food and drink e to be avoided. All discharges of blood, from the se or hemorrhoids are dangerous in the pregnant te. Moderate and wholesome food, gestation in a lan, gentle walking, soft friction, and the exercise of inning are proper. About the eighth month, which the most critical period, the diet is to be more con- cted, and the exercise increased. If the bowels are nstipated, owing to the compression of the rectum by e enlarged uterus, laxative food is to be given, such as isan and mallows. In the ninth month the regimen is be of a relaxing nature, and for this purpose the pid bath is to be frequently taken, for it has a great ect in rendering parturition easy." — *Avicenna*, Canon. iii. 21. 2. 2. — *Haly Abbas*, Pract. l. i. c. 19. — *Prim- osius*, De Morbis Mulierum, l. iv. c. 2. — *F. Rau- inus*, Tract. duo de Morbis ante Partum, in Partu et st Partum, &c. Lugd. Bat. 8vo. 1644. — *Herliz*, In *aller's* Biblioth. Med. Pract., vol. ii. p. 237. — *R. Castro*, De Universa Mulierum Morborum Medicina, . 3tia. Ed. 4to. Hamb. 1688. — *Mauriceau*, Des Ma- lies des Femmes Grosses. Paris, 1824, vol. i. p. 178. — *anning*, On Diseases of Women, p. 328. et *pluries*. — . *Manningham*, Aphorism. 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PROSTATE GLAND — Diseases of. — This gland is seldom diseased in young persons; but it is much more frequently affected after puberty, and with advancing age. It is very often diseased in old persons; and generally at this period of life its diseases are associated with those of the bladder, often also with those of the kidneys and urethra; and sometimes gravel or urinary calculi are superadded. The diseases of this gland are, 1st. Inflammatory; and, 2d, Organic or structural; certain of these latter being independent of inflammatory action, and frequently associated with other diseases of the urinary organs.

INFLAMMATIONS OF THE PROSTATE GLAND — SYNON.: — PROSTATITIS; — *Inflammation de la prostate, Prostatite*, Fr. — *Entzündung der Vorsteherdrüse.* Germ.

CLASSIF. — III. CLASS. I. ORDER. (*Author in Preface.*)

1. DEFIN. — *Pain and heat in the perinæum extending to the anus; frequent micturation, with a scalding sensation on voiding urine; tenesmus; and sensible enlargement and heat of the gland upon examination per rectum, with symptomatic fever, and sometimes retention of urine.*

2. Inflammation of this gland may be either *acute* or *chronic*; and each may occur primarily; but the chronic is often consequent upon the acute, owing as frequently to the constitution and age of the patient, and the complications of the disease, as to any fault in the treatment. Either of these states of the disease may arise from causes common to both, and be followed by nearly the same, or the very same, organic lesions. Prostatitis, whether acute or chronic, may be the *primary* malady, and occasion diseases of other associated parts; or it may be *secondary*, or con-

secutive of these diseases, or of urinary deposits or calculi.

3. i. The causes of Prostatitis are chiefly premature or excessive excitement of the sexual organs, especially manustupration; riding much on horseback, or in a carriage; sitting habitually on warm cushions, or accidentally on wet or damp cushions; a frequent or habitual neglect of due evacuations of the urine, or of the bowels; the abuse of such purgatives as irritate the rectum, as calomel, blue-pill, aloëtic preparations, &c.; frequent costiveness or constipation; dysenteric attacks; inflammations of the urethra, especially gonorrhœa, gleet, &c.; strictures of the urethra; the use of various substances recommended for the cure of gonorrhœa or gleets, especially irritating or astringent injections, and stimulating gum-resins and balsams; nutritious and highly seasoned viands; excessive use of spirituous and vinous liquors; or of strong coffee; aphrodisiac substances, especially cantharides taken internally or applied externally; exposure of the lower extremities to cold or wet, especially if the individual be of the gouty, gravelly, or rheumatic diathesis; catarrh or inflammation of the urinary bladder; morbid secretions from diseased kidneys; the irritation or pressure of calculi in the bladder; the irritation of worms in the rectum; and injuries sustained in or near the perinæum and anus. Either of these causes may develope the disease, especially during advancing age, and in persons who are addicted to venereal excesses.

4. ii. Symptoms. — *A. Acute Prostatitis* is attended by increasing heat and pain in the perinæum, that extend to the anus. Micturition is frequent, and accompanied with pain and scalding upon passing the urine, these sensations being increased "as the *acceleratores urinæ* contract to expel the last drops of urine." Mr. Coulson accurately observes, that evacuations from the bowels cause great uneasiness; and there often remains a sensation as if the rectum was not completely emptied, giving rise to distressing tenesmus. Upon making an examination *per rectum*, "the prostate is felt as a smooth, round and hard body, projecting downward on the bowel," which feels hot; and pressure on the gland is exceedingly painful. If a catheter or sound be attempted to be introduced, it passes without difficulty as far as the membranous part of the urethra; but its passage onwards is attended by acute pain, and severe spasmodic contractions. The above symptoms are aggravated by sitting, standing, or riding on horseback, or in a carriage, or by exercise or exertion of any kind, and by the use of heating or stimulating beverages.

5. When resolution takes place, the above symptoms subside; but, if the inflammatory action continues unchecked, the inflammation extends to the neck of the bladder, or even further, and, with the tumefaction of the gland, gives rise to *retention of urine*. In this case, the febrile symptoms are remarkably exacerbated; and if retention be prolonged, delirium, followed by coma, owing to excrementitious plethora, may result, if the inflammation be not subdued or the bladder emptied.

6. When rigors occur, with increase of the febrile symptoms, quickened pulse, hot skin, and furred tongue, especially toward the evening; with a sense of fulness, tension, or throbbing in the perinæum; and with more frequent calls and
creased difficulty of micturition, the existence
suppuration may be inferred. Mr. Coulson stat
that if the prostate be now examined through t
rectum, it will no longer be found hard and resi
ing, but resembling a distended bladder. T
examination, as well as the discharge of fæc
causes great pain, and there is constant tenesm
with a sense of burning. The fibrous investme
of the gland, softened by inflammation and d
tended by pus, sometimes exudes a creamy a
sanguineous matter into the urethra, the rectu
or the bladder; and then the tumour subsides, t
urethra becoming freer, the bladder emptyi
itself, and the symptoms abating. If the absc
opens into the urethra, the evacuation of urine
preceded or followed by a copious discharge
purulent matter by this passage. Mr. Couls
remarks, that in some cases more or less blood
mixed with the discharge, and that he has kno
a considerable hæmorrhage to take place. Af
the last drops of urine are voided, there is a stir
ing pain which lasts for a few minutes, or for
longer period; and there is also a burning pain
the glans penis.

7. *B. Chronic inflammation of the prost
gland* is sometimes a consequence of the ac
state of prostatitis, especially when the inflamm
tory action is only partially subdued, and not e
tirely removed. It is occasionally, also, a rep
duction of the morbid action in a milder a
slower form, in consequence of the influence
one or more of the causes, during, or soon af
the susbidence of the acute attack. The prolon
ation of the inflammation in a chronic form, af
the acute symptoms are subdued, is often owi
to the gouty or rheumatic, or scrofulous diathe
to gravelly or calculous formations, to the use
stimulating beverages, and to venereal ind
gences. Mr. Coulson remarks, that sometim
in feeble subjects, the antiphlogistic treatme
stops the progress of the inflammation at a peri
of the disease when pus has already formed in t
prostate, but has not effected its discharge. I
filtrating the cellular tissue connecting the lol
of the gland and surrounding parts, or contain
in small abscesses, this purulent matter becom
more consistent by the absorption of its more flu
parts, and gives rise to cheese-like or tubercul
formations, which excite slight attacks of infla
mation with increased deposition and bulk of t
gland.

8. More frequently, however, chronic pr
tatitis commences primarily, and the gland
sumes an enlarged, and sometimes an indurat
state, owing to the absorption of the more fl
portions of the serum and lymph deposited
inflammatory action into the cells of the co
necting cellular tissue. Each exacerbation
the morbid action is thus followed by increas
symptoms and size of the gland.

9. The *symptoms* of chronic prostatitis th
vary with the mode in which the disease co
mences and proceeds. In the *consecutive fo*
(§ 7.) they are merely the protracted contin
ance of a milder state of the symptoms than e
isted during the acute stage, either after int
missions or without, or with remissions of varyi
duration. When chronic prostatitis is *primary*,
is often long neglected, owing to the gradual
crease of the inconvenience, and to the sympto

mistaken for those of internal piles, until
lty of micturition suggests the origin of the
When the gland becomes enlarged from
ontinuance of inflammatory irritation, the
t has a sense of weight and bearing down,
desire to go to stool, although the rectum
ty. The urine is voided every hour, or
r, although but little has collected, and so
that it drops or dribbles merely from the
of the urethra; slight pain being felt in the
penis, and course of the urethra. The symp-
re increased by riding, walking, or stand-
nd are attended by symptomatic pains in the
r down the thighs. There are generally,
constipation and dyspepsia; sometimes
ch, or scaly eruptions on the skin; and oc-
ally, slight hemorrhage from the urethra.
ncreased size of the prostate always inter-
more or less, with the exercise of the func-
of the urinary bladder. The inability to
rge, readily, the contents of the bladder,
to the impediment produced by the in-
d size of the gland, and by the associated
es in, or near the neck of the viscus, is the
and the most serious effect of this disease.
er exertions to empty the bladder, an ounce
o of urine are left in it, the desire to mictu-
quickly returns, and renewed efforts are
in vain to expel it. This distressing symp-
s much increased by exposure to cold, or
y irregularity of diet, by stimulating liquors,
y constipation of the bowels. Sometimes
d of retention, there is incontinence of urine;
ring sleep, the urine passes involuntarily.

Chronic inflammation, or *enlargement* of
rostate, with, or without *induration*, is ge-
ly a disease of middle life, or aged persons;
as also been met with in the young, chiefly
se who have been addicted to self-pollution.
se, as well as in other circumstances, the mu-
follicles increase in size, and the surrounding
ar tissue becomes thickened, the prostate
thereby considerably enlarged, and the de-
nd difficulty of passing urine proportionably
ented. When the gland becomes so far en-
d as to prevent the entire evacuation of the
, the retained portion becomes ammoniacal;
and numbness are felt in the *glans penis;*
of weight or uneasiness in the perinæum;
in the back of one or both thighs, in the loins
n the sciatic nerves; and the fæces are flat-
. In aged, or middle-aged persons, the en-
ment is often *complicated* with *hæmorrhoids,*
olapsus ani, and sometimes with both. The
oniacal smell of the urine becomes more
sive as the disease advances; and the urine,
sionally, is white and milky, owing, in some
ure, to the extension of inflammation to the
nal surface of the bladder. If, however,
rine be retained, it presents the appearance
ffee, occasioned by the admixture of blood
it.

. Sir B. Brodie remarks that with far ad-
ed age, "the prostate usually, perhaps inva-
y becomes enlarged." This change takes
slowly and at first imperceptibly; and the
chronic enlargement is not improperly em-
ed to distinguish it from the inflammatory
ks to which the prostate is liable in early life.
ay in some respects be compared with the
nic enlargement of the thyroid gland, known by the name of bronchocele. Like the latter it is generally slow in its progress, and often, after having reached a certain point, it remains stationary for many years, if proper treatment be adopted. It rarely terminates in ulceration or in abscess.

12. *Upon dissection*, the prostate is found enlarged sometimes laterally, but most frequently in the middle or third lobe. Enlargement of the lateral lobes has existed to a very great extent without having occasioned retention of urine; but even moderate enlargement of the third or middle lobe may occasion retention; for, being situated immediately behind the orifice of the urethra, the urine behind the tumour formed by it presses it against the orifice, and it thus obstructs the passage. Sir B. Brodie remarks that the tumour of the third lobe varies in size from a horse-bean to an orange. When small it is of a conical shape, with the apex projecting into the bladder, and the base continued into the gland; but, when large, the base is often the narrowest part. In some instances there is another tumour also projecting into the bladder, formed by one of the lateral portions. The canal of the urethra where it passes through the enlarged prostate is generally flattened. Not infrequently the enlargement so alters the direction of the urethra, that, instead of pursuing a straight course through the gland it is inclined first to one side and then to the other. The urethra is, in some cases, narrowed by the enlarged gland; but in others it is wider, and even dilated into a kind of sinus where it lies in the centre of the prostate.

13. iii. The Diagnosis of enlargement of the prostate is determined by examination per rectum and by the introduction of a bougie or catheter into the urethra. The former mode, however, although it will furnish evidence of the existence of enlargement, may not determine the presence of enlargement of the middle lobe. The introduction of the catheter will, however, soon settle the question as to disease of this lobe. The symptoms of retention of urine from enlarged prostate are not very different from those caused by stricture, but Sir B. Brodie remarks that the terminations are different. He has never seen a case in which the bladder has given way in the former, as sometimes happens in the latter state of retention.

14. iv. The Prognosis.—*A. Of acute Prostatitis* depends upon the progress of the disease and the age and other circumstances of the patient. At an early stage of the disease and before the symptoms of suppuration have appeared, if the health of the patient be not otherwise bad, a favourable prognosis may be given; but in the aged, in a constitution exhausted by excesses; and especially if symptoms of abscess be present, a guarded or an unfavourable opinion should be entertained of the result. When the pain is throbbing, is attended by shivering, and the disease has passed eight days either unsubdued by treatment or neglected, then suppuration has generally commenced, and probably advanced through the connecting cellular tissue; and in this case the patient often ultimately sinks, either one or several abscesses being formed, which may open into the urethra, or into the rectum, or through the fascia, cellular tissue, and perinæum. But the abscesses may burrow and form fistulous

passages, and cause wasting suppuration. An unfavourable issue may occur before the abscess makes for itself an exit, owing to the retention of urine produced by it, and to consequent excrementitious plethora, causing fatal coma or apoplexy. This, however, will rarely occur when the patient receives medical aid. If the abscess opens into the urethra or rectum, the infiltration of excrementitious fluids through the orifice will rapidly aggravate the symptoms and accelerate the result. When the matter is early evacuated per perinæum, recovery may be expected, if other circumstances be favourable or the disease be uncomplicated, no serious disease of the kidneys or bladder being associated with it.

15. *B. The Prognosis of Chronic inflammation and enlargement of the prostate gland* is always unfavourable. When the patient is not very far advanced in age, and the constitution is otherwise not materially impaired, then the enlargement and hardening may sometimes be reduced, especially when the disease has not been of very long duration. But in advanced age, in weakened constitutions, and when the disease is associated with inflammation or structural lesions of the bladder or of the kidneys, little hope of recovery can be entertained, although life may be prolonged for a considerable time, if the complication be not of a very severe or dangerous nature, by careful treatment and regimen. Mr. Coulson observes that "tumefactions of the prostate which are brought on by strictures, disappear when these are cured: it is necessary, therefore, to distinguish them from more permanent disease."

16. v. Complications. — Acute, as well as chronic prostatitis with more or less enlargement of the gland is not infrequently associated with one or other of the following affections; — with the gravelly, especially the phosphatic diathesis; with calculous concretions in the bladder or kidneys; with irritable, inflammatory, and thickened states of the bladder; with hæmorrhoids or prolapsus ani; with gonorrhœa or gleet; or with stricture of the urethra. In the more chronic states of inflammatory action of this gland, and especially when the enlargement and induration are considerable, one or other, or even more than one of these complications, is often observed.

17. vi. Treatment. — *A.* In *acute prostatitis*, before symptoms of suppuration appear, the treatment should be strictly antiphlogistic, and consist of the application of leeches, or of cupping over the perinæum; of cooling diaphoretics, especially the liquor antimonii tartarizati, with liquor ammoniæ acetatis and spiritus ætheris nitrici, in camphor water; of Dover's powder at bed-time; of cooling saline aperients, and cooling lavement in the morning; and of farinaceous or vegetable diet. If there be much heat about the anus, a frequent injection of a cold fluid and cooling lotions to the perinæum and anus will be of use. And, in such cases more especially, the patient should recline on a horse-hair sofa, or sit upon an open cane-bottomed chair. The patient's beverages should be diluent and demulcent, and all stimulating and heating food and drink ought to be avoided. If retention of urine be threatened, owing to the swelling of the gland or of the middle lobe, and if cold enemata and cold lotions have failed, the hip-bath, demulcent and soothing clysters, and fomentations or poultices to the perinæum may be resorted to. But, until these and the for ing means fail, the introduction of instruments uld not be attempted. When recourse to these re quired, the able advice given by the su cal writers referred to in the *Bibliography* sho be adopted.

18. *B.* If *suppuration* has commenced, B Brodie and Mr. Coulson advise an ear ex ternal discharge for the matter, in order t pre vent it bursting into the urethra. The ear and free puncture of the perinæum down to the nd, save where little or no matter has yet form generally useful, by the loss of blood, ar the removal of the tension of the parts. I the disease have anticipated the operator, an the abscess have opened into the rectum or ur ra, then the general health should be maintaine If it have burst into the latter canal, then a fl ble catheter ought to be retained in the bladde and such other means as the peculiarities of th ase may require, aided by surgical assistance, ght to be adopted.

19. *C. Chronic Inflammation and enlarg ent of the prostate* require at first small but re ted local depletions from the perinæum; abst nce from venereal indulgences; rest in the hori ntal posture, and sleeping on a hair mattre a farinaceous and vegetable diet, with coolin and demulcent diluents, and a gently open st of the bowels, procured by means of cooling pe rients, as the confection of senna with mag sia, or bi-tartrate of potash, or with sulphur. ese means will be often of service, if persevered for some time. If these fail, emollient inje ns, with henbane or syrup of popies; or suppos ries with henbane or hemlock; or the local ap ca tions of ointments containing the iodide of pota um, as advised by Mr. Stafford; and the ir nal administration of the iodide of potassium ith liquor potassæ in camphor-water, or in muc gin ous or demulcent fluids, or with sarsaparill or the tincture of the sesquichloride of iron, ta in the infusion of calumba or of quassia, whe the disease is associated with the phosphatic dia sis, or the hydrochlorate of ammonia in gra lly increased doses, may severally prove of me service. Blisters and issues to the perir um, mercurial ointments, camphorated and v tile liniments, anodyne, and narcotic supposi ies, have likewise been recommended. The ju ous employment of these may either prevent th ac cession of, or relieve, or even remove, reten of urine. But when these fail, recourse to su cal aid ought not to be delayed; and for opini as to the employment of surgical means, I ref the reader to the works enumerated below.

II. Organic Lesions of the Prostate G nd.

Classif. — IV. Class. IV. O er.

(*See Preface.*)

Defin. — *Changes of structure of the p ate gland, of various kinds, resulting generally om prolonged vascular excitement, or functio nervous irritation, causing disorder of, ob struction to, the urinary excretion, and ofte sso ciated with other affections of the urinary ans and rectum.*

20. i. The most frequent organic lesi of this gland are enlargement and indur ion consequent upon chronic inflammation. — But these changes may take place independen of any actual inflammatory action, frequent ac-

excitement consequent upon entertaining nt ideas, or upon frequently practised self- ions or other venereal excesses, often oc- ing these lesions independently, as well as sequence, of inflammatory action either acute onic. There is every reason moreover to hat sexual desires and frequent excitement genitals are attended by more or less active stion of the prostate, with or without in- ed prostate secretion, which, if continued ally for a long period, will pass into enlarge- and induration, and often occasion obstruc- to the excretion of urine. M. Velpeau s, by the appellation of "*Catarrh of the te,*" an increased flow of the prostatic se- n, arising from prolonged gonorrhœa or or frequent attacks of these, and appearing y when the patient has been to stool, or has d his urine. Although sometimes superven- pon inflammatory states of the urethra, this idly increased secretion is more frequent habitual self-pollutions and sexual excite- , and is attended by congestion or active mination of blood to the gland with more or enlargement, and with several of the symp- of prostatitis in a slight degree.

. *b.* Swelling or enlargement of the gland *a varicose state of the vessels*, mentioned by ius, is merely a form of congestive or non- nmatory enlargement. It generally occurs y in old persons, after venereal excesses, repeated attacks of gonorrhœa or gleet, hæmorrhoidal complaints and constipated ls, and after abuses of stimulating liquors. met with most commonly in the sedentary hose who live richly; the difficulty of empty- he bladder increasing, and becoming great, ially after violent exertion, and after heating and drink. The swollen prostate is felt *per m*, but it is free from pain, and there is no in the passage of urine through the urethra. e varicosity is situated rather in the coverings e prostate. The substance of the gland itself metimes soft and spongy, sometimes tense hard."

2. *c.* The *treatment* of these states of enlarge- of the prostate depends much upon the ence of their source. If they be consequent congestion or active determination to the n, and if the constitution be not remarkably ired, local depletions should be prescribed. ters of cold water, or of the decoction of bark, with alum; attentive regulation of the els; and a cautious use of the catheter, with other means suggested for the removal of the nic states of prostatitis, are generally of ser- (§ 19.).

3. ii. Tubercular deposits in the Pros- e, and small puriform collections dissemi- d through the gland, are mentioned by M. peau as having been, in rare instances, ob- ed by him; and attended by more or less ling. They may go on to ulceration or ab- s, and terminate in fistulous communications the urethra or rectum. — *a.* Dr. Baillie has observed *scrofulous disease* of this gland, as, n dividing it, a white curdy matter has been nd in it; and scrofulous pus has been forced of its ducts. Mr. Wilson states, that he has the prostate enlarged and changed into a te curdy matter, precisely the same in quality as that formed in a scrofulous absorbent gland. Mr. Guthrie has met with a case in which the enlargement caused by scrofulous deposits or suppuration of the prostate was remarkably great. It is probable that these scrofulous changes are merely the results of sub-acute or chronic inflammation of the gland, occurring in scrofulous subjects, and giving rise to the formation of scrofulous pus, in the form either of small deposits, or of larger collections, which become more or less altered by the absorption of their more watery parts, or by the occurrence of consecutive irritation and softening.

24. Mr. Wilson states, that scrofulous swellings of the prostate are usually found in persons not advanced beyond the middle period of life; that they are slow in their progress, and not attended by much pain; that they may be felt *per anum*; and that their effects upon the excretion of urine depend upon the size and form they assume.

25. *b.* The *treatment* of scrofulous enlargements of the prostate consists chiefly in the use of the iodide of potassium with liquor potassæ and sarsaparilla; of sea-water, or of cold water with salt dissolved in it, topically, and occasionally as a clyster; of sea-bathing and sea-air; and of the application of an ointment of the iodide of potassium to the gland, in the manner recommended and explained by Mr. Stafford.

26. iii. Ulceration of the Prostate is sometimes observed. — *a.* It rarely occurs in the anal aspect or surface of the gland, unless as a consequence of the extension of ulceration, or of cancer of the rectum. It is not infrequently seen in the urethral surface of the gland, sometimes near the bladder, but oftener near to, or on the *verumontanum itself*. Ulceration is a consequence generally of scrofulous disease of the prostate, or of purulent formations, or of injuries occasioned by bougies or catheters.

27. *b.* The *diagnosis* of ulceration of the prostate is very obscure. The appearance of blood on a bougie, or after micturition; the existence of pain in the situation of the gland, and the acute exacerbation of pain upon the passage of a bougie, and upon micturition, will suggest the probable existence of ulceration, but by no means prove it; inasmuch as these symptoms attend inflammation of either the prostate itself, or of the prostatic portion of the urethra.

28. *c.* The *treatment* which these symptoms suggest will depend upon, and vary with, the circumstances of the case, but it will not be materially different from what has been recommended above for the consequences of *prostatitis* (§§ 18, 19.).

29. iv. Hæmorrhage from the Prostate may occur from ulceration, from the opening made by an abscess, from the accidental rupture of vessels, or from injury by a catheter. In these, the hæmorrhage is rarely very great, and the blood passes by the urethra. But, when it is excessive, it may flow into the bladder, where its presence, especially its coagula, always occasions distress. In a case published by Mr. Copland Hutchison, the bladder was suddenly filled with blood, which proceeded from "two *fungoid tumours* which projected into this viscus from the prostate gland." The bladder was perfectly healthy. The entrance of the urethra was situated between the two tumours; the left being

about the size of a hen's egg, and the other that of a walnut. (*Lond. Med. Repos.* vol. xxii. p. 130.) The *treatment* of hæmorrhage from the prostate does not differ from that advised for hæmorrhage from the urinary passages. (See art. HÆMORRHAGE, § 215.)

30. v. FUNGO-ENCEPHALOID DISEASE AND CANCER have been met with in the prostate. — *A.* In the former, either the fungoid or the encephaloid structure may predominate. This form of malignant disease may be primary and solitary, as in an interesting case recorded by Mr. STAFFORD; or it may be a part only of a more general manifestation of this malady.

31. *B. Carcinoma,* or scirrho-cancer, of this gland is rarely seen; but the prostate may be implicated in scirrhus, or cancer of the rectum. It is rare that scirrhus of the prostate occurs primarily, or in an uncomplicated form. Sir B. BRODIE, however, has adduced cases in which scirrhus appears to have affected this gland primarily.

32. *C.* When fungo-encephaloid malignant disease is seated in the prostate, there is not only great enlargement and retention of urine, but also an elastic or soft tumour felt *per anum,* sometimes with hæmorrhage from the urethra, following efforts to pass urine. A scirrhous state of the gland is indicated by acute intermitting pains in the prostatic region, unconnected with the excretion of urine, and enlargement with a stony hardness of the prostate felt *per anum,* in addition to the usual symptoms of chronic enlargement.

33. vi. CALCULI IN THE PROSTATE.— The calculi found in the cavities of the prostate have been too generally viewed as quite different from those formed in the bladder, and as being altogether similar to those concretions sometimes found in the salivary ducts and elsewhere. It is not improbable that, whilst there are some which thus originate, there are others which are formed chiefly from urinary deposits; or which, originating in the gland itself, become greatly enlarged by urinary deposits, the prostatic calculi being only the nuclei around which these deposits are formed. It should be recollected that, when there is obstruction to the passage of urine through the urethra owing to stricture, the prostate gland is then sometimes seen with its follicular cavities very much widened, and its ducts dilated; the latter being even as much enlarged as to admit of the introduction of a crow-quill. When, therefore, the urine is prevented from passing by stricture, or passes only in small quantity, some of it is forced into the ducts and cavities of the gland, which thereby become enlarged, the muscular coat of the bladder being also gradually thickened. In these circumstances, if prostatic calculi exist, they will readily increase, owing to the passage of urine over them, or the stagnation of it around them. But when the ducts and cavity become thus dilated, and admit the urine during efforts to expel it, the calculi may actually form in the prostate from the urine thus propelled into and accumulated in the cavities of the gland. I consider that calculi may form in the prostate, or be found either altogether or partly in it, as follows: — 1st. They may form in the gland, or in its ducts, independently of any access of the urine, or deposit from this excretion; and, in this case, they are small and numerous, consisting chiefly of the carbonate r the phosphate of lime, with a large proportio f animal matter: — 2d. Calculi may form in e ducts and cavities of the gland consecutivel f stricture of the urethra, owing to the passage o and stagnation of urine within these parts, s shown above; and may afterwards increase s s to be partially external to the gland: in this e they may be similar, in chemical constitution o other urinary calculi, according to the exis g calculous diathesis, and may reach a large si : — 3d. They may originate in the first of the modes, and subsequently increase greatly in s , owing to urinary deposit, as in the second mo : — 4th. Fragments of calculi may escape o dilated prostatic ducts or cavities after i- otomy, or small gravelly calculi may pass o the ducts independently of this operation, w e they may increase, as in the second mode of - mation.

34. The *first,* or true prostatic calculi y in size from that of a pin's head to that of a t, and in number from eight, ten, or twelve, to f y or fifty. They are often attended by little in- venience until they obstruct the excretion of ur ; but in rare instances, they occasion distres g irritation and excitement. Two remarkable c s of prostatic calculi are reported by Dr. HERB T BARKER (*Trans. of Provin. Med. and Surg. A c. N. S.,* vol. ii.), and by Prof. FERGUSSON (*L l. Med. Gaz.,* 7 Jan. 1848). The calculous - posit was most probably formed, in these case n the *second* of the modes now pointed out. Ind l, Professor FERGUSSON mentioned to me, that is was the probable mode of their formation in e case operated upon by him, as they were - ceded by stricture of the urethra. Dr. PR T believes that the larger calculi, which are sm h and polished, and have a porcelain-like app- ance, always originate in abscess of the prost , but it will be found, that they are formed in e cavities of the prostate consecutively of stric e of the urethra, as shown above.

35. Dr. CROSSE, of Norwich, remarks that, it is only when large or numerous in one large t, or projecting into the urethra, that prostatic - cretions give rise to the symptoms of stone; - quent painful micturition, and discharge of m s from inflammation of the urethra and neck of e bladder. They seem to be sufficiently often c- bined with stone in the bladder to lead u o suspect that the one disease contributes to e production of the other; and, indeed, I cons r that urinary calculi, stricture of the urethra r whatever other diseases here situated, causin - flammation of the prostatic part of the uret , and interrupting the free exit of the excretic f the prostatic ducts, dispose to the formatio f calculi of this description." These observati , by so learned and experienced a surgeon, s w the connection I have contended for; whils is subsequent remarks indicate, that the *third* le in which I have viewed the formation of t e calculi (§ 33.), is one to which he most j y attaches great importance, although he genera s more in respect of them than agrees with y views. "A distinction to be kept in min n respect of prostatic calculi, is," Dr. CROSSE - serves, "that they are not urinary concret , but are formed and may increase without e urine having access to them; they may, not -

ding, rise to the orifice of the prostatic ducts, et into, or be detained in, the urethra, or pass grade into the bladder, becoming the nuclei ind which deposits from the urine take place." ; is one of the modes of formation which I enumerated, and I could not have an abler iority upon which I might found my views.

6. *B. The Diagnosis of prostatic calculi* is om very clear, unless the calculi are large or ierous, or project into the urethra or bladder. Coulson justly observes, that "a retention rine or pain about the neck of the bladder, and uent desire to make water, are sometimes the symptoms; and these are common to several r affections of the prostate gland and urethra." *anum* the gland may be felt to be enlarged; , in some instances, the calculi may, by their iber, form, or size, furnish sufficient evidence heir presence, as in a case mentioned by Dr. rcet, where they could be plainly felt through coats of the rectum. When the calculi pro- from the gland into the urethra, the sound strike against it; but it will still be a question ther or no the calculus be one which has ed out of the bladder into the urethra. The ory of the case, and the existence, previously at the time of symptoms referable to the tate will be the chief guides to a diagnosis. en they strike or grate against an instrument will occasion sensations in both the prostate perinæum, and in the *glans penis*, which will cate their nature. When very large or nu- ous, they may be felt, as if in a cyst, *per m*, or they may protrude so as to be felt in the næum.

7. *C. Treatment.*—When severe symptoms are luced by prostatic calculi, then dysury, stric-, sacculi, inflammation and thickening of the s of the bladder all ensue; and in extreme s, and when it is fully ascertained upon the uisite examinations that large or numerous pros- calculi are present, it will be right, as advised Dr. Crosse, to cut down to the prostatic gland the perinæum, as in the lateral method of -cystotomy, and to remove the concretions. interesting case, recorded by Mr. Coulson . *Cit.* p. 273.), will further illustrate the treat- t, which is entirely surgical; and to this, as as to the remarks of other eminent writers ced in the *Bibliography*, I must refer the er.

8. vii. Concretions formed in the Veins, *t the prostate gland and neck of the bladder*, e been noticed by Meckel, Tiedemann, Otto, stein, and Crosse. The last named author es, that "in aged persons, particularly with hy- rophy of the prostate, a bladder diseased, and the s about it and the rectum varicose, concretions hosphate of lime, or carbonate of lime, vary- in size from a pin's head to a kidney-bean, are n found in the veins." Sometimes they present appearance of a white pea, and an inequality rojection answering to the part by which they ered to the vessel. These concretions have no nection with urinary or other excretions, and merely growths or concretions which had been erent to the coats of the vein. They approach rer to ossific than to calculous concretions.— osse, *Op. Cit. passim.*)

9. viii. The Complications of organic lesions he prostatic gland are those already noticed (§ 16.), especially inflammation and thickening of the coats of the bladder; structural lesions of the kidneys, strictures of the urethra, gleets and gonorrhœa; involuntary pollutions; the several diseases of the rectum, particularly hæmorrhoids, prolapsus ani, stricture or scirrhus; constipation and various affections of the colon, hæmorrhage from the urinary bladder, or from the urethra, or from the rectum, and intestinal worms.

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PRURIGO.

—Synon.—*Cnesmos* (*χνησμὸς*, Galen); — *Pruritus*, *Scabies papuliformis*, Auct.; *Exormia Prurigo*, Good; — *das Jucken*, *jeukte*, Germ.

Classif. — 6th *Class*, 3d *Order* (Good); —
1st *Order*, 3d *Genus* (Willan); — III.
Class, I. Order (*Author in Preface*).

1. Defin. — *An eruption of papulæ, larger than those of lichen, not materially differing from the colour of the skin; attended by excessive heat and pungent itching; becoming covered with small black scabs when scratched or abraded; leaving behind them yellowish stains; very chronic in duration, but not contagious, and generally unattended by fever.*

2. This eruption generally appears about the neck and shoulders, and sometimes extends to the face, trunk, and limbs, more especially to the back; and to the outer sides of the arms and thighs, in the line of extension, and assumes a severe character. It is occasionally confined to a single spot. Its mildest forms may decline in the course of three or four weeks; but much more frequently it continues several months, or even years, and is attended by a burning and intolerable itching. Willan has distinguished *three varieties* which may be modified in certain localities, or be limited to these localities, thus assuming *three local forms*. The *varieties*, according to Willan and other writers, are *Prurigo Mitis*, *P. Formicans*, and *P. Senilis*. The first and second differ from each other merely in degree; there being no fundamental distinction between them. The third variety has some peculiar characters.

3. I. Description. — i. *Prurigo mitis* appears in the form of small and slightly prominent papulæ,

broader than those of lichen, soft and smooth to the touch, and of the same colour as the skin. They are attended by incessant itching, which is greatly increased upon the removal of the clothes, by changes of temperature, by the warmth of bed, and by exercise. When left to themselves, or not aggravated by scratching, or by a heating regimen, they subside, with a slight exfoliation of the epidermis; but more commonly the relief of the pruritus attempted by scratching causes the removal of the tops of the papulæ, which then become covered by a small characteristic black scab, formed by the drying of a minute exudation of blood on the abraded spot. If the papulæ be much irritated, ecthymatous pustules are sometimes developed. This form of the eruption is most frequent in the spring and summer months in the situations above mentioned (§ 2.). It is often preceded by slight disorder of the digestive and excreting functions, especially of the latter, and occasionally by slight acceleration of pulse; but these are usually overlooked. The mildest cases may terminate in about three weeks; but more frequently fresh papulæ appear as the preceding vanish, and the eruption may thus be prolonged for several months.

4. ii. *Prurigo Formicans* is merely a severer form of the preceding. The papulæ are, however, generally larger — broader and more prominent, yet flat. They are distinct, nearly of the colour of the skin, if not torn by the nails, and commonly seated on the neck, back, loins, and external aspect of the limbs; although they may appear also on other parts. They are sometimes very numerous in young subjects. The itching is more severe and pungent than in the first variety, resembles the gnawing of innumerable ants, or the prickings of hot needles, and is increased towards evening by the heat of bed, and by the circumstances already noticed. **Rayer** remarks, that patients describing their feelings liken them to burning fires, and maddening itchings. **Alibert** says that **Plato**, **Charles V.**, **Charles IX.**, and other great men, were afflicted with this eruption; and that the Abbé **Morellet**, at the age of eighty, expressed himself as writhing on "St. **Lawrence**'s gridiron" when suffering from it. The warmth of bed sometimes increases the itching to such a pitch as to cause the patients to scratch themselves until they bleed, and as to prevent sleep until morning, or until exhaustion sinks them into it; when they often soon awake to be similarly tormented. The black scabs following the scratching are frequently the chief appearance of eruption, although redness of the skin is often produced for a short time by the scratching. The affection continues for months, and, with varying remissions or intermissions often for years, especially in weak children and adults, and in old persons. After the subsidence of the eruption the skin remains dry and thickened, and the epidermis exfoliates. This form of the complaint is generally preceded by disorder of the abdominal organs, and by slight fever, which tend to complicate and perpetuate it. Like numerous other cutaneous affections, it should be viewed as a local manifestation of disorder implicating the excreting functions and the state of the circulating fluids, and requiring a treatment directed accordingly. It may occur in both children and adults at any period of the year.

5. iii. *Prurigo Senilis*, or *senile prurigo*, clos resemble prurigo formicans; but the papulæ harder, larger, and more confluent. It is atten by incessant and insupportable itching, and r endure for years, with varying severity. papulæ are intermingled with small black sc and numerous scratches caused by attempts relieve the pruritus. In more prolonged cases skin becomes swollen, inflamed, and as if th ened; and the affection is sometimes complic with eruptions of vesicles, pustules, or boils, cording to the constitution and regimen of patient. Abscesses are even occasionally form But these external associations generally ceed from more or less marked disorder of the similating and excreting functions, more es cially of the liver, bowels, and kidneys; with without gastro-intestinal irritation or febrile citement.

6. In a severe case of senile prurigo, **Wili** found a number of minute *pulices* upon the s and he remarked the frequent association of *pediculus vestimentorum* with this eruption. very old persons, or in the debilitated, when eruption follows febrile diseases, and in those live on poor unwholesome food, but especiall debilitated persons in the decline of life, swa of *pediculi* not infrequently complicate this af tion. There is, however, also more or less diso of the abdominal functions; with either a poo impure state of the circulating fluids.

7. iv. *Local Forms.* — These are merely occurrence or limitation of prurigo — of its racteristic eruption, to certain localities, whe usually becomes severe and prolonged, and o sionally produces additional annoyance or distr In the several localities constituting these fo the eruption is similar to some one of the varie already described; the locality favouring no variety more than another. — *A. Prurigo poo* is generally an eruption of papulæ similar to t of *P. mitis*, but more frequently to those of *formicans* around the anus, sometimes extend to the perinæum, between the nates and thi The symptoms and duration of the eruption the same as stated above. After its long c tinuance the skin around the anus becomes rou thickened, and otherwise altered. — *B. Pru* *Scroti* is merely the extension of the eruptio the scrotum, and is not further peculiar in respect, the symptoms and sufferings being same as in the several varieties. — *C. Pru* *Pudendalis* is seated chiefly in the *labia ma* and mucous surface of the *vulva*. It is atten by constant but varying pruritus, occasio swelling or inflammation of the parts, someti with a serous exudation; and it induces se excitement, and self-pollution, amounting in s instances to nymphomania. This form someti occurs during pregnancy, and occasions m misery.

8. II. **Diagnosis.** — Prurigo is distinguis by the absence of colour from the papulæ, and the stinging or burning pruritus. It may, howe be confounded with *lichen* and some of the *cular eruptions.*—(*a.*) It is distinguished from *li* by the larger size of the papulæ, by the sr black scabs, and by the intense burning itch — (*b.*) Prurigo is most likely to be confoun with *scabies*, but the papulæ of prurigo are tish and of the same colour as the skin, wh

e vesicles are acuminated and rose-coloured. he vesicles of the latter terminate in yellow abs, and occur in exactly opposite situations to ose in which prurigo appears, namely, in the ternal surfaces of the limbs and in the line of xion. The pruritus of scabies is also much more pportable than that of prurigo. — (*c.*) Prurigo ay *co-exist* with lichen, scabies, and eczema, d with the pustules of impetigo and ecthyma. terminates by resolution or by furfuraceous squamation.

9. III. Prognosis. — Prurigo is not attended danger in the young, robust, or otherwise althy, although it may prove very obstinate and rassing to the patient. In debilitated, cachectic nstitutions; in old and ill-fed persons; and iere. cleanly habits are not duly observed, it is en incurable; and if it be associated in these th visceral disease, it may tend to shorten life. the complications especially, and particularly those with disorder of the abdominal organs, her the suppression of the external eruption, or e development of acute disease of these organs, ay be attended by severe or dangerous symptoms, pecially if the eruption disappear rapidly.

10. IV. Causes. — The first and second varieties prurigo occur chiefly in children and adults, d at all seasons, but more frequently in spring d summer. Senile prurigo is most common in e old, ill-fed, and in connection with an im- verished or impure state of the blood. Low and mp situations; poverty, and the want of clean- ess; unwholesome, deficient, or poor diet; the e of salt, stale, or dried, or otherwise preserved h, or of shell-fish; heating and stimulating uors and condiments; impaired excreting func- ns, especially by the liver, bowels, kidneys, and in; the neglect of aperient or chologogue me- cines, and of due evacuations; visceral disorders casioning, or even consequent upon, the accu- ulation of effœte materials in the circulation; e suppression or interruption of various depura- e functions, as amenorrhœa, &c.; the use of ty clothes, or of foul woollen bed-clothes, and foul or impure beds, stuffed with animal pro- ctions, as wool or feathers which have become ntaminated by the perspiration of many years occupation; the influence of mental emotions, d interruptions of the excreting functions, seve- lly and in various states and forms of associ- ion and succession, occasion this and various her chronic eruptions.

11. V. Treatment. — In all cases, especially e more protracted, of this complaint, the state the abdominal viscera, and of the several ex- etions should be closely examined, and existing sorder of these corrected or removed. — *A.* If ab- minal plethora or congestion of any of the abdo- inal viscera be present, a moderate vascular de- etion may be prescribed; and Plummer's pill ith soap be given at bed-time, and an aperient the morning, consisting of the electuary of nna with magnesia and milk of sulphur. A dose a bitter infusion, as calumba or chereita, may taken once or twice daily, with the sesqui- rbonates of potash and ammonia. Having re- oved accumulated or morbid excretions, and omoted the discharge of effœte materials from e blood, the healthy functions of the skin should restored by a frequent use of warm alkaline, or soap, or of sulphur baths; and by the internal administration of sulphur with magnesia, or with an alkaline carbonate, every night, or both night and morning. When the skin is dry and rough, these baths may be alternated with vapour baths, or with baths containing the bi-borate of soda, and followed by warm baths with gelatin or mucilaginous substances, as tragacanth, two or three days being allowed to elapse after the mucilaginous baths in order to observe their effects. These last baths may likewise contain either of the alkaline sub-carbonates, from one to four ounces to each bath, according to the size and age of the patient. Where the skin is delicate and irritable, then irritating baths and applications ought to be avoided; simple warm or soap-baths, or gelatinous, emollient, or mucilaginous baths being most serviceable. If these fail, the state of the assimilative and excreting viscera should be strictly examined, in order to detect lurking disorder; for generally to this cause is the obstinacy of the complaint owing, and to it also are to be imputed the injurious and often dangerous consequences of suppressing the eruption before, or without, attending sufficiently to the states of the abdominal functions and organs.

12. Various ointments, and greasy or oily applications have been recommended for this eruption, especially those containing sulphur, the iodide of potassium, and muriate of ammonia; but independently of the unpleasantness of such applications to an extensive surface, they soon become, owing to the action of the air upon them, more or less irritating, although they may, at first, have afforded a little ease. If they be at all prescribed, they ought to be followed, in eight or ten hours, by a warm saponaceous or emollient bath. Instead of these I have generally employed a lotion with the hydrochlorate of ammonia; or a very weak solution of the bi-chloride of mercury, with or without the vinum opii, or watery extract of opium; or a solution of the sulphuret of potash; or a solution of the bi-borate of soda, or chlorate of soda or potash, or of the alkaline sub-carbonates, or diluted pyroligneous acetic acid, with the addition of creasote. These are severally beneficial; and whilst camphor-water, rose-water, or elder-flower water, may be used as the vehicles of the active agents, opium, or hydrocyanic acid may be added according to the circumstances of the case. In the more obstinate cases, I have prescribed, after due attention to the abdominal functions and organs, a weak solution of the iodide of potassium with a watery solution of opium, as a lotion, and sometimes also this iodide or the iodide of iron internally with sarsaparilla or with taraxacum, and have observed much benefit accrue from the treatment.

13. *B. The senile variety* of prurigo will generally be removed, if it be capable of removal, by the means above recommended, especially if due attention be paid to the states of the several excreting viscera, and to *diet* and *regimen.* The utmost cleanliness should be observed; and as there is often not only debility, but also anæmia, or an impoverished state of the blood, in these cases, tonics and chalybeates should be associated with carbonate of ammonia, or with either of the other alkaline carbonates in the treatment. The patient should sleep on a hair mattress; and the bowels ought to be duly regulated by means of sulphur with magnesia, or of any stomachic aperient which

may be found to agree the best, as the infusions of gentian and senna with the sesqui-carbonates of ammonia and of soda.

14. When the eruption is associated with the production of *pediculi*, a tonic treatment is more especially required, aided by cinnabar fumigations, or by frequent sulphur baths, or by lotions with the bi-chloride of mercury. A trial, in the most obstinate cases, may be given to *mineral waters*, especially when the excreting organs are torpid. The waters of *Cauterets*, or of *Bônnes*, or of *Barèges*, or of *Carlsbad*, may be taken. Of these the *Barèges* water may be preferred; but I believe the sulphureous waters of *Harrogate*, or of *Gilsland Spa*, or of *Moffat*, to be equally, if not more beneficial in this complaint; aided by warm bathing, due exercise, and appropriate diet. Whilst the *diet* is sufficiently nutritious it ought to be digestible; and fish, shell-fish; pork, veal, ham, bacon; heating condiments and rich sauces, coffee, and stimulating beverages, should be avoided.

15. C. *The local varieties* require chiefly the means already noticed. — (*a.*) *Prurigo podicis*, and *P. scroti* are often connected with chronic irritation of the rectum and of its mucous follicles, owing either to the presence of *ascarides*, or to *hæmorrhoidal affection*. In these cases, small injections of some of the lotions above mentioned into the rectum; great attention to cleanliness; the treatment, local and general, advised for these diseases; the application, by means of a sponge, of the lotions already enumerated (§ 12.), or of a weak solution of the acetate of lead with vinum opii, especially immediately after each stool; local fumigations with sulphur or cinnabar, and an occasional application of leeches, in plethoric persons, will seldom fail to remove the complaint, which, however, is very prone to recur, after neglect or errors of diet and regimen.

16. (*b.*) *Prurigo pudendalis* being sometimes occasioned by disordered catamenial functions, or by leucorrhœa, or by pregnancy, and complicated with either of these, requires an especial reference to the existence or non-existence of either. In these cases, the internal, external, and dietetic means already specified are of more or less service; but in these complications they may all fail, and the patient be reduced to a state of great misery. Treatment often fails during pregnancy, although the complaint will generally disappear after delivery. In some cases it has recurred in each pregnancy, and has even re-appeared after the change of life. The application of leeches to the vulva; cooling aperients and enemata, and cooling and detergent injections *per vaginam*, or similar lotions to the *vulva*, are commonly of use. It is not rare to find this variety associated with one or more small boils of the labia majora, and, in these cases, the lead lotion with vinum opii will remove the affection at any early stage; and poultices, or warm fomentations afford relief at a more advanced state. *Prurigo vulvæ* has generally disappeared, after the use of a lotion consisting of a saturated solution of the bi-borate of soda in rose or elder-flower water, either with or without the addition of the vinum opii, or of the pure acetic acid, or of both.

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PRURITUS — Synon. — *Hyperæsthesia cutis* — *Itching, morbid sensibility of the skin* — *Pruri Démangeaison*, Fr.; — *das Jucken, die Reit barkeit*, Germ.

Classif. — III. Class. I. Order. (*Autho in Preface.*).

1. Defin. — *Itching over a greater or less exte of the cutaneous surface, or limited to a particula part without any perceptible eruption, and gen rally symptomatic of some internal disorder.*

2. Pruritus, more or less general, is usual symptomatic of disorders of the digestive orga or of some irritation of the digestive canal, e pecially intestinal worms. In these cases, t irritation of the mucous surface is propagated t or reflected upon, the extremities of the nerv supplying the skin. The itching is often annoyin and is generally remittent; but it often continu in this form for many months. It is exacerbat by the same causes as those which increa prurigo, especially by changes of temperature, l stimulants and heating condiments, by hot spic by opium, and by directing the attention to it. some idiosyncrasies, various articles of diet or medicine occasion it; and then it usually co tinues only for a short time. Shell-fish, or fish any kind; smoked, dried, or preserved meats, & sometimes cause it. It is not infrequently symptom of disorder of the uterine discharge, hysteria; of the slighter states of irritation of t spinal chord or membranes, and of several eru tions.

3. i. *The local or limited states* of pruritus or itc ing may arise from the same causes as those n mentioned; but they much more frequently p ceed from others, more immediately connect with the seat of itching. In most instances, ho ever, of local pruritus, there is more or less fu tional disorder of the digestive organs, or acc mulation of fæcal or excrementitial matters. (*a.*) *Pruritus nasi* is often sympathetical of intesti worms, and even of ascarides in the rectum, or fæcal collections in the large bowels, or of d peptic disorders. — (*b.*) *Pruritus urethræ* is oft a very troublesome affection. Itching of t extremity or course of the male urethra is m frequently caused by calculus or gravel in t bladder, or by irritation of the prostate gland stricture of the urethra. In females it is connec either with calculus in the bladder, or with l corrhœa of uterine disorder. — (*c.*) *Pruritus vu* is often a most distressing affection. It is sea chiefly in the labia majora, but it frequently i plicates the clitoris and nymphæ, or even exte up the vagina. It is usually caused by ascari in the rectum, by disorder of the catamenia, leucorrhœa, by self-pollution, and by hæmorrhoi

is not uncommon during the periods of puberty, id the cessation of the menses, and especially uring pregnancy. — (*d.*) *Pruritus ani* is often a ery troublesome and obstinate complaint, and is ost annoying soon after retiring to rest. It is sually *caused* by ascarides in the rectum, by emorrhoids, by fistula ani, by neglect of cleanly ibits, by morbid states of the intestinal secretions, pecially of the mucous follicles of the rectum, id by irritation or congestions of the prostate and and vesiculæ seminales. It is often comained of by persons of sedentary occupations and ibits, and by those who sit on soft and warm ishions. The itching, although occurring indendently of any visible eruption, when repeated protracted, often occasions slight excoriations id thickening around the margin of the anus.

4. ii. *Diagnosis.* — Pruritus can be confounded ily with *prurigo*, from which it is distinguished the absence of any visible eruption, unless such dness, or excoriation as may result from scratchg, and the mechanical irritation employed to move or relieve this annoying sensation.

5. iii. *Treatment.* — This should be directed to e removal of the morbid condition of the viscera, on which the pruritus depends. This is most ectually accomplished by occasional doses of irits of turpentine and castor oil, and by enemata the same, so as fully to evacuate all accumulated morbid matters from the bowels. Afterwards e lotions I have prescribed for Prurigo (§ 12.), pecially the lead lotion with opium; diluted negar or lemon juice with creasote; a weak solun of bi-chloride of mercury with some hydrolorate of ammonia; or the solution of the birate of soda. Attention should be directed, in treatment of the pruritus of females, to the te of the uterine functions, which ought to be ly promoted; and, when congestion of the erine organs, or of any of the abdominal viscera present, especially if the patient be young and thoric, or if the parts become hot or excoriated, n local depletions, followed by hot fomentations required. The *diet, regimen*, and *treatment*, in most respects the same as advised for URIGO.

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SOÆ MUSCLES, INFLAMMATION AND SUPPURATION OF. — Synon. — *Psoitis*, Auct. Lat.; — *Psoite, Inflammation des Muscles lombaires*, Fr.; *Entzündung der Lendenmuskeln*, Germ.; — *Psoas abscess*; — *Lumbar abscess*.

Classif. — III. Class. I. Order. (*See Preface.*)

1. Defin. — i. Nosolog. — *Pain in the loins erally on one side, commencing and existing iniously, but often becoming severe, and extending the hip, thigh, and knee-joint, caused by inflamtion and suppuration, the pus collecting around muscles, and descending with more or less tuur, either under* Poupart's *ligament, or in some er direction.*

2. ii. Patholog. — *Inflammation of the cellular tissues surrounding the psoæ lumbar and adjoining muscles, generally originating in caries of the bodies of the vertebræ, or in inflammation of the intervertebral substance, the muscles themselves ultimately becoming disorganized, and the purulent collection gravitating in the course of the cellular tissue, and opening or forming a tumour as above and as hereafter stated.*

3. I. The Causes of *Psoas* or *lumbar abscess* are the scrofulous, the rheumatic, and the gouty diathesis; a cachectic habit of body, tubercular changes or deposits in the bodies of the vertebræ; caries of the vertebræ, especially the lumbar; inflammation of the invertebral substance; violent exertion of the lumbar muscles, external violence, severe strains, or sudden jerks or twists of the loins; currents of cold air on the back or loins; and ulcerations of the cæcum extending to the peri-cæcal cellular tissue. Caries of the dorsal or lumbar vertebræ, or inflammation of the intervertebral spaces are the most common causes of psoitis and lumbar abscess. Of nineteen cases detailed by Abernethy only two were independent of disease of the spine. He observes that the general opinion of surgeons, in which he entirely concurs, is that lumbar abscesses most frequently arise from diseases of the vertebræ; and they should certainly all be treated as if such were their origin.

4. II. Symptoms. — *Psoitis* sometimes occurs suddenly, and the patient complains of pain in the loins, especially on one side. Walking becomes troublesome; the thighs can be neither raised nor extended without pain. The disease sometimes commences gradually, with pricking pains, which, becoming more severe, extend to the hip, and to the thigh, and even to the knee-joint. Sometimes the progress of inflammation is so insidious as hardly to be noticed, until the mischief appears in the form of a purulent collection. According to the extent of vertebral disease, and the degree of inflammation, does suppuration appear early or late; but the abscess which is formed generally assumes a *chronic* state, and is of a *symptomatic* character, as it is *consecutive* of inflammation and caries of the vertebræ. The chronic abscess, termed *psoas* or *lumbar abscess*, commonly forms in consequence of disease of the vertebræ of the back or loins. Matter is secreted around the diseased vertebræ, and then descends through the loose cellular tissue covering the muscles, along the side of the pelvis into the thigh. It may take a course towards the back, or may go in various directions either within or without the pelvis. The pus formed about the seat of caries remains there for a longer or shorter time, especially in the cellular tissue. As the pus collects and increases it forms a cyst, which descends, and lengthens as it inclines to either or to both sides of the vertebral column. As the pus accumulates it pushes onwards the lower end of the cyst, which, if it meet with any obstacle, spreads out, but contracts when pressed on by the adjoining parts, and dilates again when relieved from pressure; until it at last arrives at the place when it projects, or breaks. In the route which the purulent matter thus takes, the psoæ and other lumbar muscles are inflamed, pressed upon, partially absorbed and disorganised, owing to the extension of the inflammation and purulent infiltrations to them and their connecting cellular tissue.

5. The abscess most frequently protrudes below Poupart's ligament, and it generally extends or opens at a greater or less distance from the original seat of disease. It may, however, point or open into the cæcum, into the colon, or the rectum, or in some part of the back, or in the loins just above the sacrum; or it may make its way to the hip, or the groin, and proceed even down the thigh in the direction of the large vessels. As the matter is seated behind the peritoneum, and as it generally gravitates according to the position of the body, it very rarely perforates this membrane and becomes effused into the abdominal cavity. As the purulent matter increases, and presses upon, or otherwise implicates, or even inflames, the larger veins, nerves, or arteries, so are the symptoms either of phlebitis, or of neuritis, or of artereitis, according to the situation and extent of the abscess, not infrequently superinduced, and *complicated* with the advanced progress of the disease, in addition to the primary lesion of the spine. I have repeatedly met with these complications, which have greatly aggravated the sufferings of the patient. If during its increase the abscess breaks externally, or is opened so as to admit the air, pus is discharged, at first without smell; but it subsequently becomes offensive; and the hectic symptoms more marked. The powers of the patient sink, and the stomach becomes irritable. In some cases the aperture either closes, and matter again collects, or it contracts, and remains fistulous for a considerable time.

6. III. Diagnosis. — (*a.*) During the formation of matter the patient suffers pain in the loins, and walking is painful. When the abscess is not large, the usual symptoms of suppuration may be absent, or so slight as to escape observation. Night or morning sweats, emaciation, and other hectic symptoms, however, generally appear or increase with the progress of the complaint. When the purulent collection has increased so as to form an external tumour either in the groin or in the loins, or near the anus, a movement may be perceived in it upon coughing. When the matter has gravitated towards the thigh or anus, the tumour is lessened by the recumbent posture. If the patient has suffered continued pain in the loins for four, five, or six months; if he has difficulty in extending the thigh, especially when putting his legs together; if he feels pain and tightness in the groin, and increase of pain on attempting to exert the limb, or when the psoas muscle is either put on the stretch or exerted, then this disease should be suspected, even although no external tumour has yet appeared; but if such tumour is present, there can be little doubt of its nature.

7. (*b.*) Psoas abscess, when protruding under Poupart's ligament, may, as Mr. South observes, be mistaken for *femoral hernia*, especially as it dilates on coughing, and partly subsides when the patient lies down. But it is generally of larger size than femoral rupture, and the fingers cannot be at all thrust around it, as they partially may behind the hernial sac. The chief distinctions, however, are the long continuance of pain in the loins previously to its appearance, the persistence of that pain, and the remarkable increase of pain produced by attempting to extend the thigh, especially backwards, or the entire inability to do so. "When the abscess appears in the loins, there is no difficulty in determining its character by its history, and by its dilatatio on coughing. Pulsation may sometimes be communicated to it from the adjoining large vessels; and thus it may be mistaken for aneurism, if th history of the case and the existing symptoms b not attentively investigated.

8. (*c.*) The diagnosis between psoas absce and *disease of the hip-joint* is not always, althoug it is frequently, easy. It has been well pointe out by Mr. Coulson (*On Disease of the Hi Joint*, 4to, Lond. 1837, p. 72.), and nearly follows: — 1st. In psoas disease, the patient g nerally complains of dull or of severe pain in th loins, which is increased by the upright postur and by every motion of the limb, particularly extending it: in diseased hip, there is no fix pain in the loins; it is felt more in the vicinity the hip, and especially in the knee: — 2d. In th whole course of psoas disease there is no devi tion in the natural situation of the trochant and no difference in the length of both limbs; diseased hip, on the contrary, this is always t case: — 3d. In psoitis and lumbar abscess, t patient cannot turn the foot of the affected si outwards, without increasing the pain; in diseas hip, the foot is generally turned outwards: 4th. On taking a deep inspiration, on coughin crying, and in the erect posture, the fluctuati swelling either in front of the thigh or on t nates increases, and exit of matter, if the absc be open, is facilitated; but in abscess of t hip-joint neither phenomenon is observed.

9. IV. Prognosis. — The prognosis of psoi especially when the inflammation has gone on abscess, is extremely unfavourable. Profes Colles states that not one patient out of fi recovers from it; and that, in the course of practice, he has not known five cases in all cover. He never knew a case get well wher surgeon interfered at all with it. In my o practice, I know only of two recoveries. I these no surgical aid was required, beyond formation of an issue in the back or loins. Wh psoas abscess is *complicated* with tubercles in lungs, or with paraplegia, or with phlebitis neuritis, instances of such complications hav occurred in my practice, the case is then ho less. I may, however, add, that psoas absc may become complicated with hip-disease, a c of this association — the latter supervening on former — having been under my care; or h disease may give rise to psoas abscess, as sho by Dr. M'Dowell.

10. V. Treatment. — This disease usua appears so insidiously, and advances so slow that it has proceeded, in most cases, beyond influence of treatment before medical aid is quired. When it is recognised at an early sta and especially when the lesions of the verteb are not far advanced, or the inflammation con quent upon them has not given rise to mu suppuration, then reasonable hopes may be ent tained from the use of appropriate means. If powers of the patient be not reduced, if there no sign of anæmia, or of impaired vascular act and tone, the application of leeches, or cupp in the vicinity of the vertebral lesion, accord to the state of the case, should be prescribed, aided by stomachic aperients and cooling diap retics, with suitable attention to diet and perf quietude. After sufficient local depletion, I h

enerally directed either of the following embroations to be applied to the back or loins by ieans of flannel, and renewed once in the twenty-our hours if it be found to agree; the senations of the patient, the state of the pulse, and careful observation of all the symptoms, guidig the physician.

No. 325. ℞ Linimenti camphoræ comp.; Linimenti erebinthinæ; Linim. saponis cum opio, āā, ℥j.; Olei ajuputi ʒj. ♏ Fiat embrocatio.

No. 326. ℞ Linimenti terebinthinæ, Linimenti camhoræ comp., āā, ℥jss.; Olei olivæ ℥iij.; Olei cajuputi j. ♏ Fiat embrocatio.

11. If these embrocations fail, after local depleions and other constitutional or suitable means, to rrest the progress of the disease, open blisters in the icinity of the part, or issues ought to be ordered, nd kept freely discharging; whilst an alterative nd restorative influence should be exerted on he constitution by a course either of the iodide of ron with sarsaparilla, or of the iodide of potasium and liquor potassæ, with compound tincture f bark and fluid extract of sarsa; or of the bihloride of mercury, in either the compound incture or decoction of cinchona. I have alterated short courses of these, varying them acording to circumstances, during the operation of he applications, issues, &c. advised to be applied ear the diseased vertebræ, and often with marked enefit. I have prescribed iodine for this disease ince 1822.

12. Several surgical writers, even Abernehy, Cooper, Dupuytren, Lawrence, Pearon, Chelius, South, and others, have directed heir attention and their treatment chiefly to he consecutive abscess. But, if the abscess e not large, if it be not complicated with paaplegia, or if it occasion no distressing sympoms, as it sometimes does, by its pressure on ervous, venous, or arterial trunks, or large ranches, it should not be officiously interfered with; the external drains, &c. placed near the liseased vertebræ, the constitutional means precribed above (§ 11.), and such other aids, as tomachic aperients, &c., as the peculiarities of he case may require, being the remedies most leserving of confidence. If these means succeed n even partially removing the spinal disease, the consecutive abscess, if not large, will either diminish or become absorbed, at least in some instances, as in two of those which have come under my care, and for which the above treatment, without opening the abscess, was pursued. In one of these cases, the treatment sometimes consisted, during the intervals between courses of the above medicines (§ 11.), chiefly of full and regular doses of either morphia or opium, which also were occasionally given with these medicines.

13. When the inflammation terminates in suppuration, and an abscess is formed, Chelius remarks, that the absorption of the matter may be procured in some cases, although rarely, by issues or perpetual blisters in the loins, and by general treatment, which promotes the abdominal functions and the patient's strength. Dupuytren observes, that these abscesses may remain for years; and the pus either be absorbed, no trace of them remaining, or, after a time, they may increase, the skin covering them becoming inflamed and giving way. In rare instances, the pus may drain away, and not be reproduced, or, after a longer or shorter time, it may be converted into adipocerous matter. These, however, are favourable terminations of rare occurrence. Much more frequently the abscess goes on increasing, either until it inflames and bursts the skin at the most prominent point, or until it opens into one of the hollow viscera, or until the distressing effects produced by it, as already adverted to, create a necessity for opening it.

14. Mr. South observes, that issues are most important aids in the treatment of psoas abscess, either before or after it has opened of itself, or been punctured; and that no circumstance should prevent a recourse to them. He advises the issue to be made on the side of the spine opposite to that where the abscess is seated. If presenting in one of the lumbar regions, the issue should be made at the outer margin of the quadratus lumborum of the opposite side; but if there be abscess in both lumbar regions, issues ought to be placed above and below them. If the swelling appear at the top of the thigh, an issue may be made on the same side, or in both sides of the spine, but never over the spine, nor over the abscess itself, for very obvious reasons. The issue should be made the size of a sixpence, with caustic potash, and it will generally enlarge to that of a shilling: one, or both, should be kept freely open and discharging, as just advised; whilst the constitutional and restorative powers ought to be promoted by the means recommended above.

15. Much difference of opinion exists as to the propriety of opening psoas or lumbar abscess, or of waiting for the self-evacuation of it. My own observation leads me to state, that there are cases for which surgical interference is either unnecessary or injurious; whilst there are others for which it may be most beneficially employed, if not for a cure, at least for the alleviation of the sufferings of the patient, and prolongation of life. When required, the opening should be made, as advised by Mr. Abernethy, so as entirely to prevent the entrance of air through the aperture, otherwise inflammation of the sac, increased hectic, offensive discharge, and sinking of the powers of life, will ensue. An opening thus carefully made, and subsequently managed as carefully, will often prevent those painful complications observed in the advanced course of the malady, and to which surgeons have not sufficiently adverted. The occasional inflammation and erosion of vessels adjoining the purulent collection, and the distressing symptoms which result, as well as the not unusual implication of a nervous trunk, or of some other important part, may be prevented, or even alleviated after their appearance, by opening the abscess before it has become so greatly distended as to complicate the case and increase the sufferings of the patient. Mr. South has given a good digest of surgical opinions on this topic, with his own advice, and to his translation of Chelius's system of surgery I refer the reader respecting it. I should, however, add, that whether the abscess be opened or not, the issues and constitutional treatment I have recommended, with opium and other aids, and alternated, modified, or changed, as circumstances may require, ought to be persisted in throughout the disease.

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PSORIASIS AND LEPRIASIS. — SYNON. —

PSORIASIS, Ψωριασις (from ψωρα, scabies, itch); *Impetigo, Scabies,* Celsus; *Impetigo,* Sennert, Plenck; *Scabies sicca,* Plater, Hoffman; *Psoriasis,* Vogel, Swediaur, Willan, Bateman; *Lepidosis psoriasis,* Young, Good; *Dartre, Dartre furfuracée,* Fr.; *Kleinaussatz,* Germ.; *Dry tetter, Dry Scall.*

LEPRIASIS, *Lepra,* Λέπρα (from λεπρὸς, scaly, rough). *Leuce, Alphos, Impetigo, Vitiligo,* Celsus; *Impetigo excorticativa,* Avicenna; *Lepra,* Sauvages, Sagar, Cullen, Willan, Young, &c.; *Lepidosis lepriasis,* Good; *Lèpre,* Fr.; *Dartre squammeuse,* Alibert; *Aussatz,* Germ.; *Scaly Leprosy, Leprous Scall.*

CLASSIF. — 4. *Class;* 8. *Order* (CULLEN). 6. *Class;* 3. *Order* (*Good*). ii. *Order.* 2. *Genus* (Willan and Bateman). III. CLASS; I. ORDER (*Author*).

1. DEFIN. — *A chronic inflammation of the skin, either limited to a particular region or extended more or less over the surface, appearing first with slight elevations, which change into scaly patches; the patches of* psoriasis *being of different sizes, not depressed in the centres, but with irregular and very slightly raised edges; those of* Lepriasis, *being generally rounded, slightly depressed in the centres, and surrounded by slightly raised and reddish circles.*

2. Both *Psoriasis* and *Lepriasis* or *Lepra,* were considered as modifications of the same disease by most of the ancients, and they are treated of by PAULUS ÆGINETA by the terms "*Leprosy and Psora.*" He states that "both these affections consist of an asperity of the skin, with pruritus or wasting of the body, having their origin from a melancholic humour. But leprosy spreads over the skin more deeply in a circular form, throwing out scales which resemble those of fishes; but psora is more superficial and variously figured, and throws out furfuraceous bodies." (*Transl. by* ADAMS, vol. ii. p. 15.) Mr. ADAMS concludes his remarks respecting the views of the ancients as to these affections as follows: — "It will be remarked that the Leuce of the Greeks, the leuce and fourth species of impetigo of CELSUS, and the albarras of most of the Arabians, are the same as the *lepra vulgaris* of Drs. WILLAN and BATEMAN; that the alphos of most of the Greek authorities and of CELSUS, and the morphia alba of most of the Arabians, correspond with the *lepra alphoides*
of our English nosologists; that the melas, alph
niger, and common lepra of the Greeks, CELSUS
third species of impetigo and his melas, and t
morphia nigra and impetigo of most of the Arabia
translators, apply to the *lepra nigricans* of o
modern arrangement; and that the psora of t
Greeks, CELSUS's second species of impetigo, a
the scabies of OCTAVIUS HORATIANUS, and of mo
of the Arabian translators comprehend both t
psoriasis and *scabies* of WILLAN and BATEMA
Since many of the ancient authorities speak
scabies as being infectious, they must have appli
the term to the true itch, with which it is n
likely, as RAYER maintains, that they were whol
unacquainted. The earlier modern writers,
those of the Schola Salernitana, PLATERIUS, G
OF CAULIAC, and LANFRANCUS, jumble togeth
the Latin and Arabian names, so as to produ
no ordinary degree of confusion." — (*Op. Cit.* vol.
p. 21.)

3. I. CAUSES. — The *causes* of the several v
rieties of both *Psoriasis* and *Lepriasis* are t
same; or the same causes are common to b
these species. — *A. The predisposing causes*
chiefly hereditary conformation, the melancho
temperament, and an habitual languor and we
ness of the circulation in the integuments, w
dryness of the skin. These affections occur at
ages and in both sexes; but somewhat more f
quently in adults and in those advanced in l
The influence of sex is not great, some writ
stating that they are more frequent in femal
others in males. They are both constitutio
maladies, and are often connected with disorde
abdominal functions, both at their origin, and
their course. They are sometimes connec
with the gouty and rheumatic diathesis, and t
may appear at any season, but more frequentl
spring and autumn — lepriasis oftener in autun
Prolonged or neglected dyspepsia; inattention
the states of the bowels and of the intestinal
cretions and excretions; the habitual retention
accumulation of fæcal matters, improper and
sufficient food; mental anxieties, and sex
excesses also predispose to these eruptions.

4. *B. The occasional exciting causes* are the
of salted, dried, smoked, or otherwise preser
meats and fish; the frequent use of shell-fi
irregularities and improprieties of diet, the us
pork or the flesh of the wild boar, bacon, hams, &
drinking cold fluids when the body is perspiri
vicissitudes of temperature and weather; p
innutritious, or unwholesome food; exposure
cold or moisture, and living in low, damp cel
or localities; prolonged anxiety of mind;
frequent use of heating and stimulating f
sauces, spices, condiments, pickles, preser
acids, or spirituous liquors; debaucheries or
cesses of any kind; the want of sufficient
sonal cleanliness; and the irritation produced
various substances employed in several of
useful arts.

5. The *contagious* or *non-contagious natur*
these eruptions has long been a topic of disp
especially as they appear in countries borde
upon the Mediterranean Sea. My friend
colleague, Mr. DENDY, has considered the sub
very fully in his unpublished work on these
ladies, which he kindly allowed me to per
and concludes that in this country they are
contagious. WILLAN has observed that *psor*

guttata and *annulata* affect several children about the same time in large families and schools, especially those who sleep together, and the same remark is made by Mr. E. WILSON and others. The simulation of contagion must, however, arise from the constitutional predisposition to these eruptions undoubtedly existing in some families, and from the simultaneous operation of the same exciting causes. The topic, however, deserves further investigation.

6. I have observed these eruptions more frequently in unmarried than in married females. They are often dependent upon impaired digestion and assimilation, and upon equally impaired function of the skin, kidneys, and intestinal canal, the blood thereby abounding in imperfectly assimilated chyle and in effœte materials. I have seldom observed them in females, whose catamenial discharges were quite regular and sufficient, these discharges, when healthy, being manifestly depurative as respects the circulation, and no mean preventive of chronic cutaneous eruptions. Many modern pathologists have viewed both *psoriasis* and *lepriasis* as symptomatic of gastro-intestinal irritation. That there is more or less disorder of the digestive canal in most cases of both these eruptions must be admitted; but it does not strictly follow that this disorder consists of inflammatory irritation. It is generally functional, merely—a defect of function as much as disorder of function, the digestive and assimilative derangement and the cutaneous affection proceeding from the same source, viz. impaired organic nervous power, the cutaneous disorder only being the last of the series of functional and morbid changes.

7. Every *arrangement* of the scaly eruptions must necessarily be, to a certain extent, conventional, and be based on the more prominent phenomena and differences which they present. The chief points of difference have thus become the most familiar, as being the most commonly noted and represented, whilst the gradations by which the one variety and species pass into the other are so far kept out of view as to be either overlooked or unacknowledged. That this is the case more especially with the three species of scaly eruptions to which the terms of *pityriasis*, *psoriasis*, and *lepra* have been applied is not to be doubted by any one whose knowledge of them has been acquired from observation, and not from writers who have been more anxious to create distinctions than to trace resemblances. That these three species of eruption do not merely present points of resemblance in most cases, and even of identity in others, but also originate in the same or similar causes, will be further admitted. Nor are their causes only the same, their constitutional nature, their associations and their tendencies are also the same or closely similar. Still, it becomes necessary to describe those differences which may be remarked in their external characters, and which enable us to recognise as well as to classify them. The intimate connection subsisting between these eruptions is shown by the circumstance of their presenting, in some cases, the distinct features of psoriasis in one part, and in another part those of lepriasis; and it occasionally happens that pityriasis of very long duration, or the acute or inflammatory form of that species, when it becomes very chronic, assumes the form either of psoriasis or of lepra, whilst lepra of long duration often passes into the form of psoriasis inveterata. The three species of eruption, moreover, require the same constitutional and local treatment. For these and other reasons mentioned when treating of *tubercular leprosy*, or the leprosy of the Arabians and middle ages (see art. LEPROSY), I have viewed lepra as merely a species belonging to the same genus as psoriasis and pityriasis; and have treated of psoriasis and lepra in connection, their causes, pathology, and treatment being the same.*

8. II. DESCRIPTION.—i. PSORIASIS GUTTATA — SYNON. — *Lepra alphoides; Lepriasis albida*, Good; *Psoriasis discreta*, Rayer; *Dartre squammeuse orbiculaire*, Alibert; *Lepriasis guttata*, Dendy; *Guttated dry scall.*—Psoriasis, even in this the mildest of its forms, is often preceded or attended by symptoms of indigestion, lassitude and inaptitude for physical or mental exertion; but these are often so slight as to be overlooked. In this variety numbers of small, distinct, elevations or papulæ occur, sometimes appearing at first of the size of a pin's head, their summits soon becoming covered with a minute scale, of a

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* My Colleague, Mr. DENDY, whose experience in the treatment of these eruptions is very great, has endeavoured to clear up the confusion, existing even down to the present day, respecting squamous diseases. He has arranged *psoriasis*, *lepra*, and the inflammatory form of *pityriasis* as *species* constituting one *genus* "*Lepriasis*," and has assigned to each species what he considers its *synonyme* in ancient and modern authorities. His views, as well as his descriptions, are most deserving attention. I give his arrangement, but I take the liberty of placing his species, "*Lepriasis furfurans*," or acute pityriasis, before the other more chronic and severe species, consisting of psoriasis and lepra.

LEPRIASIS.[1] — SYNON. — *Zaraab*, H. — *Kouba, Kuba, Alkauba*, Ar.—Λεπραι, Gr. — *Lepra*, W. — *Lepidosis lepriasis*, G. — *Scale-skin, Leprosy, Scaly leprosy.*

SPECIES i. LEPRIASIS FURFURANS. — SYNON. — *Alvarati*, Ar.—*Tinea, Porrigo, Dartre furfuracée*, Al.—*Teigne amiantacée; Pityriasis*, W.—*Pityriasis acuta*, R.

SPEC. ii. LEPRIASIS GUTTATA.— SYNON. — Αλφος, Gr.—*Alphos*, C. — *Lepra alphoides; Psoriasis guttata*, W. — *Dartre squammeuse orbiculaire*, Al. — *Lepriasis albida*, G. — *Psoriasis discreta*, R. — *Guttated dry scall. Spotted leprosy.*

SPEC. iii. LEPRIASIS ANNULATA. — SYNON. — *Boak; Behag*, H.—*Bohak, Bothor*, Ar. — (*Translated pearly or dull white leprosy*). — Λεπραι, Gr. — *Lepra Græcorum, vitiligo*, C. — *Lepra Vulgaris*, W. — *Dartre squammeuse arrondie*, Al. — *Psoriasis circinnatus; Lepidosis lepriasis*, G. — *Lepra; Leprosy; Greek, leprosy.*

VAR. — *Centrifugal; Crescentic; Gyrated.*

SPEC. iv. LEPRIASIS DIFFUSA. — SYNON. — *Saphat*, H.— (*Translated spreading dry scall.*) — *Sahafati*, Ar. — Ψωρα λεπρωδης, Gr.—*Scabies sicca, s. Crassa, Itch.*—*Psoriasis diffusa*, W.—*Psoriasis confluens*, R. — *Lepidosis Psoriasis*, G. — *Dry scall; Scaly tetter.*

VAR.—*Confluent*, &c.

SPEC. v. LEPRIASIS INVETERATA. — SYNON. — *Bahereth lebena*, H.—(*Trans. Plague of Leprosy*):—*Beras begas*, Ar. — Λευκη, Gr. — *Agria. — Bright white leprosy. — Lichen agrius. — Pellagra. — Acrodynia.— Psoriasis inveterata*, W.—*Dartre squammeuse invétéré: Lichenoide*, Al. — *Lepriasis Candida*, G. — *Inveterate dry scall.*

VAR. — *Scabida. — Indurata. — Prominens.*

SPEC. vi. LEPRIASIS LIVIDA. — SYNON. — *Bahereth cecha*, H.—τσορατ, Gr.—*Beras asved*, Ar.—*Melas*, C.—*Lepra nigricans*, W. — *Lepriasis nigricans*, G. — *Black albaras. — Black morphia.— Dusky or black leprosy.*

SPEC. vii. LEPRIASIS SYPHILITICA. — SYNON. — *Lepra Syphilitica, Psoriasis Syphilitica*, W. — *Syphilide pustuleuse*, Al.—*Syphilides*, R. — *Syphilitic lepra and psoriasis. — Scaly syphilis.*

[1] The capital letters following the synonymes represent the authorities. Al. Alibert. — Ar. Arabians. — C. Celsus. — G. Good.—Gr. Greeks. — H. Hebrews. — R. Rayer. —W. Willan.

dull white colour. These elevations are generally at first from two to three or four lines in diameter, irregularly circumscribed, and generally rounded. They increase somewhat in size, but always remain distinct, with the skin sound between them. When freed from the squamæ on their surfaces, they appear red and irritable, forming rounded spots or patches, from two to four or five lines across; and are slightly prominent, and of a brownish red hue. These patches occasionally heal, like those of lepra, from the centre to the circumference; and, in this case, they present slight depressions in the centres, and acquire a yellowish dusky tint. The scales formed on their surface are reproduced as soon as they are removed. As they decline, the patches often are transformed into segments or arcs of circles; and when quite removed the skin presents small stains of a greyish brown or yellowish hue in the spots occupied by them.

9. This variety is seldom accompanied with much pruritus, unless when the body is heated by exercise, or by stimulating or heating food and drink. It may be confined to the hairy scalp, face, trunk or extremities; or be disseminated over these regions, appearing either at once upon all of them, or upon each in succession. The patches or spots are generally irregularly disseminated, being crowded in one situation, and thinly scattered in others; but they are more numerous in the line of extension in the extremities than in that of flexion. Guttated psoriasis appears most frequently in spring and autumn, and often disappears in summer or in winter. It may thus recur for many successive years. It is not infrequent in children, and is more quickly evolved in them, often with slight fever. It is more prevalent in adults than in children and old persons. It often presents characters intermediate between psoriasis and lepra. It sometimes coexists with one of the other forms of psoriasis, and I have seen it associated with pityriasis. When it affects the fingers, it often implicates the nails.

10. ii. PSORIASIS DIFFUSA.—SYNON.—*Psoriasis Confluens,* Rayer; — *Lepidosis psoriasis,* Good; *Lepriasis diffusa,* Dendy; — *Spreading dry scall; scally tetter.*—*a.* In this variety the patches are of large size, of variable extent and irregular form. They are developed either by a number of small elevations, like the preceding variety, which run together and form one continuous patch, or by a papular roughness of a patch of the epidermis and congestion of the subjacent dermis, or by several patches, which speedily increase in size and coalesce. In each of these modes the patches may require two or three weeks to be fully formed. The surface of each is usually then of a dull red colour, rough, and slightly elevated above the surrounding skin, intersected by furrows which correspond with those of the epidermis, and often fissured by several deep chaps. The patches are covered by numerous thin epidermic scales, the removal of which is rarely followed by any fluid exudation. The eruption often assumes the characters of the guttated or discrete variety over different parts of the body, and the diffused form around the joints and extremities.

11. Diffuse psoriasis may occur in a single patch, of various sizes, or in several, and upon any part of the body; but most frequently on the fore-arms, or about the elbow and wrist, and, unlike lepra, chiefly the fleshy parts of the limb Its duration is always chronic; even its milde states may continue for weeks or months, and tl severest forms may remain for months or years.

12. Diffuse psoriasis, when extensive, is oft preceded by symptoms of constitutional disorde especially indigestion, costiveness, languor, ar debility, which frequently subside as the eruptic is developed, but which often recur. The eruptic is generally attended by slight pruritus, and l pain and tenderness after the removal of the scale or when the patches are fissured or chapped. occurs chiefly in adults and the middle aged.

13. *b.* This variety has, in rare instances, assum a *gyrated form*—*Psoriasis gyrata,* or that of narro bands, or curved or tortuous lines. BIETT describ it as long, narrow, tortuous stripes, resembli worms; and sometimes bending into rings, o curring generally on the back, or trunk of tl body. These stripes are covered by very delica epidermic scales, which exfoliate and are repr duced as in the other forms of this variety. Th are attended by a slight pruritus, and but little i convenience. In very rare cases the eruptic assumes an *annular form,* especially about t neck and face of delicate persons, and is ve slight.

14. *c. In children,* diffuse psoriasis is occasional seen in a sub-acute form — *Psoriasis infantil* WILLAN. It appears from two or three months two or three years of age. It is more acute, attended by more pruritus and smarting, and much more rapid in its progress than in adul The surface of the patches, which are often larg is intersected by numerous fissures or chaps, a often excoriated by friction; the excoriations e uding an ichorous fluid, which dries into ha scabs of considerable size. In infants and childr this eruption may be attended by phlyzacio pustules, by a morbid secretion from the nostri by loss of the hair of the eye-brows, and the ey lashes when the forehead is affected, and hardened elevations of a reddish hue.

15. iii. PSORIASIS INVETERATA. — SYNON. *Lepriasis candida,* Good; — *Dartre Squamme lichenoide,* Alibert; —*Lepriasis inveterata,* Dend — *Inveterate dry Scall.* — When either discrete confluent psoriasis has continued months, or yea or sometimes after the more inflammatory form pityriasis has persisted long, especially when t eruption is hereditary, or occurs at an advanc age, or attacks a debilitated or shattered constit tion, or is consequent upon protracted functior disorder of the digestive organs, then the erupti assumes the form thus named. It may be garded as an aggravated form of psoriasis diffu Inveterate psoriasis usually extends over a lar surface, occupying the most of the limbs, and the trunk; the face, the palms of the hands, a the soles of the feet being free. The skin is thic ened, congested, hot, dry, and harsh. It is sti fissured by deep cracks, and covered by epidern scales and scabs, which are thrown off in gre abundance. Pruritus is very troublesome in tl variety, and is increased by the heat of bed a by a heating regimen. The thickening of the i teguments restrains the motions of the limbs, a flexions of the joints. When the surface is abrad or excoriated by friction or otherwise, a fl exudes which concretes into scabs. When tl eruption affects the scalp the scales collect

umbers ; and when they are removed, an ichorous etid exudation takes place from the reddened urface. When it extends to the hands, the nails re remarkably affected ; but, in some cases, I ave observed the affection of the nails without ie fingers being otherwise implicated, and have nputed the disease of the nails to the infection of ie fluid exuded from the surface scratched by iem. The constitutional disturbance may be but ight even in the severest cases ; particularly in espect of febrile symptoms. But the functions of ie stomach, liver, and bowels, are often languid id torpid, and the several depurating actions imaired. The duration of this variety is always rolonged and indeterminate. In old persons it ontinues for the rest of life.

16. LOCAL STATES OF PSORIASIS. — (*a.*) Pso-asis may occur primarily on the *hairy scalp.* ut it is more frequently consequent upon the uption in some other part, or upon neglected ityriasis. It is oftener seen in the *distinct* form ; uch more rarely in the *confluent.* In rare in-ances it has extended over nearly all the scalp, xtending to the forehead in a line parallel with iat of the hair. The inflammation sometimes tacks the bulbs of the hair, which become de-ched in the patches affected.

17. (*b.*) *The face* is rarely affected alone, ie eruption generally appearing also in some her part. The patches on the face are usually d and furfuraceous, the scales being light and iin. On the *eye-brows* and *eye-lids* it appears, s every where else, by the formation of papulæ. he eye-lids become stiff, and slightly fissured or iapped, and these changes are followed, in chil-ren, by the loss of the ciliæ and the hair of the ye-brows. It rarely *affects the lips*, as true pso-asis, but generally in a form that more strictly elongs to *pityriasis.*

18. (*c.*) *Psoriasis genitalium* is not infrequent, and ther the *prepuce*, or the *scrotum*, or the *labia ma-ra vulvæ* may be the seat of the eruption. In either the-e situations it presents the characters already escribed. It seldom appears in any of these pri-arily, but generally in connection with its oc-urrence in other situations. It may, however, be onsequent upon prurigo or pruritus of these parts. n the *prepuce* this eruption is often obstinate and vere, and is sometimes attended by thickening, ainful exudations of blood and fissures, and iymosis. Psoriasis in this situation may be as-ciated with psoriasis of the *scrotum*, which is ten most obstinate, and assumes the inveterate orm, or with *psoriasis palmaris.* As respects the aracters of the eruption, there are no differences roduced by these localities. But swellings of the guinal glands are often caused by the appear-ice of the eruption in these situations ; and care iould be taken not to confound it with venereal fections.

19. (*d.*) *Palmar psoriasis — Psoriasis palmaris* ay be either distinct or confluent ; but in either rm, the elevations are generally broad ; of a ale reddish hue, and the seat of much heat and ching. If the elevations are numerous they be-ome painful, and interfere with the patient's oc-upations. In the confluent form the palm of the and swells, and presents an uniform brownish d colour. As the eruption becomes more chronic, ie heat and itching are less troublesome ; the uticle covering the elevations grows thicker, acquires a yellowish hue, dries up and becomes friable, and at last of a dead white on the surface of the patches. The epidermis then cracks, and is detached either spontaneously or by the nails of the patient, and leaves a new epidermis, through which the corion appears red and vascular. The epidermis surrounding the diseased patch also undergoes a change, being thicker than usual, of a dirty yellow tint, and subsequently becoming dry or mealy on the surface. It finally exfoliates irregularly, at first adjoining the older patches, and then in the flexuses of the joints and natural folds of the palm. The desquamation is always *irregular*, and very different in appearance from that of the next variety, the *psoriasis palmaris centrifuga ;* but, like it, and even more constantly, is attended by linear fissures, which penetrate to the quick in the lines of the palms, and by smaller cracks or fissures which extend less deeply.

20. (*e.*) *Centrifugal palmar psoriasis* is less common than the preceding. It begins in the palm by a single elevated spot, solid, and of small size, upon which a small white scale is formed. Around this elevation a series of red eccentric circles are produced, each in succession, and are covered by epidermic scales, which exfoliate. As these circles appear, each successive one is more eccentric, until the whole palm is implicated, and each undergoes desquamation. Squamous patches also appear on the palmar aspects of the fingers. The palmar integument is reddish, where the exfoliation of the scales has taken place, is thickened, and fissured by numerous chaps, some of which upon opening the hand, which is painful and stiff, sometimes exude a little blood.

21. Both these forms of palmar psoriasis are of long duration, they seldom continuing for a shorter time than several months, and often persisting for years. They often decline in summer and autumn, and are exacerbated in winter and spring, for a number of years. Palmar psoriasis is sometimes complicated with *psoriasis genitalium* in either sex. A modification of it sometimes affects, although much less frequently, the soles of the feet—*psoriasis plantaris ;* but the severity of the symptoms is less in this situation, owing probably to the structure of the plantar integument, and to the protective coverings of the part. Fissures in this situation are much less apt to occur, and are smaller when they occur.

22. (*f.*) A variety of psoriasis diffusa occasionally affects the backs of the hands, and is called *grocers' itch*, because it is often seen in persons engaged in this trade ; but it also often attacks bakers, laundresses, and others. It begins with two or three squamous elevations, which often spread until the whole back of the hand is covered. The integument at length presents numerous dry and painful fissures over or near the wrist and the articulations of the metacarpal bones and first phalanges of the fingers. This variety is distinguished from confluent and chronic *lichen* of this part by the circumstance of the latter always commencing in an eruption of small papulæ.

23. (*g.*) *Psoriasis of the nails — Psoriasis unguium.*—When the disease affects either the upper or the lower extremities, the nails often are attacked, even although neither the fingers nor the toes may be affected. But the affection of the nails never occurs without some other part being attacked. It is most frequently associated with psoriasis

guttata of the hands or arms. The nails, when diseased, become yellowish or tawny; thickened and irregular in their structure; rough, ragged, and brittle, and often bent over the ends of the fingers. A cheesy-like matter is sometimes formed at the roots of the nails, or between the roots and the matrix, as at the extremity of the papillary surface, these parts sometimes becoming unusually vascular, and giving rise to thickening, &c.

24. (*h.*) Psoriasis is often *complicated* with visceral disorder, as already noticed, and sometimes with *lepra* or *pityriasis*. It has also been seen associated, especially in children, with *eczema impetiginodes*, vesicles and purulent points appearing amidst the thin squamæ covering the patches of psoriasis. At a later period these patches become excoriated, and form thin, lamellar, yellowish scabs like those of eczema. This association is not infrequent in children during the period of teething, and occasionally at a more advanced period.

25. iv. PSORIASIS LEPRÆFORMIS. — SYNON. — *Lepra; Lepriasis.* — *Lepra Græcorum*, Auct.; — *Lepra vulgaris*, Willan; — *Psoriasis circinnatus;* — *Lepidosis lepriasis*, Good; — *Lepriasis annulata*, Dendy; — *Psoriasis orbicularis; Dartre Squammeuse arrondie*, Alibert; — *scaly leprosy; Greek leprosy.* — This chronic squamous eruption is *characterised* chiefly by its consisting of circular and slightly raised patches, which are speedily covered by thin, semi-transparent, epidermic scales; the patches being prominent at their edges, and somewhat depressed in their centres, and the scales being thrown off and replaced by successive formations. Lepra is occasionally confined to the knees and elbows, and it generally appears first in these situations, or rather immediately below them. In most cases it affects both legs or both arms at the same time. It is apt to extend by the successive formation of new scaly patches along the arms and thighs, to the breast and shoulders, and to the lumbar and lateral regions of the abdomen. The patches are sometimes more numerous, large, and prominent on the lower part of the trunk. The disease rarely extends to the hands or hairy scalp. The patches which appear on the head are usually of a small size. They are seen near the outer angles of the orbits, whence they spread along the eyebrows to the forehead and temples. When lepra extends to the hands or fingers, the nails and the matrices of the nails are often affected in a similar manner to that described above (§ 23.). Every where the patches are apt to coalesce by their corresponding edges; but the originally orbicular form of the aggregate patches is partially preserved in the arcs of circles which are seen in the circumference.

26. *A. Lepra vulgaris* commences with small, smooth, solid elevations of a dull red hue, around which numbers of other reddish, prominent spots, about a line in diameter, are evolved. The surface of the elevations become covered, in two or three days, with thin whitish scales. In four or five days the elevations spread, having thrown off the small spangle-like scale from their summits, and are attended by a sense of heat, tingling, or pruritus. They then enlarge rapidly by the extension of their circumference, which is raised and red; whilst the centres become depressed and paler than the margins. As the scales exfoliate others are produced, and are of a glistening or opalescent, or of a pearl-grey or pale yellow tint. The squamæ are not evenly spread over the surface of the
patches, and they are detached partially and
regularly. After their fall, the skin which th
covered looks red, shining, and somewhat raise
They are superposed, especially in the circu
ference of the patches, and thus become thick
and thicker, so as to form prominent layers. Ev
when small, the patches are never covered by
single scale. When they are recent, the cor
does not present lines corresponding to those
the cuticle, but when they are older such lines a
observed, and are often increased to wrinkl
which correspond with small indentations or ridg
in the inner surfaces of the scales. However
tached from the inflamed surface, a fresh form
tion of scales takes place.

27. The cure of the orbicular patches of le
begins in the centres, and extends to the circu
ference. After the detachment of the squamæ
skin acquires, when they are not renewed, a gr
ish tint, with a shade of yellow. At a later peri
the ring bounding the patches is narrowed p
gressively from within outwards; the circle at l
is broken in one or more places, and the s
ultimately disappears entirely.—(Rayer.)

28. Lepra is seldom attended by any feb
disturbance, or other disorder than impaired dig
tion, assimilation, and excretion. The appetit
usually good, and generally greater than the pow
of digestion. It occasions no further inconvenie
than slight itching upon getting into bed, or up
changes of temperature. But when the patc
are extensive or numerous, or when the infla
mation of them is increased by a heating regim
the patient feels so much burning or stinging p
ritus, as often to disturb repose. When the patc
surround the joints they cause stiffness, and oc
sionally are attended by small painful fissu
The disease is always of considerable duration
often continues for years, sometimes for life. I
now attending a lady who has been afflicted w
it extensively for upwards of forty years, althou
she has always had the advantage of the
medical advice.

29. *B.* The variety denominated *Lepra alpho*
by Willan is merely a milder form than the p
ceding, the squamous patches remaining of sm
size, and seldom exceeding a few lines in diame
The spots increase slowly, are slightly promin
and rarely run into one another. They form aln
exclusively on the joints and extremities, and di
from the patches of lepra vulgaris chiefly in
small size and whiteness of the scales which
formed. They are commonly met with in child
and delicate persons, and are not easily
tinguished from psoriasis guttata. Several ot
modifications are sometimes observed in the fo
disposition, and extension of the patches depe
ing upon their seat and the constitution of
patient. But these are too numerous to descr
Some of them so closely resemble psoriasis as ha
to be distinguished from it. When this variety
fects the scalp or pubic region it often occas
much pruritus or inconvenience; but it rarely
fects these situations exclusively. The squam
these situations are generally yellow and furf
ceous, and are without the glistening micac
hue they present on the knees or elbows.

30. *C. Lepra nigricans* is a comparatively
form of lepra, and is met with only in cache
and broken down constitutions. The form
distribution of the patches are the same as

ibed ; but the patches are not so large, and are nerally without the central depression. Instead being of dull red or rose-colour, they are of a id or bluish brown hue. Mr. E. Wilson states, at the scales are so thin as to allow the lividity the surface to be seen through them, are easily tached, and leave behind a tender and frequently excoriated surface, from which a morbid serous id, often mixed with blood, is poured out. This udation hardens into an irregular and friable ust. This variety is particularly annoying when affects the scalp. It occurs chiefly in persons iose occupations expose them to the vicissitudes the weather, and to a precarious diet, with igue and watching, and excesses in spirituous uors, &c.

31. v. PSORIASIS ET LEPRIASIS SYPHILITICA. SYNON. — *Squamæ Syphiliticæ.* — *Lepra Syphi- ica, Psoriasis Syphilitica,* Willan ; — *Syphilide stuleuse,* Alibert ; — *Syphilides Squameuses,* ayer ; — *Lepriasis Syphilitica,* Dendy ; — *Scaly philis.* — *Secondary syphilis* assumes every spe- es and variety of cutaneous eruption ; and no ecies more frequently than psoriasis and lepriasis all their forms. Mr. Dendy states, that the ost common form of scaly syphilis is that of ir- gularly scattered spots, which, however, become casionally confluent, and sometimes three or ur forms or distributions of scale is seen in the me subject, viz. *foliaceous laminæ* on the scalp, *ttated* and *diffused psoriasis* with indurated ales on parts subject to pressure, heat, or fric- n, as the palms, soles, axillæ, scrotum, and labia lvæ ; *psoriasis lepræformis,* or *lepra,* on the east, abdomen, and thighs ; and very rarely an tensive *psoriasis diffusa,* as a syphilitic eruption.

32. *A. Psoriasis guttata syphilitica* commences a copper-coloured, livid, or violet spot, at first tremely small, usually becoming from six to ht lines in diameter, and when extending to the lp, assuming a greenish olive, or dull yellowish e. The spot is flatter, softer, and smoother than e incipient papulæ of common psoriasis, and s squamous, having little or no defined edge ; it may be sometimes larger or redder, more de- ed, and less squamous. The spots or patches e often more ovoid than circular ; the diseased ticle on their surface is usually more furfurace- s, still adhering tenaciously, and it is of a dull let or yellowish hue, rather than white. When e scales are detached they are of dirty pearl ey, the livid colour being imparted by the sub- ent tissue. After one or two exfoliations the squa- us character often diminishes, and under mercu- l influence, disappears in three or four months. a syphilitic treatment fail, they will degene- e, the squamous character changing to that of a tch, or even to superficial ulceration. In some ses, Mr. Dendy remarks, that in the centre of e scale a sort of pustular or ulcerated character observable, even in an early stage, very similar the moist crusts of *eczema.* This is never seen the common forms of the non-syphilitic eruption.

33. *B.* Another form of scaly syphilis is that of a *sky* or *brownish, livid, circular spot,* the centre ghtly fissured and foliaceous, the cuticle de- hed as it were around the disc, and thus form- g a white margin. This form nearly resembles thyma syphilitica. (See Art. Ecthyma, § 6.) both these forms of syphilitic scales, ulceration the throat is often also observed.

34. *C. The annular syphilitic scale,* or syphilitic lepra, is less defined than the common circular lepriasis ; the margins are slightly raised, the scales are dusky rather than white, and more annular. "In some cases the guttated and annular forms become one elevated, brownish, red mass, here and there spotted with scales."—(Dendy.)

35. *D.* Syphilitic scaly spots usually appear from five to ten weeks after the subsidence of a chancre. "Mr. Carmichael believed it to be the sequence only of that ulcer which was marked by indurated edges—the true Hunterian chancre." Mr. Dendy does not think that it is thus limited, for he has seen it consequent upon primary pustules which had speedily subsided ; and both consequent upon and coexistent with almost every primary form of the syphilitic malady.

36. The most common seat of scaly syphilis is on the forehead, "corona veneris," and the breast. When, however, the patches speedily arise during acute or often recurring primary disease, especially in depraved constitutions, often appear first in the vicinity of the organs of generation, and are then more defined. The character of the patches or spots is, however, much altered by the treatment, especially by external applications.

37. The spots of simple lepra are generally larger and rounder than those of syphilitic origin, the latter being much more rarely confluent and united into broad bands and patches than those of the former. Scaly syphilis is, however, much modified by locality. When it is seated in the axilla, or between the toes, it is moist, whitish, and very offensively fœtid. Sometimes also fissures form, and the cuticle peels rather than drops off. On the scalp, it assumes a greenish livid hue. On the palms and soles it is usually guttated. The spots, however, are not so distinct as in other parts, the cuticle, on being detached, also appearing more horny and yellowish ; and in this situation exfoliation is often very protracted. If fissures form, and the feet and hands are subject to much pressure, they become deeply ulcerated. If the matrix of the nails become affected, painful or phagedenic onyxis may follow.—(Dendy.)

38. *E. Infantile scaly syphilis* is almost invariably marked by *snuffling* from the child's birth. The skin is of a dirty yellow or waxen hue, with numerous brownish pink spots, presenting a sprinkling of a grey or brownish white dust, which is often most abundant on the circumference of these spots. The disease may resemble also the livid spots already described, even at a very early age ; but more frequently an association of these differently tinted spots are observed on the face and hands.

39. III. DIAGNOSIS.—The differences between the species of scaly eruption have often been exaggerated, or the extreme points of difference have been chiefly adduced and placed in bold relief by most of the writers on diseases of the skin, believing that the enumeration of minute distinctions, and the recognition of modifications of the external characters, would evince a more intimate knowledge of their nature than a display of their relations, not only with one another, but also with the state of the digestive, the assimilating, and the excreting functions, and of the circulating fluids. The devotion to "specialities," with the view of attracting the public by the presumed advantages of, and by the superior knowledge

assumed from, a division of labour, was first manifested in modern times by the writers on skin affections; and, like all others, devoted to a single craft, who adopt merely a minute segment of the great circle of medical science for their practices on the public, rather than for its proper cultivation and improvement, they merely partially advance the trivial and the mechanical to the detriment of profound or comprehensive views, and they fail in the recognition of extensive morbid relations. Whilst a few local distinctions, or mechanical contrivances are paraded as proofs of a superior acquaintance with the adopted subject, their narrowed powers of mental vision fail to recognise much more important relations and matters, the sources from which the local mischief proceeds, and the varied sympathies which either produce, or are produced by, the object of exclusive adoption and cultivation,—a cultivation resembling merely the superficial scraping of the soil by the hands of savage ignorance, not the deep ditching, the draining, and the manuring of applied science. The human microcosm cannot be advantageously studied in one of its parts only, nor can its states, affections, or structural lesions, be either understood or remedied by confining our inquiries and our means to a particular or limited locality, even although that locality is the seat of disease. The animal body is one and indivisible, no one part being independent of another, — no single system, or organ, or tissue, being disordered or diseased without implicating more or less the functions, and even the organization of several, or even of all the rest. Hence it is that no division of labour which has been adopted in medical practice in ancient times, since the ages of the PHARAOHS, down either to the modern days of the higher and more regular grades of empiricism, or to the lower degrees of quackery and imposture, has tended to advance medical science, or to raise the respectability of our profession. On the contrary, all such divisions,—all adoptions of a single member, organ, or viscus for special practice or study, have lowered in proportion to the degree of division, our science to a craft, and sunk the physician to an empirical practitioner, — they may have enriched the charlatan, but they have degraded the profession.

40. Those who have taken the eruptions of the skin under their protection, or the "Dermatologists," as they have dignified themselves, have generally laboured to point out the extreme distinctions which may exist between the several forms or cases of scaly eruption; limiting, however, their distinctions to the form, the size, the tint, and the thickness of a scale; and to the form, size, hue, and condition of the tissue underneath. Their distinctions have been always local, and without reference to the states of the assimilating and depurating functions, and of the circulating fluids and excretions. Even the most important of all local distinctions have been neglected; for they have failed to show whether the scales are an exuberant formation of cuticle,—are diseased cuticle hastily formed and as hastily thrown off,—or are merely a thin albuminous exudation on the inflamed surface, that becomes altered by the action of the oxygen of the air, and thrown off by the local morbid action and the state of its vital and vascular relations; or in how far various states or appearances of these scales depend upon a morbid cuticular formation, or upon a modified albuminous exudation — upon the production and upon, the skin, of an oxidised albumen.

41. *The diagnosis of scaly eruptions* is there e hardly to be regarded as respects the several fo s which they assume, because shades of differe , too slight and too varied, and ever varying, to ac it of description, are even more common than n e marked distinctions; but it may be entertaine s regards other eruptions with which the squan s may be confounded, upon a hasty or imper t view, and if the history, progress, and morbid lations of the case are not observed. The c f differences which exist between the leprous d other species of psoriasis are, that generally in e former the patches are circular, with ra d margins, and somewhat depressed centres, e scales being moderately thick and slightly l- herent; whilst, in the other species the patches e irregular, not depressed in their centres, and e covered by thinner and more adherent sc s. Psoriasis guttata, however, very nearly approa s to the leprous species, especially to the alp d variety, the distinctions now stated existing n some respects, and the patches of the latter b g generally of larger size. *Pityriasis* may be founded with psoriasis,—indeed it is but slig y different, either in local characters, or in pa logical relations from the several species of ps sis; so that pityriasis, psoriasis, and lepra, ma e justly viewed as species of one genus. The tinction between pityriasis and the other spe s consists chiefly in the more superficial affectio f the skin in the former, and in the smaller size d more furfuraceous character of the scales. e integuments, moreover, are often chapped or sured in the latter, and but rarely in the for r. *Lichen circumscriptus,* with its annular cluste f papulæ, fading towards the centre, may somet s be mistaken for leprous psoriasis, especiall n process of cure; but the existence of the form is shown by the presence of marginal papu ; whereas in the latter, the inflamed surface, den d of its scales, is smooth and devoid of papulæ. *T a annularis,* or *ringworm,* at certain periods o ts progress, either at the commencement or the l, when the crusts fall off and leave behind red nular-shaped patches, may be mistaken for l a of the scalp, especially if there are patche n other parts of the body. But the one is as ra y seen on the body as the other is on the sc ; besides the favous pustules of the former wil dicate its nature. It should be recollected t several varieties of squamous eruption may st in the same case, and that it may be associ d with other eruptions as with tinea.

42. IV. PROGNOSIS.—The several species of is eruption are more or less obstinate. The prog is depend much upon the condition of the pat t, and the duration, species, and state of the erup . Even the mildest forms are apt to return r having disappeared, upon the recurrence of e causes, regimen, and diet especially, which st occasioned it. *Psoriasis guttata,* although n a severe form, is yet very obstinate, and is ap o return after disappearing. The *diffused varie* is still more obstinate, especially in debilitated, l, or cachectic persons; and the *inveterate form* n resists all treatment, particularly in those u vourable circumstances. The same prognosis plies to the different forms of the *leprous spe* s. It is rarely attended by danger, and in y g subjects it is often cured; but in adults and d

rsons it is always very rebellious, and often in-
rable, although treatment may restrain its pro-
ess, and palliate most of the more annoying symp-
ms. The existence of an hereditary predisposi-
n to any of the species of scaly eruption, militates
ongly against a perfect cure, especially in patients
vanced in life; for, even if almost or altogether
moved, it seldom fails to return. The *syphilitic*
aly eruptions, when not associated with serious
sease of the throat, or of the periosteum, or of the
ints or bones, and not advanced to extensive ul-
ration, will generally be removed by appropriate
atment, unless the disease be developed in the
rofulous diathesis, or is connected with an abuse
mercury, when a less favourable opinion of the
sult, as respects the constitution and vital organs,
ould be entertained.

43. V. THE PATHOLOGY OF SCALY ERUPTIONS
s been imperfectly, if, indeed, at all considered.
ese eruptions have been viewed as altogether
cal, and their obvious dependence upon the state
the circulating fluids most unaccountably over-
oked. Many years ago (in 1822) my attention
as attracted to the state of the blood by a case of
oriasis, for which I had prescribed venesection,
d found the serum remarkably milky or whitish
loured. Since then, other cases have furnished
idence of a superabundance of insufficiently as-
milated chyle, of albumen, and sometimes of
ty matter in the blood of patients severely af-
cted with either of these eruptions. It is very
vious that impaired function of the liver and
gestive canal, as well as of other assimilating
gans, will be followed by the presence, if not by
superabundance, of imperfectly assimilated
yle, and chyle-globules in the circulation; and
at equally impaired excreting function will oc-
sion a state of excrementitial plethora; the imper-
ctly assimilated and the effœte materials thus
cumulated in the blood, exciting and perpetuat-
irritation of the capillary circulation of one or
er of those emunctories whose office it is to
move these materials from the circulation. Ir-
ation of the cutaneous surface having gone on
inflammation of a slow and chronic form, and
blood abounding with albumen, a state of
illary action and a material are thereby fur-
hed for the formation of the scales which are so
undantly produced on the inflamed surface, and
ich is rarely, excepting at the commencement
the eruption, an altered state of the cuticle, and
morbid reproduction of it, but an exudation of
uminous lymph from the diseased capillaries,
at is modified by the state of the blood and the
cal action, and by the oxygen of the air, so as to
m the several varieties of squamæ observed in
s genus of eruption. This view of the nature of
uamous eruptions shows the impropriety of em-
oying local or external means, solely or chiefly
the treatment, and of thereby shutting up a
fety valve in the œconomy, opened by the course
functional disorders; and it accounts for the
casional supervention of serious visceral disease
on the suppression of the cutaneous eruption.
also suggests the use for these and similar
uptions of such means as shall most effectually
move the disorders of the digestive, of the assi-
lating, and of the excreting functions, upon
ich these eruptions are chiefly dependent, and
impropriety of prescribing external means
herwise than as aids to internal and constitutional
eatment.

44. VI. TREATMENT. — The circumstances which require especial attention, before the intentions of cure are determined upon, in each case of scaly eruption, are the following:—1st. The habit of body, diathesis, age, and employment of the patient. — 2d. The indications of disorder of the digestive, of the assimilative, and of the depurative functions, in connection with nervous and vital power. — 3d. The duration and character of the eruption, the causes in which it originated or tend to perpetuate it. These last circumstances should be viewed in connection with the previous diet, mode of living, &c. commonly adopted by the patient. These particulars being ascertained, the *states* of those suffering any form of the eruption may be arranged as follows, as furnishing the chief bases for therapeutical intentions: — *First, as regards habit of body*, &c., indications of *plethora*, or of *anœmia*, and of *digestive* and *excreting derangement*, ought to be carefully observed; and the several associations of these states: — *Second*, as respects the *duration* and *appearances of the eruption*, the amount and character of the *inflammation*, and the *discrete* or *confluent*, or *syphilitic* form of the eruption ought to be noted: — and *Third*, the state of *vascular action*, generally and locally, and of *constitutional power*. These data having been obtained as accurately as possible, and with due reference to the states of the blood and of the functions of waste and supply, the intentions are, 1st. To remove whatever disorder may exist in the quantity or quality of the blood, and in vascular action; 2d. To restore the digestive and depurative functions, as being subsidiary to the first indication; and 3d. To correct the morbid action on the skin by rational local means.

45. Viewing the cure of scaly eruptions as being thus dependent, at all times during treatment, upon a due exercise of the several vital actions, especially those of digestion and depuration, and upon a sufficient, but not an exuberant, supply of wholesome food, the application of these indications of cure should be accompanied with strict attention to *diet* and *regimen*, as noticed in the sequel, and with a careful avoidance of the several predisposing and exciting *causes* (§§ 3. *et seq.*).

46. *A.* If the patient be *plethoric*, *strong*, or *young*, and the eruption copious, red, and not of long duration, and more especially if the pulse present sufficient tone, local and general action not being impaired or asthenic, then *blood-letting*, according to the peculiarities of the case, should unhesitatingly be prescribed; and in healthy, dry, and country localities, if the patient has lived fully or richly, it may be repeated, according to the effect produced by the first. After bleeding, an active antimonial *emetic* ought to be given, and its operation freely promoted. When the stomach is quieted, the bowels, and through them, the liver should be freely evacuated, by chologogue and stomachic *purgatives*. At first, and on several occasions afterwards, a full dose of calomel, with some purgative, ought to be prescribed, and its free operation promoted by an *enema* containing spirits of turpentine and castor oil, or some other cathartic. These should be repeated according to circumstances, but sufficiently often to procure not only an entire evacuation of all crudities and accumulations, but also an increased discharge of all secretions and excretions from the digestive canal, and, through the medium of it, all effœte or injurious materials from the blood.

47. *B.* When the patient presents no indications of *vascular plethora*, or of increased action, and the patches are not very irritable, or much inflamed, then blood-letting may be omitted, or a small blood-letting only prescribed. In the metropolis and large manufacturing towns, vascular fulness and excitement are not generally such as require more than a small, or a local bleeding only; and not infrequently a state of anæmia, requiring opposite means to this, is met with in connection with scaly eruptions.—*a.* For the former of these cases *emetics* and *purgatives* are indispensable; and for the latter they are not the less so; but the purgatives should be either conjoined with *chalybeates* or vegetable *tonics*, or alternated with them, so as to improve the powers of digestion and assimilation simultaneously with the evacuation of injurious matters. M. CAZENAVE and SCHEDEL remark, that, "when the patient is young and vigorous, and the disease pursues a rapid course, the skin being hot and inflamed, and the pulse full and quick, then venesection, simple baths, diluents, strict regimen, and quiet, are necessary." To these, however, I would add emetics and purgatives as above advised (§ 46.). In old and feeble persons, or in constitutions broken down by privation or excesses, in whom there is either but little inflammation, or inflammation of an asthenic or cachectic character, a course of tonics should be directed, and either alternated with or followed by purgatives and other energetic measures, according to the peculiarities of the case.

48. M. BIETT, although he says nothing as to exhibition of an emetic, either at the commencement or in the course of treatment, strongly recommends a purgative course, especially when the disease is recent and the patient young or robust. He advises calomel every morning fasting in four-grain doses, either alone or with the same quantity of jalap. Sometimes sulphate of soda or sulphate of magnesia, taken in a considerable quantity of a bitter infusion, is very beneficial; and occasionally a more active purgative, as colocynth, scammony, gamboge, &c. may be employed. The choice should be guided by the conditions of the patient and of the eruption, and by the effects of the medicine previously employed. M. BIETT advises the calomel and the other purgatives to be continued daily for several weeks — for two months — if they do not produce a complete cure within that time. If salivation or other specific effects of the calomel appear, this substance may be omitted or the dose reduced; but this effect would seldom appear, and will not delay the cure. It is often necessary, or even advantageous, to suspend the treatment for three or four days, and then renew it. I have generally preferred to combine the calomel with rhubarb, and sometimes also with magnesia; or to give the calomel alone, much less frequently, and soon afterwards a full dose of sulphur and magnesia; or the pilula hydrarg., chloridi comp. with soap and extract of colchicum at bed-time, and sulphur with magnesia in the morning. When sulphur is prescribed with magnesia an aromatic powder may be added, and the medicine continued, once or twice daily, so as to keep up a free evacuation from the bowels for several weeks, the tepid or vapour bath or other external means about to be stated being also employed in aid of them.

49. *b.* The *tincture of cantharides*, administered in any mucilaginous diluent in doses gradually i creased from five to fifteen or twenty or thirty drc for a dose, was much praised by BIETT; and, M. RAYER observes, occasionally causes the ra disappearance of the eruption, especially of t leprous form when not severe, or only recent a limited in extent. But if taken in larger doses may, although it relieves or removes the eruptic excite inflammation of the digestive or urina organs, or of both.

50. *c.* The *arsenical preparations*, especia FOWLER's solution, has proved very efficacious scaly eruptions, and I have found it more cert in its effects than almost any other single me- cine. But the good effects have seldom be permanent or even so progressive as to effect cure, in the more severe cases, unless the diet carefully regulated. There is often, also, a l- bility to a recurrence of the eruption after it l been removed by too large or too frequent doses any arsenical preparation; but this liability ex in most cases, and is to be met only by a m careful avoidance of the exciting causes. M. CAZENAVE and SCHEDEL state, that as psoriasi often more obstinate than lepra, the remed especially arsenic, should be pushed further for former affection; and that a permanent cure, wi- out any dangerous results, may be obtained by judicious administration of arsenical preparatio. M. BIETT also entertains a similar opinion. Th preparations should not be given oftener th twice daily, and the dose ought not to be larger th three drops at first, nor increased beyond ter twelve. In many cases, they should be gi after a full meal, especially when the doses large, and when the course is protracted; a unless the dose is very small, an intermission the use of the medicine for three or four d should be directed. The following is the mod which I have usually prescribed arsenic for cure of psoriasis: —

No. 327. ℞. Liquoris Potassæ Arsenitis ♏ iij ad ♏; Liquoris Potassæ ♏ xv ad ♏ xxxv; Extr. Fluidi zæ comp. ʒj: Tinct. Aurantii ʒj. Infusi Genti Comp. ʒx: Aq. Cinnamom. ℥ss. *m.* Fiat Haustus quotidie sumendus.

51. I believe that large or too frequent d of arsenical medicines are not only more injuri to the constitution, but actually much less ben- cial, as regards the eruption, than either very sm or very moderate doses. This circumstance account for the not very favourable opinion pressed by Dr. A. T. THOMSON respecting th. He observes, "That notwitshtanding the powe influence of arsenic in psoriasis inveterata, I h met with cases which resisted it, even when ministered in the largest doses. In some c erysipelas has accompanied the use of the arsen solution, in which case the remedy should suspended until the erysipelas be removed, afterwards renewed in smaller doses."— (P.)

52. *d.* Dr. THOMSON adds, "That the medi on which the greatest confidence may be place psoriasis is the *liquor potassæ*." He comme with thirty drops in two fluid ounces of bitter almond emulsion twice a-day, "and dually increases the dose of the solution to ei or even one hundred drops. If the patient delicate, the infusion of yellow cinchona, o cascarilla is substituted for the almond emulsic" and he has found the hydrargyrum cum cret

es of six or eight grains, at bed-time, an useful to this practice. I have employed a similar tment, but could rarely succeed in getting the ient to take so large doses of the solution as advises: indeed I view them as injurious to the estive organs and kidneys. I have seen marked antage derived from it conjoined with the *iodide* *otassium*, and taken either in a bitter infusion, n one of the decoctions advised for this eruption.

3. *e*. The *bi-chloride of mercury*, taken in the de- tion of cinchona, or of sarsaparilla, or of dul- ara, has been also recommended, and is eficial in slight or recent cases; but has failed very case of inveterate or of protracted leprous riasis in which I have tried it. Dr. A. T. omson states, that he has found the combina- of iodine with mercury the most successful any mercurial preparation for this disease. he *biniodide*, in doses of a sixth to a fourth of rain exerts almost a specific influence upon morbid state of the skin; and when given at same time as the *iodide of arsenic*, and aided blood-letting, it has rarely failed in curing the st inveterate cases." As the acrimony of the paration has disturbed the alimentary canal, he usually combined it either with opium or with ium, carefully avoiding ptyalism. As, how- r, he has usually combined the *biniodide of* *cury* with the *iodide of arsenic*, it is difficult to ermine what share each may have had in the e. He prefers this preparation of arsenic to liquor arsenicalis. The dose of it, at first, ht not to exceed one-tenth of a grain; and in instance should it be carried beyond one- l of a grain. "Its obvious effects are quickness hardness of pulse, with slight puffiness of the er eyelids; but generally, before these symptoms lay themselves, the disease has begun to yield. symptoms which indicate a necessity for re- ing the dose are, heat of the mouth and fauces, iety at the præcordia, pain at the epigastrium, riping. If, besides these, there is tension, with ness around the eyes, erythema of the face, st, white tongue, the edges and tip of a florid hue, and a quick pulse, the medicine should suspended for some days. If nausea, cough, igo, or salivation supervene, it should be left altogether. The employment of any ar- cal preparation is inadmissible, if it cause an asy sensation in the chest from the first."

4. The reason of the failure of arsenic in the e of leprous and inveterate psoriasis is, in y cases, the large, or too frequent doses in ch it has been prescribed; the poisonous ef- s of the arsenic being thereby produced before cient time is afforded for the development of alterative operation of the mineral. Most ers who have depended chiefly on arsenic for cure of scaly eruptions, have advised small oderate doses, and a protracted course of it. Dlestone, Biett, Rayer, Willan, Bate- and Erichsen advise from two to three s, twice a day, up to seven or eight, this dose to be exceeded, and the course to be per- red in, if none of the injurious symptoms just ed be occasioned by it.

5 *f*. Recently, a preparation of arsenic, iodine mercury has been strongly recommended for more obstinate and inveterate cutaneous erup- , by Mr. Donovan, under the name of the "*quor Arsenici et Hydrargyri Iodidi*." The composition of this solution is as follows: — Water, one drachm; arsenious acid, one eighth of a grain; peroxide of mercury, one fourth of a grain; iodine, as hydriodic acid, about three fourths of a grain. Twenty minims three times a day have been considered as a proper dose with which to commence a course of it, and forty minims, thrice daily as the largest dose. I have prescribed this solution in many cases; but I consider the dose here advised as very much too large. If the tongue be at all foul or loaded, an emetic, followed by two or three doses of calomel and rhubarb, or jalap, ought to precede a course of it, and at first, from five to ten minims, twice or thrice daily, and very gradually increased to twenty or thirty, at the utmost, will be sufficient. This solution is most serviceable when the liver is torpid or loaded, and in the strumous diathesis. It, as well as the biniodide of mercury, is very efficacious in the syphilitic scaly eruptions. Mr. Dendy recommends the occasional use of the warm nitro-muriatic foot-bath during the course of this solution.

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56. As to the use of arsenical preparations in psoriasis and lepra, Mr. Erichsen very justly observes, that they should not be given until the disease had assumed a chronic or inactive character. As long as there is inflammatory redness, heat, or irritation of the patches, they ought not to be employd, as the irritation of the arsenic will augment these symptoms. Besides, during the earlier periods of the eruption, a cure may be effected by the antiphlogistic and other means I have above advised, especially by depletions, emetics, and purgatives, with strict attention to diet and regimen. It is only, therefore, in very indolent, or extensive squamous diseases, and after other remedies have failed, that any of the arsenical preparations should be prescribed; and in all circumstances, they ought to be given cautiously, and their effects closely observed; for, if prescribed too largely, or too long, they may injure the constitution much more than the continuance of the eruption, which, in many circumstances, admits of palliation merely, and not of complete cure.

57. *g*. There are various other medicines that have been prescribed, internally, for the scaly eruptions. The chief of these are, the decoctions of *dulcamara*, of *guiacum*, of *mezereon*, of *elm-bark*, the infusions of *nettles*, of *marsh rosemary*, the decoctions of *sarsaparilla*, *sulphur*, and the *sulphurets*, or the milk of sulphur conjoined with magnesia, or with either of the alkaline carbonates, and the æthiop's mineral and other preparations of *antimony*. Either of these infusions or decoctions may be made the vehicles for the administration of other more active agents, as the liquor potassæ, with or without the iodide of potassium, the liquor iodidi arsenici et hydrargyri, the liquor hydrarg. bichloridi, &c. In some obstinate cases of psoriasis, after morbid secretions and excretions have been evacuated, I have lately resorted to the use of *spirit of turpentine* internally and externally, prescribing this substance either alone or with oleum ricini, in doses of half a drachm, or of one drachm, twice or thrice daily, and after two or three days, the occasional application of an epithem, or embrocation of this spirit over the part chiefly affected. The turpentine ought to be discontinued as soon as it irritates the kidneys, but persisted in, if it acts gently on the bowels. It

will be taken with little inconvenience on the surface of a little milk or coffee. I have occasionally prescribed *tar-water*, internally as well as externally. It will be found a medicine of considerable power in this and other cachectic disorders, if appropriately employed. *Pitch, tar*, and the *turpentines* have been recommended internally and externally for squamous diseases, and generally in the form of pill, when administered internally, tar and the turpentines being rendered more or less consistent by means of magnesia. They are sometimes of service; but they often, in this form, pass into the large bowels undissolved, become excrementitial, and hence have little effect.

58. *C.* The *state of the constitution* as well as of *general and local action*, should guide the physician in the choice of remedies, which ought to be chiefly *antiphlogistic* and *evacuant*, in the acute or early stage, and *alterative* and *depurative* in the chronic or advanced states. In many cases, however, alteratives and depurative remedies require to be combined with tonics and even with chalybeates; especially in *cachectic habits*, and when the eruption assumes a livid or dusky hue. In these, the iodide of potassium with the carbonate or solution of potass and sarsaparilla, or tonic infusions, or the iodide of iron with syrup of sarsaparilla, or the bichloride of mercury in the tincture or decoction of bark, with tincture of serpentaria, or the fluid extract of sarsaparilla, will generally be of great service; and, if a cure be not effected by these, aided by external means (§§ 61. *et seq.*), then the preparations of arsenic, or the combinations of arsenic, iodine, and mercury, may be resorted to, as above recommended.

59. *D.* The *syphilitic varieties of squamous eruption* should be treated with strict reference to the history of the case, and the means which have already been employed and the period of their employment. Several severe cases of this eruption, some of which had either gone on to extensive ulcerations or become complicated with disease of the throat, or the bones or joints, have at sundry times come under my care. For these, there are certain remedies, which, if judiciously employed, may be viewed as specifics.—*a.* The oldest and not the least efficacious of these, is the *bi-chloride of mercury*, prescribed either in the manner recommended by Van Sweiten, or given dissolved in alcohol, and taken in water with the hydrochlorate of ammonia, or in decoctions of sarsa, &c., or prescribed with the decoctions or infusions, or tinctures of cinchona, serpentaria, &c. When the eruption and its antecedent symptoms have not been attacked by a mercurial course, then the bi-chloride should be given in decided doses, and preferably soon after a full meal, either in the form of a pill and in gradually increased doses, as advised by Van Sweiten, or as just recommended, in either of which combinations it may be taken in the intervals between meals. Salivation, unless it be slight, need not be produced; although the specific effects should be continued for some time; when either of the other remedies next to be noticed should be prescribed, if the eruptions have not nearly or altogether disappeared.

60. *b.* The next specific remedy for this species of eruption is *iodine*. I believe that this substance, or any of its preparations, had not been prescribed for any form of syphilitic disease, when first I ordered it in the summer of 1825, the formu , as well as an ioduret of sulphur, having b prepared by Mr. Morson, the eminent operat e chemist. At first I employed the iodine eithe n the form of a weak tincture, or in combinat with potash, or the iodide of potash with the -dition of pure iodine. Subsequently I prefer d the iodide of potash, conjoined with liquor -tassæ and sarsaparilla; full doses of Plummi s pill being taken at bed-time. The iodides of -cury have more recently been employed for s eruption, and are generally beneficial; but t y are not superior to the treatment which prece d them. They are, however, advantageously gi n in the form of pills, at night or night and m -ing, the iodide of potass being taken during e day, with liquor potassæ and sarsa. In e syphilitic species, also, Mr. Donovan's solu n is an excellent remedy, and may be ad-tageously adopted in the more protracted case

61. *E.* *The internal and external use of min l waters, either natural or artificial, and of si le or medicated baths*, will generally promote a c e. It is preferable, however, not to have recours to these until morbidly increased action and va -lar or excrementitial plethora is removed by e-pletions, emetics, purgatives, antimonials, c. But this end being attained, the sulphur w rs of Harrowgate, Leamington, Moffat, Cro n, and of other springs in this country; or of t se of Barèges, Cauterets, Bagnères, Bagnoles, on the Continent, will be employed with at advantage. A frequent use of warm baths he patient remaining in them for a considerable e, and using gentle friction over the affected ts, will often be of service. A small quanti of the sulphuret of potash may be added to the h. If the eruption be attended by much itching he biborate of soda dissolved in the water will ve very beneficial. Dr. Duffin recommends he immersion of the part, especially when the x-tremities are chiefly affected, in warm arti ial Harrowgate water; or the diseased parts be washed or fomented with it twice or thrice ly, for fifteen or twenty minutes each time; a a mixture of equal parts of the weak citrine nd tar ointments to be applied after each foment on. The following formula is given by him fo he preparation of this water: — Sulph. mag iæ ʒij; supertart. potassæ gr. x; sulphat. po sæ cum sulphure (or sal polychrest) ʒ ss. Thes re directed to be dissolved in twenty-four ounc of warm water, and used for a wash or foment on. I have lately employed a wash or foment on, either warm or tepid, with tar-water, conta ng biborate of soda dissolved in it.

62. If the scales adhere, or are accumu ted in crusts, sulphureous vapour baths, followe by frictions, or gently stimulating ablutions, fo-mentations, with a solution of the biborate of da, or with a little liquor potassæ, will be of se ice. The application of steam or vapour, wi or without the fumes of sulphur, is always c use. Lotions of diluted alcohol, of solutions o sul-phuret of potass, or the decoction of dulca ra, will aid the exfoliation. When the scal are removed, Bateman and Thomson recom end the unguentum picis, or the unguentum h rar-gyri nitratis, diluted with the ceratum nbi compositum, or with simple ointment; or, ich is better than either, an ointment compo l of

qual parts of these two ointments. The ointments which I have preferred are the *induret of sulphur intment* (gr. xij. or xj to ℥j), the *calomel ointment* (ʒj to ℥j), the *ointment of white precipitate,* he *zinc and lead ointments conjoined,* and the everal *ointments of the nitrates of mercury* and of he *iodide of mercury.* These last should, however, be employed more or less diluted. The intments containing either of the iodides are most uited to very obstinate cases, the others for slight r recent cases. The iodide of sulphur ointment was first employed by the author in 1825. The intments should be applied at night and washed ff in the morning with a saponaceous or alkaline otion (as ʒiij of liquor potassæ in ℥vij ss. of water), after which a solution of the bi-chloride of mercury, in dilute alcohol (gr. ij in ℥i p.), may e applied slightly by a sponge over the part. Besides these ointments, others, with the acetate r phosphate of mercury, with the sulphate and deutoxide of antimony, with an ioduret of ammonia (ʒj to ℥j), with camphor, or with concrete naphthaine (two to four parts to thirty parts of lard), ave severally been recommended by different writers. A principal advantage derived from intments is the protection of the inflamed surface rom the action of the air, to which very insufficient attention has been directed in the treatment of cutaneous inflammations. Therefore, afer the surface has been cleaned by any of these intments, they should be washed off, and some elatinous, albuminous or gummy preparation pplied to it, so as to exclude the air, as advised or PITYRIASIS (§ 27.); and this preparation hould be allowed to remain as long as it answers this purpose, when it should be removed by omentations and ablution, and reapplied until he parts are completely restored. I have lately mployed for scaly eruptions, a lotion of one part f *Glycerine,* to three, four, or five parts of water, with marked benefit; and Dr. GLOVER has recommended *Iodoform* externally (ʒss. — ʒi. to the j. of cerate), and internally, in doses of two or hree grains twice or thrice daily.

63. As I have shown in the article PITYRIASIS, he chief causes of the obstinacy of scaly and ther cutaneous eruptions, are — 1st, The action f the air, from which they are not sufficiently protected during the treatment; — 2nd, The want of ue attention to the state of the assimilative and epurative functions of the blood; — and, 3rd, nsufficient restrictions on diet and regimen. But, ven when a cure is obtained, or nearly obtained, *relapse* or a *return of the eruption* is a frequent ccurrence — a relapse generally proceeding either rom the causes just specified, or from a premaure relinquishment of treatment; a subsequent eturn of the disease resulting from the same auses as produced it at first, or from inattention o the several digestive and excreting functions. Both these unfavourable contingencies are most kely to occur when the functions of the several bdominal organs have not received due attention uring the treatment, and a restoration of them to he healthy state has not been effected; and also when the healthy conditions and colour of the arts affected have not been completely restored efore the successful means were relinquished. hese two causes, especially when acting simultaneously, with errors in diet and regimen, are most influential in producing relapses, and returns, at more or less remote periods, of scaly eruptions; and they are of greater importance than they have hitherto been considered.

64. *The local forms of psoriasis and lepra* mentioned above (§ 16, *et seq.*), require chiefly the adaptation of the general and local treatment already described to the circumstances of each case. — (*a.*) *Psoriasis palpebrarum* will often be benefited by the application of three or five leeches behind the ears, and by a lotion consisting of a weak solution of the nitrate of silver, or a lotion of sulphate of zinc, or diluted tincture of iodine, to the part. The calomel ointment, or the zinc ointment, or a diluted nitrate of mercury ointment, may be severally applied in this and the other local forms of the eruption. — (*b.*) For *psoriasis genitalium,* emollient local baths, and the use of the lotions and ointments just mentioned are most beneficial. If these forms be attended, as they usually are, with much itching or irritation, a solution of the bi-borate of soda in tar water, or in some emollient fluid, containing creasote, applied as a lotion, or by a sponge, will generally give relief, and remove the eruption. Sulphur and cinnabar fumigations are usually successful when the scrotum or anus is implicated. — (*c.*) For *psoriasis palmaria,* after soothing the parts with local baths of the decoction of bran, &c. ointments containing the iodide of sulphur, or the iodide of mercury, or the other ointments already mentioned, may be employed in aid of the constitutional remedies recommended. In the more chronic states of psoriasis palmaris, Mr. WILSON advises a spirituous lotion of bi-chloride of mercury, followed by water dressing.

65. The *mineral acids* have been favourably mentioned by some writers; but I have seldom observed much benefit derived from them; and have even believed them to have been sometimes injurious. In a few cases, however, after a due evacuation of accumulated secretions and excretions, the liver still continuing torpid, the nitro-muriatic acids given internally and employed externally have appeared of some use; and the sulphuric acid has occasionally been added, with marked advantage, to the neutral sulphates, dissolved in bitter infusions, and taken in quantities sufficient to keep the bowels freely open. Dr. C. SMITH and Dr. CUMIN, however, are of opinion that dilute sulphuric acid possesses considerable efficacy in the treatment of squamous eruptions; the latter physician believing that the acid is decomposed, and that the system is thereby impregnated with sulphur. This may be the case when the quantity taken is small or very moderate: but in some experiments I found that the dilute acid, when given in large and frequent doses, could be detected unchanged in the urine. Acids, however, ought to be employed with caution, and with strict reference to the excretions, especially the urine, and its saline constituents.

66. The *diet and regimen* are of the greatest importance in the treatment of all the scaly eruptions, and are often more beneficial, if strictly enforced, than even medical means. Animal food should be used sparingly; and pork, veal, ham, dried or smoked and preserved meats; fish and shell-fish, especially fried and rich fish; rich sauces, doughy articles, pastry, or pie-crust; pickles and preserves; heating and stimulating

beverages, especially spirituous and malt liquors, coffee, punch, acid wines, &c. ought to be constantly avoided; and sugar, butter, and sweet or acidulated articles very sparingly taken. The remarks offered on this topic, in the article Pityriasis (§ 34.), a species of the eruptions now treated of, strictly apply to the treatment of these eruptions.

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PUERPERAL STATES AND DISEASES.

— The Pathology of Parturition. — Diseases incidental to the Puerperal States. Classif.— General Pathology. Special Pathology.

1. Several of the diseases incidental to parturition and to convalescence from this act are discussed under their special denominations; and to these I shall refer as they successively take their places in the group of maladies usually called "*Puerperal.*" In this place, therefore, it chiefly remains to discuss,—1st. *The pathological relations of the puerperal state;* and 2d. *The very dangerous and often malignant maladies incidental to it, which are not treated of under other heads.* That a view of the pathological relations of the puerperal state, impartially exhibited, and without reference to peculiar doctrines, will be of use, it is hoped, in guiding the inexperienced during their intercours with the deviations from the more common pr cession of morbid phenomena which will occasio ally be met with by them, is only a reasonabl expectation; and hence an inducement to unde take the labour which a faithful exhibition of th view involves.

2. I. The Pathology of the Puerpera States. — i. Of the State of the Female a the most advanced or full Period of Pre nancy. — The changes, as well as the princip deviations from the healthy state, during uter gestation, are described in the article Pregnanc and under various other heads. It only remains notice the state presented by the female œconom when gestation is approaching, or has reached i full period. The uterus then has attained its u most size; and it then enjoys a copious determin tion of blood for the nourishment and growth the fœtus, and for the preservation of its ow augmented structure. The distended uterus, esp cially in a first pregnancy, presses more or les according to the size of the female, and the c pacity of the abdomen, upon the other visce especially on the urinary bladder, the kidne the rectum, and large bowels, the liver and bilia apparatus, and stomach; and consequently t descent of the diaphragm is impeded, and co gestion of the lungs is favoured. But the pressu also influences the circulation through the lar venous trunks, and often, in some degree, throu the heart and lungs; hence arise congestion remote parts, especially of the veins of the low extremities, often followed by œdema, and co gestion of the sinuses within the cranium, wi the dangerous consequences of this conditio The effects produced by the large size of the uter are very much aggravated if pressure upon t lower bowels be allowed to interrupt the regul process of fæcation and excretion; and if t cause or indigestion should give rise to flatule collections in any portion of the alimentary can

3. With the increased development of t pregnant uterus, the peritoneal envelope of t organ, and even the ligaments experience a markable change, and are inordinately stretche so as to favour the supervention of inflammati especially upon the removal of the distendi cause, when additional influences come into op ration. With the ascent of the fundus of t uterus, the omentum is more or less displaced, carried upwards; its exact position and influen upon adjoining parts varying with the quantity adipose substance it may contain.

4. It is obvious that changes of the position a condition of the viscera must influence more less the functions performed by these viscera; a that, both during the progress of these changes a at their consummation, various disorders, notic under Pregnancy, are liable to appear—that t secretion and excretion of urine should be d turbed or impeded, or even arrested, the functi of digestion and assimilation disordered, the int tinal secretions and excretions interrupted, a sensibility and motion materially disturbed. the full period of gestation, the circulating a respiratory organs, and still more the nerv centres, owing to the congestions to which th are exposed at this period, are severally liable the most serious attacks as soon as the congesti in which these attacks originate, is carried to pitch requisite for their development.

5. In connection generally with the changes now mentioned, if not always dependent upon these changes, the nervous system generally acquires increased sensibility and susceptibility of impression; and, through the medium of this system more directly, and through that of the vascular system more indirectly, the whole frame intimately sympathizes with the uterus, independently of the mechanical effects produced by it upon the other viscera. The nervous development of this organ, and the vascular determination to it, influenced by the nervous organization, renders the womb the centre of numerous sympathies, and the source of many morbid phenomena, all which increase and become more prominent with the progress of pregnancy, and still more manifest at the full period, during parturition, and for some time after delivery. The activity of the nervous influence, and of the vascular circulation of the uterus at an advanced stage of pregnancy, influences remarkably the conditions of both the nervous and the vascular system generally, notwithstanding the various pathological conditions tending to impair the energy and sensibility of the one, and the tone and action of the other — notwithstanding interrupted excretion, and the various circumstances favouring excrementitial contamination of the blood, and congestion of it in venous trunks and sinuses.

6. ii. Of the Changes taking place during the Parturient Process, and their Influences in causing Disease. — The uterus, having completed its function of fœtal development, or having carried this function as far as is consistent with the health and subsequent safety of the mother, experiences that state of action which is the best calculated to preserve both the child and the parent from injury and disease. But during this action, and the changes in the nervous and vascular systems which it more or less remarkably produces, various morbid conditions are apt to appear. The painful contractions of the uterus, although occurring only at intervals, tend to excite or react upon the nervous systems generally, but more remarkably upon the spinal cord, and through it upon the brain. These contractions also tend to diminish the flux of blood to the uterus, and to determine it in greater quantity to the brain, and thereby to change a pre-existent state of passive congestion into active and increased congestion, or to carry a condition of the vascular system, which was insufficient to produce acute disease, to that pitch which instantly developes such disease.

7. The uterine actions, although often thus productive of seizures depending upon the states of the cerebro-spinal nervous centres, especially as regards the circulation of these centres and the peculiarities of that circulation, are yet independent of these states. This fact is undeniably demonstrated by the occurrence of uterine action independently of the will, and during abolition of the functions of the cerebro-spinal system; by natural parturition taking place during paraplegia as well as hemiplegia; and as shown recently by the regular progress of the parturient process, whilst sensibility and voluntary motion are abolished by the inhalation of æther or of chloroform. It is obvious that the muscular contractions, and the painful excitement of the uterine nerves during parturition, will occasionally develope morbid tendencies in the nervous system when these already exist, owing either to hereditary or to acquired predisposition, and consequently that convulsive or apoplectic seizures, or phrenitic or maniacal attacks will occasionally appear during this process; the convulsive seizure presenting more or less of the apoplectic, of the epileptic, or of the simply convulsive character, according to the predisposition and peculiar circumstances of the case; the maniacal attacks rarely appearing during parturition, although frequently after this process. Convulsive seizures are not confined to parturition, for they occasionally take place previously to, as well as after, this process; but during it, they are more apt to assume an apoplectic or epileptic, or a mixed form — in consequence of the greater liability to active congestion of the brain and spinal cord during the parturient act — the apoplectic being characterised by profound coma and stertorous breathing, with slight convulsions, the epileptic by the violence of the convulsions, by frothing at the mouth and injury to the tongue. (See Articles Convulsions, Puerperal; and Insanity, Puerperal.)

8. Certain changes in the uterus itself may take place during pregnancy, or even may have existed previously, and may arrive at a dangerous or even fatal termination upon the accession or in the course of parturition. Thus inflammation may have attacked a portion of the pregnant uterus and occasioned softening, or impaired action and tone, or even a greater lacerability of that portion, in consequence of either of which changes rupture of the uterus, or dangerous hæmorrhage may take place during parturition; or, if either of these do not supervene, inflammation of the uterus, or of its veins or sinuses, or peritonitis, or puerperal fever, may follow delivery; the previously diseased state, and the exhausted tone and contractile power of the organ especially favouring the occurrence of these maladies.

9. There are various circumstances connected with parturition productive of disease either of the uterus or of adjoining and associated parts. The interferences arising out of impatience and want of confidence in the efforts of nature — a premature or inconsiderate, or a too long delayed, recourse to medicinal or mechanical aids of parturition, and the injury which these may occasion either to the uterus, or to parts in the vicinity, or even to both, are amongst the most influential causes of disease, not only of the parts thereby injured, but of the frame generally through the media of the nervous and vascular systems. The means which have recently been recommended for the prevention of pain during parturition, although quite competent to the production of this result, cannot be viewed as altogether innocuous. Several instances have already occurred, evincing not merely dangerous but actually fatal effects from recourse to them. A fatal issue may certainly be prevented from taking place immediately from these means; but the changes which may terminate fatally cannot be so readily prevented in all cases, and at the same time accomplish the intention for which they are employed. These anæsthetic agents have been demonstratively shown not only to destroy sensibility for a time, when inhaled for a short period, but also, in comparatively short periods of inhalation, to produce congestion of the lungs, a manifest change in the state of the blood, and even a

rapidly fatal result. That these agents, when adroitly and cautiously administered, may not occasion any inconvenience subsequently to their inhalation may be the case, in nine out of ten instances in which they have been employed will be readily admitted, but the tenth instance may be one of serious puerperal disease, of convulsions, or of mania, or of fever, or of congestive pneumonia, or bronchitis, owing to the previous state and predisposition of the patient—events which cannot be anticipated or guarded against by the physician. Pain is often salutary as respects its effects, and especially in enabling the œconomy to resist, and to rally against, the depressing operation of shocks upon the vital influence; and, when neither its violence nor its continuance is productive of injury to the constitution, or of exhaustion of vital power, to endure it is preferable to the annihilating of sensibility by an agent which acts so remarkably, and so immediately, upon the chief manifestation of animal life, arrests the usual processes of nature, and even terminates existence itself if employed a few seconds longer than is required to destroy this the highest function of living creatures.

10. iii. Of the State of the Female after Parturition, and its Influence in favouring the Occurrence of Disease. — In estimating the state of the female upon delivery the previous conditions now passed in review — those just antecedent to parturition, and the act of parturition itself, ought to be held in recollection. The pressure produced by the gravid uterus upon adjoining viscera, and the effects of that pressure as shown above (§§ 6. *et seq.*), are now suddenly removed. The vitality of the frame has sustained some degree of shock from the violent contractions of the uterus, the expulsion of the fœtus, and the detachment of the placenta, as well as from the sudden loss of blood, and the removal of pressure and distension. The internal surface of the uterus, moreover, resembles that of an extensive wound, especially where the placenta was attached to it; whilst the peritoneal surface of the organ, and the positions and physical conditions of the several abdominal viscera, are now more or less changed. The general results of these concurrent changes are not severely felt by robust or sound constitutions, beyond what may be viewed as a slight shock to the vital energy, attended by more or less exhaustion consequent upon the pains, the uterine action, and the loss of blood; but this result in these constitutions amounts not to disease; it is merely a state of vital exhaustion, which nature soon repairs; but which readily favours the development of disease whenever any of the causes to which puerperal females are often exposed comes into operation. It is different, however, with females who are otherwise circumstanced, especially with the delicate, the insufficiently nourished, and the morally depressed. If there exist a deficiency or poorness of blood; if fæcal accumulations have formed in the large bowels; if the patient be nervous, hysterical, or subject to sudden or epileptic seizures; if she entertain fears of her state, or anxieties as to the present or future; and if she be exposed to the impure air of a low, miasmatous, damp and close chamber or locality; or to the contaminating and infectious air of an hospital; or to any of the numerous causes which induce the diseases incidental to child-bed, then the effects, whatever may be the especial form which they assume, will be most serious and often fatal.

11. In proportion to the severity of shock produced by the parturient act upon the vital energy, and to the susceptibility of the nervous influence and sensibility of the patient, will the liability to the supervention of puerperal maladies be great. Mania, watchfulness, headach, convulsions, imperfect contractions of the uterus, or an impeded return of the organ to the size proper to the time which has elapsed since delivery; suppression of or irregularities in the lochial discharge; suppression of the secretion of milk, &c. may severally follow severity of shock, especially when heightened by marked susceptibility and sensibility; and these latter will, in their turn, be greatly aggravated by large losses of blood relatively to the condition of the vascular system, even although no other malady be superinduced. After considerable hæmorrhage, also, particularly when vital exhaustion is remarkable, or when the mind is anxious or depressed, morbid emanations strongly impress the nervous system, and readily pass, by endosmose, into the pulmonary circulation. The contractions of the uterus being then also inefficiently produced, the lochial discharge is partially retained and rapidly altered; and, thus altered, it is partially imbibed by the vessels opening on the internal surface of the uterus, inflaming these vessels and venous sinuses. But the matters retained in the uterus may not merely inflame these vessels, they may also contaminate the organ itself; and being imbibed and absorbed into the circulation, contaminate also the whole mass of blood, with or without manifest change in the uterine vessels and structure; and, moreover, after such contamination, superinduce remarkable constitutional effects and structural lesions of those parts especially which have undergone the more evident alterations as to position and condition during the successive stages of gestation and parturition

12. Thus, after parturition the female frame is particularly open and liable to be invaded by the most influential causes of disease; — 1st, By mental excitement and impulse, and by moral depression; — 2nd, By the inhalation of morbid effluvia, proceeding either from other diseases, or from the decomposition of animal discharges and secretions, or from the other sources generally productive of infectious emanations; — 3rd, By the absorption from the cavity of the uterus itsel retained and partially decomposed discharges; — 4th, By infectious matters retained in the fou bed-clothes, mattresses, or beds in which the female is confined; — 5th, By the retention and absorption of altered secretions and excretions, or of fæcal matters from the alimentary canal; — and, 6th, By interrupted secretion and excretion, the blood being altered more or less, owing to the accumulation in it of morbid or excrementitial materials.

13. iv. Of Convalescence after Parturi tion. — *A.* The natural Course of Convalescence. — *a.* The *shock* consequent upon delivery soon subsides when it is moderate and the patien obtains a few hours' sleep, if all disturbance or excitement be prevented. In proportion to the subsidence of this effect upon the vital power, the comfort and repose of the patient return, and nervous symptoms or vascular excitement are prevented. As the shock subsides, and exhaus tion is diminished, so are the several secretion

and excretions, with the new secretion of milk, re-established. The *circulation*, as indicated by the pulse, which was excited or increased in frequency during the progress of labour, falls below the natural standard immediately after, and continues below it during a few hours. After varying somewhat for the following fourteen or fifteen hours, the circulation becomes slightly increased on the secretion of milk; and, when this secretion is established, it generally continues about the natural state.

14. *b.* The *uterus* contracts more or less firmly immediately after delivery, so as to reduce it, in the more energetic cases of contraction, to about the size of the infant's head. This contraction — 1st, Prevents hæmorrhage; — 2nd, Empties the cavity of the uterus, and prevents the lodgment of coagula; — 3rd, It constricts the uterine vessels and sinuses, evacuates their contents, and prevents their tendency to imbibe fluids, which may be retained in the cavity of the womb; — and, 4th, It diminishes the afflux of blood to the uterus. The contraction and diminishing size of the womb proceed, although not regularly, or without recurrences of slight relaxation, until about the eighth, or ninth, or tenth day, when it descends into the pelvis. Previous to the eighth day, its state may be ascertained through the relaxed abdominal parietes; but afterwards the fundus only can be felt above the pubis, and in six or seven days it can no longer be detected. This diminution of bulk is not altogether attributable to contraction, but to absorption in part, and in no small degree to the exclusion of the supply of blood, and to the pressure, by the contraction of the uterine fibres, of the fluids from the vessels and the interstices of the structure. It may, however, be doubted whether absorption is concerned in lessening the size of the womb after delivery, the lochial discharge probably contributing to this result.

15. *c.* The condition of the *internal surface of the uterus,* after delivery, is a matter of interest. "For several days after parturition, when no disease of the uterus has supervened, its lining membrane is coated with a yellowish brown, dark red, or ash-grey coloured layer of no great thickness, which seems to be formed chiefly of the fibrine of the blood, with small portions of deciduous membrane." The part to which the *placenta* was attached is raised above the surrounding level: its surface is unequal, resembling in this respect a granulating ulcer; its size is wonderfully reduced. In this situation dark-coloured coagula are found sealing up the orifices of the uterine sinuses, and frequently extending into the veins. The structure of the uterus is found to be less dense than natural, and the fibres more distinct. The *os* and *cervix uteri* are covered with echymoses, as if severely bruised; and sometimes small lacerations are observed on the edge. The orifice remains open for some days, but gradually closes. The *vagina* soon recovers its former calibre; considerable heat and soreness of it are experienced for only a short time, unless the head of the child have remained long in the pelvis, or the lochia be very acrid, when they are prolonged or pass on to inflammation of a more or less severe character. The vulva also resumes its natural capacity in a shorter time than might be expected. (See Churchill.)

16. *d. After-pains* require no mention at this place, as they are considered under that head. (See art. After-pains.) The *lochia* is merely a continuation of the discharge of blood which attends delivery, and proceeds from the vessels exposed by the separation of the placenta. For three, or four, or five days, it continues of a red colour; but it is much thinner, and more watery than blood, and is not coagulable. It then sometimes becomes yellowish, retaining its serous consistence; but it most frequently changes successively to greenish, yellowish, and lastly to a turbid appearance. The quantity and continuance of this discharge vary remarkably. Of the former no estimate can well be formed; the latter varies much; but the discharge seldom ceases altogether in a shorter period than three weeks, unless in consequence of disease, or continues longer than a month. Its sudden disappearance, and even its short duration, or scanty quantity, are important symptoms of puerperal disease.

17. *e. The several secretions and excretions* are more or less affected during the puerperal states. During parturition the *perspiration* is abundant, but diminishes gradually after delivery; but it usually continues free, and has a faint sickly odour, until convalescence is fully established, when the skin presents its usual state. The *urine* varies in quantity with the abundance of perspiration and of fluid ingesta, and also with the *state of the bowels,* which also vary, owing to their previous conditions and other circumstances. *The milk* is secreted immediately, or soon after delivery. A serous fluid, approaching to, but in some respects differing from true milk, is generally secreted for some time before parturition; and occasionally true milk is secreted during labour, although rarely with first children. In this case the mother can suckle immediately after delivery. But more frequently the milk is not secreted for eighteen or twenty-four, or thirty-six hours, when the breasts enlarge and stinging pains shoot through them. As the parturient shock passes off, and the contracted state of the uterus diverts the vascular determination from this organ, the secretion of milk commences and increases.

18. *f.* With the development of this new function a general disturbance of the system, constituting what is termed the *milk fever,* is produced. The severity and duration of this disturbance are influenced chiefly by the circumstance of the woman's nursing the infant, or discouraging the secretion of milk, and by the state of the bowels and of the other secretions. At first, or about the second, or beginning of the third day, the mammæ are heavier, larger, and tenser, and the patient has slight chills or rigors, followed by heat of skin, soreness of the breasts and acceleration of pulse. With these symptoms the secretion commences, at first slowly and with difficulty, but afterwards more freely. As the secretion becomes more abundant, the above symptoms abate, and in two or three days disappear. The milk first secreted is thicker and richer than that which follows, and acts as an aperient to the infant. (See art. Lactation.)

19. *B.* Deviations from the natural and healthy Course of Convalescence after Delivery. — Dr. Hamilton justly remarks — 1st, That when there has been unusual suffering during labour, the usual changes after delivery cannot

be expected to proceed in a healthy manner, because the exhaustion of sensorial power must more or less paralyse the actions of every part of the system; — 2nd, That the violent pressure to which the parts concerned in the mechanism of labour have been subjected must occasion a tendency to inflammation; — and, 3rd, That the violent and continued actions of the respiratory organs must render them liable to derangement. But, however influential these causes may prove in occasioning deviations from the ordinary course of convalescence, there are others not the less so, and these consist — 1st, Of disorders previously existing, or occurring during pregnancy; — 2nd, of peculiarity of constitution, or predisposition; — 3rd, Of mental agitation and moral influences; — and, 4th, of numerous circumstances occurring, and of causes coming into operation after delivery.

20. (*a.*) The *nervous shock* may be so very severe as to create alarm. The patient has the aspect of a person in a state of collapse, or extreme exhaustion. The countenance is expressive of anxiety; the senses are either morbidly acute, or, what is still worse, unnaturally dull; the pulse is very rapid, small, and weak, or very slow, laboured, or irregular; and the respiration is hurried, panting, and often more frequent than accords with the state of the pulse. Between this more extreme state of vital shock and the natural state there are numerous grades; and, even in the slighter states, reaction may be long deferred, or may take place imperfectly, or even excessively. In the more extreme states of shock, death may occur in a few hours, without any attempts at reaction being made, the vital sinking proceeding until life is terminated.

21. *Dissection*, in these cases, detects no lesion to account for death. Dr. CHURCHILL remarks, that of several cases of this kind which he has seen, one was tedious, but terminated naturally, and two others were instrumental deliveries. A due estimate of the nervous shock is of great importance in severe cases; for, in most instances, the progress of convalescence is in inverse proportion to the amount of this disturbance. In some persons slight circumstances increase, in a wonderful degree, the susceptibility of impression; and, if this be overlooked, very serious results may follow.

22. (*b.*) The *state of the pulse* is of the utmost importance after delivery. If it continue frequent or very quick, one of two, or even three, things is to be apprehended, even although no other untoward symptom may exist, namely, hæmorrhage, internal or external, or the accession of inflammation, or of puerperal fever. Dr. CHURCHILL observes that, in almost all the cases of flooding after labour, he has found the pulse remain quick, and perhaps full, up to the occurrence of the attack. He might have extended the observation to inflammations and puerperal fevers; seeing that the phenomenon is equally applicable to them and to the commencement of lactation, to after-pains and to the retention of coagula, in some constitutions. The remark of Dr. JOHN CLARKE that no woman should be considered as safe whose pulse exceeds 100 is certainly just; and, I may add, that if the pulse exceed 110, then the risk of puerperal fever or of internal hæmorrhage having commenced, is very great; and a careful examination of all the symptoms of the case should be made, and the coming mischief anticipated, and if possible prevented.

23. When with increased quickness of pulse, it is found that the uterus has not decreased so far in size as might have been expected from the time that had elapsed since delivery, or that, having been diminished, its bulk has increased about the fourth or fifth day, then inflammation of the womb or of its vessels may be expected to declare itself, if it have not already done so, by increased tenderness, by less firmness of the uterine tumour, by the diminution of the lochia, and by the sensations of the patient. These symptoms may, however, be occasioned by the retention of coagula ir the womb; which, if retained long, or if no thrown off, by means which will aid the contractile action of the uterus, may cause inflammatior or puerperal fever. As tenderness may accompany severe after-pains, it is proper to distinguisl between the tenderness thus produced and tha which depends on inflammation; and this may b effected by ascertaining whether or no the tenderness continues in the intervals between the pain and contractions which occasion them. If it doe continue, inflammation should be suspected, especially if the pulse be quick, and if the lochia ha suddenly become scanty or suppressed.

24. (*c.*) The *lochia* rarely deviates from the usua condition without exciting some degree of anxiet in the mind of the patient and physician. Thi discharge may *cease* a few hours after delivery after the birth of a still-born or putrid child; and although putridity of the fœtus may be viewed a risking the healthy condition of the uterus, ye the membranes may have protected this orgar so that no unpleasant symptoms appear. Th lochia may also be very *scanty*, yet of the usua duration, as when flooding has occurred; an in this case no further mischief may appear, a though a greater predisposition to some othe puerperal malady is thereby developed as puer peral fever or mania, &c. This discharge ma be, on the other hand, *excessive*, either as to th quantity within the usual time, or as to the pro longed duration of it. After having decreased i quantity and changed in colour, it may suddenl increase, or become even excessive. This usually caused by sitting up too soon, or walkin about; or by the expulsion of a clot which ma have obstructed the passage of the discharg through the os uteri. If the lochia change sud denly from a paler to a redder colour, or if a *r colour* return after it has disappeared, the acce sion of secondary hæmorrhage should be dreade and guarded against. The passage of the di charge into uterine *leucorrhœa*, which may b permanent, will sometimes occur, and oug to be prevented. The lochia may assume a *acrid* and a very *offensive state*. It is then of dark or green colour, very profuse and water often so acrid as to excoriate the parts, and a ways very fœtid. These conditions of the di charge are often a sign of disease, but they ofte also arè caused by the retention of a small portio of the placenta, or of coagula, either in the uteri cavity, or in the extremities of the veins ar sinuses, or by portions of the decidua which putri and come away.

25. (*d.*) The *bladder and urethra* may suffer co siderably after labour, especially when protracte and be excessively tender; and redness and te

ness may extend to the *vagina* and *vulva*. This te is often productive of distressing strangury, netimes with considerable fever.

26. *C.* OF THE MANAGEMENT OF CONVA- SCENCE FROM PARTURITION. — (*a.*) *For the tural course of recovery*, the recommendations of AMILTON, CLARKE, SMELLIE, BURNS, CHURCHILL, d others accord in every respect, and are nearly same as those which will be here adopted. The tient, after delivery, should be kept for some ne in a state of perfect quiet. The room ought be slightly darkened, and very few persons, cept the nurse, admitted. Little or no talking ght to be permitted, unless in an under-tone, d no whispering. The conversation and de- anour of all should be cheerful; and no ill ws, frightful stories, or unseasonable communi- ions related. Mental excitement or emotion of ery kind is liable to be injurious. The hori- ntal position must be strictly preserved, and ep invited. After a few hours' sleep, the ner- us system will recover from its shock. The te of the *pulse* ought to be carefully watched, d excitement of it viewed attentively in con- ction with every sign or symptom of disorder; it is generally the first to indicate the approach disease. "Immediately after delivery, it is oper to apply *compression* to the abdomen, by eans of a broad binder. This is useful, in the st place, to fix the uterus, and secure its steady ntraction; and, secondly, to encourage the con- ction of the abdominal parietes. The binder ould extend from the ensiform cartilage to the ibes, and be carefully applied for ten days or a rtnight." Immediately after the expulsion of e placenta, a warm napkin ought to be applied the vulva, and changed at short intervals. This will afford relief from the smarting pain nsequent upon the passage of the child. After me hours, when the patient is recovered, the ternal parts should be washed with tepid milk d water, containing a small portion of spirit. his must be repeated twice a day, not only for e sake of cleanliness, but to aid in restoring the rts to their natural state." — (CHURCHILL, &c., *p. cit.* p. 253.)

27. The *horizontal posture* ought to be undevi- ingly observed; and however the exact position ay be changed, the horizontal state should never e departed from until permitted, and never ntil after the fourth or fifth day from delivery. he *after-pains* require such attention as is ad- ised in the article respecting them. The *lochia* eeds no further attention, than that the napkins hould be changed sufficiently often; and that ey be applied warm, and so as to prevent the dmission of air, especially cold air, to the tender arts, and the action of the air on the internal urface of the vulva. The air in the chamber ught to be preserved in a fresh and moderately ool state, and a fire kept up in order to promote renewal of air in the room. The bed-clothes ught only to be sufficient to afford a comfortable egree of warmth.

28. *Micturition* should be attempted as soon fter delivery as may be felt to be requisite — in rom five to eight hours; and it should take place s nearly in the horizontal position as possible. Dr. HAMILTON advises the patient to turn round pon her knees, by which any coagula accumu- ated in the vagina will readily be expelled. If micturition be neglected too long, the bladder may be paralysed, or inflammation may attack it and extend to the peritoneum, or convulsions may be excited by its over-distension, as I have witnessed in two instances. If any difficulty in evacuating the bladder exist, a warm fomentation to the vulva, or the introduction of the catheter, will remove it. It is the more important that the urine should be voided, when the patient complains of pain in the lower belly, with a desire to pass it, and when the labour has been severe or instrumental.

29. The *bowels* may remain quiet for twelve or eighteen hours after delivery; and if they are not moved at the end of this time, a dose of castor oil, or of senna, or of rhubarb may be given, and, if necessary, repeated. The frequency of repetition must depend upon the state of the bowels previously to delivery, and upon the presence of signs of fæcal accumulations. Dr. HAMILTON remarks, that "unless it be unequivocally ascertained that the bowels have been regularly cleared previous to delivery, a dose of castor oil, or of aloes, with some narcotic if necessary, ought to be given as soon as the woman has recovered from the shock of labour, and the appearance of the stools particularly examined." If indurated fæces be present, the purgative should be repeated every ten or twelve hours, until the bowels are completely unloaded. When the reduction of the bulk of the uterus is tardy, purgatives are more especially required, or an enema, containing the spirit of turpentine and castor oil, may be occasionally administered.

30. If the *breasts* become hard and painful, warm fomentations, frictions with warm oil, or with a slightly stimulating liniment, and a dose of a purgative medicine, are usually advised and repeated, for those cases where the milk is to be discouraged, the woman not intending, or not being capable, of suckling the infant. As soon as the secretion commences, the child should be put to the breast, in order to facilitate the discharge of the milk and to prevent distension. It is better, as Dr. CHURCHILL advises, to do this, even if the patient should not suckle her infant, as it will afford relief. When she is not to suckle, she ought to have every second or third day, according to her strength, till the secretion of milk ceases, and the tension of the mammæ subsides, a dose of some purgative, as rhubarb or senna, with a neutral salt. She ought not to leave her bed, even to have it made, before the fifth day; and, if she be a delicate subject, she should strictly preserve the horizontal position for several days longer. Premature *exertion*, and inattention to *position* and to suitable *diet*, are the chief causes which combine with *impure air*, foul *beds* and *bedding*, and *mental emotions*, to produce the maladies consequent upon parturition.

31. The patient's *diet* should consist chiefly of gruel, arrow-root, sago, rice, milk, whey, panada, weak black tea, with dry toast, or biscuit, and very little butter, for the first three or four days. When the vascular excitement attending the commencement of lactation has subsided, and no disorder is observed, broth, chicken, mutton, or other light articles of diet may be taken on the seventh or eighth day; and wine and water, preferably claret, may be allowed in a day or two afterwards.

32. *b. Deviations from the ordinary progress of convalescence* ought to be promptly attended to, and cautiously treated.—*α.* If the *vital shock* be extreme, or even severe, small doses of opium, with camphor, ammonia, or musk, should be frequently administered, and the quantity of each duly proportioned to the frequency of exhibition and the urgency of the case. These substances are preferable to wine or brandy, as they procure sleep, quiet the pulse, and prevent the subsequent reaction from being excessive; whilst the latter may occasion fever, or distressing headach, or even mania. In this emergency, perfect moral and physical quietude should be preserved. As the shock subsides, suitable nourishment and restoratives are requisite.

33. *β. Increased frequency of pulse* ought always to excite suspicions and the strictest investigation. If the patient suffer from gastro-intestinal irritation, the cause of frequency is thereby manifested, and blue pill, or the grey powder, with Dover's powder, should be prescribed and repeated according to circumstances. If fæcal matters have accumulated in the bowels, the purgatives and enemata already mentioned are required. If the quickness of pulse still continue, the states of uterine contraction and of the lochia ought to be examined, with the view of detecting the commencement of disease in the uterus or its appendages, or in the peritoneum.

34. *γ. An acrid or morbid state of the Lochia* is apt to occasion irritation, excoriation, or even inflammation of the vagina and vulva, with smarting and itching. In this case, extreme cleanliness, frequent bathing, warm diluent vaginal injections, lotions, containing lead, or the black-wash, or the sulphate of zinc, may be employed; the simply diluent injections being first used; and the others subsequently or after the lochia has become scanty, or about to disappear, lest suppression of the discharge should be produced. The injections ought to be warm, and if the lochia be very offensive, a small quantity of creasote, or of chloride of lime, or chlorinated soda may be added. During the treatment, the *binder*, above recommended, should be duly and carefully applied. When the lochia becomes *excessive* or *prolonged*, nutritious diet, tonics, as the preparations of cinchona, or quinine or chalybeates, or the tincture of the muriate of iron, ought to be allowed, after a due time from delivery has elapsed. When the discharge becomes excessive or changes in colour after having nearly ceased, the patient should be confined to the horizontal posture. In all these circumstances, and especially when the lochia is excessive, prolonged, or likely to pass into uterine leucorrhœa, the occasional administration of an enema containing oil of turpentine, or embrocations with this substance, applied either above the pubis or over the sacrum, will be of service.

35. v. Of the Influences and Agents favouring, predisposing to, or exciting Puerperal Disease. — The same *causes* may produce any of the acute maladies incidental to the puerperal state; the particular malady being determined by the peculiar combination of causes, and of circumstances, aiding the development of the effects of these causes, by the constitution, habit of body, and state of the patient previous to, and during the parturient process, and by the changes consequent upon delivery — by these last more especially than by others. The remarks whicl have been offered above on the several change and varying states and circumstances tendin strongly to predispose the female frame to the in vasion of the exciting causes of acute disease, wil sufficiently show the marked liability to such dis ease which these changes and states create even in the more favourable circumstances i which she may be placed. But when it is con sidered that, with these successive changes, va rious mental emotions have been and continue i operation, — fear and anxiety in most cases, an the most depressing of the moral sentiments i some, — these changes must be viewed as receiv ing therefrom the most important aids towards th development of serious morbid effects. To these moreover, are often added the influences of di and regimen, not always the most suitable to th successive states of advanced gestation, and parturition, and more especially to the period im mediately following delivery; the still more ac tive agency of close, impure, and miasmatous ai of foul exhalations, and of imperfect ventilation and the contingent operations of infectious effluvi variously generated, and as variously conveye and propagated.

36. Amongst the poorer classes, and eve among the richer in some localities, the mois putrid, and contaminating emanations from th numerous sources with which all cities and larg towns more or less abound, are productive of th more malignant of the maladies incidental to th puerperal state. These sources have been ful described, and their influence shown, in the art cles Infection and Pestilence, *protection fro* But the most malignant operation of a foul contaminated air is shown in lying-in hospital where every patient which enters them, at certa seasons or times, is seized with puerperal feve or some other acute and often fatal disease. the wards of a lying-in hospital contain more tha four beds; if these wards are placed too close each other; if they be not lofty and ventilated b a thorough current, by open fire-places, and b fires; if they be too closely shut during cold ar moist states of the air; if the discharges be n quickly removed, and the cloths imbibing th lochia be not frequently renewed; and if th bed-clothes and bedding be not perfectly clea and duly purified, the more malignant forms puerperal disease will soon make their appearanc owing to the generation of a morbid, an infe tious, and a contaminated effluvium, by puerper females and by their discharges, in too confine and insufficiently ventilated apartments. Th effluvium, when once generated, may be convey by the clothes, or by other media, and may infe others so circumstanced as to be contaminated b it. Of this fact I have known numerous proo which will be noticed in the sequel.

37. There is every reason, moreover, to belie that lying-in hospitals are not the only source the fevers which render these institutions a great curse than a benefit to the community; for I ha seen reasons for inferring, that the foul air ext cated from the numerous sources of impurit contamination, and death with which this city a others abound, and which I have described und the heads referred to above, especially when u diluted by due ventilation, or when accumulat in a humid, still, and confined atmosphere, ar

w n admitted to, and acting upon, the recently d vered female, will so depress organic nervous p er, and so contaminate the circulating fluids, a o develope puerperal fever of a malignant c acter, which may, in its turn, generate an e vium productive of a similar malady in other p peral females when communicated to them.

3. The contaminating effluvium, or infected a osphere, productive of the more violent states o uerperal diseases, and the sources from which s effluvium proceeds, cannot be disputed; but it nodes of invasion and operation are not quite s manifest. I believe, however, from what I h observed, in the different circumstances in w h this effluvium or contaminated atmosphere h been generated, that its modes of invasion and o ation differ materially according to the con- c ration of this cause, and to the circumstances f uring its invasion in one way in preference to a her. Thus, in the more concentrated state of t effluvium, as generated in the crowded wards o lying-in hospital, during a cold and humid state o e air, and when due ventilation was prevented, I ve seen females without any complaint, and d l within twenty hours afterwards; and, on d ection, neither the uterus nor its appendages, n the peritoneum, has presented any manifest l on, or any change more evident than that of o r organs; the chief alteration being a fluid a dark state of the blood, some congestion of t lungs, and enormous flatulent distension of t alimentary canal. (See hereafter.) In these c s, which were observed as closely as I was a , I attributed the intensity of the opera- t of the poison to its being respired with the a to its operation on the nervous system and l d, to its contaminating the fluids, and to its i airing not only the crasis of the blood, but a the vital cohesion of the tissues, as evinced t n dissection, even before the body had entirely c led.

9. In other circumstances, when the morbid c oisonous effluvium appeared to be less concen- t ed, and to be productive of a less malignant c ess rapidly fatal disease, and where there was l crowding, and better ventilation of the wards, t effects were different both as to their pro- c ion and as to their issue. The appearances a r death were varied, and were most remark- a e in the peritoneum, or in the uterus, or in the u rine sinuses, or in the veins of the uterus and i ppendages; and, in respect of these cases, I l e doubted whether or not the poisonous efflu- v m or emanation had invaded the frame through t respiratory organs, or by the vulva and va- g a, or by both avenues. It may be viewed as a s newhat extravagant notion to suppose that an a nt disseminated in, and conveyed by, the air c contaminate or infect the frame by the latter a nue — by the vagina. But if the effects of t admission of even pure air into the cavity of a abscess, and the difficulty of preventing this a nission on occasions of opening psoas and lum- l abscesses, and of puncturing empyema, be duly e mated, the probability of air finding admission l the vagina to the uterus will be admitted, e ecially when the states of these parts for some d s after parturition is considered. If, then, the a already poisoned or contaminated thus finds i way into either the vagina or the uterus — an a nue much more patent than the opening into a chronic abscess, &c. — it will necessarily occasion, in the puerperal state, effects even more remarkable than when admitted into other cavities; for the already infected air will contaminate not only the discharges retained in these situations, rendering them still more injurious and infecting, but also the surfaces with which they come in contact, and which, as respects the uterus, resemble those of a recent wound, and, as regards the vagina, are excoriated, tender, or inflamed.

40. If the production of dangerous states of puerperal disease by this local contamination be admitted, the very intimate connection between certain forms of puerperal fevers and erysipelas will be further demonstrated thereby; whilst, on the other hand, this admitted connection between these maladies will evince the high probability of this mode of infection and contamination. It is extremely probable, moreover, that the vital depression produced by the foul air respired by the puerperal female, or even by an infecting effluvium communicated by the clothes of an accoucheur, will so influence the state of the recently-delivered uterus as to give rise to further changes: — 1st. To imperfect contraction of the uterus and impaired tonic action, and to the slow return to the natural states of the vagina and vulva; — 2d. To an altered, contaminating, or morbid state of the lochia; — 3d. To a more marked disposition to the absorption of such parts of this altered discharge as may be retained in the uterus or vagina; — and, 4th. To the prominent changes observed after death in the uterus, its appendages, and peritoneum.

41. vi. THE CAUSES OF THE SERIOUS NATURE OF ALL, AND THE VERY DANGEROUS TENDENCY OF SOME, PUERPERAL DISEASES, will readily appear from what I have already advanced respecting the changes experienced by the female frame in connection with the puerperal state, and the nature of the influences and agents to which the female in this state may be exposed. The shock which the vitality of the frame has received during parturition, its manifest effects on the nervous system of some females; the predisposition to fever, mania, or convulsion which it occasions; the sudden removal of distension and of pressure; the as sudden change in the state of the vascular system, as respects both fulness or deficiency, and distribution or determination of blood; the continuance of weakening discharges, and of depressing mental emotions; the alterations in the secretions and excretions; and the organic disposition of the sexual organs and adjoining tissues and viscera to experience structural change during the puerperal states, — all and severally tend to impart a serious or dangerous character to the diseases which occur during these states.

42. But it is not only to the changes, which the female constitution undergoes, in the puerperal states that the severity of the diseases incidental to those states are to be imputed, but also to the nature of the causes which produce these diseases, and to the pathological changes which necessarily follow, if they be not arrested by prompt and active measures at an early period of their progress, and before the fluids become contaminated, and the predisposed structures disorganized or altered. The diseases, also, with which puerperal females are affected, whether those following the operation of the common or physical causes, of

those induced by the imbibition and absorption of morbid secretions or excretions, or by infectious effluvia, are seldom simple or uncomplicated — are not confined to the nervous system, or to the vascular system, or to the sexual organs, or even to several of the abdominal viscera, — but extend to all the general systems, implicate both the nervous and vascular systems, change the vital and physical conditions of the blood, and affect, in a more or less prominent manner, the generative organs and peritoneal surface, which in many cases manifest the greatest amount of organic lesion. It is obvious that diseases of so complicated and general a character, affecting the chief factors of life, changing the conditions of vital fluids and of vital organs, attacking the frame at that period of existence, and in that condition, which are the most liable and open to their invasion, and in which the vital energies are the least capable of resistance, will, in these circumstances, make a rapid, a dangerous, and often a fatal progress.

43. vii. Of the prevention of Puerperal Maladies. — The remarks which I have offered above on the management, both of the natural course of convalescence after delivery, and of the slightest deviations from it (§§ 26—34.), and on the chief causes of the most important of puerperal diseases (§ 35, *et seq.*), will have already shown what the chief means of prevention are, and that they should have strict reference to the management of convalescence and to the treatment of those early deviations, as well as to the careful avoidance of those more noxious causes to which puerperal females may be exposed. Indeed an early and judicious treatment of the slighter deviations from the usual progress of convalescence, and avoidance of the infectious or contaminating causes constitute the chief means of prevention that can be adopted. Yet there are certain of these causes, and more especially of the sources whence they spring, which receive insufficient attention, and until lately have received no attention at all, even from those who consider themselves expert, beyond all others, especially in matters which they view as their own particular province, and as being above all the rest most important. I believe that the chief sources of puerperal fevers, particularly of their more malignant forms, are lying-in hospitals, in which not only a very large proportion of those who are received become infected, but also from which the infection is carried abroad, not solely by the females who go out, but also by the clothes of the dead and of those who recover, and by the persons and clothes of the medical attendants. The charitable would much more wisely and humanely contribute their bounty for the promotion of cleanliness and comfort in the chambers of the poor, and for enabling the objects of their bounty to be delivered in their own houses, with requisite and healthful appliances and aids, than in causing them to be transported to sources of contamination, contingent infection, and in no very small proportion, even of death.

44. The importance of removing, and of avoiding, when removal cannot be attained, the several sources of infectious effluvia which have been mentioned, under the several heads already referred to, was not the less obvious because it was so generally overlooked, previously to the
appearance of those parts of this work, in whi
the injurious effects of these sources of conta
ination were treated of; and even now they ha
not received the least attention as respects th
influence in causing the more important malad
incidental to the puerperal state. The natu
the number, and the concentrated agencies,
these sources are now too manifest to requ
description; but there is at least one to whi
insufficient attention — or indeed no attenti
at all — has been directed, namely, the imp
state of the *bedding* used by many persons
the middle classes, and of those below the
although not the poorest. The beds, consi
ing chiefly of feathers or wool, always of anin
substances — having imbibed the effluvium a
perspiration of the persons who have slept
them during many years, or even during gene
tions, without having once undergone purificati
— have become more or less contaminated by
continued use; and it cannot, therefore, be
matter of surprise if, in certain occasions of p
longed occupation, and in some atmospheric c
ditions, an effluvium should be evolved from the
productive of infection or contamination to
susceptible and predisposed puerperal fema
That a contaminating effluvium is actually evol
from foul beds in these circumstances, I belie
because I have seen proofs of this cause of d
gerous disease; and hence more notice should
taken of this source of human and especially
puerperal infection than it has hitherto receiv
It is not improbable, that puerperal females
not the only sufferers from this cause, and t
puerperal fevers are not the only diseases wh
may occasionally originate in this source, but a
that erysipelas, typhoid fevers, and other feb
and infectious maladies, may often be produ
by the same causes, both in the wards of an h
pital, and in the close and impure sleeping ap
ments and beds of the poorer classes, and ever
those next above them, when the infection
comes more generally diffused.

45. II. Of the local and Functional
seases incidental to the Puerperal State
Several of these diseases are treated of under dist
heads. *Phlegmasia dolens, puerperal convulsi*
uterine hæmorrhages, and *puerperal mania* h
separate articles assigned to them. (See a
Convulsions, § 27, *et seq.* Hæmorrhage, U
rine, and Insanity, Puerperal,). The
orders incidental to the *mammæ* and to the se
tion of *milk* are considered in the articles Lac
tion and Mammæ. It therefore only remains
me to notice at this place, certain *lesions* of
sexual and adjoining organs which are apt to
cur, during and subsequent to parturition, and
fevers to which puerperal females are liable.

46. i. Structural Lesions consequent u
Parturition.

Classif. — IV. Class. IV. Order (
thor).

47. *A.* Sanguineous Tumour of the Vul
Sanguineous tumour of the labia, Churchill
Sanguineous extravasation into the labia, Cross
Effusion of blood into the cellular tissue of one o
both labia is of rare occurrence. It has been
served and described by Macbride, Maitla
Denman, Burns, Merriman, Dewees, Ha
ton, Crosse, and others.

48. The effusion may not be limited to

but may extend into the pelvis, and down-
to the perinæum. It may occur during la-
previously to the delivery of the child, as in
AITLAND's case; but much more frequently
liately afterwards. The tumefaction is ge-
y sudden, and increases rapidly. The size
much, and has even reached that of a
head. Dr. CHURCHILL, quoting M. SCHE-
tates, that as much as six or seven pounds
od have escaped.

a. It is *caused* by the rupture of some vessel
sels, by the pressure of the child's head
passing through the pelvis; and most pro-
the ruptured vessels have been in a varicose
rdered state previously. "Dr. BURNS sup-
some of the vessels of the nymphæ to be
ed; Dr. DEWEES, that the vessels of the
give way; and Drs. DAVIS and CAMPBELL,
dic vein." But there is not sufficient reason
gn it to any particular vessel. It most pro-
arises from the rupture of several small va-
veins. This lesion has usually followed
l labours.

b. Symptoms.—The patient's attention is first
ed to it, by the swelling of the labia, and by
e of weight and of bearing down. On ex-
tion, one or both labia are found distended,
imes enormously, and the labium everted, so
he tumour appears partially covered by the
us membrane. The colour is livid, or nearly
. The parts are extremely tender, and the
s very great. The tumour increases rapidly
it covers the vulva and perinæum. Dr.
CHILL states, that a considerable degree of
is present: the pulse becomes quick, the skin
nd the head pained; there is sometimes also
um. Retention of urine, from the pressure
tumour on the orifice of the urethra increases
listress. The patient lies on her back,
ely able to move, with the thighs widely se-
ed, unable to bear even the pressure of the
lothes (DEWEES). After a few hours, relief
ained by the rupture of the labium, which
ys takes place on its inner surface, and by
ischarge of blood. A small portion of this
ce begins to slough, and part of the blood
es; but, some coagula remaining, the wound
nes offensive from their decomposition. The
h and remaining coagula are afterwards
n off, and the parts generally heal by de-
.

. The rupture of the tumour rarely takes
during the labour; but in this case, as well
others where it occurs before the blood is
ulated, the hæmorrhage is so great as to oc-
n fainting, or even death, as in the instances
ced by PHILLIPART, CROSSE, NAEGALÈ,
DEL and others. If the tumour be very large,
e the birth of the child, it proves so serious an
cle as to require surgical interference. This
ur cannot be mistaken for *hernia;* the rapidity
appearance, the period of its occurrence, its
and colour sufficiently distinguishing it from
a. It has been mistaken for the distended
branes, and punctured with this idea; but the
ormed by the membranes can be isolated from
abia and traced up to the os uteri. Besides,
tumour generally does not occur until after
ery.

c. The *Treatment* is evidently to give as early
sue as possible after the blood has coagulated to the contents of the tumour. If the risk of hæmorrhage before coagulation be considered so great as to prevent an opening being sooner made in the tumour, the urine ought to be drawn off, and an enema, with an ounce, or an ounce and a half of oil of turpentine administered. In no case should this enema be withheld, and rarely ought an incision into the labium be delayed longer than two or three hours. When the small coagula infiltrating the cellular tissue causes an offensive discharge, then lotions with vinegar, water and creasote, or with chloride of lime, or charcoal poultices, may be employed. If hæmorrhage continue, or return, the turpentine clyster should be repeated, and compresses, moistened with oil of turpentine, applied. The bowels ought to be kept open, and the febrile and other symptoms treated according to general principles and the peculiarities of the case.

53. *B.* LACERATION OF THE PERINÆUM. This accident is varied in extent. Where it is slight, if may not materially interfere with the comfort of the patient, but when it is extensive it is a cause of almost constant distress. It occurs most frequently during first labours.—*a.* "The exact *situation* and *extent* of the rupture vary with the cause and the circumstances of the case. — 1st. It may commence at the anterior border and extend *to* the sphincter ani, and this is the most frequent extent. — 2nd. The rent may involve the entire perinæum, and extend through the sphincter ani, laying the cavities of the rectum and vagina into one. — 3rd. The central space of the perinæum is sometimes ruptured, leaving the anterior edge and the sphincter ani untouched." Both the child and the placenta may pass through this central laceration, or completely *per anum.* — 4th. The recto-vaginal septum, sphincter ani and part of the perinæum may be torn, so as to permit the passage of the child, leaving the anterior portion of the perinæum entire.

54. *b.* The *causes* are deviations from the ordinary mechanism of parturition; mal-conformation of the passages, or of the soft parts; exostosis or tumours in the pelvic cavity; excessive violence of the pains, and the too rapid passage of the head of the fœtus; great breadth, or extreme rigidity, or great weakness of the perinæum; mal-position of the child's head, or mal-presentations; and mismanagement or want of care, especially when instruments are used. Thus it will appear, that this accident cannot always be prevented.

55. *c.* The *symptoms* and *consequences* of laceration depend upon the extent of it. If the injury be slight, no ill effects may probably result. But if it extend to the sphincter, the patient complains of want of support, and is liable to procidentia of the womb. If the recto-vaginal septum be torn the state of the patient is most distressing. The fæces, for some time at least, pass through the vagina involuntarily; and the utmost attention to cleanliness is required, but cannot always prevent most distressing annoyances. When slight, the rent commonly contracts, and heals without interference, after a short time. Even when the recto-vaginal septum is torn, partial union may take place and leave only a fistulous opening. Dr. BURNS remarks, that a valve may ultimately be formed, so that the patient may be partly relieved of her infirmity. But frequently the lochial discharge passing over the wound prevents the natural pro-

cess of cure, and the torn surfaces become callous, or degenerate into ulceration in consequence.

56. *d.* The *prevention and treatment* of this accident are fully discussed in works on midwifery and surgery. To these I must refer the reader. But I may remark, that slight cases require only cleanliness: the part will heal of itself, and the patient may not even suspect what has occurred. Even when the laceration is more considerable, all that may be required is, to give at first, one or two active purges, and afterwards allow the bowels to become costive, to observe strict cleanliness, and to keep the patient in one position, so as to preserve the edges of the wound in contact. If these means do not succeed, a binder may be passed around the hips, and a pad on each side of the perinæum, so as to preserve the edges of the wound in apposition. Sutures of different kinds have been employed, and have succeeded in rare instances. After sufficient purging, it may be advisable to give opiates, so as to cause costiveness for a few days, and thereby to aid in the restoration of the parts. The catheter must be passed twice or thrice daily, and means used to absorb entirely the discharge. The *diet* should be spare, and chiefly farinaceous. Perfect quietude is necessary. In the various circumstances in which a failure, partial or complete, of the above means may occur, the assistance of the surgeon and mechanist will be required.

57. *C.* RUPTURE OF THE UTERUS AND VAGINA. — This fatal occurrence may take place during parturition, during pregnancy, and at an advanced period of life, of course unconnected with pregnancy; this last being the rarest. Dr. CHURCHILL adduces statistical details of this accident, from which it appears, that Dr. COLLINS met with thirty-four cases out of 16,654; that sixty-five cases occurred in an aggregate of 42,768 patients, or about one in 657. Dr. BURNS says, that it happens about once in 940 cases. It is not so often met with in first as in subsequent pregnancies. Of seventy-five cases, nine occurred in the first pregnancy, fourteen in the second, thirteen in the third, and thirty-seven in the fourth and subsequent pregnancies.

58. *a. Causes.* — 1st. *During gestation,* it may arise from that form of extra-uterine pregnancy called *interstitial fœtation;* the ovum being retained, in passing the fallopian tube into the uterus, between the uterine fibres, where, as it grows, it occasions the absorption of that portion of the uterine parietes, which at last gives way, and allows the fœtus to pass into the abdominal cavity. Rupture of the uterus may also proceed from disease, as from inflammation, softening, or suppuration of a portion of the walls of the organ; or it may be produced by accidents, blows, falls, &c. It may even occur without any assignable cause, unless it be then occasioned, as Dr. BURNS supposes, by irregular action of the fibres of the uterus.

59. 2d. *During parturition:* it may also arise from pre-existing disease, and especially from any one of the usual consequences of inflammation. A portion also of the uterus may be atrophied, softened, or thinned by the pressure of the child against it, or by pressure of some part of the abdominal or pelvic parietes, so as to yield during the uterine contractions of parturition. DUPARCQUE mentions scirrhus of the uterus as one of the causes of rupture; but this is doubtful. V en partial inflammation of the uterus has ex ed during gestation (§ 58.), then the laceration as usually corresponded with the situation o he previous pain, marking the seat of inflamm n. There can be no doubt that a perfectly he hy uterus is rarely or never ruptured. In one se M. MALGAIGNE attributed the rupture to th dministration of ergot of rye.

60. *b.* The *period* of labour at which ru re may occur varies: "it may be at the beginni — before the rupture of the membranes; durin the passage of the head through the pelvis; or i he moment when the child is delivered." Narr ng of the upper outlet may give rise to it; o ny other mechanical obstacle opposing the acti of the uterus; or even oblique positions of the w b. The age of the patient has but little influer in predisposing to rupture.

61. *c.* The rupture may only be *partial,* me one of the tissues of the uterus giving way her previously to or during labour, probably ow to antecedent disease, or to peculiarity of stru re. The peritoneal coat alone may be torn, the muscular coat may be ruptured, the peri eal covering remaining uninjured. Dr. COLLIN met with nine cases of this description. Althou the extent of lesion is less in such instances, y Dr. CHURCHILL considers it to be equally fatal. And as in other forms of rupture it may be caus by external injuries, by excessive movements the child, by over distension, &c.

62. Violence in turning the child may use rupture; "and it may accompany this ope ion in certain states of the cervix uteri, witho any fault of the operator." Rigidity of the os ut , or imperforation, may also occasion laceration. Several instances are recorded in which the o ter was torn completely off during labour. Pr ure at the brim of the pelvis rendering the vix uteri thinner or softer than natural, and ore easily torn, has been assigned for this occur nce.

63. 3d. *At an advanced period of life* the ucture of the cervix uteri is more or less ch ed, becoming dense, cartilaginous, and the can reduced in size, or even obliterated. The out for the escape of secretions accumulated in the u ine cavity is thus closed; and if the quantity col ted be sufficient to distend the organ, some por n of the walls experiences absorption and thinni , or inflammation and softening. Thus an openi , or perforation, may be made by absorption, by rupture, into the peritoneal sac.

64. *d. On dissection* the torn edges, an the parts immediately adjoining, usually exhibit rks of disease, when the rupture has proceede om this cause, the laceration in such cases occ ing in any part of the organ. "When the rupt e is the result of mechanical causes, it generally kes place near the cervix, and involves both the rus and vagina," the part which gives way ing usually near the union of the cervix wit the vagina. The wound is commonly transvers Of twenty-three cases, Dr. COLLINS found one the right, one on the left side, eleven posteriorl and ten anteriorly. The structure of the ute is hardly altered — is firm in texture, and natu in colour, except a few ecchymoses. The ed s of the laceration are jagged or uneven. In ver are instances the bladder has also been rup ed. When the *peritoneal surface* of the uteru has

been torn, several small lacerations, re-
ng scarifications, from a quarter to half an
length, and one or two lines in depth,
und. They are attended by the effusion
od in the peritoneal cavity, and by the usual
rances and products of peritonitis, which are
by the effused blood and the injury. When
scular substance is alone torn, there may or
ot be found evidence of pre-existent disease.
eritoneal covering is generally inflamed, and
is found effused in the cavity of the uterus.
ation of the *cervix uteri* is accompanied with
sed appearance; its edges are ragged and
n, and the parts immediately adjoining red
vollen. The connection between the cervix
gina is not compromised. In cases of rup-
f the uterus in *old persons* (§ 63.), the
is rather perforated than ruptured; the
es caused by the contents, and the softening
inning of a portion of the parietes appearing
like perforation than rupture. *Peritonitis*
s follows rupture of the uterus, if the patient
e the shock.

e. *Symptoms.* — The symptoms vary some-
with the extent of the rupture — according as
ritoneal, or the muscular coat is singly torn.
ircumstances which may suggest fears of
e are the occurrence of partial inflammation
uterus during gestation, and the existence of
t labour-pains in patients with a narrow, or
rmed pelvis. "Rupture of the uterus and
is marked by an acute, sudden, and in-
ble pain, like cramp; a sense of some part
ng, giving way, or tearing, with an audible
according to the testimony of the patient;
spension of the labour-pains; hæmorrhage
he vagina; and by a rapidly succeeding state
lapse." (Churchill.) All these symp-
nay not be observed in some cases, but the
nd collapse are never absent. When one of
ats alone is torn, the labour may continue if
the peritoneal coat, and there may be no
rrhage. In such cases, Dr. Ramsbotham
ks that the symptoms of actual rupture of the
e structure are observed in a diminished de-
excepting the escape of the child.

Rupture of the uterus is always attended
ontinued and extreme pain; nausea and
ing supervene, — at first of the contents of
tomach, then of a greenish, and lastly of a
or coffee-ground-like matter; the counte-
becomes pale, anxious, and ghastly; the
e and extremities cold and clammy; the
rapid, small, and weak, or fluttering and
lar; respiration is hurried, panting, and
us, with a desire of fresh air; and hæmor-
takes place from the vagina, varying much
antity. The shock or collapse characterising
cases is owing more to the nature and se-
of the injury than to the amount of hæmor-
which may follow, although this is some-
very considerable; but both conditions
ibute to this result. When the rupture is
lete, the child passes through the opening
the abdominal cavity, either partially or
ly, where it may be felt through the ab-
nal parietes, and the efforts at expulsion
. If the presentation was within reach be-
the accident, it cannot now be ascertained.
hurchill refers to instances of a loop of
ine having passed through the rupture, when
complete, and become strangulated. The state of collapse may continue for some time, if it do not prove fatal. But, at length, reaction takes place to a certain amount, and the usual symptoms of peritonitis appear: exquisite tenderness, pain, and flatulent distension of the abdomen; pulse small, hard, rapid, and, lastly, weak; decubitus on the back, with the knees drawn up; hurried respiration, anxious and collapsed countenance.

67. *f.* The *terminations* of ruptured uterus are — 1st. Death a few hours after the shock, or after delivery; — 2d. Death from peritonitis; — 3d. Death from consecutive lesions; — and, 4th. Recovery. In by far the greater number of instances, the accident proves fatal. The aggregate of cases observed by Smellie, J. Clarke, Merriman, M'Keever, Ramsbotham, Collins, and Beatty, amounting to sixty-eight, furnished only six recoveries. Osiander, Velpeau, and Churchill quote several cases of recovery; but instances are very rare in which recovery has taken place when the fœtus has remained in the peritoneal cavity. (Duparcque.) In cases of interstitial fœtation, also, patients have very rarely survived both shock and consequent inflammation. In all cases, therefore, of ruptured uterus, the *prognosis* is very unfavourable.

68. *g. Diagnosis.* — The sudden and acute pain, the cessation of labour, the collapse, and the recession of the child, sufficiently indicate the nature of the mischief. When, however, the rupture is partial, the diagnosis is much more difficult. The sudden pain, collapse, and consequent peritonitis, are the chief symptoms of rupture of the peritoneal coat; the pain, collapse, cessation of uterine action, and vaginal hæmorrhage, being the principal indications of rupture of the muscular coat. The sudden occurrence of peritonitis in *old women* may excite suspicions of perforation or rupture of the uterus, but certainty can be arrived at only by a *post mortem* inspection.

69. *h. Treatment.* — When rupture of the uterus is recognised, the propriety of immediate delivery cannot be disputed. Common sense and experience, as evinced by the results of recorded cases, support this practice. When the os uteri is undilated, instant delivery cannot be effected; but the measures to be adopted on this emergency, as well as in others connected with the delivery, especially when the child has passed through the rent into the abdominal cavity, come not within the scope of my work. The means which should be administered during the continuance of the vital shock, or collapse, are camphor, ammonia, and opium, in such doses as may be just sufficient to support the powers of life without inducing inordinate reaction. If peritonitis supervene, calomel, camphor, and opium; terebinthinate embrocations applied over the abdomen; opium in large doses, and the other means recommended in cases of *inflammation of the* Peritoneum (§ 138, *et seq.*), should be prescribed, bearing, however, in recollection, that the large loss of blood usually occasioned by the rupture, as well as the shock sustained by the vital powers, prevents either depleting or depressing measures from being too freely employed.

70. *D.* Inflammation of the Vagina. — Inflammation of the vagina may occur, independently of the puerperal state, or it may arise from specific causes, or infection, as shown in the ar-

ticle VAGINA.—(*a.*) It is of frequent occurrence after delivery, in various grades of severity. It may consist merely of slight soreness or excoriation, or irritation, and follow an ordinary or natural labour, and speedily subside, unless it be prolonged or exasperated by an acrid state of the lochia. When, however, the head of the child has remained a long time in the pelvis, pressing on the soft parts, or when the narrowness of the passage has created great difficulty, or when the presentation has been unnatural, or when instrumental aid has been required, the vagina is then liable to experience most severe inflammation, the consequences of which may be most serious.

71. (*b.*) The *symptoms* generally commence with a smarting pain, more severe than that usually following delivery, soon passing into a sense of painful heat and scalding, extending from the external parts up the vagina. There is also a feeling of fulness and weight in this situation. On examination, the external parts appear swollen and bruised, with increased heat, and acute pain or tenderness, when touched. On averting the labia, the vagina presents large rugæ, of a bright red colour. At first, the discharge from the inflamed surface is scanty, but it afterwards is purulent, or pus may be detected, mixed with the red lochial discharge. If the discharge have become more colourless, the puriform secretion from the vagina renders it more opaque. With the local increased action, more or less of symptomatic fever is present; and, in the more severe cases, this fever may assume a very serious aspect.

72. (*c.*) The *terminations* are sometimes serious. The slighter cases, or those which receive prompt and judicious treatment, usually terminate in *resolution.* The decrease of pain, and of the local and constitutional symptoms, is the chief indication of this issue. *Suppuration* and *ulceration* are not infrequent. When the injury causing the inflammation has been severe, or the attack violent from the first, suppuration advances rapidly, is attended by a copious puriform discharge, and, in the course of a very few days, is followed by the appearance of a number of sloughing ulcers, or rather of several partially detached portions of sloughing mucous membrane. As these separate, the parts which they covered appear deprived of this membrane. If the *sloughing ulceration* be more severe, the coats beneath the mucous coat may be invaded; and it is then not uncommon to find the posterior part of the neck of the bladder attacked, and even an opening formed in this situation,—a *vesico-vaginal fistula;* or to find a similar sloughing ulcer into the rectum,—or a *recto-vaginal fistula,* to be formed. When sloughing ulceration appears, the greatest care may not succeed in preventing these consequences from occurring.

73. *Gangrene* may rapidly follow when the pressure on the parts has been prolonged or excessive. In these cases, the separation of the sloughs is generally followed by vesico-vaginal fistula; more rarely, by recto-vaginal fistula. In 1845, a lady, who had experienced the most unaccountable neglect whilst in the care of a surgeon in the East Indies, but who was perfectly well-formed, came to London for the advice of the author and the late Mr. LISTON. Most extensive recto-vaginal and vesico-vaginal fistulæ co-existed in her case. She had been a strong and healthy person, previously to her protracted confin ent in the East. When she came to Londo the urinary bladder, the vagina, and the rectum f ned a single cavity. The case was far beyor any measures, excepting mechanical aids, and rict attention to cleanliness.

74. (*d.*) *Treatment.*—The usual antiphl stic means, appropriate in kind and extent to tl violence of the inflammation, and the habit o ody and constitution of the patient, are requirec t an early stage. Dr. CHURCHILL has found *rtar emetic*, conjoined with a saline aperient, o reat use. It should be given so as to nauseate ithout producing vomiting. "The external arts ought to be well fomented two or three ti s a day; and, during the intervals, a large p tice may be applied over the vulva. Twice or rice daily, also, the vagina should be syringe vith tepid milk and water, or a weak solution of tate of lead. After the sloughs have separa l, a careful examination should be made every ond day, to ascertain the progress of healing and when the surfaces begin to be covered wit new membrane, we must take measures for prev ing the formation of cicatrices. This can be one only by the repeated introduction of bougie and the best kind are tallow or wax candles. first a small-sized one should be oiled and intro ed, night and morning, and allowed to ren a quarter of an hour. Afterwards, as the t lerness diminishes, the size of the candle sho be increased; and it ought to be introduced o ner, and retained longer. The warm injections uld be continued, and the milk and water n be changed for some slightly astringent flui —(CHURCHILL, *Op. cit.* p. 281.) When slo ing ulceration or gangrene exists, a restorative o nic treatment, and light nutritious diet, are rec ed. The unfavourable consequences of these c ges — *vesico-vaginal,* or *recto-vaginal fistula* are sometimes remedied, when not very extensi by surgical treatment. For the measures ich may be attempted for these distressing les s, I must refer the reader either to surgical wo , or to the systems of midwifery practice re red to hereafter; and more particularly t Dr. CHURCHILL's work. (See art. VAGINA for her lesions not necessarily proceeding from the erperal state.)

75. E. INVERSION OF THE UTERUS.—*The inside of the uterus may be turned out, and her drawn or pushed down into the vagina.* I nay take place in different degrees, and form wh has been called — 1st. Simple depression; — 2 Incomplete inversion, when the fundus u i is merely engaged in the orifice; — and, 3d. omplete inversion, when it protrudes from the v na, with the mouth turned upwards. The vag , in this latter case, is also partly reversed, so tl the tumour is often of considerable length. hen the inversion is only partial, the tumour is re ned altogether, or chiefly within the vagina, the dus protruding in part through the os uteri.

76. (*a.*) *Symptoms.*—The patient with version of the uterus feels severe and obstinate ain, accompanied with bearing down efforts, by ich a partial inversion is sometimes rendered omplete. She is very weak; her countena e is pale and anxious; and her pulse is feeble, all, or almost imperceptible. Hæmorrhage is nerally present, and is often most profuse. t is

uently scanty, or absent, when the inversion
complete ; although a very partial inversion
be attended by a fatal discharge. A sense
dragging at the epigastrium, or of a dragging
nwards of the bowels, is usually present; and
ting and convulsions may occur even when
hæmorrhage is trifling. These symptoms
not fail of exciting suspicions of inversion,
ch will be readily ascertained on examination ;
womb protruding like a mass of flesh, and no
ine tumour being present in the hypogas-
m.

7. (*b.*) *Causes.*—Inversion is produced by
ing the cord in endeavours to remove the pla-
ta, which may even adhere when the uterus is
ed down ; but it is generally separated ; or it
aused by the sudden expulsion of the child,
cord being short or entangled about the child,
fundus receives a jerk, and is thereby inverted.
Burns thinks that great pressure or strong
traction of the abdominal muscles on the
dus uteri may cause depression of the fundus,
cup form, and encroach on the uterine cavity.
s may rectify itself, but it may increase and
on to complete inversion some time after de-
ry. An incomplete inversion, as well as the
plete, may become chronic, and occasion in-
ble fluor albus, and even hæmorrhage.

8. (*c.*) Inversion *terminates* in different ways :
ay be rapidly fatal by hæmorrhage, or by
ope, or by convulsions ; or it may be slowly
l by inducing over-distension of the bladder,
nflammation, and various consequent changes.
r severe pains and expulsive efforts, the pa-
t may survive, or even partially recover, from
immediate injury; the uterus may slowly
nish to its natural size, become *chronic*,
cause little inconvenience ; or it may dis-
ge fœtid matter, and give rise to frequent de-
ating hæmorrhages, with copious mucous dis-
ge in the intervals ; or hectic or pulmonary
ptoms may come on, and the patient ulti-
ely sink.

9. (*d.*) The *treatment* consists in reducing
nversion, if it be discovered sufficiently early.
is to be done by first pressing the uterus, if it
protruded without the vagina, within this
age. The tumour should be grasped cau-
sly in the hand ; and, whilst it is compressed,
most prominent part of the fundus ought to
ushed up in the direction of the axis of the
us. If reduction is accomplished, the hand
ld be kept within the uterus, so as to excite
ractions, which will detach the placenta, if it
adhere. Even after the reduction, when the
ent is apparently doing well, she may be seized
a fit, and die. But she generally remains
weak if she recover.

). If inversion have not been early dis-
red, it is always much more difficult, and
etimes impossible, to reduce it. The obstacle
e contracted state of the os uteri. It may not
it of reduction, even after a few hours from
ccurrence ; and if it have become much more
nic, it is not prudent to make the attempt, as
nt or dangerous convulsions may be pro-
d thereby, and the uterus is often so swollen
inflamed as to render reduction impossible.
chronic state of inversion is considered under
head Uterus, as it does not strictly belong to
peral maladies.

ii. The spasmodic and nervous Affections of the Puerperal State.

Classif.—II. Class. III. Order (*Author*).

81. The nervous and spasmodic diseases of puerperal females are *convulsions*, *mania* or *insanity*, *hysteralgia*, *paralysis*, and various irregular *spasmodic* and *nervous affections*, which seldom assume any precise or definite form. The first and second of these are considered in separate articles ; the others will be briefly noticed at this place.

82. *A.* Hysteralgia.—(*a.*) This *painful affection of the uterus* occurs soon after delivery ; but it is more continued and severe than the usual *after-pains* (which see). It is characterised by severe pain in the back and hypogastrium, by sickness, faintness, and a feeble, or sometimes quick pulse. These sensations may or may not be attended by the expulsion of coagula, or by a sense of severe bearing down. It not improbably is sometimes occasioned by some mal-position of the uterus consequent upon delivery. It is often connected with obstruction of the lochial discharge, which obstruction is probably caused by the painful affection of the uterus. Hysteralgia is most apt to occur after a severe or tedious labour. It may not appear until the third or fourth day, or when the patient has got up too early to have the bed made. It seems to be caused by an irregular spasmodic action of the muscular fibres of the organ, the spasmodic action and the altered sensibility sometimes extending also to the bowels.

83. (*b.*) The *symptoms* of hysteralgia vary with the extension of these morbid states to parts adjoining the womb and its appendages. The suddenness of the attack, the absence of rigors or chills ; the greater severity of the pain than that attending inflammation ; the suddenness of the remission or cessation of the pain, and generally the absence of tenderness or of increased suffering on pressure, chiefly serve to distinguish this affection from inflammation of the uterus.

84. (*c.*) The *treatment* consists of the administration of a purgative clyster with turpentine, castor oil, and camphor ; and, after the bowels have been freely evacuated by these, or by a repetition of them, or by a draught containing half an ounce each of castor oil and turpentine, an opiate may be given, or may be administered in an enema. Terebinthinate fomentations or embrocations should also be applied, sufficiently warm, over the hypogastrium ; and warm or camphoreted diaphoretics and opium, or henbane, may be given, to equalise the circulation and procure a free perspiration. Warm cloths soaked with oil of turpentine, and kept applied over the seat of pain, also will seldom fail of procuring relief. The abstraction of blood is rarely required, unless the affection be actually inflammatory, as evinced by increase of pain on slight pressure, by the states of the skin and urine, and by the pulse.

85. *B.* Various other nervous or spasmodic affections sometimes appear in the puerperal state, especially in hysterical, delicate, or nervous females, and are evidently owing to the effects produced by uterine action and the vital shock upon the organic and cerebro-spinal nervous systems.—(*a.*) *Palpitations of the heart* are not infrequent soon after delivery in the temperaments just

mentioned, especially after considerable loss of blood, and upon any alarm. The patient experiences a violent beating not only at the præcordia, but also in the epigastrium and in the head, sometimes with dyspnœa, or short panting respiration. She is alarmed, apprehensive of dissolution, and her fears aggravate the symptoms. As the attack passes off, languor, depression, or a sense of sinking, or profuse perspiration, and flatulent distension usually supervene, and, after a time, the disorder subsides.

86. (*b.*) *Hysteria* is not uncommon, in some form or other. It may occur with dyspnœa, or with syncope, with hiccup, or with pains in the side or abdominal muscles, &c., and is generally aggravated, if not excited, by the secretion of air into the alimentary canal. The dyspnœa is seldom attended by cough, and is owing chiefly to exhausted power of the respiratory muscles, and sometimes to either too great or too little tightness of the abdominal bandage, the abdominal muscles and floating ribs being thereby too much compressed and embarrassed in the one case, or insufficiently supported in the other. When the *dyspnœa* is owing to an affection or *spasm of the diaphragm*, it is felt most on inspiration, and pain is often complained of in the back or sides, or pit of the stomach, with a feeling of suffocation, sharp pain sometimes darting across the lower part of the thorax, and with a very rapid weak pulse. This affection of the diaphragm usually occurs a few hours after delivery, and is always sudden in its accession and departure. It may readily be distinguished from pleurisy by these circumstances, and by the slower accession of pleurisy, which is usually accompanied with shivering or chills, and which very rarely or never appears so soon after delivery.

87. (*d.*) *Colic* may occur within a few days from delivery. It usually attacks suddenly, and in the evening; but it is not preceded by shivering, although it is sometimes attended by sickness or vomiting. The pulse is at first slow or natural, but it soon becomes frequent. The pain is remittent or intermittent, but commonly subsides altogether after some hours, when judiciously treated. If the irritating cause be not soon removed it may induce inflammation. *Cramp of the stomach*, or spasmodic gastrodynia may occur during the first fortnight or three weeks after delivery. Its attack is always sudden, the suffering extreme, and the danger great in delicate or exhausted females. It is often attended and aggravated by flatulence. It requires decided and prompt treatment.

88. (*c.*) Females who have been subject to the more obstinate and complicated forms of hysteria, and especially to *spinal irritation*, or to affections reflected from the spinal chord or roots of the spinal nerves, often experience various nervous disorders, either immediately after, or at more distant periods from delivery. Soon after the expulsion of the placenta they feel urgent *sinking* or debility, with a sensation and dread of flooding, although neither internal nor external hæmorrhage exists. In the more extreme cases, if stimuli be not administered, the patient may suddenly die, without any other obvious cause than the *sinking* or *exhaustion* consequent on the shock of parturition. These severe cases of sinking not only may affect the weak and delicate, or those weakened by flooding, or by greater losses of blood, than the state of the vascular system can well sustain but sometimes even fat, plump, and apparently s ng females may be placed in jeopardy by the attacks. In other instances, the sinking is fol ved by violent determinations of blood to the ad, threatening phrenitis, or puerperal mania, or ven passing into either, or into lethargy, com or apoplexy. Fat, plump, and pale females are ven more liable than others to experience these angerous forms of nervous sinking, owing to eir deficiency of vital power and resistance, an the states of the blood and vascular system; a in them, nervous and vascular re-action are ore rare.

89. (*d.*) Partial or even complete *para gia* sometimes occurs after delivery, althoug the labour may have been easy or natural. he head is unaffected, but pain or weight is f in the back or loins, occasionally with retenti of urine. The palsy exists in various degrees, t it generally disappears after a few weeks, whe the treatment is judicious. A more severe an rotracted form of partial paraplegia occasi lly follows severe, protracted, or instrument delivery. In these cases severe pain is comp ned of in the back and loins, with disordered sec ion and excretion of urine. In most of these st s of paraplegia there is either increased effusi of serum from the membranes of the spinal ord with congestion of these membranes and the cord itself; or what is more probable, e me congestion, also, of the venous sinuses exte l to the sheath, in the lumbar and dorsal regions the spine. *Hemiplegia* is not more frequent in nging than in other females.

90. (*e.*) *The treatment of these several aff ions* is generally successful if it be prompt and ef ent. — *a. Palpitations of the heart* (§ 85.) r uire the administration of antispasmodics with an nes or narcotics — of HOFFMANN's anodyne with nall doses of opium or henbane; of the boraci acid with camphor and opium, or henbane; or w the ammoniated tincture of valerian, with eit of these narcotics. When the paroxysm has een relieved by these, the antispasmodics shou be conjoined with tonics and aperients, and c nge of air, preferably to the country or to the se side ought to be recommended.

91. *β. The hysterical affections* (§ 86. are relieved by the remedies just now enume ted, more especially by the æthers, valerian, am nia or camphor, and opium; and if dyspnœa b resent, the state of the abdominal bandage uld be examined and adjusted. If the sympto be aggravated by flatulence, as they often are mmonia or magnesia may be given with ntispasmodic stimulants and warm terebint ate embrocations, or epithems applied over the e gastrium. When the hysterical affection as mes a *colicky* form (§ 87.), from two to our drachms of oil of turpentine may be given ith half an ounce of castor oil, and a drachm o ncture of senna, on the surface of an aromatic er; and the same remedies, in increased dose administered as a clyster, if the bowels are not ely evacuated in six hours. After the evacua of the bowels a full dose of opium, or of the mpound soap pill will be given with benef If *flatulence* still continue, ammonia or mag sia, with gentle tonics, or the fœtid spirit of am nia or the compound galbanum pill, may be re-

ribed at intervals. If the colicky symptoms sume the form of *cramp of the stomach*, or severe *asmodic gastrodynia*, the patient is placed in opardy, especially if it occur within a fortnight three weeks from delivery. A draught conining a full or even a very large dose of laudaum, with camphor and æther, or with musk, or e compound spirit of ammonia, ought to be mediately given, and the warm terebinthinate nbrocation, or a mustard poultice, be applied er the epigastrium.

92. γ. For those states of distressing *sinking* llowing parturition (§ 88.), Dr. BURNS adses about thirty drops of laudanum, and afterards small doses of wine or brandy, or of comund spirit of ammonia, or ammoniated tincture valerian, taking care not to give stimuli too eely, lest cerebral affection be thereby excited. usk or camphor with opium is generally beficial in these cases; and light nourishment ght not to be overlooked, as not a few of these ses arise from inanition, or the prolonged privaon of requisite food and restoratives. If *phretic or maniacal symptoms* supervene, the treatent must depend upon the habit of body and rength of the patient. Vascular depletions, geral or local, cold applications to the head, active rgatives, and terebinthinate enemata, external rivation and irritation, and the other measures adsed for cases of *Puerperal Mania* (see INSANITY, UERPERAL (§§ 55, *et seq.*) should be employed.

93. δ. The occurrence of *Paraplegia* in the uerperal state requires strict attention to the inary functions and free purging, large doses of rgatives being sometimes necessary. Cupping or eching near the spine may be requisite. Terebininate embrocations may also be applied in the urse of the spine, and if these prove not of service, peated blistering or open blisters may be dicted, and the other means advised when treating paraplegia (see art. PARALYSIS, §§ 215, *et seq.*) ay be adopted. Three cases of this disease in the uerperal state have come before me, and have oved both obstinate, and afterwards associated th amenorrhœa. In one which had been of ng standing, the amendment was slow. As soon the patient is able to move the lower extremis, she should endeavour to use them as much as ssible, and persist in the use of derivatives, th internal and external, of frictions, and of befacients.

I. THE MILDER FEVERS INCIDENTAL TO THE PUERPERAL STATE.

CLASSIF. — III. CLASS. II. ORDER (*Author.*)

i. EPHEMERAL FEVER — WEED — PUERPERAL PHEMERA.

94. DEFIN. — *Chills or shiverings during early nvalescence from parturition, followed by headach, in in the back and limbs, thirst, rapid pulse, termiting with profuse perspiration and cessation of fever, nerally in from twenty-four to forty-eight hours.*

95. *A. Causes.* — The increased sensibility, sceptibility, and irritability of puerperal females, ve rise to febrile attacks upon exposure to comratively slight causes, especially when the temrament is nervous or irritable, and the constituon is delicate. These states of *predisposition* are owever much heightened by the changes in the scular system, and in the blood itself, consequent on pregnancy and parturition; and these, moreover, are associated with the predisposed conditions of the uterus, mammæ, and intestines, always present in these cases. The *exciting causes* are commonly exposure to cold, irregularities of diet, fatigue, exhaustion, want of rest, mental emotions, inattention to the state of the bowels and indigestion, getting up, or leaving the bed, or changing the apartment too soon; accumulations of morbid secretions and excretions in the biliary organs and bowels, &c.

96. *B. Symptoms.*—On the approach of the disease the patient is languid, yawns frequently, and experiences a sense of cold in the course of the spine, and extending over the body. The chilliness may increase to shivering, with, or followed by, headach, pain in the back and limbs; full, irregular, and rapid pulse, thirst, and slight diminution of the milk and lochia. The bowels are usually costive and flatulent, the stomach disturbed, the tongue coated, the patient is depressed in spirits; complains of shifting pains in the abdomen, is anxious or afraid of dying; and, in the more smart attacks, she is slightly delirious at night. The face is flushed, and she has pain in the breasts and in the forehead, with throbbing of the temples, and slight soreness of the abdomen. To these symptoms a copious perspiration succeeds, and removes the fever and its attendant symptoms, the milk and lochia returning to their previous states. The attack is usually *terminated* in about twenty-four or thirty-six hours; and if judiciously treated it seldom returns; but, if it be neglected, it may assume an intermittent, a remittent, or a continued form; or it may be complicated with some visceral disease, and assume a dangerous aspect.

97. *C. Diagnosis.* — The suddenness of the attack, the irregularity of the pulse, the absence of local pain excepting that of the head, and of abdominal tenderness, the rapid succession of the different stages, and the cessation of the paroxysm in a few hours, distinguish this state of fever from true puerperal fever, from which, however, it will be distinguished with difficulty during the early stage, if all the phenomena of the latter be not duly considered. (See hereafter, §§ 251, *et seq.*)

98. *D. Treatment.* — During the cold stage, warm diluents, warm flannels to the back, gentle restoratives, and external warmth are required. The states of the several functions should be carefully examined — the uterine discharge, the mammæ, and the abdominal secretions and excretions demanding the utmost attention. If the tongue be loaded, or if nausea be present, an ipecacuanha emetic should be given, and its operation promoted by warm diluents. If the bowels have been, and still are confined, a full dose of calomel, or of calomel and jalap should be taken. In all cases, the bowels ought to be freely evacuated by these or other purgatives, as the infusion of senna and salts, &c.; and, having hastened on the hot stage, saline diaphoretics, fewer bed-clothes, and diluents, should be directed, in order to procure a free perspiration, which may be kept up for five or six hours. As the perspiration declines, or at the end of that period, the patient should have her clothes changed; and gentle restoratives, especially such as may promote the secretions and excretions, ought to be prescribed, with a view of preventing a return of the attack and of restoring the tone of the system. From two to three grains of camphor,

with as much henbane, taken twice or thrice daily, and such restoratives and diet as the state of the patient will suggest, will prove beneficial. If the patient be exhausted by the attack, wine-whey, or wine and water warm, with sugar, &c. may be allowed; or the tonic infusions, or the infusion of valerian, or the decoction or infusion of cinchona may be given, with the solution of the acetate of ammonia, the ammonia being a little in excess, and the spirit of nitric æther may be prescribed. The abdominal excretions ought to be freely promoted by a combination of the compound infusions of senna and gentian, and any neutral salt, with tincture of cardamoms; and rest procured by a soothing dose of camphor (1 to 3 grs.) with opium or henbane, or with morphia. Change of air, especially to the sea-side, is always beneficial. The diet should be light and nutritious, as convalescence advances. The states of the mammæ and uterus should receive strict attention, and if either organ present prominent disorder, the treatment should be directed accordingly.

99. ii. INTESTINAL OR GASTRIC FEVER. — FEBRIS GASTRICA VEL INTESTINALIS. — *F. Gastrica vel Intestinalis Puerperalis; — Puerperal gastro-intestinal Fever.*

CLASSIF. — *Ut supra.*

100. DEFIN. — *After chilliness or shivering, fever, with nausea or vomiting, flatulence, griping, diarrhœa, and various nervous symptoms.*

101. *A.* This state of fever is generally *caused* by previous torpor of, and inattention to the bowels, by accumulations of bile in the biliary organs, and of morbid secretions and fæcal matters in the bowels, especially during the advanced period of gestation; by errors of diet after delivery; by close, low, damp, and cold apartments or situations; and by the use of acid, cold, or unsuitable drink or beverages. It usually appears within ten or twelve days from delivery, and is liable to be confounded with ephemeral fever at its commencement; and, when attended by inflation of the bowels, with the puerperal fevers.

102. *B. Symptoms.*—After chilliness or rigors, the patient is oppressed at the stomach, loathes food, and becomes sick. The pulse is frequent and soft; she complains of being cold, although the skin, except that of the feet or legs, feels from the first hot to another person. Afterwards, she is thirsty, has a slimy or white tongue, sometimes with red edges, and vomits a ropy mucus or bile. She now feels hot, especially in the hands and feet, is distressed with flatulence and griping pains in the abdomen, and the bowels are at first either open or costive, the stools dark and very offensive, and subsequently relaxed or even purged. Purgative medicines always act abundantly, and afford relief. The pulse continues quick; the patient does not sleep, or merely slumbers; and then she talks, or is tormented by visions and dreams. She often complains of short, darting, or nervous pains, or of throbbing or confusion in the head. There is no fixed pain in the abdomen or hypogastrium, nor any tumour in the belly, which is generally soft. The local discharge is not necessarily obstructed, nor is the secretion of milk affected, during several days; but, when diarrhœa is considerable, or continues, both one and the other are much diminished or suppressed. The countenance is unchanged at first, and continues so for some days, unless nervous symptoms, or pain in the hypogastrium, or some complication supervene.
some cases, when this disorder continues long
than six or seven days, and is neglected, inflati
of the bowels, pain and tenderness in the low
part of the belly, pain on making water, or
passing the fæces, and other indications of ir
tation of the sexual organs supervene; whilst,
other cases, various nervous symptoms, as p
pitation, vertigo, a feeling of sinking, or startin
and shooting pains in the head, are complain
of. The *duration* of this fever, which is ma
festly symptomatic of gastro-intestinal irritati
or consequent upon accumulation of morbid
cretions in the biliary organs, and of fæcal matt
in the bowels, is usually from a few days to
fortnight.

103. *C. The diagnosis.*—Intestinal fever may
distinguished from *ephemeral fever,* by not
pearing so soon after delivery; by its more grad
accession, and by the manifest disorder of
stomach and bowels attending it; by the charac
of the evacuations and the griping or shift
pains in the abdomen; by the ready and copi
action of purgatives, and the more protrac
duration of the disease. It may be mistaken
either *puerperal fevers,* but the symptoms j
enumerated, the relief obtained from purgati
the softness of the abdomen, and the absence
fixed pain, of tension and of inflation, unless
casionally in very protracted cases, the state of
pulse, and the general condition and appeara
of the patient will distinguish this complaint fr
the more serious fevers of the puerperal state.

104. *D. Treatment.*—An emetic of ipecacua
is always serviceable on the accession of, or ea
in, this complaint. When its operation is o
saline diaphoretics and tepid diluents are th
beneficial. A full dose of calomel may be gi
in a few hours after the emetic, and its operat
on the bowels should be promoted by the ad-
nistration of rhubarb and magnesia, or by a si e
dose of castor oil with spirit of turpentine. If e
evacuations still continue offensive, with grip g
pains, either of these purgatives should be repeat;
but if they be more natural, or if diarrhœa su -
vene, then the existing irritation ought to be l-
layed by opiate or anodyne enemata. The bow s
should never be allowed to become costive; ei r
of the purgatives just named, or the infusion f
gentian and senna, being interposed, or gi n
according to the requirements of the case. f
griping pains or flatulence, or inflation of e
bowels become troublesome, the application of e
warm terebinthinate embrocation over the ab-
men, and an enema containing spirit of turpent e,
with olive oil and assafœtida, will afford comp e
relief.—The *diet* should depend upon the stat f
the bowels. If diarrhœa exist, light farinace s
articles of food, arrow-root, sago, and jelly, y
be given. If there be no diarrhœa, ripe it
may be allowed; and, as convalescence proce s,
the several farinaceous articles, various prep -
tions of rice, beef-tea, warm jellies, chic -
broth, &c., may be taken. Ginger wine h
water, Seltzer water with old Madeira or An -
tiliado sherry, the milder tonics, as the infusio f
columba or of cheyreitta, may also be prescr d
as recovery proceeds.

105. iii. MILIARY FEVER—FEBRIS MILIARI —
FEBRIS MILIARIS PUERPERALIS. — The erup n
described under the head, *miliary eruption,* sc -

times occurs during the puerperal state, as a symptom of puerperal fevers. By several older writers, and by some as recently as the last century —by White and others—it was described as one of the most formidable epidemics of child-bed; but it is now rarely met with, unless occasionally as a symptom of ephemeral fever, of milk fever, and of puerperal fever, when they are attended by profuse perspiration, and is evidently dependent upon a morbid state of the circulating fluids, consequent upon imperfect secretion and excretion, or upon the absorption of morbid matters, in connection with excessive secretion from the skin. It occurs most frequently in delicate females, and commonly from the fourth to the twelfth day from delivery. This eruption affords no crisis to the disease of which it is symptomatic, nor relief to the symptoms.—The *treatment* of this eruption, or rather of the disease of which it is a symptom, should be directed to the pathological conditions of that disease, as stated in the article "Miliary Eruption."

IV. Severe Puerperal Fevers.—Synon.—*Puerperal Fevers.—Febris Puerperalis; Febris Puerperarum; Metritis Puerperarum,* Sagar, Sauvages;—*Hysteritis,* Vogel, Cullen;—*Metritis Puerperalis,* Boivin, Dugés;—*Peritonitis Puerperalis,* Forster, J. Clarke, Hull;—*Fièvre Puèrperale,* Fr.;—*Kindbetterinn-fieber,* Germ.;—*The low fever of child-bed,* John Clarke;—*Child-bed fevers; severe child-bed fevers.*

Classif.—III. Class. II. Order (*Author in Preface*).

106. Defin.—i. Nosolog.—*Great frequency of the pulse, and pain, tenderness, and tumefaction of the abdomen, occurring in the puerperal state; the pain often commencing in the pelvic region with rigors, the patient generally lying on her back, with the knees more or less elevated.*

107. ii. Patholog.—*Fever occurring in the puerperal state; commencing, in some cases, in local disease, with rigors or chills; in other cases, from infection of the frame and contamination of the fluids, with or without chills or rigors, and frequently with, but sometimes without, prominent local lesion of structure.*

108. When treating of Fevers in an early part of this work, I took occasion to point out the several and very different forms or types which the febrile diseases of the puerperal state assume (see Fever, § 44.); and Dr. Ferguson, in his classical work on "Puerperal Fever," has adduced the arrangement I then suggested, with others adopted by the more recent writers on puerperal diseases. It is evident, from what this able writer has stated, as well as from the best works which have been published on the subject, since the middle of the last century, but still more from an extensive experience of puerperal diseases, in different circumstances, seasons, and periods of their prevalence, that *puerperal fever* is not either a simple or an unvarying malady, and that, thus influenced, it assumes the most diverse types, forms, and complications, and often the most malignant and fatal character of any disease met with in European, or even in other countries. It is hence the more difficult to comprise within the succinct limits of a *definition* those characters which are applicable to all the states which puerperal fever may assume, without omitting what is really important, and, at the same time, embracing only such features as are essential to its actual and individual existence.

109. i. Literary Notices of Puerperal Fevers.—Previously to 1689 and 1733, when Hake and Berger wrote on the "Fevers of Puerperal Females," no satisfactory account of puerperal fevers existed, although inflammation of the womb after child-birth had been noticed by Felix Plater and Tulpius; and the diseases incidental to this period had been viewed as consequences of errors in diet and regimen, and of interruptions or suppressions of the secretions and discharges, by Sennertus, Riverius, Willis, De la Boe, Mauriceau, Strother, Boerhaave, and others. The earliest accounts of puerperal fever as a distinct malady appeared in inaugural dissertations, published at some of the continental universities. These were probably of some importance at the times of their appearance, as containing much of the experience and views of the professors in these institutions respecting this malady, the earliest of these having been printed at Leyden, in 1689. In 1746, puerperal fever prevailed in Paris, chiefly at the Hotel Dieu, where scarcely any recovered from it, the albuminous exudations found in the peritoneal cavity appearing like to coagulated milk on the surface of the intestines, with a copious effusion of whey or milk-like serum; and hence the effusion was viewed as a metastasis of the milk, although a slight attention to the history of these cases would have shown that the secretion of milk was not suppressed, or even interrupted. (Fontaine, Col de Villars, &c., in *Hist. de l'Acad. Roy. des Sciences,* 1746, p. 16.)

110. Pouteau (*Mélanges de Chirurg.* p. 180.) mentioned the appearance of this malady in the Hotel Dieu of Lyons in the spring of 1750, and its great fatality. He noticed sero-puriform effusion into the peritoneal cavity, thickening and contraction of the omentum, a relaxed and softened state of the uterus, and gaseous distension of the intestines, as the chief appearances on dissection; and was the first who regarded the disease as an epidemic erysipelatous inflammation of the peritoneum. Dr. Hall wrote an account of this fever in 1755; and Sauvages viewed it as inflammation of the uterus, occurring, 1st—in the puerperal state;—2d, associated with typhoid fever;—and, 3d, with suppression of the milk. Stoerck has stated that puerperal fever broke out in the hospital of St. Mark, at Vienna, in 1770, and prevailed through that city during the two following years. It was characterised by pain in the hypogastric region and abdominal swelling; the uterus presenting marks of inflammation and gangrene, and the intestines being covered by false membrane. Dr. Denman was the first author, after Dr. Hall in Edinburgh, who attempted in this country to give an account of this malady; but he appears not to have examined the body after death from this disease, although he more correctly infers that the milky matter, described by the French pathologists as existing in the peritoneum, is a product of inflammation. Dr. Manning wrote soon after (in 1771), and ascribed the disease to a putrid tendency in the humours; and Hulme, Leake, and White, who followed him in quick succession, whilst they viewed the disease as inflammatory, and as affecting chiefly the pelvic viscera and peritoneum, believed that it could not be ascribed to simple inflammation, but to the in-

flammatory associated with a putrescent disposition; and Millar subsequently adopted the same view.

111. Next to Pouteau, Kirkland espoused the most rational doctrine of the nature of this malady, on which he wrote in 1774, and considered it as arising from, and consisting of, sundry pathological changes; — from absorption of putrid or morbid matter from the uterus, — from inflammation of the womb, — from the retention and absorption of morbid secretions and excretions. He concludes that, whilst absorption of morbid matter, and inflammation originating in the uterus will occasion puerperal fever, the abdominal lesions will also be consequent upon the fever when occurring primarily. Whilst Kirkland thus wrote so creditably, this malady appeared in the Hotel Dieu of Paris, and prevailed during 1774 and 1775, but presented nothing of additional importance to what had already been ascertained. During the middle and towards the close of the eighteenth century, the disease was observed by numerous physicians, many of them of great reputation; but little was added to the existing knowledge of its nature and treatment, the fatality caused by it in hospitals being often so great as to harass the feelings of those who were called upon to combat it. More or less detailed accounts of the pathology and treatment of the malady appeared during this period in the writings of Stoll, Bang, Burserius, Butter, Hecker, De la Roche, Doublet, Frank, Reil, and others referred to in the *Bibliography*, but there is nothing furnished by them deserving especial notice.

112. In 1787 Walsh wrote on the disease, and considered it as an infectious fever complicated with diffuse inflammation of the peritoneum. In 1787 and 1788 this malady was prevalent in the General Lying-in Hospital in London, and an account of the appearances observed upon dissection was given by Dr. John Clarke in 1788 and 1793. In that manifestation of the disease, the peritoneum presented the chief morbid changes, and these he has described with greater precision than any of his predecessors. He remarked that the uterus and ovaria sometimes partook of the inflammation of the peritoneum, but not more frequently, nor more remarkably than other parts, and that the interior surface of the uterus was not inflamed. From this time, and guided by Dr. John Clarke's description of the changes after death, puerperal fever was viewed merely as *inflammation of the peritoneum in the puerperal state;* and this view was adopted by Dr. Gordon of Aberdeen, by Dr. Joseph Clarke, of Dublin, by Dr. Hall, Mr. Hey, Dr. Campbell, Dr. Mackintosh, and by Dr. Armstrong, with but slight modifications, or with no further modification than the expressing of the same idea in somewhat different words — for in medical writings different Tords are too often substituted for different ideas. whese writers bring down the literature of puerperal fever in this country to 1822; their works deserving notice chiefly as furnishing examples of a particular form or epidemic state of the disease, without any recognition of other still more important states, observed by other authors, and insisted on by Hamilton, Burns, Boer, Douglas, and others referred to in the sequel.

113. In 1823, I became consulting physician to Queen Charlotte's Lying-in Hospital, notorious at that time, and indeed for some years before and after that time, for the recurring appearances of this malady, in the most malignant forms, in its wards; and, for several years subsequently to 1823, I had numerous occasions of there observing the several states of puerperal disease. Contemporaneously with my own researches, and still more recently, investigations of a similar nature were made both on the Continent and in this country; and the results proved that inflammation of the peritoneum, in some form or state, although one of the most constant, is not the only, and often not the earliest change; and that alterations of the uterus, its sinuses, veins, and appendages, are equally common. Pouteau had stated, about a century ago, that the inflammation of the peritoneum and pelvic viscera, in puerperal fever, is of an erysipelatous kind; and the same opinion was subsequently maintained by Hunter, Gordon and others, and still more recently by numerous writers. Indeed the erysipelatous or diffusive character of the inflammation when once the disease has commenced, could neither be overlooked nor disputed; for this character is, as I have shown when describing the causes of puerperal maladies (§§ 35—43. 130, *et seq.*), a necessary consequence of the operation of these causes, which, by their effects upon the states of organic nervous power and of the blood, preclude the formation, by the inflamed surface, of organizable or coagulable lymph, by aid of which the extension of the disease may be arrested.

114. It has been shown by Kirkland, and stil more demonstratively by Bang, of Copenhagen — a pathologist, whose clinical and necroscopic researches have not received their merited attention, — that not only the uterus, but also the ovaries and the Fallopian tubes, were inflamed softened, or contained purulent collections; and that the womb often presented various changes in its internal surface. Similar lesions were afterwards described by John Clarke, Selle, and Osiander; and more recently by numerous authors in Germany, France, and Great Britain Inflammation of the uterine sinuses and veins was first distinctly described by Bang and J. Clarke and subsequently by Dance, Luroth, R. Lee Duplay, Tonnellé, Cusack, Ingleby, the author, and others, and shown to exist, in many cases of puerperal fever, by several of these writers. Dr. John Clarke, however, in 1793 attempted to prove that the low, or the mos malignant form of this malady is distinct from tha which is attended by inflammation of the peritoneum, and of the uterus and its appendages; and although doubts have been expressed of the truth of this doctrine, still my experience has shown its accuracy; and has convinced me that a mos rapidly fatal and most malignant form of puerperal fever is occasionally developed in lying-in hospitals, which is certainly not characterised by uterine phlebitis, nor by purulent collections in the uterus or its appendages, nor even in some cases by peritonitis, the chief lesions often being merely a remarkable alteration of the blood, genera lacerability of the tissues or loss of their vital cohesion soon after death, with a dirty, muddy, offensive, and sometimes scanty serous effusion into the serous cavities. It is true that the circumstances by which this form of the disease is developed are seldom observed, and still more rarely at the pre-

sent day than formerly; but when once developed in these hospitals, under the circumstances in which I have observed it, not a single patient, within a week or fortnight from her delivery will escape this pestilence, which may even be propagated abroad to puerperal females, if the proper precautions be not taken. When I became consulting physician in 1823 to Queen Charlotte's Lying-in Hospital, the wards were small, crowded, and without ventilation — a large number of females being confined in each ward; and, as night have been anticipated *a priori*, a most pestiential form of puerperal fever was always recurring a few months after it was re-opened, after each occasion of its having been shut up for the purposes of fumigation and purification. In the atal cases — and at first all the cases were fatal — he appearances now stated were those chiefly oberved, in some instances with more marked disease of the peritoneum, and a relaxed or uncontracted state of the uterus. Subsequently, when the representations of the medical officers procured nlargement and better ventilation of the wards, with a diminution of the number of beds in a ward, puerperal fever was of rarer occurrence, nd assumed different types and forms, with the rogress of these sanitary alterations, inflammatory ppearances in the uterus and appendages, in the uterine sinusés and veins, and in the peritoneum, being then most frequently observed in fatal cases. As I believe that, in the present and advancing state f medical science, and of sanitary improvement, he circumstances which have produced the more malignant forms of puerperal fever — the local estilence, which I had to treat many years ago, re not likely to exist and to occasion a similar intensity of the disease, so I infer that the various ates of inflammation of the uterus, of its apendages, of the uterine veins, and of the peritoneum, will constitute the chief lesions of puerperal ver; and that the type or character of the fever ill entirely depend upon the state of inflammatory athesis — upon the states of vital power and of he blood, accompanying the inflammation; and upon the absence or the presence of contaminaon of the circulating fluids by retained or abrbed morbid matters and excretions.

115. ii. Arrangement of the Forms and tates of Puerperal Fever. — Numerous writers have described only one or other of the veral forms or states of this fever, very probably from having seen only such form during a mited experience, and in peculiar circumstances, from having described what they saw on a single casion, or in a particular epidemic. That this as actually been the case is shown by the fact, at these authors have not described the same rm or variety, but each has adduced the variety he has described as the true and only form of the sease, and has been indignant at those who beved that any other state of the malady can exist cepting that which he has observed. Thus Rmstrong, Hey, Mackintosh, Campbell, &c., ho observed chiefly inflammatory forms of the sease, accompanied with a sthenic diathesis, uld not tolerate the idea that any other state of e malady existed, and were most ireful at J. Larke, Hamilton, and others, who believed that low, typhoid, or malignant form, very different om that which they described, sometimes broke t. Thus, from the days of Stoll and Doulcet, to almost the present time, some writers have described only a single variety, and have believed it only to be the true malady. But, as will appear more fully hereafter, the symptoms, characteristic features, and still more the *post mortem* appearances, display diverse features and extensive complications, according to the circumstances occasioning the disease and influencing its course.

116. Several writers, on the other hand, with stronger powers of observation, or with more extensive experience, have viewed puerperal fever as more or less varied in form, and complicated in its nature; and not from a single position or aspect merely, as those just alluded to, but according as diverse circumstances, seasons, or epidemic influences, have impressed on it different forms and complications. Thus John Clarke, having observed, — 1st. Inflammation of the uterus and ovaria; — 2d. Inflammation of the peritoneum; — 3d. Inflammation of the uterus, Fallopian tubes, or of the peritoneum, connected with inflammatory fever; — and 4th. Low fever, connected with affection of the abdomen, which is sometimes epidemic; — recognised three types or forms of puerperal fever; — 1st. That consisting of local inflammation in the puerperal state; — 2d. Primary inflammatory or synochal fever developing local inflammation; — and 3d. Typhoid fever with inflammation. — Professor Vigarous next divided the disease into — *a*. The gastro-bilious; — *b*. The putro-bilious; — *c*. The pituitous, proceeding chiefly from season, &c.; — *d*. The inflammatory, or associated with inflammation of the uterus, peritoneum, &c.; — *e*. and the sporadic, arising from mental causes, cold, &c. — M. Gardien arranged the forms of puerperal fever into the following: — 1st. The angiostenic, or strictly inflammatory; — 2d. The adeno-meningic, or slow insidious fever; — 3d. Meningo-gastric, with bilious derangement, yellow skin, &c.; — 4th. The adynamic; — 5th. The ataxic or nervous; — and 6th. Fever with local phlegmasiæ.

117. Several continental writers on puerperal diseases have confounded those which belong more essentially to the puerperal state with those which may occur under every contingency, which are quite unconnected with this state, and are not more likely to affect puerperal females than other persons; and they have thus embarrassed the subject with complicated sub divisions and compound terms. Thus Busch enumerates the following varieties in *the local affection*, occurring in the puerperal state: — (*a*.) Puerperal fever with inflammation within the abdomen; — (*b*.) With inflammation within the cranium; — (*c*.) With inflammation within the thorax; — (*d*.) With inflammation of the extremities; and he believes that the character of the fever may also be varied as follows: — 1st. Gastric fever; — 2d. Nervous fever; — 3d. Typhus fever; — and 4th. Petechial fever. Ritgen, like Busch, has rendered what is often a very complicated subject still more complicated and involved by his mode of discussing it. He views puerperal fever as a disturbance of the œconomy in its attempts to bring the organism back to the unimpregnated state; and he contends, that any organ in the three cavities of the body may become inflamed during this disturbance. He considers the term "*Malacosplanchnitis puerperalis*" as the best that can be applied to the malady, since not only may the peritoneum be

attacked, but any other viscus also, the chief peculiarity being the marked tendency of the local lesion to terminate in large fluid effusion.

118. Dr. **Robert Lee**, who has directed his attention to the state of the uterine vessels in puerperal fever, has referred the symptoms to *four varieties;* — 1st. To inflammation of the peritoneal covering of the uterus, and of the peritoneal sac; — 2d. To inflammation of the uterine appendages, viz. the ovaria, Fallopian tubes and broad ligaments; — 3d. To inflammation and softening of the proper or muscular tissue of the uterus; and, 4th. To inflammation and suppuration of the absorbents and veins of the uterus. It is manifest, however, that although cases will sometimes present one or other of these lesions, either singly or chiefly, much more frequently two or more of them will be associated in the same case; and, therefore, instead of founding the varieties upon the individual lesions, it would be preferable to consider the local lesions as complications, or prominent changes occurring in the course of the malady.

119. The arrangement adopted by some other recent writers have been much more simple; and have possessed this recommendation, although it may have been carried too far. **Martens** acknowledges only the *inflammatory* where one organ only is affected; the *nervous*, commencing with delirium; and the *putrid*, where the frame is more generally implicated. **Douglas** has three forms, the *inflammatory*, the *gastro-bilious*, and the *epidemic*, or *contagious* or *typhoid*. **Tonnellé** assigns only three varieties, the *inflammatory*, the *adynamic*, and the *ataxic*. **Blundell** adduces also three, the *sporadic*, the *mild epidemic*, and the *malignant epidemic*. This last physician believes that, in this last form, where the epidemical disposition to peritonitis is strong, the diffusion of the inflammation is great and rapid, whence the difficulty of the cure; that, in the milder epidemic, the peritonitic disposition is weaker, and the inflammation of smaller extent; and that, in the sporadic, the epidemic constitution is wanting altogether, and the local affection is limited and the treatment much more successful.

120. Dr. **Gooch**, Madame **Boivin**, and M. **Dugés** have reduced the varieties to two—the *simple inflammatory form*, or metro-peritonitis, and the *typhoid*. In this last form, M. **Dugés** includes all cases of softening of the uterus and of suppuration of the veins; but he is certainly not accurate in his description of the symptoms characterising it.

121. The author, in 1834, adopted an arrangement of the *forms* or *states* of puerperal fever (see article **Fever**, § 44.), which he had observed in practice, and which will be followed and illustrated in the sequel. In that arrangement, the local affection or affections were viewed as often being accidents or contingencies in the progress of the fever — as complications supervening in its course; whilst inflammations of the uterus and its appendages, and of the peritoneum, were admitted to be sometimes primary diseases, of which the fever was symptomatic. Dr. **Moore**, in his very excellent treatise, published in 1836, very justly remarks, that the varieties observed in the local lesions in puerperal fever, arising under the same circumstances, cannot be viewed as forms or varieties of the disease, which may be known by the symptoms, but should be considered rather as complications appearing in its course.

122. Dr. **Ferguson**, in his very able work or this malady, assigns as the result of his extensive experience *four* forms: — 1st. Puerperal fever characterised by abdominal pain; — 2d. Fever with gastro-enteric irritation; — 3d. Nervous form o fever; — and 4th. Complicated form of puerpera fever.

123. Dr. **Churchill**, the most recent writer o puerperal fever, divides it, according to the predominant local affection, into *five varieties*, whic he has placed in the order of frequency of occurrence: — 1st. Peritonitis; — 2d. Hysteritis; — 3d. Inflammation of the uterine appendages; — 4th. Uterine phlebitis; — 5th. Inflammation of th absorbents. This arrangement is open to th following objections: — (*a.*) It takes for grante that the lesions of these individual parts are trul and always inflammatory — are, in truth, inflammation seated in one or other of these structure and the fever the symptomatic constitutional expression of the inflammation of such structure — positions which cannot be supported by enlightene observations: — (*b.*) It leaves without any recognition or mention the type or nature of the fev as a consequence or effect of the exciting cause — it takes no account of the varying character the constitutional disease, upon which, and upo it only, can rational and successful indications cure be founded; — (*c.*) It takes for granted th these lesions are primary, although this is on occasionally the case; and fails of viewing ther as they are presented in practice, in various ci cumstances, and in different endemic and epidem states of prevalence. It is based upon a partial piece-meal consideration of the malady, and i stead of being founded on a comprehensive a mature digest of constitutional and local change it assumes that the nature of the constitution affection, as well as of the local lesion is alwa the same, the only difference being the part o ginally affected; and it remarkably fails in th distinction, inasmuch as the local changes a rarely limited to a single organ or tissue, but a generally extended to several, and even to man When most strictly limited, the appropriation symptoms, so as to mark the limitation, cannot effected with either truth or accuracy.

124. The above divisions of the several forms puerperal fever comprise those which appear m deserving of notice. The classification of the forms, adopted from the results of my experien and published in 1834, and subsequently by I **Ferguson** in 1839, embrace, — 1st. The *infla matory states* of puerperal fever, or *inflammati* (*a.*) of the uterus, (*b.*) of the ovaria and tub (*c.*) of the peritoneum, (*d.*) of any two or all them. 2d. *Synochoid Puerperal Fever*, comp cated with inflammation, — α, of the peritoneu β, of the uterine veins, γ, of the uterus and a pendages. 3d. *Adynamic or malignant puerpe fever*, — *a*, simple; *b*, complicated with pre minant alteration; α, of the blood; β, of t fluids and peritoneum; γ, of the fluids, ser surfaces, and soft solids generally; δ, of t uterus, or of the uterus and appendages; ε, of t internal surface of the uterine vessels, substance the uterus, &c. — (*a.*) The *first form* comprises t *primary or idiopathic inflammations*, most liable occur in the puerperal state, and which, co mencing in either of the organs or structures h specified are attended by symptomatic fev

haracterised according to the diathesis, strength, ad circumstances of the patient, and are limited, r more or less extended or associated, according these and other influences and causes.—(*b.*) The *cond form* embraces those cases of frequent ocurrence, especially in lying-in hospitals, in which is difficult to determine whether the fever, or e local affection is primary — or in which the cal alterations rapidly follow the constitutional febrile affection. In this form of the disease, e symptoms are much more asthenically inflamatory than in the first, more insidious at the ommencement, and often referable to a local ontamination or infection. It may prevail in ing-in hospitals, on certain occasions which adit not of precise description, and may be proagated by contagion. It is not infrequently onnected with the prevalence of erysipelas. I ave seen it in the wards of hospitals which have ot been over-crowded or apparently ill-ventilated. -(*c.*) The *third form* is the most malignant, and in s most intense and pestilential states, is seen chiefly lying-in hospitals or wards, when over-crowded d ill-ventilated. The whole frame appears incted from the commencement, and whatever cal affections or lesions may exist are developed the progress of the malady, such lesions merely resenting more prominent forms than those obrved in other parts of the body. This form of uerperal fever is caused by the local or endemic fection of the ward — by respiring an infected mosphere; the infection originating as stated ove. The disease produced by it may terminate pidly in death, without any tissue or viscus havg presented a more prominent lesion than the rest the body. The blood, however, always is more or ss altered, and the tissues generally are very ficient in vital cohesion immediately after death. hen this form of the malady is less rapidly fatal, e or more of the complications, or rather of the ore prominent alterations enumerated above are nerally observed.

125. Between the more primary inflammations, pearing sporadically, and constituting the *inmmatory form* of puerperal fever, and the *alignant form* now mentioned, that form which have named the *synochoid* holds an intermediate ace, passing insensibly into either of the other rms with the intensity of the exciting causes, and e amount of predisposition. This *synochoid*, or *termediate form*, may arise not only from a less ncentration of the causes—from a less impure or ntaminated air—from a less concentrated or innse effluvium; but also from an impure or fected state of the bed or bed-clothes, or from e infected hands of the accoucheur, causing a cal infection during examination; or from other rcumstances either already, or about to be noed; but according to the nature of the causes, eir concentration, the state of the patient and e predisposition, so will it approach either the flammatory form on the one hand or the maligant on the other; and so will it occur sporadilly, or even extend by infection.

126. Another circumstance deserving a brief tice is the fact, which has been presented to me several occasions, that, although the cases hich occurred when ventilation was most deient, were generally of the third or most manant form I have mentioned, yet occasionally less malignant case, or one more properly belonging to the second form, presented itself, and was to be ascribed to the greater constitutional powers of the patient. But during this state of ventilation and infection not one escaped the disease who was confined in the hospital. Subsequently, when ventilation was improved, and when a fever ward was provided outside the institution, the cases presented generally the second form, and very few of the most malignant or third form were then seen.

127. Besides these three forms of puerperal fever, with their complications or more prominent lesions, another may be adduced, namely, infectious, or *true typhus fever* occurring in the puerperal state; and of which I have seen a few instances. The infection may have been received before or after delivery; but typhus fever appearing in this state should no more be viewed as a form of puerperal fever than small-pox, or any other of the exanthematous fevers ought to be so considered, when attacking a woman in child-bed. I shall, therefore, notice it no further than the diagnosis may require.

128. In the several works which have appeared upon puerperal fever, the *epidemic* and the *sporadic* occurrences of its several forms have been mentioned in a very loose manner. I have no doubt of any of the forms of the malady appearing sporadically, more especially the first and second forms which I have assigned, when circumstances combine to develope them; nor can I deny that any of these forms, more particularly the second and third, may become so prevalent owing to a combination of causes, as to deserve the epithet epidemic. But most of the instances in which puerperal fever has become so prevalent as to be so called, have occurred in lying-in wards; and the disease has been limited to them, unless on some occasions when the infection has been carried abroad from them. The term epidemic is therefore not strictly applicable, the malady being truly *endemic* as respects such institutions as thus occasion it, the character, the type, intensity, and other features of the malady, depending much upon the *endemic sources* — upon the concentration of the infectious effluvia and other causes generated in these institutions and wards. It is not improbable, however, that certain atmospheric constitutions, depending upon the states of terrestrial and atmospheric electricity, and of humidity and temperature, and other circumstances affecting the prevalence of febrile maladies, may so affect also the form and prevalence of puerperal fever as to render it not only endemic in lying-in hospitals, but also epidemic, or approaching to this state, in various places, in which it may break out. For, as I stated above (§§ 36. 44. 138.), causes similar to, or almost identical with, those which generate it in lying-in wards, actually exist in various houses and localities, in such forms and degrees of concentration as to give rise to sporadic cases, which, when circumstances combine to favour their spread, may propagate the malady.

129. It will be asked, what are these causes which thus exist locally or endemically? — 1st. Beds and blankets contaminated by prolonged use, without any attempts at purification (§ 44.); — 2d. Privies containing immense accumulations of fæcal matters, often rising as high as the boards, emitting contaminating vapours, particularly when frequented, or disturbed, and sometimes occasion-

ally, as I have remarked in several instances, asthenic or irritative and spreading inflammation of the vulva, vagina, and cervix uteri of married females, and even also of the rectum. I am convinced that the domestic causes of disease, and even of the most malignant maladies, which I have described in the article PESTILENCES, PROTECTION FROM (§§ 10—23.), and of which I have even assigned proofs (§ 14.) at that place, are mainly concerned in producing the more serious forms of puerperal disease; the malignancy of the attack depending chiefly upon the concentration or intensity of the cause.

130. iii. CAUSES.—The *causes of puerperal diseases* have been stated above, with reference both to the peculiar condition of the puerperal female, or the predisposition thereby acquired (§§ 6, *et seq.*), and to the more efficient and immediate agents and influences (§§ 35, *et seq.*, and 129.). These aredisposing and exciting causes, with their several concomitants, especially when present in concentrated or intense forms, commonly occasion puerperal fevers — produce it sporadically and favour its spread. From the days of HIPPOCRATES, down to the close of the last century, the suppression of the lochia or of the milk was viewed as the chief cause of puerperal fevers; and certainly there can be no doubt that the suppression of these will often be followed by very serious disease, particularly of a febrile kind. But, in most instances, the suppression is merely one of the effects of antecedent causes; and it may not, — indeed, most frequently it does not — take place in the most malignant states of the disease.

131. *A.* The *predisposing causes* of puerperal diseases have been already enumerated, and the influence of mental emotions has been noticed. The depression caused by *fear* of the disease, especially in lying-in charities, when the death of a patient is known, has a remarkable effect in favouring the extension of the disaster, and the *depressing feelings* entertained by unmarried puerperal females exert a similar influence. Large *losses of blood*, by uterine hæmorrhage or otherwise, have a manifest influence, not only in predisposing to, but also in aggravating the danger of this disease, more especially in lying-in hospitals and wards. Several instances demonstrating the truth of this statement have been observed in the course of my experience. Hæmorrhage appears to increase the predisposition, both by augmenting vital depression and shock, and by favouring the absorption of morbid secretions and excretions, and the passage of contaminating effluvia into the circulation.

132. Hydrometric and thermometric states of the *atmosphere* also favour the occurrence of puerperal fever, both by depressing nervous power and by concentrating animal exhalations. Cold and humid states of the air frequently prevent due ventilation of wards and apartments, and the requisite dilution of the contaminated atmosphere; and all methods of warming lying-in apartments which do not promote due ventilation, or currents of fresh air, tend remarkably to generate a pestilential effluvia in lying-in wards or hospitals. *Humidity* at all seasons, but more especially during winter and spring, favours the generation and propagation of this and its allied diseases, as remarked by writers of all ages, more especially of erysipelas, fever, dysentery and rheumatism.

133. Some difference of opinion has existe
respecting the seasons and states of the weathe
favouring the development of puerperal fever, e
pecially in lying-in wards. My experience cor
vinces me that *cold* is influential chiefly by pre
venting that amount of ventilation which is re
quisite when several women are in child-bed i
the same apartment. According to my own ol
servations, during a period of thirty years, th
disease has been most prevalent during the la
three months and the first four of the year. M
DUGÉS' observations, which are limited to 181
and 1820 merely, show an order of frequency
follows : — November, February, January, O
tober, December, September, May, March, Apri
August, July, June. M. DE LA ROCHE, of G
neva, exhibits the following order of prevalenc
January, March, November, December, Apri
October, September, February, July, Augus
May, June. As respects the influence of h
midity there is greater uncertainty. But I belie
that a moist state of the air, especially when co
joined with a low temperature, is most injuriou
especially as respects lying-in wards; and in th
opinion I am supported by CHAUSSIER, DUGÉ
CLEIT, and others, whilst M. DE LA ROCHE conside
that a dry state of the air is most favourable to t
prevalence of the malady. Humid states of t
atmosphere conjoined with warmth and stillne
are certainly not infrequently productive of sporad
cases arising from the local sources of contamin
tion and infection already pointed out (§§ 36,
seq.); and from these cases either contagion
infection may extend when the media are suitab
to the transmission, especially by the midwife
nurse.

134. But neither temperature nor grades
humidity, nor both conjoined, always account f
the prevalence or absence of this distemp
There seems to be a disposition to the prevalen
of it at some periods and not at others, indepen
ently of the conditions now remarked upon. T
states of the electricities, in as far as they affe
the human body, may be the cause of this pred
position, or emanations from the soil, of a natu
quite incognisable to our senses, and means
detection, may favour its development and d
fusion. But the epidemic occurrence of the m
lady seems allied to the prevalence of low
adynamic or eruptive fevers, more especially
typhus and erysipelas; and when puerperal fev
is found to prevail in lying-in hospitals, ind
pendently of crowding or want of due ventilatio
it generally partakes of the nature of the preva
ing epidemic, or of the general epidemic constit
tion.

135. Neglected states of the bowels, constip
tion, or diarrhœa; improper or insufficient foo
addiction to the use of spirituous liquors or cordia
and living in low, ill-drained, and ill-ventila
houses, also predispose to puerperal fevers. It
difficult to determine the influence of first or su
sequent labours, or of the kind of labour. B
very quick labours have been viewed as favouri
the occurrence of puerperal disease in those co
fined for the first time; and prolonged or diffic
labours in subsequent confinements. Prematu
labour seems to dispose to puerperal fever; b
it may be mentioned that, when the patient
infected by the disease previously to delivery,
to the full period of gestation, premature labo

be thereby induced. Of this I saw two in- ces in consultation with medical friends in the ter of 1827 and 1828.

36. Other circumstances often concur with foregoing in predisposing to puerperal fevers, e especially an age approaching to or above years; females who have suffered previous tions, and who are vitally or mentally de- sed or exhausted; severe, prolonged, or in- nental labours: those who have been subject iarrhœa, hæmorrhoids, or leucorrhœa; and e who are cachectic, or have been ill-fed; or *too low* during their confinement. — Indeed, fficient nourishment, or *inanition*, in the pu- ral state, is a more frequent predisposing cause usually believed. These require no remark, cially when they are concomitants of the going causes, and with other states of pre- osition noticed above. (See §§ 6. 10, *et seq.*)

37. *B.* The *exciting causes* are chiefly those h tend to contaminate the atmosphere of the g-in apartment, or which may occasion a local tion.—(*a.*) The *sources* of contamination have described above (§§ 35, *et seq.* 128, 129.); and ugh their nature and effects must have been ago recognised, their removal and prevention hitherto received very slight attention. But are not the only sources. Many houses retain in their own walls, sufficient causes of conta- ation and of local infection, as just stated, and ully demonstrated under the head PESTI- CES, PROTECTION FROM (§§ 10—23). These es are often productive of dysentery and of enic inflammation of the vagina and uterus, they may be inferred not to be less innocuous males on the eve of delivery, the foul air ved from these sources infecting the female or- , and thus producing sporadically, either some of the forms of puerperal fever, or uterine dis- incidental to the puerperal state. That maladies have been thus produced in seve- nstances I have had sufficient evidence to e; and that the more febrile or severe may ropagated to other females in this state, when umstances combine to favour the propagation, nly believe. Besides these sources of *extrinsic* amination, and the effluvia disengaged from beds (see § 44.) there are other influential es which should not be overlooked, namely, t and mediate contagion or infection, and the *nsic* contamination caused by morbid matters bed, and carried into the circulation from the is and vagina.

38. Not the least important of the exciting es of sporadic cases, which, however, in cir- stances favouring infection, may become more ss prevalent, is confinement in a low, close tment, near where the exhalations from pri- cess-pools, or drains find an outlet and con- nate the air. Apartments near the ground s of houses which are provided with privies cess-pools that have no communication with is and sewers, — and most houses are thus injuriously constructed, — are liable to have air in them contaminated at all seasons from sources; but more especially in winter, when are kept more closely shut, and when the ex- ions arise not much less abundantly, and trate wherever hydrogenous exhalations may bly pass.

39. The unguarded use of improper beverages, as beer, ale, wine, spirits, &c.; all sudden mental emotions, or shocks, frights, chagrin, anxieties, &c.; and premature excesses of any kind, may concur to induce an attack of certain forms of the disease, especially of the more inflammatory. Coagula in the womb, or retained in the vagina; portions of the placenta left adhering to the uterus; and death of the fœtus in utero, may severally cause uterine phlebitis, or other forms of this disease, especially if the labour has been tedious, or has required the use of instruments.

140. (*b.*) *The infectious nature* of puerperal fever has been denied by some, proved and believed in by many, and imperfectly elucidated, or stated without precision or due limitation by most recent writers on the disease. Infection, or even contagion is undoubted — unless by the inexperienced and the sceptical — in certain circumstances and forms of the malady. MM. TONNELLÉ and DUGÉS, however, do not believe in the contagious nature of puerperal fever, and adduce their experience at the Maternité in Paris in support of their opinion. During the latter part of 1818, and spring of 1819, the disease was extremely prevalent in Paris, where I was then residing, and had an opportunity of seeing some of the cases which were so numerous in that institution, where alone about three hundred women died of it, in these two years. It was prevalent at that time not only in lying-in wards, but also throughout Paris and its environs. These physicians state that it did not extend itself to the bed nearest that in which a patient was affected by it; and they assert that women newly delivered there, had each a separate apartment, and yet were attacked. These are the chief facts in proof of their opinion, but they prove nothing beyond what has often been demonstrated (see §§ 143, *et seq.*), viz. that the malady is often propagated by the mediate contact of the hands of the midwife, and by the effluvium imbibed and conveyed by the clothes. They, however, admit, what was generally observed, both there and in other institutions, that when the fever was prevalent, it generally attacked several in the same ward, and was sometimes confined entirely to one ward, a fact sufficiently demonstrative of at least an infectious or contaminated state of the air or of the bedding in that ward.

141. A circumstance worth noticing is mentioned by M. DUGÉS, which is no mean proof of the influence of the infected air of the hospital upon the lower animals. During 1819 several cats frequenting the wards of the Maternité during the prevalence of fever, were attacked by painful distension of the abdomen, and tumefaction of the parts of generation. The most of them died in four or five days; and the dissection of them was made, in the presence of Professor CHAUSSIER, by M. DUGÉS, who found in the peritoneal and pleural cavities a large quantity of a whitish serum mixed with albuminous flocculi, and a thin whitish coating covering the abdominal and thoracic viscera. A similar instance of the cat of the hospital becoming infected occurred in the hospital to which I was consulting physician during the prevalence of the fever in it.

142. In 1824, I was requested by a practitioner in the Edgeware road to see a patient with him in this disease. She was the sixth case which he had had in the course of a few days. She was moribund when I saw her. I learnt from him

that each case of midwifery, which he had attended from the first of these six cases, was attacked in succession and had died; that he had called the most eminent accoucheurs to see these cases; that they had prescribed large bleedings; and that the present case had been also largely blooded, as was then the general practice, the injurious effects of which were making themselves apparent. I insisted that contagion had caused these cases, advised measures to be taken against his being the medium of its transmission, and no other cases occurred to him for a considerable time.

143. Dr. CAMPBELL wrote on this disease in 1822, from a short experience; and, because he saw no reason to satisfy himself of the propagation of it by contagion, contended, in opposition to the no mean authority and more extensive experience of HAMILTON and GORDON, that the disease was neither infectious nor contagious, although he has adduced no conclusive evidence that some at least of the numerous cases which occurred in 1822 did not arise from contagion. It must be admitted that the sources of sporadic contamination, which I have described above (§§ 137, 138.), are so abundant in Edinburgh, where Dr. CAMPBELL practised, that the difficulty of discriminating between the influence of these and of contagion is thereby much increased. With a candour, which always characterises the truly scientific inquirer, this physician states that subsequent experience has shown him his error (*Lond. Med. Gaz.* Dec. 1831), and much to his credit he adduces the following facts: — After examining the body of a female who died of the disease after an abortion, and carrying some of the diseased parts to the class-room, he attended the delivery of a woman the same evening without having changed his clothes: she died. Next morning he went in the same clothes to assist a difficult case, the subject of which also died of the disease; and of others who were seized, within a few days, three shared the same fate. In June 1823, he assisted at the dissection of a case, where, from want of accommodation, he was unable to wash his hands with due care. He was soon after called to two patients requiring assistance, and went without further ablution, and without changing his clothes, and both these were seized with the disease and died.

144. Dr. GORDON states that the malady attacked only those women who were attended by a physician or nurse who had previously attended those affected with it. He remarks that he had abundant proofs, that any person who had been with a patient in puerperal fever became charged with an atmosphere of contagion which infected every pregnant or puerperal woman who came within its sphere. Dr. HAMILTON affirms that this fever is produced by an infection *sui generis*, and that he is quite positive that this infection is of so virulent a nature that it may be conveyed by a third person. Dr. GOOCH records that a surgeon, after opening the body of a woman who died of this disease, continued to wear the same clothes, and delivered a lady a few days afterwards, who was attacked by a similar malady and died. Two more of his patients were seized in rapid succession and also died. He then suspected the transmission of the infection by his clothes, changed them, and met with no more cases of the distemper. A washerwoman and nurse washed the linen of a fe e who had died of puerperal fever. The next ly- in patient she nursed died of this disease, an o did a third; when the circumstance having e- come known, she was no longer employed. At SUNDERLAND, forty out of fifty of these cases o- curred in the practice of one surgeon and hi s- sistant. Many other proofs of infection e been adduced by Drs. LEE, MOORE, WAL a, ROBERTSON, and by many recent writers. e last named writer, in a most instructive c- munication (*Lond. Med. Gaz.* vol. ix. p. 5), states, that a midwife in extensive practice an g the out-patients of a lying-in charity, within e month delivered thirty cases living in an exte e suburb of Manchester, and of this number x- teen were attacked with puerperal fever, and y all died; and that, of about three hundred d eighty delivered at this time by the midwives o is charity, none had the disease except the pat ts delivered by this midwife. Other conclusive ts are adduced of contagion by this writer.

145. These facts sufficiently show the conta us nature of this disease — that this fever ma be propagated both by the hands, and by the clo s, or by either, of a third person, that third p on being generally the midwife or nurse. Bu ot only is it thus contagious — the tangible con u- nication often taking place during an examin on *per vaginam;* but it is also infectious throug he medium of the bed-clothes or bedding, o he body-clothes of a patient, or of a midwife or n se, or the contaminated air of a lying-in ward I have had several occasions of observing, t a lying-in hospital, or ward, for some time er having been opened or purified, will remain ee from puerperal disease; but that, if too ny patients be admitted, or if, owing to the se n, weather, temperature and humidity, the war re too closely shut, the emanations from the is- charges, &c., will soon contaminate the air nd infect the more recently delivered women he effluvium from those first attacked increasin he infectious state of the air, which is confined a time to the wards where the emanations were rst accumulated, but which soon becomes di ed through all the wards and apartments.

146. It has been very justly remarked b Dr. HOLMES, of Boston, United States, that, "su se a few writers of authority can be found to p ess a disbelief in contagion — and they are ver ew compared with those who think differently — it quite clear that they formed their opinions a view of all the facts, or is it apparent that ey relied mostly on their own solitary experien ?" Dr. DEWEES, in the last edition of his treati on the diseases of females, has expressly said: — In this country under no circumstance in v ch puerperal fever has hitherto appeared d it afford the slightest ground for the belief tha is contagious." The evidence already furnished ay be viewed as quite decisive of the infectiou nd contagious nature of the disease in Europe ut Dr. DEWEES is incorrect as to his statement he matter as respects the United States; fo as Dr. HOLMES has remarked, Dr. FRANCIS s es, that the disease was in some instances suppo to be conveyed by the accoucheurs themselves nd Dr. PEIRSON, of Salem, United States, admi his to have occurred to himself in several conse ve cases. Dr. CONDIE, although not previou a

er in the contagious nature of the malady, nevertheless become convinced by the facts ave fallen under his notice, that the puerperal now prevailing is capable of being conveyed tagion."—(*Trans. of Coll. of Phys. of Phila-* *a*, July, 1842.) Dr. WARRINGTON stated e same meeting of the college, that after as- at an autopsy of puerperal peritonitis, he alled upon to deliver three women in rapid ssion. "All these women were attacked different forms of what is commonly called eral fever." At this meeting also Dr. WEST , that seven females delivered by Dr. JACK- n rapid succession were all attacked with eral fever, and five of them died. These the only cases which occurred in that dis- for the women became alarmed at the ex- e of what Dr. DEWEES and a few with him denied, and sent for other assistance. "And I may mention that this very Dr. S. JACKSON e of Dr. DEWEES' authorities against con- !"

7. A physician in Boston, United States, had ollowing consecutive cases: — on the 24th h, 9th, 10th, 11th, 27th, 28th April, and ay, seven in all, of which five died. He left town. Another physician writes to Dr. MES as follows: — "The first case was in uary (1830), during a very cold time. She onfined the 4th and died the 12th. Between 0th and 28th of this month I attended six n in labour, all of whom did well except the s also two who were confined March 1st and Mrs. E., confined February 28th, sickened died March 8th. The next day, the 9th, I cted the body, and the night after attended a Mrs. G., who sickened and died the 16th. 10th I attended another, Mrs. B., who sick- but recovered. March 16th, I went from B.'s room to attend a Mrs. H., who sickened died 21st. The 17th I inspected Mrs. G. he 19th I went directly from Mrs. H.'s room end another lady, Mrs. G., who also sickened died 22d. While Mrs. B. was sick on the I went directly from her room, a few rods, attended another woman who was not sick. o the 20th of the month I wore the same es. I now refused to attend any labour; did not till April 21st, when, having tho- ly cleansed myself, I resumed my practice, ad no more puerperal fever. The cases were onfined to a narrow space. The two nearest half a mile from each other, and half that nce from my residence. The others were two to three miles apart. There were no cases in their immediate vicinity." (p. 517.) nother communication, the writer considered he carried the contagion to five cases; and he and the preceding correspondent state that isease infected the young and the more aged; strong and the weak; and without being in- ced by the labour or other circumstance.

8. Dr. RAMSBOTHAM remarks, that he has n the disease to spread through a particular ict, or to be confined to the practice of a par- ar person, almost every patient being attacked , whilst other practitioners had not a single ; and he views the distemper as being ca- e of conveyance in not only common modes, through the dress of the attendants on the nt. — (*Lond. Med. Gaz.* 2d May, 1835.) Dr. BLUNDELL says, that some practitioners "have lost ten, twelve, or a greater number of patients in scarcely broken succession:" that this fever may occur spontaneously he admits; that its infectious nature may be plausibly disputed he does not deny; but he would considerately add, that he had rather "that those he esteemed the most should be delivered, unaided, in a stable, by the manger-side, than that they should receive the best help, in the fairest apartment, but exposed to the vapours of this pitiless disease. Gossiping friends, wet nurses, monthly nurses, the practitioner himself, are the channels by which the infection is chiefly conveyed." — (*Lect. on Midwifery*, p. 395.) My friend Dr. KING, of Eltham, mentioned at a meeting of the Medical and Chirurgical Society (*Lancet*, 2*d* May, 1840), that some years since a surgeon at Woolwich lost sixteen patients from puerperal fever in the same year. He was compelled to give up practice for one or two years, his business being divided among the neighbouring practitioners. No case of the disease had occurred in the practice of these practitioners, or occurred afterwards. Mr. DAVIES states, that in the autumn of 1822 he met with twelve cases, while his medical friends in the neighbourhood did not meet with any, or at least with very few. He could attribute this to no other cause than his having been present at the examination of two cases, and his having conveyed the infection to his patients notwithstanding every precaution. In December, 1830, a midwife who had attended two fatal cases of puerperal fever at the British Lying-in Hospital, examined a patient who had just been admitted to ascertain if labour had commenced. This patient remained two days; but labour not coming on she returned home, when she was suddenly delivered before she could return to the hospital. On the third day she was seized with the fever, and died in thirty-six hours. A young surgeon shortly after examining the body of a sporadic case that had died, delivered three women who all died of puerperal fever. Mr. INGLEBY states, that two gentlemen after the post mortem examination of a case of this disease, went in the same dress, each respectively, to a case of midwifery. The one case was attacked in thirty hours afterwards, the other in three days. One of the same surgeons attended, in the same clothes, another female, and she was attacked on the evening of the fifth day, and afterwards died. These cases belonged to a series of seven, the first of which was believed to have originated in a case of erysipelas. Mr. INGLEBY also adduces another series of severe cases which occurred to a practitioner in 1836, the first of which was also attributed to his having opened erysipelatous abscesses shortly before.

149. Dr. RIGBY remarks, that the discharges from a patient in puerperal fever are highly contagious; that the puerperal abscesses are also contagious, and may be communicated to healthy lying-in women by using the same sponge, as proved repeatedly in the Vienna Hospital; and that the women engaged in washing the bed-linen of the General Lying-in Hospital have been attacked with abscesses in the hands and diffuse inflammation of the cellular tissue. Dr. RAMSBOTHAM, in a letter to me, mentions a series of seven cases, two of which he saw, which occurred successively to a surgeon in this city; and he,

moreover, notices the connection of erysipelas with certain of these cases; but to this I shall revert in the sequel. Now, after the evidence I have adduced—and I could have quadrupled the amount—is it not criminal for any medical man to go from a case of this disease, or even from a case of erysipelas, to a female in the parturient or puerperal state, without using the strictest precautions? I may conclude this part of my subject by stating that the fact of the contagious nature of this malady is completely set at rest by the above evidence, especially when it is undisputed that within the walls of lying-in hospitals a miasm is often generated as palpable to the senses, and even sometimes much more so, than the fumigations used to destroy it, so tenacious as often to withstand the common measures of purification, and when generated, more deadly than the plague, if not arrested at its commencement by the most prompt and efficient means. I may further add, that lying-in hospitals, or even lying-in wards, ought not to be allowed to exist, for the reasons rendered apparent by what I have adduced, and because the aid they afford may be more beneficially furnished in other ways; and that boards of health, if such existed, or without them, the medical institutions of a country should have the power of coercing, or of inflicting some kind of punishment on those who recklessly go from cases of puerperal fevers to parturient or puerperal females, without using due precaution; and who, having been shown the risk, criminally encounter it, and convey pestilence and death to the persons they are employed to aid in the most interesting and suffering period of female existence.

150. The contagious nature of puerperal fever has been denied by HULME, LEAKE, HULL, BEAUDELOCQUE, TONNELLÉ, DUGÉS, DEWEES, and others; but GORDON, J. CLARKE, DENMAN, BURNS, HAMILTON, HAIGHTON, BLUNDELL, GOOCH, RAMSBOTHAM, LOCOCK, DOUGLAS, LEE, INGLEBY, ALISON, RIGBY, WATSON, CHANNING, and others, have professed their belief in, or adduced proofs of, the existence of this property, as respects this, the most frightful of any of our domestic pestilences; and if any would prefer the weight of authority to the overwhelming evidence now adduced, the names I have enumerated must satisfy him — at least they are quite, nay, more than sufficient to warrant him in acting with caution, and to render him criminal in the eyes of the considerate part of the community if he should ever be the medium of transmitting contagion and death to those who confide not only in his science, but also in his humanity, and in the incalculable value attached by him to human life. Dr. HOLMES has forcibly and eloquently brought this much neglected subject before the profession; and he thus concludes: — "It is as a lesson, rather than as a reproach, that I call up the memory of those irreparable errors and wrongs. No tongue can tell the heart-breaking calamity they have caused; they have closed the eyes just opened upon a new world of love and happiness; they have cast the helplessness of infancy into the stranger's arms, or bequeathed it with less cruelty the death of its dying parent. There is no tone deep enough for regret, and no voice loud enough for warning. The woman about to become a mother, or with her new-born infant upon her bosom, should be the object of trembling care and sympathy wherever she bears her tender burden, or stretch her aching limbs. The very out-cast of the s eets has pity upon her sister in degradation wh the seal of promised maternity is impressed upo er. The remorseless vengeance of the law is ar ted in its fall at a word which reveals this tra ent claim for mercy. The solemn prayer c the liturgy singles out her sorrows from the mult ied trials of life, to plead for her in the hour of eril. God forbid that any member of the professi , to whom she trusts her life, doubly precious a hat eventful period, should hazard it negligently unadvisedly, or selfishly!"

151. *C. What Connection is there between uerperal Fevers and Erysipelas?* — The conn ion apparently existing between these diseases has een hinted at above; but it is more remarkal at some seasons and occasions than at other . It was first observed and insisted upon by PO AU in 1750, who considered the puerperal fever s it then prevailed in Paris as an epidemic erys elas of the peritoneum. Drs. HOME and YOU , of Edinburgh, and Dr. LOWDER of London, no oug afterwards, also maintained this opinion. Dr. ABERCROMBIE, as Dr. MOORE has rema ed, adopted a similar view, and founded his o ion principally on the circumstance of both di ses giving rise to serous effusion. In the v ous discussions this subject has given rise to, has been contended by Dr. WHITING, Dr. WA ER, and others, that the identity of both these ma lies is shown by the similarity of symptoms, a by the ill-success of remedies; they asserting tha ike erysipelas, puerperal fever cannot be arreste and that it is contagious. This last property has een shown to exist, and cannot now reasonab be doubted. But that puerperal fever may arrested I have proved on numerous occasions and I shall have occasion to describe the mea by which its arrest may be accomplished. Ph itis of the capillary veins not infrequently compl tes erysipelas, and uterine phlebitis is a fre ent complication of the second or more interm ate grades or states of puerperal fever. These p nomena evince a certain amount of allianc but not identity. GORDON, HEY, ARMSTRONG and others, contend for similarity, if not for ide ity. Dr. LEE states, that in 1829, when the ver broke out in the British Lying-in Hospital, ree children died of erysipelas, and on exami ion after death the peritoneum in these infant vas found extensively inflamed, and covered h a copious sero-purulent effusion. Three other ses are related as having occurred under simil circumstances; but it is admitted, that cases infantile erysipelas repeatedly occurred when ere were no cases of puerperal fever in the hos al. I find it remarked, in my notes of cases o his disease observed by me in Queen Char te's Lying-in Hospital, that the relation subsisti between puerperal fevers, whether of an in mmatory, or of a malignant or of an interm ate type, and erysipelas, especially of an epi nic form, has been evinced on several occasions nd during several periods, in which the former ve prevailed. Instances of both diseases occur in the winter and spring of 1823 and 1830, a of almost every intermediate year. But cases ve also been observed of either malady witho he other; and, whilst infantile erysipelas has asionally been seen contemporaneously wit he

ance of puerperal fevers among the women,
mer has not infrequently been met with,
he latter did not exist, either sporadically or
ically.
Dr. Holmes notices, in his instructive me-
that Dr. S. Jackson went from a case of
nous erysipelas which he had been dressing
first of the series of cases which took place
ractice; and that a Dr. C., who delivered
women in succession, who were all seized
uerperal fever, had made, on the 19th of
, the autopsy of a man who died after a
hort illness, from œdema of the leg and
ollowed by gangrene, and the first of these
cases was delivered by him on the 20th,
lowing day. When making the autopsy on
th, Dr. C. wounded his hand, and was con-
his house, after delivering the first case on
th, until the 3d of April, and on April the
attended the second case of fever. " Se-
ases of erysipelas occurred very soon after-
in the house where the autopsy of the man
entioned took place. There were also many
f erysipelas in town at the time of the
ral cases. The nurse who laid out the body
third puerperal patient was taken on the
g of the same day with sore throat and ery-
, and died in ten days. The nurse who laid
body of the fourth case of puerperal fever
ized on the day following with symptoms
se of that case, and died in a week, without
ternal marks of erysipelas.

Another physician, who had a series of
cessive cases of puerperal fever, states, in
to Dr. Holmes, that for two weeks pre-
to the first case of puerperal fever he had
ttending a severe case of erysipelas, and
ection may have been conveyed through
the patient, as he admits; but, he asks,
refore does not this occur to other phy-
or to himself at other times; for he has
d a still more inveterate case of erysipelas,
has had no disease in any of his midwifery
It would be culpable in him to make
eriment, or to repeat the risk, without due
ions. Inoculation with the matter of
ox or cow-pox does not always communi-
e disease; indeed, it often fails of doing
no one now disputes the contagious na-
the virus inoculated. Dr. Merriman,
e and cautious practitioner, mentioned
, 2d May, 1840) that he was at the ex-
n of a case of puerperal fever at 2 p. m.
care not to touch the body. At 9 o'clock
e evening he attended a woman in labour;
so nearly delivered that he had scarcely
ng to do. The next morning she had
nd died in forty-eight hours. Her infant
sipelas, and died in two days. A patient
was attending in the hospital, in 1828,
by a lady; and, whilst listening to her
ce, her breath was felt by the lady, who
ping over her. This lady was the follow-
attacked with erysipelas in the face.

Dr. Rigby states that, in one epidemic in
eral Lying-in Hospital, the child of every
who died of the disease perished of ery-
which ran its course in a few hours. Dr.
tham remarks, respecting this topic, that
s recorded by Ceely and Ingleby are so
in point, as to render it almost impossible to withhold the conviction that there is a form of fever to which puerperal women are liable, not only arising from the contagion of erysipelas, but, in its turn, also occasioning that disease in other persons. Whether in this affection, when it arises under such circumstances, the peritoneum is always attacked, is a question which he believes may be answered affirmatively in the great majority of cases. He further states, that on three occasions he has known the women who have nursed patients that died of this fever attacked with erysipelas of the leg; that in 1841, when erysipelas was prevalent in Rotherhithe, a medical friend of his had six cases, and whilst attending these he delivered a lady, who was speedily seized with puerperal fever, and very soon afterwards died. Her nurse was attacked with erysipelas of the hand, and was attended by another surgeon. One day, after having made an incision, and dressed the wound, this latter surgeon was called to a case of midwifery: puerperal fever supervened, and the patient sunk very rapidly. A third fatal case, attended by the same practitioner, Dr. R. also saw, and others that did well. The disease disappeared in that vicinity when these practitioners declined to attend women in labour. Since the appearance of the second edition of his work, Dr. R. has met with additional facts, which he has had the kindness to communicate to me. A surgeon, in Clerkenwell, had five fatal cases of puerperal peritonitis, rapidly following each other, and two others, which Dr. R. saw, and both recovered; but both the children of these two latter cases died of erysipelas. One of the nurses in these last cases also took erysipelas. When this surgeon attended the first case of puerperal fever, he was just recovering of an attack of diffuse inflammation of the cellular tissue, with abscess of the fore-arm, consequent on having pricked his finger in opening the body of a woman who died of cancer of the uterus. Dr. R. concludes with believing, that "the connection between malignant puerperal fever — that is, the fever in which the peritoneum is the seat of disease, and which terminates in the rapid effusion of soft lymph and whey-like serum into the cavity — and erysipelas is perfectly established." I may add to the above my opinion that the evidence is altogether satisfactory; that some of the series of cases of the more malignant states of puerperal fever have been produced by an infection originating in the effluvia proceeding from erysipelas, or by the contagion of the matter or contaminating material produced by erysipelas. It is quite unnecessary for me to adduce further facts in support of this inference, but they may be found in the writings of Ceely, Ackerley, Rigby, S. Jackson, Holmes, Ingleby, Paley, Storrs, Nunneley, and numerous others, referred to in the Bibliography to this article. My opportunities of observing this disease since 1812, and what I have seen of it in hospitals and in private practice, have convinced me of the propriety of the following *inferences* and *precautions*.

155. *a*. That lying-in hospitals and wards have been established and supported on mistaken views as to the benefits they confer on individuals and the community; that the charity would be bestowed more safely to the objects themselves, and to others contingently, if it were so administered as to afford the required aid, to increase the com-

forts, and to improve the sanitary conditions of females in the puerperal states at their own places of residence.

156. *b.* If these institutions be still continued and supported, as introductions to midwifery practice, or for the doubtful benefit of the recipients of a certain kind of charity, the obstetric physicians and surgeons attached to them ought not to attend those cases of puerperal fever or of erysipelas which so frequently break out in the wards of such institutions; for, by doing so, they convey the poison from one patient to another, both within and without the institution. In all such circumstances, the consulting physician or surgeon to the institution, who, as in my own case, should not be engaged in the practice of midwifery, ought to take charge of these cases, which should, immediately upon their attack, be removed, with due care and precaution, into a separate ward, provided for the reception of such cases, and situated without the walls of the hospital, but apart from other houses.

157. *c.* A physician or surgeon engaged in obstetric practice, upon the occurrence of puerperal fever in any of his cases, should either explain the matter to her friends, and call in a physician not engaged in this practice, to whose care she ought to be committed; or he should relinquish the care of puerperal females during his attendance on cases of this fever, and even of erysipelas; or he should change all his clothes, and carefully wash his hands, after seeing cases of either of these maladies, before proceeding to a puerperal female.

158. *d.* An obstetric practitioner should not make an autopsy of a case of puerperal fever, or of erysipelas, or of peritonitis, or of diffusive inflammation of the cellular tissue, or of the disease occasioned by the necroscopic poison (see *art.* Poisons, §§ 487, *et seq.*), nor even attend, or dress, or visit any of such cases, without immediately afterwards observing the precautions just stated, and allowing two or three days to elapse between such attendance and midwifery engagements, or visits to puerperal females.

159. *e.* It is the duty of obstetric practitioners attached to public institutions to prevent, as far as possible, the spread of this pestilence by midwives, nurses, or other assistants; and, as soon as two or three cases occur in succession, or other causes of suspicion present themselves, to take the most decided measures against the extension of contagion. Whatever indulgence may have heretofore been extended to those who have been the ignorant causes of the misery disclosed by the above statements — which convey but a small part of what has occurred in recent times — cannot now be expected, and ought not to be granted; for the practitioner is now too well informed, or, at least, the sources of information as to this matter are too open for him to be longer ignorant, that this most deadly of our domestic pestilences is conveyed from the infected to the healthy chiefly and most frequently by the accoucheur, when it occurs without the walls of a lying-in hospital; and that ignorance of, or inattention to, this fact, already not unknown to the well-informed part of the community, — this flagrant neglect of what we owe to those who confide in us, and to society in general, to whom we must look for consideration and esteem, — will be no longer viewed as a *misfortune*, but will be more justly consid d a *crime*, of no small magnitude.

160. *D. What connexion is there between pu eral fever and other maladies, especially such are epidemic or endemic; and may atmospheric issitudes or conditions be viewed as concerned this connexion, and in their prevalence severally col-lectively?* The *infectious nature* of pu peral fever has been demonstrated above (§§ 140, eq.), and it has been shown, as in Dr. Merr an's case, that the disease may be communicate without contact, although there is also reason be-lieve that the contact of a *materia morbi* w also convey it. The *connexion* between this fev and *erysipelas*, also a contagious disease, has ne been shown (§§ 151, *et seq.*); and it has been oved that the effluvium from a case of puerpera fever will produce erysipelas in a person predisp d to this latter malady, whilst that evolved from case of erysipelas will occasion puerperal fe r in newly delivered females. Moreover, it ha been shown, by several cases in the course of m prac-tice (to two of which I was called by on prac-titioner, in the winter of 1827–28), th the infection of either this fever or erysipel may be transmitted to females who are pregnan more especially at a far advanced period of ge tion, and may rapidly produce premature deliv , fol-lowed by all the characteristic phenomena ma-lignant puerperal fever; whilst, on the othe hand, abortion or premature delivery, particularl when either is accompanied with great hæmorr ge or flooding, predisposes remarkably to the i ction of puerperal fever, as well as to that of er pelas.

161. The prevalence of *typhoid* or *ad amic fevers* have been considered by some wr rs as more or less connected with the occurr ce of puerperal fever; and, indeed, that this ter is merely typhoid fever modified or aggrav d by the puerperal state. We find that *small-* and *scarlet fever*, or *measles*, are remarkably ggra-vated, and the danger from them greatly in ased, when they attack a puerperal female. B these diseases always preserve their identity an their specific forms, and the power of perpetu ng or extending themselves. Their characters e not lost in those of puerperal fever; and if, uring their course, the phenomena or the interna sions and complications usually observed in m gnant puerperal fever appear also in them, t y are merely superadded, and become the ca es of the greater malignancy and more rapid gress of the malady to a fatal issue. Now, s has been the case also with the *true* or *exan matic typhus*, when it affects a puerperal femal as far as my observation enables me to judge; or the characteristic eruption and the low mutte g de-lirium — the typhomania — marking thi ever, have also appeared in the puerperal mani ation or complication of it, the features of the p peral malady being also present; the puerpe state imparting to this specific fever, as it does o the exanthemata, dangerous complications, m ma-lignant characters, and a much more ra . and unfavourable issue.

162. I have had reason, however, to belie , that puerperal fever may arise sporadically from same causes as that form of fever which I have nomi-nated *putro-adynamic*, — the *putrid feve* f the older writers (see *art*. Fever, § 484.); — th ever, varying in its subordinate features, and the

s supervening in its course, may be produced : puerperal state by the same causes as those ı occasion that form of continued fever ; — animal exhalations, the foul vapours from l animal matter and burying-grounds, the ia from privies and sewers, and the infectious ations yielded by those affected by this fever, produce puerperal fever, in all respects the as when it prevails in lying-in hospitals ; and the puerperal fever thus originating may be d in the manner above demonstrated : that, ıort, malignant puerperal fever may arise dically from those sources of *infection* I have ibed when treating of this property (see :tion, §§ 11, *et seq.*), and of the causes of *-adynamic fever* (see Fever, §§ 449, *et seq.*), and be transmitted from one puerperal e to another, when the circumstances fa- ng this transmission are present.

3. Dr. Collins states, that puerperal fever become epidemic in the Dublin Lying-in ital on several occasions when typhus fever uiled in that city ; and at other periods when pelas was frequent. A patient was admitted ate hour labouring under fever with petechial over the body. She was removed to a se- e apartment, and died soon afterwards. The emales who occupied the beds adjoining her's attacked with puerperal fever and died. A nt in fever was admitted at night into one of abour wards, where she remained for some s. This ward contained four beds. The three en occupying the other beds were attacked puerperal fever, and two died. Dr. Collins that the recovery of the patient attacked typhus fever at the *full period* of pregnancy interesting fact, as he believes that no com- ion proves more generally fatal than the ature expulsion of the child under such cir- stances.

4. The prevalence also of the low types of the themata, of rheumatism, and even of other ses, which are favoured more or less by humid, ant, and cold states of the atmosphere, may contemporaneously with that of puerperal ; but, in such circumstances, the only con- ɔn subsisting between them is to be ascribed ıe atmospheric conditions, especially those stated, probably also associated with certain rical conditions of the earth's surface and of ıir, and with emanations from the various :es of impurity and of infection, with which rowded localities, towns, cities, factories, &c., nd more or less, particularly when these ıations are not swept away by high winds and ventilation.

5. iv. Description.—*Puerperal Fevers* pre- certain *types* or *forms*, depending chiefly ı the following circumstances : — 1st. Upon intensity or concentration of the exciting es, relatively to the predisposition of those sed to their operation ;—2d. Upon the de- of depression of organic nervous energy or ers of life produced by those causes ; — 3d. n the extent of contamination of the circu- g fluids consequent either on the respiration foul or infected atmosphere, or on the ab- tion of morbid matters from the sexual organs, om other parts ; — 4th. Upon the continued ations of these, or of various concurrent causes influences, during the progress of the malady ; — 5th. Upon the states of season, weather, and epidemic constitution, at the time cases of this malady occur ; — and 6th. Upon the manner in which the infection is produced, and the media or channels by which it is conveyed, when the disease is propagated by infection or contagion, as shown above (§§ 140, *et seq.*). These circumstances, aided by constitutional peculiarities, the previous conditions of organs and functions, and the morbid tendencies of the patient, are also the chief causes of the complications, ultimate changes, and results observed in the advanced course and at the termination of the malady.

166. The various arrangements of the forms of puerperal fever adopted by medical writers have involved the following important questions, namely,—(*a.*) *Are the several forms or types of puerperal fever the consequences of local changes—of those lesions observed after death ; or, in other words, are they merely symptomatic disturbances of the constitution produced by these lesions ?* — (*b.*) *Are the structural lesions or prominent changes found on dissection produced in the course of the malady, and are they the ultimate results of that malady ?* — (*c.*) *And are these forms or types different from their commencement, and the effects of different grades of intensity of the exciting causes, and of the different avenues or channels by which these causes invade and poison the frame?*—Now the solution of these important questions has been eschewed by all writers, and even by the obstetrical writers, on this malady, many of whom have mystified, rather than enlightened the subject. The answers which may be given to these questions will appear more illustratively in the sequel, for the importance of the topics to which they refer is great, not merely as respects an accurate description of the different resulting forms and states, but also as regards the adoption of appropriate prophylactic measures and rational indications of cure. The discussion of this topic cannot, therefore, be neglected with propriety. It is necessary first to advert to the modes and avenues by which the poison or infection may contaminate the frame, as above demonstrated. (§§ 143, *et seq.*)—1st. The atmosphere of a ward may be infected by animal effluvia — by exhalations from decomposed discharges, &c., as there shown : or a puerperal female may inspire the poisonous effluvium absorbed, retained, and afterwards given out, by the clothes of the medical attendant or nurse. In these cases the frame is infected through the respiratory avenue ; organic nervous power, and the circulating fluids being thereby morbidly impressed or affected. Whatever local changes, or prominent lesions are observed after death, whether implicating the peritoneum, or the sexual organs, or other parts, are, in such cases, *consecutive* of the operation of the exciting cause upon the nervous and vascular systems, and upon the blood. In these there can be no doubt as to the local lesions being consecutive of the infection thus produced ; although the mode in which the consecutive lesions or complications are developed may admit of discussion as noticed hereafter (§§ 245, *et seq.*).

167. 2d. It has been showen above (§§ 137, *et seq.*) that the poison may be conveyed to the uterus or vagina by contact,— by the hands of the accoucheur ; or the poisonous miasms or vapours exhaled from foul privies frequented just before

delivery, — a gust of foul air on those occasions — may infect the vagina and os uteri; or the decomposition of coagula in the vagina or uterus, or of a portion of a retained placenta may so contaminate these parts, the imbibition and absorption of the decomposed matters, or of ichorous or puriform secretions in these situations, affecting not only the states of vital power and resistance, but also changing the constitution of the circulating fluids in such a manner as to give rise to all the phenomena and complications of this malady. In this latter mode of infection — and through the channel or avenue now stated, — the local changes in the sexual organs are, as respects their earlier grades, the first to be developed; although they subsequently increase in extent and intensity with the depression or exhaustion of vital power, and with the contamination of the circulating fluids; and progressively extend to the peritoneum, digestive organs, heart, and other remote parts, as hereafter described. In the *first* of these modes of infection (§ 166.), the local alterations are generally *consecutive* of the constitutional affection; in the *second* they are *primary*, but of such a nature as rapidly to contaminate the whole frame, and as to become themselves quickly aggravated and extended by the consequent constitutional infection. The *former* of these modes is produced by an extrinsic cause or poisonous emanation generally conveyed through the medium of the respired air; the *latter* by the contact of a material poison either directly applied to the prominently diseased parts, or affecting them in the manner already stated (§ 129.).

168. It may, however, be admitted that, when the frame of a puerperal female is infected by a foul air, generated either in a lying-in ward, or in an apartment by privies or sewers, &c., and when vital power is thereby depressed and the circulating fluids contaminated, the secretions or discharges from the uterus will then also become altered, more or less acrid or otherwise morbid, and thus infect the parts with which they are in contact. Nor will the local alteration, thus originating, be limited to these parts, but it will extend to adjoining parts and surfaces, and even to remote situations, as shown in the *second* of the above categories; the complications or local lesions thus supervening upon the constitutional infection, and in their turn augmenting that infection. Such being the two modes of procession of the morbid changes, it becomes the more important to recognise the phenomena by which such is distinguished; and to inquire, as I shall endeavour to do, in the sequel, — as I have many years since inquired, and acted, and not unsuccessfully — respecting the means which may be rationally employed to arrest the onward tendency of these changes to disorganisation, to dissolution of the vital cohesion of the tissues, and to death.

169. 3d. Besides the two classes of cases now specified, and arranged according to the manner in which their efficient causes invade the œconomy and develope the malady, there is a *third*; and to this class may be referred those cases, which evince a more strictly local character — which are more individualised in their manifestations and more limited in their tendencies and structural changes. These generally are *primary*, or commence with local changes of an inflammatory character, the constitutional disturbance being symptomatic of such changes, and var g with the state of the patient, and with the i ences to which she is subjected. In this c s, the local affection is more decidedly inflammat ; and if the diathesis be not altogether *sthenic*, is at least much less *asthenic*, than in any of e former classes. The cases in this third class y occur independently of any infection taking p e in either of the modes, or by either of the aver s, indicated above; or, if they be produced at l, as there stated, the causes are so weak, or op te in such a manner, as not materially to reduce al power or resistance, or remarkably to lowe e tone of vascular reaction. Some of these c es may be referred to causes productive of irrit n or of determinations of blood to the affe d parts; or to the suppression of the secretions d excretions; or to the nature of the ingesta, to various other causes of visceral inflamma n. If, in any case, either of the modes of infec n, above specified, be concerned in producing is form of the disease, the infectious agent fai in occasioning the same amount of vital depres n, of structural changes, and of general conta nation, characterising the other forms, owing e er to the relative weakness of this cause, or t he constitutional power and strong vital resistan of the patient. Keeping, therefore, in view th ifferent or varying forms of the malady — the ogressively malignant states of puerperal f r, with the nature, intensity, or concentration o he existing causes, and with their continued oper n, I proceed to consider, *first*, the more local nd sthenic, or inflammatory form or type of the alady, and afterwards the more asthenic an alignant.

170. *A*. INFLAMMATORY PUERPERAL FEV — This form of the disease has been viewe by many writers as an *idiopathic* or *primary in mation*, occurring in the puerperal state — a *puerperal peritonitis*, or as *puerperal hysteri* or *metritis*, or as *puerperal ovaritis*, accordi as the *peritoneum*, or the *uterus*, or the *ovari* nd *ligaments* are the chief seats of inflammatory a on and of local change. That this form of the isease may thus occur primarily, being deve ed by causes which tend to localise disease owi to their nature and channels of operation, mu be admitted. Cold, humidity, neglect of va us comforts and requisites, improper food or beve es, mental emotions, &c. may primarily excite er of these local diseases, and symptomatic er, varying in the character or type of vascular a on, with the state of constitutional power, and ith numerous other concurrent influences and ircumstances. But, in other cases, as shown ve (§ 169.), the primary character of the al disease is lost in the intensity or severity o he constitutional disturbance; and the more rominent lesion of one or more of the parts st particularised, either is an attendant of the vas lar re-action following the operation of the ex ng causes and the shock produced by parturition, is consequent upon the re-action, and is favour by those conditions and circumstances insisted on above, as being influential in determining ar localising puerperal maladies (§§ 10, 11. 41.). en the common causes of inflammation occasio isease of one or more of these parts, the c titutional disturbance is modified more or le by the puerperal state, and by the constitu al

rs and other circumstances of the patient.
as the infectious and contaminating effluvium
ison, so influential in causing the malignant
of the malady, has little or no share in the
uction of the sporadic or inflammatory cases
ituting this form, they generally present more
ss of a sthenic diathesis, and pursue a more
rable and less rapid course than the others.

1. (*a.*) Puerperal Peritonitis. — *Peri-*
s puerperalis. — *Inflammation of the peri-*
m may occur in the puerperal state spo-
ally, from causes already noticed, or even
ut any very obvious exciting or external
. It may either be primary, or the con-
ence of the extension of irritation or inflam-
ry action from some one of the organs or
seated in the pelvic cavity to that portion of
eritoneum enveloping the part thus primarily
ted. This latter mode is probably the most
ent; for the uterus, the tubes or ovaria, ow-
o injury, to excoriation, or to the irritation of
ochia, or to other causes, may be so affected
t to betray the nature or amount of the affec-
in consequence of the peculiar condition of
atient, until the disease extends to the perito-
, and thus the parts primarily disordered are
r overlooked or unrecognised, and the more
inent and secondary alteration attracts the
attention, and is considered the only seat of
alady. This form of the disease is most fre-
tly *caused* by violence during delivery, by
sure to cold, or damp or wet linen or bed
es, or by the use of improper food or stimu-
. It may not appear for a fortnight or three-
s after delivery; but when it is the primary
, it may occur on the second or third day, or
r than inflammation of the uterus. Uterine
orrhage predisposes to it as well as to the
forms of puerperal fever.

2. *a. The symptoms* of puerperal peritonitis
with the constitution, habit of body, and other
mstances of the patient and the mode of at-
The pulse often continues to rise in fre-
cy from the appearance of the re-action con-
nt on the shock of delivery, and pain is felt
fferent parts of the belly, which are soon fol-
d by chills, rigors, or shiverings. With these
increase of pain in the abdomen, with tender-
and tension, sickness or vomiting, is com-
ed of. The pain is occasionally universal,
t is sometimes limited to one part; and the
soon becomes swollen and tense. The pulse
quent, hard or sharp, and small. The skin
t; the pain and tenderness increase, and ex-
over the belly. The patient lies on her back
the knees raised. The tongue is white
dry; sometimes clean, or loaded only towards
oot. There are more or less thirst, occasional
tings, and an irregular state of the bowels,
h are generally at first costive, but afterwards
relaxed or bilious. The lochia and milk are
diminished soon after the rigors, and are
quently entirely suppressed.

3. These symptoms often appear rapidly and
ly, especially when the peritoneum is pri-
ly attacked. But they sometimes come on
severely and more insidiously, especially when
are consequent upon irritation or inflam-
ry states of the uterus or its appendages. In
cases, the disease may at first be mistaken
fter-pains; but the frequency of the pulse, tenderness above the pubes, the shiverings, and the swelling and tension extending upwards from the hypogastrium, indicate the nature of the disease. When the malady thus commences the symptoms are milder and more protracted at first; and the pain for some time is not severe, until it rises above the hypogastrium, when it is rapidly aggravated and extended, and all the other symptoms increased. Whether the early symptoms are rapid or slow in their accession, or whether they are limited or extended, they soon augment; the belly becomes nearly as large as before delivery, and so tender as not to tolerate the weight of the bed-clothes; and the patient is deterred from turning, or lying even for a few moments, upon either side, by the increase of pain thereby caused. With the extension of the inflammation over the peritoneum, the respiration becomes more strictly thoracic, and the movements of the abdomen less apparent: and, when it reaches the diaphragm the breathing is difficult, anxious, short, and performed entirely by the intercostal muscles. Cough then sometimes occurs, which is short, suppressed, and painful. Painful eructations, or belchings of flatus take place at intervals, attended sometimes by discharges of fluid from the stomach. The bowels, which were generally confined, become more relaxed, and dark, bilious, or variously coloured evacuations, or even purging supervene.

174. *β.* If a *favourable termination* is likely to occur the abdominal swelling does not greatly increase. The pain either is arrested in its extension, or it gradually abates. The vomitings cease, the pulse becomes slower and fuller, the urine more abundant, and occasionally the lochia reappears, or is more copious. The breathing is easier and more abdominal, pressure is less painful, and the patient can turn more easily in bed. In rare, and less favourable cases, the disease terminates in suppuration, and the abscess points and bursts externally at periods more or less distant from the attack, — the matter in some such instances passing out at the umbilicus, in about one or two months.

175. *γ.* If the disease proceeds *unfavourably*, the swelling and tension of the abdomen increase; the belly is round and prominent; the vomiting continues or becomes peculiar, consisting of a pumping or belching up of the contents with much flatus. The countenance becomes sharp, anxious, or pinched; the pulse still more rapid and irregular; and her slumbers short, unrefreshing, and sometimes attended by a wild or wandering delirium; but she often continues sensible to the last. The pain frequently ceases suddenly, although the abdominal swelling increases; the countenance sinks; the extremities become cold, and the tongue aphthous. A *fatal issue* usually takes place within five or six days; but the disease may be protracted much longer. According to the constitution and other circumstances of the patient, and the period that has elapsed from delivery, puerperal peritonitis may vary between the forms described as sthenic and asthenic peritonitis, when treating of *inflammations of the* Peritoneum (see §§ 19—28.), the symptoms and progress of the malady being altogether the same as there described. The *appearances on dissection* are also the same as there stated (§ 80, *et seq.*), or as exhibited hereafter (§§ 221, *et seq.*).

176. (*b.*) Puerperal Metritis. — *Hysteritis*

puerperalis. — *Inflammatory puerperal fever often commences in the uterus,* the substance of the organ being affected, about the third or fourth day after delivery, but often much later: — it may arise from prolonged, difficult, or instrumental labour; from cold or damp; from stimulants or heating food; and from other predisposing and exciting causes already noticed. *a.* The *symptoms* vary much with the severity of the attack, and with the extension of the inflammatory action to the uterine peritoneum on the one hand, and to the ovaria and ligaments on the other. It thus assumes mild or severe forms, the progress of which is modified by the rapidity of the extension just mentioned. The *milder states of hysteritis* usually commence from the fourth to the ninth day, and much resemble the ephemeral fever. The patient is chilly or shivers, is sick, and sometimes vomits. The pulse is frequent and soft; and with the establishment of re-action, pains, which were occasionally felt in the hypogastrium, and which were, perhaps, only considered to be after-pains, become more constant, but are not severe. They are usually felt behind the pubis; but they may extend a little to either side, or towards the groin. Pain is also sometimes felt in the back, especially if the patient attempts to sit up. It may not be complained of even in the hypogastrium, when she lies still; but it is usually felt when turning to either side, or when pressure is made above the pelvis. There is no fulness, hardness, or tenderness of the abdomen. The lochial discharge gradually diminishes; but it does not necessarily stop; and the milk sometimes continues plentiful. The skin is hot; there are more or less thirst, no appetite, sickness at stomach, and disturbed sleep. The pulse varies from 90 to 110; the head is confused rather than painful; the urine is high-coloured; the bowels confined; and wandering pains are felt in the belly and sides. The bowels afterwards become loose or irregular, the stools being dark, offensive, or morbid. Strangury, frequent calls to pass the urine, pains in the hips, and bearings down on micturition are often complained of. In the course of a few days, sometimes not until ten, twelve or fourteen days have elapsed, the pulse becomes slower, the appetite returns, the painful symptoms referred to the uterine region subside, occasionally a slight discharge takes place from the womb, and the disease entirely disappears. Sometimes, however, the patient continues to experience more or less disorder referable to the uterus, with or without slight alterations of the position of the organ, until the menstrual discharge is fully established, when it subsides.

177. *b.* The more *severe form of hysteritis* is often caused by difficult parturition, by rude management, or by other more intense causes. It usually commences between the second and fifth day, but it may appear at a later period. It is ushered in by chills or rigors, which are often present although the skin is hot, and which are generally preceded by pain in the lower part of the abdomen. With the appearance of re-action, and of the febrile symptoms the pain becomes more constant and severe, but is usually characterised by exacerbations. The uterine region is very painful on pressure just above the pubis, and in this situation there is generally some swelling, which, however, does not extend further until the peritoneum is affected. The abdominal parietes is slack r soft, so as to admit of the state of the fundu f the uterus being ascertained. The uterus is lar , harder, and much more sensible than usual. e pain extends to the back, shoots to the groins d hips, is attended by a sense of weight, and y difficulty of passing the urine. Occasionally t e is distressing strangury, or complete suppres n of urine. The lochial discharge is early suppres d, and the secretion of milk diminished or arre d. The temperature of the vagina is increased, d the sexual and urinary organs feel generally t, inflamed, painful, and tender, the situation of e pain at the commencement varying with the rt in which the inflammation originates. With e development of the local malady the symp - atic phenomena become prominent and se e. The pulse is very frequent, somewhat hard r sharp; the skin is hot; thirst is increased; e tongue is white or dry; the urine high-colo d and scanty, or turbid: the bowels are at first n- fined, but afterwards lax or irregular; heada is present; the countenance expresses suffering ut it is not collapsed or constricted as in perito s; and nausea and vomiting are urgent. Some es the internal surface, or part of the womb, is c ly or only affected; and, in this case, a puriform is- charge follows the diminution or suppressi of the lochia.

178. *c.* If the inflammation do not extend ov he peritoneum, a *favourable issue* is more like to take place than in any other form of puer al fever. This *termination* often is preceded a copious perspiration, by diarrhœa, or by ut ne hæmorrhage, which is the most complete is. The abatement of pain and of the febrile s p- toms; diminished frequency of the pulse; t re- appearance of the lochia and of the milk; ee and general perspiration; a more natural stat nd excretion of urine; cessation of nausea an o- miting, and a more natural state of the bo ls, are the surest signs of a favourable result.

179. *d.* An *unfavourable termination* of this rm of the disease is to be feared when the inflamm on extends either to the peritoneum or to the u ine appendages, or when it goes on to suppur on, either of the substance or sinuses of the orga — *α.* If it extend to the *peritoneum*, the local s p- toms, especially the pain and tenderness i the hypogastrium, advance upwards, and grad lly invade all the abdomen, or sometimes onl the lower regions; and swelling, tension, and te er- ness of the belly with all the symptoms of *p ito- nitis* (§§ 172, 173.), supervene, and *complica* the metritis. — *β.* If this latter go on to *suppur on*, the pulse becomes still more frequent, er, softer, and afterwards weaker, or more con es- sible, and smaller. The tongue is red or dr the pain does not materially abate, but it be nes throbbing; chills or shiverings are sometim ex- perienced; and in the absence, or consecu e of these, copious sweats break out at intervals. he face is paler, or is more sharp than befor nd occasionally a circumscribed hectic flush a ars in the cheeks. The urine now deposits a ink sediment. The nights are sleepless, and, the patient slumbers towards morning, she awak in a profuse sweat. This suppurative form of ste- ritis may prove early fatal; the pulse incr ing in frequency, the tongue being red, and ra and the strength sinking; or the hectic symptom ay

ontinue for weeks, and at last be fatal. Occaonally matter is discharged from the vagina, or y the bladder or rectum—oftener by the rectum. hen it passes by the vagina the patient may cover; but when it passes by the other channels covery more rarely occurs. It may break into e peritoneal cavity and produce fatal peritonitis. -γ. When metritis becomes associated with inammation of the *ovaria, ligaments, and tubes*, the mptoms about to be mentioned supervene at an rlier or later period (§ 182.).

180. *e. The appearances on dissection* depend upon e direction the disease takes towards the fatal sue. If it has terminated by fatal peritonitis, the ual alterations produced by that malady are und, sometimes with more or less softening of e uterus, or with sero-puriform infiltrations, or rulent collections, in the walls or in the sinuses the organ, occasionally also in the veins and sorbents in the vicinity. If the disease has not tended to the peritoneum, but has terminated by ppuration, these latter changes are the more rearkable; and no further disease of this membrane ay exist beyond some alterations of the portion vering the uterus and appendages, consisting iefly of exudation of lymph, with little or no rous effusion, but often with puriform infiltrations collections underneath the peritoneum, and ftening of the tissue. Gangrene or sphacelation rarely observed, unless the autopsy has been layed longer than twenty-four hours.

181. (*c.*) Puerperal Inflammation of the terine Appendages. — It is comparatively re to find, either during life, or on examinan after death, the ovaria, broad ligaments, and bes inflamed independently of peritonitis, or of ritonitis associated with hysteritis, in the more *flammatory form* of puerperal fever. In the ore *synochoid* and *malignant states* of this fever, e uterine appendages are very frequently the at of lesions hereafter to be described; but they e, perhaps, never found in these latter states fected alone; the peritoneum or the uterus, or th, and often several other structures, being so more or less altered. It is only in the inmmatory or more sthenic form of puerperal ver that these appendages are affected alone, or iefly, and then only in rare instances. Even hen the disease appears to originate in these, hich is not unusual, it soon extends to the perineum; and, if it preserve its sthenic character, does not spread much further than to the poron of the membrane adjoining. But, if the thenic condition exist, or if vital power become epressed, or the blood contaminated by the abrption of matters from the uterus or vagina, the isease soon spreads from the uterine appendages ver the peritoneum, if it be not arrested in its rogress by treatment.

182. *a.* The *symptoms* of inflammation of the terine appendages, whether the affection oriinates in, or extends to these parts, are genelly ushered in with rigors, and with pains, tenerness, and fulness in one or both sides of the ypogastrium, extending to the groins, the pains enerally shooting down the thighs. As vascular action is established, the pulse becomes rapid, e skin hot, the urine scanty, high-coloured, c.; and headache, thirst, diminished or supressed lochia, suppression of the milk, and other ymptomatic phenomena appear. An examination *per vaginam* evinces increased heat and tenderness at the upper part of the canal, and, in some cases, even a tumour may be felt laterally. When the disease extends to the peritoneum, pain, tension, fulness, and exquisite tenderness advance upwards; and all the symptoms of *peritonitis* supervene, sometimes with others more strictly appertaining to *hysteritis* (§ 176.), with which the inflammation of the uterine appendages may be associated, as either the primary or consecutive affection.

183. *b.* The *terminations* of the inflammation of the uterine appendages are — 1st. In *resolution*, which may take place, as in cases of metritis, without any permanent injury being sustained; — 2d. In *adhesions*, by the medium of coagulable lymph to adjoining parts, which, by their situation or extent, may be injurious at some future period; — 3d. In *obliteration of the Fallopian tubes*, and the consequent loss of function, or sterility, which ensues; — 4th. In *suppuration*, the matter forming either in the ovary, or in the broad ligament, or in the veins. The purulent collections or deposits may exist in these situations in various forms, the patient dying of the attendant softening and disorganisation of the adjoining parts and of the purulent absorption, but most frequently of the consequent or associated peritonitis, and more rarely of the complication with metritis. A large collection of matter in these parts may burst into the peritoneal cavity, or may open into the vagina, or into the rectum, or through the abdominal parietes, near Poupart's ligament. — The appearances on *dissection* are described in the article Ovaria, and in the sequel (§ 229.).

184. *B.* Synochoid Puerperal Fever. — *Congestive Puerperal Fever.* — This form of the malady is that most frequently observed both in private practice and in lying-in wards, unless the causes be intense or concentrated, and then the disease assumes a more malignant character. This form may be sporadic, or endemic, or even epidemic, especially in lying-in hospitals; and in these, as well as elsewhere, it assumes modified states of vascular action and local affection, according to the constitution and other circumstances of the patient, to the relative intensity of the exciting cause, and to the avenues through which this cause affects the frame. Hence it presents, in different cases, every modification, from the inflammatory to the malignant. The same causes, or combinations of causes, as infectious miasms, transmitted by the medium of the surrounding air, or contagious fluids or secretions conveyed by the hands of the accoucheur, aided by concurrent influences, may, in the same ward, or in other places, produce this form of the malady in one female, and the malignant form in another; the state of the female, the period that has elapsed from delivery, the predisposition resulting from uterine hæmorrhage, &c., remarkably favouring the intensity and character of the attack. Thus I have seen in the same lying-in ward, and even in contiguous beds, cases not only of this form, but also of the most malignant form, of the malady, each presenting different prominent affections — one peritoneal disease chiefly, another very remarkable uterine affection, a third prominent alteration of the uterine appendages and peritoneum, and in a fourth inflammation of the veins or lymphatics of the uterus

and its appendages, or of both these vessels. This occurrence, and the circumstances connected with it, indicate two things, namely, the spread of the disease owing to the operation of a cause infectious or contaminating in its nature; and the production of different local alterations, in different cases, in connection with the infection and contamination of the constitution — of the nervous and vascular systems, and consecutively of all the living structures.

185. *a.* The *symptoms* of this form of puerperal fever vary with the circumstances already noticed, and with the mode of its accession. In many cases, the *uterus* is the first to be attacked; in some, the *uterine appendages* are the first to manifest pain, tenderness, &c.; in others, the *peritoneum* appears to be primarily seized; and, in a large proportion, alterations exist chiefly in the *uterine veins*, with more or less lesion of other parts. The mode of accession of the disease is no less varied than the local lesions discovered after death; and neither it, nor the progress of the symptoms subsequently, can always be strictly attached to the several states of the malady so as to indicate them truly during life. The accession of pain is often sudden, and as often insidious, appearing as after-pains, or as an aggravation of these, or merely as the increased sensibility of the uterine organs usually consequent upon parturition. It is frequently attended by chills or rigors, or by a recurrence of these; or the chills may be so slight as to escape observation. In the more robust, and when the powers of life are not remarkably depressed by the exciting cause, the shiverings are often severe; and in these reaction is usually more fully developed, and the disease more nearly approaches the inflammatory or sthenic form. As the chills disappear, the pulse, which was already frequent and small, becomes more frequent and fuller; but still soft, open, and compressible. The skin is hot; thirst, nausea, and vomiting are complained of, sometimes with cough, vertigo, or pain across the forehead. Soon after, or almost instantaneously with, these symptoms, pains in the abdomen are experienced, in various degrees of severity; and the patient lies on her back, with the knees drawn up.

186. *b. If the local disease commence in the uterus*, the pain and tenderness on pressure are first felt in the region of the uterus, and the abdomen, above this region, is soft and flaccid. The body of the uterus is enlarged; and the pain, frequently at first recurring in paroxysms, or presenting exacerbations, is often mistaken for after-pains, until pressure indicates great tenderness, and discloses the nature of the attack. With the aggravation of the fever, the countenance becomes suffused, and the respiration hurried. With the extension of disease from the uterine peritoneum to the rest of the membrane, the pain and tenderness extend upwards over the abdomen, which becomes swollen, tympanitic, acutely painful, and tender. Vomiting of dark-coloured or greenish fluids ensue, often attended by diarrhœa, the stools being dark, offensive, and watery. The pulse soon becomes remarkably rapid and feeble, sometimes irregular; the tongue brown or dry; the teeth covered by dark sordes; the countenance sunk and palid; the breathing short, laboured, and intercostal, with a short suppressed cough, singultus, and eructations of flatus, wit which more or less dark fluid is thrown up, witl out retchings. Coldness of the extremities, r markable smallness and frequency of pulse, an a cold and clammy surface, with a short, gaspi respiration, usher in dissolution, the mental facu ties being often but little disturbed.

187. *c. If the local alterations commence in t uterine appendages*, the symptoms generally a but little different from those just stated. Pai tenderness, and fulness are first felt in either both sides of the hypogastrium, instead of behi or immediately above the pubis, as when the di ease begins in the uterus. The primary affectio however, may be seated in the uterus, witho being detected, and extend to the appendages, both to the uterine peritoneum and to the appe dages, and thence, more or less, over the pe toneal cavity. In the early period of these case the abdomen may remain for a short time flacci and tolerant of pressure; but it soon presents the symptoms just mentioned, with the seve constitutional infection, which rapidly increas and aggravates the local changes by sinking t powers of life and contaminating the circulatio When the peritoneum becomes implicated to great extent, the symptoms above described a always present; and, if the disease be not a rested at an early stage, the fatal issue advanc as there stated; the lesions observed after dea being most remarkable in the uterine appendage as will be shown in the sequel.

188. *d. That the prominent alterations so fi quently seen in the peritoneum* actually origin in it cannot be doubted, in respect of some cas of this form of the disease; for the seat of t early symptoms and the appearances on dissecti are not sufficiently demonstrative of a prima affection of the uterus or of its appendag Nevertheless, it may be admitted that a loc poison or a contagious fluid may affect the inte nal surface of the uterus, and that the change whi takes place primarily in this part may be extend along the tubes to their fimbriated extremiti and thence over the peritoneum, the symptoms the early lesions not being fully developed, escaping observation, until the peritoneum is e tensively implicated. When this membrane thus primarily attacked, the pain generally co mences at the epigastrium or about the umbilic is sudden and acute, and is attended by extre intolerance of pressure, tympanitic distension the abdomen, a rapid pulse, and vomiting; the symptoms being generally ushered in with chi or rigors, which may either precede or accompa the pain and tenderness of the belly. In so cases the chills or rigors are either slight, or very short duration, and may thus escape notic but they are seldom absent altogether in this sta of the disease. The pulse is always quick fro the commencement, and even before either pa or rigors are experienced. The lochia and mil in this as well as in the other states of this form puerperal fever, is either diminished or suppress from the appearance of the rigors. The urine always high-coloured and very scanty, or even su pressed; the bowels irregular, the stools at fi lumpy, afterwards relaxed, watery, dark, and fensive; and the tongue white or parched, subs quently dark or brown. The countenance anxious and collapsed, the respiration sho

uick, gasping, and thoracic ; and, during the dvanced progress of the malady, the acute pain ad tenderness of the abdomen subside with the upervention of fluid effusion into the peritoneal avity, and the tension subsequently also subsides, e abdomen often being very tumid, but soft and waggy. All or most of the symptoms accom- anying an unfavourable termination of the other ates of the disease now supervene with a ra- idity varying with the severity of the attack, ad with the degree of vital power attending it, of vital resistance opposing the occurrence of ssolution.

189. *e. Inflammations of the veins of the uterus d its appendages, sometimes of the lymphatics, d, in rare instances, of both orders of vessels,* e frequently the primary and essential altera- ons in the form of puerperal fever now under nsideration ; but they are not the only changes, pecially in fatal cases ; for, in these especially, rious consecutive lesions, of an extensive and isorganising kind, are also found on dissection, even become very manifest before death. *terine phlebitis* is most commonly observed in e puerperal state ; but it may occur, indepen- ently of this state, in consequence of ulceration the os or cervix uteri, or of ulceration conse- uent upon the presence or removal of polypus. is *caused* in child-bed by the usual circum- ances and influences which occasion other in- ammatory diseases in persons weakened or ex- usted by prolonged suffering or by losses of ood, these conditions, especially flooding and fficult or instrumental labours, the depressing notions, and a varicose state of the veins, favour- g the occurrence of phlebitis. The chief or sential cause is undoubtedly the circumstance the vessels of the uterus being placed, by the paration of the placenta, in an analogous state the wounded surface of a limb after am- utation. The irritation occasioned by an ad- rent portion of placenta, or by the decompo- ion of it, or of coagula which have not been rown off owing to the imperfect contractions of e uterus after delivery, is often a cause of this ate of the disease. Injury, also, sustained during livery, and alterations or decomposition of por- ons of the retained lochia, may either inflame e sinuses or veins, or may contaminate the blood them, the portion thus contaminated further anging the circulating fluid, and even affecting e vessels through which it passes. The disease these vessels may, moreover, be produced by e contact of an infectious fluid, or by the anges occasioned in the lochia by the foul air which this discharge may be exposed, as shown ove (§§ 137, *et seq.*).

190. *α. Uterine phlebitis* generally commences in e vessels which have become in some respects posed by the removal of the placenta, as shown y the frequent limitation of it to the vessels of at part or side of the uterus to which the placenta as attached. It often extends to the veins and nuses of the greater part of the uterus, and to e veins also of the ovaria and tubes, but chiefly those of one side, that side being the seat of tachment of the placenta, or principally its seat. terine phlebitis is often a simple or uncom- icated disease of the uterine organs, but it seldom ntinues any time without giving rise to various nsecutive lesions, both of adjoining and of remote parts. When it is associated with inflammation of the internal surface of the uterus the phlebitis may be consequent upon this latter lesion; but when the substance of the uterus or the uterine appendages are also inflamed, it is difficult to determine which is primarily diseased. When thus complicated, the veins, in some cases, are most affected, and the substance of the uterus in others. In many instances, however, uterine phlebitis is associated with peritonitis, without the substance of the uterus being materially changed, or merely with slight softening; whilst in some there are not only phlebitis and peritonitis, but also extensive softening of the uterus and of the ovaria and ligaments. It is possible that the alterations of the sinuses, veins, and substance of the uterus may be nearly co-eval; for if we admit the influence of injury, or of retained putrescent matters upon that portion of the uterus to which the placenta was attached, and upon the exposed openings of its vessels, the effects may be produced upon both the vessels and substance of the organ. But it cannot be disproved that inflammation may commence in either and be limited to it, or extended to the other, as circumstances may favour the extension.

191. Inflammation of the uterine veins generally extends to the veins of the tubes and ovaria; but those of the uterus may be inflamed on both sides, and yet the disease may extend only to the veins of one tube or ovarium. M. DANCE states that the veins of the right tube and ovarium are more frequently altered than those of the left. However extensively the veins of the uterus and appendages may be inflamed, the disease may be limited to these organs; but as frequently it is extended to their trunks, even as far as the hypogastric vein, or nearly to the vena cava. It may be asked, however, what are the changes which may be viewed as consequences of uterine phlebitis? and, should the presence of pus, merely, in the uterine veins, be viewed as indicative of inflammation of them? The existence only of pus in the veins of the uterus is not sufficient proof that the pus is a product of inflammation of these veins, for the pus may have been imbibed by the veins from the cavity or internal surface of the uterus, where it had been produced by inflammation of that surface; and therefore unless its existence be associated with changes in the coats of these veins, it cannot be viewed as a satisfactory proof of uterine phlebitis.

192. *β. The symptoms* of this form of puerperal fever—of uterine phlebitis—cannot be stated with the desired precision. Indeed, the accomplishment of the attempt is nearly impossible; for the change is so frequently and so early associated, in puerperal females, with alterations of the substance of the uterus and appendages, and not only with these, but also with changes in the peritoneum and in remote parts, that it is most difficult to separate the phenomena which belong to the phlebitis from those which are attached to the other lesions. The symptoms, therefore, of this form of the disease should be viewed as not strictly those of uterine phlebitis, but of that state of puerperal fever, in which this particular lesion constitutes a more or less important part of the organic changes found after death. That this lesion is an important one in puerperal fevers is shown by the fact, that pus and other changes in the veins have

been found by M. TONNELLÉ in ninety-three cases out of two hundred and twenty-two; and in twenty-four cases out of forty-five by Dr. R. LEE. — But in most of these cases in which it has been seen, it was associated with other changes, as just stated.

193. Uterine phlebitis usually commences, in from twenty-four to forty-eight hours from delivery, with pain in the uterus accompanying, preceding, or following rigors. The uterine region is tender on pressure, and upon the cessation of the shiverings and chills, the lochia and milk are generally found much diminished, and if not altogether suppressed they soon are. The pulse is frequent from the first; and general uneasiness, with physical depression, nausea, or vomitings, and headach, are experienced. As the rigors cease, the skin becomes hot, the pulse more accelerated, but soft, often full, broad, and open, and the vomiting more frequent, a greenish fluid being usually thrown up. With the headach some degree of incoherence may be remarked in some cases, or delirium and agitation in others, which often pass into extreme exhaustion or a state of drowsiness or partial insensibility. Tremors of the muscles of the face and extremities, dysuria, or scanty, or entirely suppressed urine, an irregular state of the bowels, or diarrhœa and offensive stools; extreme thirst, parched mouth, dry and brown tongue; a sallow, lurid, and dirty hue, occasionally with miliary or petechial eruption, and more rarely a dirty yellowish appearance, of the whole surface of the body, generally supervene as the disease advances.

194. The pain in the hypogastrium varies in severity, but it may not increase with the progress of the malady, but the tenderness in this region is generally aggravated, and the abdomen is commonly swollen or tympanitic. If the phlebitis be associated with peritonitis, extreme pain and tenderness of the abdomen, great tension and tympanitic distension of the abdomen are experienced with all the symptoms attending the peritoneal state of the malady (§§ 172, 173.).

195. If the uterine phlebitis proceeds without being associated with inflammation of the pelvic or abdominal peritoneum, little or no pain in the hypogastrium may be complained of; or merely a dull pain, with a sense of weight. But this region will generally be found tender, or painful on pressure. The uterus too may return to its reduced volume, or nearly so, if its substance be not implicated; but, if its substance be diseased, it commonly remains above the brim of the pelvis, and is large, hard, and very painful on pressure. In many instances these local symptoms may be so slight as to escape attention, the constitutional symptoms, caused by the passage of morbid matters into the blood, especially prostration of strength, feeble and rapid pulse, vomitings, and diarrhœa, low wandering delirium, brown parched tongue, diminished, suppressed, or puriform or offensive lochia, &c. at last exciting alarm, and indicating the existence of a most dangerous malady. A large proportion of cases terminate fatally in this more acute stage, — or within eight or ten days; but a larger number live longer, some *secondary affection* supervening.

196. γ. The *consecutive affections* generally appear in remote organs, especially the lungs, pleura, brain, liver, spleen, the joints or muscles, the
cellular tissue, the eyes, and digestive canal. On
or other of these organs and parts, in the cours
of a few days, experiences a rapidly disorganising
form of congestion or asthenic inflammatory ac
tion; softening, puriform or sanious infiltrations
purulent deposits, and even gangrenous softenin
or liquescence of the tissues, and effusions int
serous cavities quickly following the secondar
local affection, which is undoubtedly occasione
by the passage of the sanious and purulent matter
into the circulation, and by the action of th
contaminated blood on the capillaries of pre
disposed or susceptible parts. Many of these se
condary affections advance insidiously, and withou
being attended with much pain, or local distres
until they reach the last stage of disorganization
whilst others betray much earlier, and by mo
evident symptoms, the nature of the consecutiv
mischief. Their progress, generally to a fatal issu
is often rapid; but not infrequently it is muc
slower; the duration of the malady depending c
the seat and extent of the consecutive disorganiz
tion.

197. In this form of puerperal fever, the i
flammation may be limited to the veins of tl
uterus, but more frequently the muscular tiss
adjoining the veins participate in it, and becom
of a dark-red or brown colour, and remarkab
soft consistence, the peritoneal covering of tl
uterus may also be implicated, and the chang
hereafter described be found in the appendages a
peritoneum. The veins which return the blo
from the uterus and appendages, may be eith
wholly or in part inflamed; commonly, howeve
the spermatic are chiefly affected, and general
the one on that side of the uterus to which t
placenta was attached; and it may be confined
a small portion of the vessel, or extend throug
out it. Injection, infiltration, or condensation
the cellular tissue, in which the veins are i
bedded; thickening induration and constriction
the coats of these vessels; and the exudation
lymph, mixed with pus and coagula of blo
within their canals, are the changes chiefly o
served in fatal cases of uterine phlebitis. T
hypogastric veins are more rarely affected th
the spermatic. Dr. R. LEE ascribes this to t
latter vessels being invariably connected with t
placenta; but as in respect of the spermatic, so
is observed as regards the hypogastric, that o
one is affected. Marks of disease of the uterine ve
may extend by the iliac or the spermatic veins
the vena cava itself. "This occurrence seld
takes place to a great extent, through the medi
of the spermatic, the inflammation usually t
minates abruptly at the opening of the sperma
into it on the right side, or of the renal on the l
If it pursue, as it sometimes does, the direction
the kidneys, the substance of these organs, as w
as their veins, may be involved in the disease."

198. *C.* MALIGNANT PUERPERAL FEVER.
PUTRO-ADYNAMIC PUERPERAL FEVER. — T
most fatal form of the malady — most fatal if
very early, very decidedly, and most appropriat
treated — occurs chiefly in lying-in wards, and
circumstances described above (§§ 36—40. 14
It was the almost only form of the distemper
served in Queen Charlotte's Lying-in Hospital
1823 and 1824, and until the improvements w
made in the house. It is the most certainly
fectious and contagious form of puerperal fe

be often conveyed by the clothes of the acco heur or nurse. When this disease is produced sp dically by the foul or contaminating air of a cl or crowded lying-in ward, or of a low apartme, liable to gushes of foul air from privies, se rs, or cess-pools, it is not infrequently conve d to other puerperal females as already shown (§ 37, 138.); and it produces a similar, or but sli ly modified, state of disease to that which tra mitted the infection. In all its essential chara rs — as respects its exciting causes, the general de ssion of vital power, the rapid contamination of e circulating fluids and loss of the vital cohe n of the soft solids, &c. this disease very cl ly resembles *Putro-adynamic fever* (*described at* 172, *et seq. of art.* FEVER). The chief differ ces between them arise from the peculiar cir mstances of the female at the time of infectio and to these are entirely to be imputed the ra progress of the puerperal disease, the greater ma gnancy, if not early arrested by judicious me s, and the local complications, which frequ tly either appear during the course of the ma dy, or are detected on examination after de h.

9. *a. The symptoms* of malignant or putro-ad amic puerperal fever vary in the mode of th *accession* with the period of the puerperal sta at which the infection appears to be produ d. In three sporadic cases, to which I was ca d in consultation, the disease commenced in th ast week or fortnight of pregnancy; and, in tw instances, it either followed or caused abortio for I was unable to determine the sequence; bu as I traced, as I conceived, the disease in two ou f the three sporadic cases just mentioned to th requenting of privies having no communicatio with drains, and containing the accumulated ex iæ of many years, it is not improbable that th abortion was the result of a local infection. W n, therefore, the infection, poison, or conta nation, however, or by whatever channel it m be communicated, attacks a female before de ery, or immediately afterwards, or not until se al days have elapsed from delivery, the *acce n* of the early symptoms may be expected to va accordingly.

00. (*a.*) In a case of a female attacked *before de ery*, to which I was called by Mr. BARNWELL, th ymptoms were the same as those observed by m n other cases. This patient was seized early or he 12th of February with acute pain throughou the abdomen, with enormous distension and ex isite tenderness; with very rapid, full, and sc pulse, varying from 130 to 136, and with fr uent vomiting. I saw her in the afternoon of th same day. The vomiting and state of the p e were as now stated. She complained of h lach, and of thirst, and was very despondent. H tongue was broad, flabby, slimy, and trem ous; her countenance pale, anxious, and cov d by perspiration, and her general surface m st, warm, and clammy. Labour-pains came o that evening, but were soon inefficient, the a on of the uterus having ceased. Mr. BARNW L administered secale cornutum, which ultim ely induced uterine action, and she was deli red after a labour of about twenty hours. O the following day (the 16th), the distension a tenderness of the abdomen were diminished; a the sickness and vomitings, with borborygmi and flatulent eructations, continued. A pathetic depression of spirits, anxious expression of countenance, flabby and slimy state of tongue, a very rapid, fluent, and weak pulse, clammy state of skin, scanty and almost suppressed urine, quick and oppressed breathing, a feeling of pressure on the diaphragm, requiring the head and shoulders to be elevated, were soon followed by the symptoms ushering in dissolution.

201. (*b.*) When the disease follows *almost immediately upon delivery*, or soon after this event, the earliest indication of the impending mischief is the great rapidity, softness, and weakness of the pulse, often attended by pain and tenderness at the epigastrium, by sickness and vomiting, followed by general distension of, and pains darting through, the abdomen. But, in the majority of cases, there are neither chills nor rigors; in a few a feeling of coldness only; and in still fewer, slight rigors. In this state of the disease the patient soon becomes despondent, predicts her dissolution, is afterwards apathetic, and makes little or no inquiry for her infant. The milk and lochia are either little or not at all diminished, or are more than usually abundant. The abdominal pain and distension are sudden or quick in their accession, but the pain often soon ceases, the distension remaining, and afterwards changing its character, if the disease continues above two or three days. The tongue, from the commencement, is flabby, broad, and slimy, or covered by a mucous or creamy coating; the pulse is usually from 120 to 140, or even upwards, fluent, soft, or broad; and the general surface presents a lurid, or dusky or dirty hue, and is covered by a clammy and offensive perspiration. The countenance is pale and inexpressive, unless when the pain is acute, when it becomes anxious and covered by perspiration. The mind is but little disturbed, beyond a state of complete apathy. As the disease proceeds, respiration is short, suspirious, or difficult; the pulse small and soft, or irregular; the bowels frequently relaxed, and the stools offensive and passed without control. Distressing feelings of sinking, leipothymia or restlessness supervene, and are soon followed by the symptoms of impending dissolution.

202. (*c.*) When the disease does not appear until *two, three, or more days have elapsed from delivery*, the abdominal pain, distension, vomiting, vital depression, and rapidity of pulse, are very often sudden in their accession, and unattended by either chills or rigors; much more rarely, they are more gradual, and attended by chilliness or slight rigors. But physical and mental depression, absence of hope of recovery, of all affection or care for the infant, and of regard for any object whatever, and perfect indifference characterise this form of the malady at whatever period of the puerperal state it makes its appearance. In one case, which occurred in the hospital in 1824, the attack took place above a fortnight after the patient was delivered, and whilst I was in the board-room. When I was visiting some other patients about an hour before her attack, she was sitting in a chair by the fire-place making no complaint; and after this short period I found her complaining of agonising pain over the whole abdomen, with enormous tympanitic distension, extreme tenderness, and a pulse so rapid as hardly to be counted. Vomiting with eructations of flatus, leipothymia, cold, clammy, offensive perspirations, quick,

short, and laborious respiration; failure of the pulse at the wrist; cold clammy extremities; moist, flabby, and tremulous tongue; singultus, eructations or belchings of the contents of the stomach, and loss of power of the sphincters, successively supervened, and terminated in death within twenty hours from the accession of the seizure.*

203. (*d.*) Whatever may be the period or m of its accession, this variety of the disease alw pursues a rapid course; and, unless early arres by energetic means, it almost always tends to neral contamination of the fluids and structu , and to death. At its commencement the nerv system of organic life and the blood appear to suddenly and seriously affected; as shown by general loss of vascular tone and of sthenic act — by the disturbance of all the vital functi , and relaxation of contractile parts. The earl t symptom is often the remarkable rapidity of *pulse*, which is also broad, open, soft, or fluent r small, thready, or irregular — but always v quick and compressible. *Rigors* and chills generally absent; or if they have been pres , they are either slight or of short duration. In most rapidly fatal cases, or such as occur crowded or close lying-in wards, they rarely - cur; and, in these, the disease may be *unc*-*plicated*, or present no prominent lesion or affect , the whole frame participating in the mal , through the medium of the organic nervous vascular systems; or if any prominent lesion - pear, the peritoneum and other shut cavities t frequently experience it, and present the appearances hereafter to be noticed.

204. α. These more *simple states* of this for f the malady may run their fatal course in f twenty hours to two or three days, the ear t symptoms being remarkable frequency and s-ness of pulse; pain in the epigastrium or exte-ing over the abdomen, with tympanitic or flatu t distension, and tenderness; frequent vomiti , and sometimes purging; a scanty or suppre d state of the urine; a lurid or dusky appearanc f the surface, which is covered by a clammy -spiration, and exhales a peculiar and disagree e odour; a pallid, apathetic and sometimes slig y livid or sallow countenance, the eyes being s , or surrounded by a dark circle; a broad, fla , tremulous tongue, which is covered by a slim r cream-like mucus; little or no thirst; an ab-ant secretion of milk, and a copious discharg f the lochia, which often becomes offensive or ot-wise changed, and great apathy and disregar f the infant and of all relatives. These sympt s may exist in the most marked degree; the resp-tion becoming short, suspirious, and gasping, e vomitings being more frequent, and attende y belchings of flatus, or passing into a pumping , or eructations of the contents of the stomach, d alternating with singultus or with leipothy a, and the abdomen still continuing remarkably s-tended by flatus, until, after a period varyin n duration, as just stated, dissolution takes pl e, preceded either by extreme restlessness, diffic y of breathing, and lividity of countenance, o y sudden or gradual sinking of all the vital funct s, and a feeling of impending death. In these c s, the mind may evince no further disturbance n the state of indifference just mentioned, or a w wandering delirium at times, the patient answ g correctly when roused, and expressing a convi n of dying, and indifference as to the issue.

205. β. When this most malignant form o e disease is *complicated*, or accompanied with a f the prominent lesions to which frequent all n has been made, the symptoms are somewhat -dified either early or in the course of the mal . The most frequent complication is that with -

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* The following case, recorded at the time, will illustrate this form of the malady. I adduce it, not as being characterised by extreme malignancy, nor by any marked peculiarity, but as a specimen of the disease as it was then prevalent; and as the treatment which had been adopted was such as could not have influenced the rapid tendency of the disease to dissolution. — Mrs. Turner, married, aged about twenty, was delivered on the 2d Feb., after a natural labour. She was seized on the 11th, without any chill or rigor, with severe pain in the epigastrium, distension and tenderness of the abdomen, rapid, soft, and weak pulse, sickness, and vomiting. The matters thrown off consisted chiefly of greenish fluids; and the pain extended to the hypogastrium and both groins. I was not called to her until the evening of the 13th, about fifty-four hours after the accession of the disease. She then presented the following symptoms:— The pulse was so rapid and weak as hardly to be counted or felt at the wrist: the hands and feet were cold and clammy: the breathing remarkably quick, difficult, and laboured; the countenance sunk, and of a pale livid hue; the conjunctiva pearly, and the pupil contracted: the abdomen was tumid, but not tense nor very painful; the milk was abundant, and the lochia scanty, but not much more so than usual at that period after delivery. The tongue was clean, broad, and slimy, the skin was covered with a clammy, offensive perspiration, and the heat of the trunk was below the natural standard. The urine had been scanty, but passed without difficulty; the bowels duly evacuated. The odour exhaled from the body was peculiar and very marked. Her mind was collected; but indifferent to every thing. She died a few hours afterwards — about sixty hours after the first feeling of disease.

Inspection twenty hours after death, present Drs. Copland and Dennison, and Mr. Cholmondeley. The thoracic viscera presented no further disease than congestion of the posterior parts of the lungs, and loss of vital cohesion. The peritoneum was very slightly adherent in parts by means of a film of puriform lymph which covered the membrane throughout the whole surface. This film was thickest on the right side, and over the diaphragm, stomach, liver, and spleen. These viscera, as well as the kidneys, were healthy, excepting that they were more friable and softer than usual, especially the spleen. The omentum was remarkably softened, and was drawn together, like a cord in the middle of the abdomen between the convolutions of intestines. There was not much fluid effused, but it had a livid and whey-like appearance, especially between the convolutions of the bowels, and between the right ovarium and cæcum. The peritoneum, when the film of puriform lymph was wiped off, was congested with dark blood, in points, or streaks, and much softened, so that it could be torn in parts like to wetted paper. The uterus was of the usual size, for the period which had elapsed from delivery; and its structure, when divided, appeared natural. The internal surface of the uterus seemed also sound in consistence and colour. The veins of the organ were quite healthy. The spermatic and hypogastric veins, on both sides, were natural, and contained little blood. The right ovarium was of a brownish colour, and slightly enlarged. When divided, a little colourless fluid escaped from the interstices of its structure. The right Fallopian tube appeared slightly inflamed, especially at its fimbriated extremity. No purulent or other matter was found in the sinuses or veins of the uterus. The site of the placenta was somewhat darker than usual at the surfaces, and covered with a dark semifluid lymph; but the vessels proceeding from the part were empty, and of natural appearance. The veins of the heart were much engorged with black blood. The left ventricle was empty and flaccid, the right was filled with black blood. The body was but little rigid, and the external surface slightly discoloured, of a yellowish livid hue. The whole intestinal canal was greatly distended by gas. This and other cases which I have examined have suggested the belief, that in some instances at least, the disease extends from the internal surface of the uterus along the Fallopian tubes to their fimbriated extremities, and thence to the peritoneum. I have frequently observed that the structural changes, both in the ovaria and peritoneum, have been greater in the same side as that in which the fimbriated extremities of the tubes were most altered.

into, and other lesions of the *peritoneum.*
hen this surface is prominently affected, the
n and tympanitic distension and tenderness of
abdomen are most severe, and is either general,
is felt most severely near the epigastrium, or in
or both sides of the hypogastrium, indicating
this latter case the origin of the mischief in the
es or ligaments. In rare and most severe cases,
ecially if the malady has followed floodings,
solution may take place before the peritoneum
periences further change than is presented by
er parts; but, more generally, or, if the case
tinues two or three days, the abdominal pain
sides more or less, and, with it, the tympanitic
tension and tenderness partially diminish. The
lomen now furnishes indications of more or less
usion into the peritoneal cavity, which generally
reases, and which, by its acridity, increases the
s of cohesion which this membrane evinces after
th. In other respects the symptoms of this
te of the disease pursue the same course as that
t described (§ 204.), varying only slightly with
severity of attack, and the extent of con-
nination or change of the circulating fluids and
degree of vital resistance opposed to these and
er alterations.

206. *γ*. There can be no doubt of the *uterus* and
appendages undergoing, in some cases, and on
ne occasions, in which this form of the malady
pears, more or less prominent changes; but it
very difficult to determine the period of the
ease in which they occur, or the exact proces-
n of the morbid phenomena. Although the
itoneum may present the chief lesions, as shown
ove, in some cases, it is seldom that the uterus, and
appendages especially, are much disorganised
hout this membrane being also implicated very
ensively or throughout. It is very probable,
t disease may have extended from the internal
face of the uterus and Fallopian tubes to the
briated extremities, and thence over the peri-
eum, at least in some cases; and that the
rus may have been so early softened and other-
e affected as to implicate the peritoneum, the
nge thus induced in this membrane rapidly
ending, owing to the infected and contaminated
te of the frame. It may not unreasonably be
umed, that the general infection produced by
exciting cause will render the lochia more
id or septic than in more favourable circum-
nces, and that this state of the discharge, espe-
lly when retained in the sexual passages, may
taminate these parts, and give rise to the
nges observed, in some cases, not only in them,
t also in the peritoneum and adjoining cellular
ue. I have usually observed that, in these
tances, the milk has been undiminished, and
lochia more or less offensive, usually abund-
t, sometimes remarkably putrid or fœtid. In
s complication of the malignant state of the
ease, pain, tenderness, and fulness have com-
nced either in the hypogastrium, or in one or
h sides of this region, and extended to the
rum and loins, shooting irregularly through the
lomen, which has also presented considerable
ulent distension, with borborygmi. The pain
also often extended to the groins and tops of
thighs. In all other respects the symptoms
the same as are observed in the simple and
itoneal states of the malady, but their progress
a fatal issue, although not the less certain, when they are not judiciously interfered with, is generally less rapid, and is often accompanied, as in the former states of the malignant form, with frequent recurrences of faintness or sinking, with dysuria or suppression of urine.

207. *δ*. In the most malignant states of puerperal fever, the *veins* and *lymphatics* rarely present inflammatory changes. It is chiefly in the synochoid form, or when the disease displays a less degree of malignancy, and pursues a less rapid course (§§ 189, *et seq.*), that purulent matter and other changes are found in these vessels. It does not, however, follow, that morbid matters are not imbibed by either the veins or lymphatics, or even by both, and carried into the circulation because they do not evince any lesion of their parietes; on the contrary, it is not improbable that sanious or putrid matters may be imbibed by the veins, in this form of the malady, and contaminate the blood, without producing sthenically inflammatory lesions, or any very evident changes, in these vessels; the irritation produced by such matters on their internal surface giving rise, in the existing state of the frame, to an ichorous exudation, which is carried into the blood and mixes with it, and not to that form of lymph which coagulates, and arrests the progress of the mischief, nor even to a puriform matter, such as often is met with in the synochoid or less malignant forms of the malady, not only in the veins, but also sometimes in the lymphatics.

208. The *lymphatics* of the uterus and its appendages, and their vicinity, present changes in a few cases which have been viewed as, and which probably are inflammatory. These changes, however, consist chiefly of the presence of pus in the lymphatics, and of congestion of the glands in the vicinity; and are found chiefly connected with inflammatory changes, or with the presence of pus in the veins, or with purulent deposits, or with ulcerations in the pelvic viscera and parietes. The *symptoms* of changes in the lymphatics of the pelvis are hardly to be recognised during life, owing to their associations with the alterations of other parts just mentioned. I have observed these changes chiefly in cases which have commenced with asthenic inflammatory symptoms referable to the uterus and other pelvic viscera, and even also to the pelvic parietes, which have been of several days' duration, from eight or nine to fourteen or more, and which have terminated in one or other of the consecutive lesions already noticed (§ 196.). I have, however, remarked that these cases generally are attended by acute pain in one or both sides of the hypogastrium, extending to the groins, with tenderness, and sometimes with enlargement of the deeper-seated glands in the groins; but the former of these symptoms also accompany prominent affection of the ovaria and ligaments.

209. *D. Of certain symptoms marking the form and terminations of the disease.*—*Rigors* and *chills* have been stated by most writers as ushering in the disease. This is the case certainly in the more inflammatory states, whether of a sthenic or asthenic diathesis, but they seldom occur in the most malignant forms. When they do occur, then generally are the *milk* and *lochia* diminished or suppressed, if, indeed, the secretion of milk has commenced before the accession of the malady. But, in some cases, rigors are experienced without

the suppression either of the secretion or of the discharge; but this is rather the exception than the rule. In the malignant states of the malady, even when effusion into the peritoneal cavity is very great, neither is the milk, nor is the lochia suppressed or even diminished, but, on the contrary, they are more than usually abundant, whilst the latter is often very offensive and contaminating. In the more strictly inflammatory, and in the synochoid or intermediate forms of puerperal fever, suppression or diminution of the milk and lochia generally obtains — suppression in the more inflammatory, and diminution in the synochoid. In the malignant states of the disease observed by me in 1823, 1824, and 1825, the lochia was rarely remarked; but in 1827 and 1828, after better ventilation was established, diminution and occasionally suppression of the lochia were observed: the disease having then assumed the synochoid or intermediate grade of impaired vital power. M. Dugès states (*Journ. Hebdom. de Méd.* t. i. p. 348.) that in eighty-nine cases observed by him at the Maternité, there were twenty-five instances of suppression or diminution of the lochia during the rigor, twenty-seven of suppression or diminution in the progress of the disease, and thirty-seven instances in which there was no diminution, but were sometimes an augmentation of the discharge.

210. In some cases in which the lochia is diminished an increase of it takes place after a judicious treatment. But a return of the lochia is not always followed by amendment; and when this result ensues, the return of the lochia is evidently the consequence of the amendment and not the cause of it. In estimating the value of this indication, the time which has elapsed from delivery, and the state of this discharge from the period of delivery, should be considered. It may be stated, as a corollary, that the state of the lochia varies in different epidemics and forms of the malady, and in different individuals even in the same epidemic, or endemic prevalence of it, according to its more or less inflammatory character, and to the kind of complication which marks its commencement or progress.

211. (*b.*) The secretion of *milk*, if established before the attack of the most malignant states of the disease, is generally not influenced thereby; and if the accession of the malady precede the appearance of the milk, the accession of this secretion may occur in the course of the malady. I have seen the breasts full of milk at the period of dissolution, although they appeared more or less flaccid. In all respects, this secretion generally presents the same relations to the forms and states of the fever as have been just stated in respect of the lochia.

212. (*c.*) A correct interpretation of *the pulse* is of the utmost importance in the estimation of the nature, forms, and states of this malady; and is not less so as regards the diagnosis and prognosis. A very frequent pulse—a pulse above 110 after parturition, should always be viewed with suspicion, if the acceleration cannot be accounted for, or referred to mental emotion or physical excitement, although no other symptom be complained of; and inquiries, as well as a more particular examination, should be directed to the secretions and excretions, to the condition of the uterus, and to the sensations excited by an examination of the abdomen and hypogastrium. If, in connection with great acceleratio the pulse is open, expansive, and soft, the inquirie now suggested are the more necessary, especiall if pain, fulness, tenderness, or distension in an part of the abdomen be also present. If the puls rise above 120, the probability of the accession puerperal fever is much greater, the type character of the fever being indicated by the tor or resistance furnished by the vessel, and by th various existing symptoms. In the more maligna states of the malady the pulse becomes remarkabl frequent, often so as hardly to be counted, and the same time open, expansive, soft or fluent, if insufficiently filled with blood. There are als observed, in connection with this pulse, a free ar offensive perspiration, copious discharges from th bowels and from the stomach, whilst both th milk and lochia are abundant. These evacuatio must necessarily soon leave the vascular syste more or less deficient in its contents; and th deficiency must be the more serious, the great the loss of blood during parturition, and the low the patient is kept during the first days after d livery, as too frequently directed by accoucheu who are more capable of adopting a fashion mode, than of thinking rationally, uninfluenced hypothesis, and conformably with the dictates sound common sense. If we duly consider th effect which the abundant evacuations observed the course of the more malignant form of puerpe fever must have in reducing the quantity of blo circulating in the vessels, and view this reducti in connection with the impaired tone or contract power of the vascular system generally, the wa of due relation between the quantity of the blo and the capacity of the vessels containing it, mu necessarily appear as no mean cause of the leip thymia, faintings, or sinkings so generally c served, and of the rapid progress of the disease dissolution, especially when a lowering or dep tory treatment is adopted.

213. (*d.*) In the more malignant states of puerp ral fever *vomiting* is almost a constant symptom. is generally present from the commencement, a frequently consists at first of a greenish-yell ropy fluid, afterwards becoming greenish-brow and lastly nearly black, watery, and turbid. dark greenish fluid is often ejected from the ginning. At first the vomitings are attended considerable retchings; but as the disease vances to a fatal issue, the matters are belched with little or no effort. Vomiting sometimes curs at the commencement of the disease, th subsides, and is followed by diarrhœa, and aft wards recurs in its worst form, the diarrhœa f quently continuing also.

214. (*e.*) The states of the *bowels* and of the *e cuations* vary considerably in the different forms puerperal fever. The intestinal irritation, or gast enteric disorder, which has been viewed by so writers as a form of the disease, is merely symptom which is often more or less promin in all the varieties, but more especially in most malignant and rapidly fatal, in which pression of vital power, alteration of the blo and loss of vital cohesion of the tissues, are most manifest phenomena. In the more infla matory, and in the intermediate or synochoid for the stools are at first bilious, feculent, or frot sometimes costive, or not relaxed, or irregul but they are often relaxed and irregular, or

as the disease advances. In the more nant states the evacuations are generally reen, greenish-brown; in a few cases almost aching to black. They are commonly also very copious, occasionally slimy, and usu-ontaining numerous small pieces of soft al-ious flakes mixed with them. They are s extremely offensive. Towards the fatal of the more malignant cases they are often l involuntarily.

. *b. The state and appearances of the blood* vary emarkably in the different varieties of puer-fever. In the more inflammatory, particu-when the sthenic diathesis obtains, and the e presents the characters of peritonitis or itis, the blood does not differ materially from ates of this fluid usually seen in other in-iations of serous or fibrous structures. It is y in the inflammatory form that an oppor-of examining the blood, whilst the patient ng, is afforded the physician. But I have called to cases of the malignant form, pro-by infection, in which venæsection has been sed, and opportunities have thus been fur-l, fatally to the patients, of observing the rances of this fluid in that form, during their

. (*a.*) In the case of a patient who exhibited st symptoms of *puerperal peritonitis* on the ng of the second day after delivery, the being very quick, hard, and full, the respira-apid, with heat of skin and thirst, Dr. Simon that the blood formed a tolerably firm clot, as covered by a buffy coat of a line and a hick; the chemical analysis furnishing very similar results to those about to be adduced Andral and Gavarret. These physicians eight analyses of the blood in four cases — f *peritoneal fever*, the others of *metro-perito-* Two of the cases terminated fatally, and in a large quantity of purulent matter was found abdominal cavity. The following are the s: —

sections.		Water.	Solid residue.	Fibrin.	Blood-corpuscles.	Solid residue of serum.
case	1	787·2	212·8	5·5	122·8	84·5
ase	1	822·9	177·1	5·4	88·3	83·4
	2	831·6	168·4	5·3	73·6	89·5
	3	851·0	149·0	3·6	60·5	84·9
case	1	786·4	213·6	7·2	117·0	89·4
case	1	789·4	210·6	3·8	120·0	86·8
	2	802·7	197·3	4·7	109·5	83·1
	3	813·5	186·5	6·1	100·3	80·1
thy od		790·0	210·0	3·0	127·0	80·0

7. The second case, which proved fatal, led puriform effusion into the peritoneal y. The fourth case did not manifest symptoms *tro-peritonitis* until the second bleeding was ed, this disease having been fully developed ie occasion of the third bleeding, when the tity of fibrin in the blood was greatest. In of metro-peritonitis quoted by Dr. Day, from analysis of Scherer, Haller, Becquerel, Rodier, the blood presented a similar increase of fibrin, and a much greater diminution of blood-corpuscles.

218. (*b.*) In cases of *metro-phlebitis puerperalis*, the clot of the blood drawn from a vein was, according to Ebert, large, and more or less concave. It was covered either with a thin, true buffy coat, or more frequently with a thick and often discoloured stratum of gelatinous substance, forming a false buffy coat. Gelatinous coagula, of a similar nature, were also frequently seen floating in the serum. The microscope often detects pus in the blood, in the course of the disease. In two instances, in which the blood was analysed by Simon, in this form of puerperal fever, a nearly similar increase of fibrin and diminution of blood-corpuscles to the above were found. The quantity of albumen and of fat in the blood was much augmented, the former amounting to 103·35 and 112·77, the latter to 3·12 and 4·32.

219. (*c.*) I am not acquainted with any analysis of the blood in the most *malignant form* of puerperal fever, unless that which Dr. Day adduces from Heller, who states that the blood was of a very dark brown colour. The clot was dark, of a loose consistence, and covered by a buffy coat, over which was a delicate membrane, which presented under the microscope a finely granular appearance, and fat vesicles. The serum was turbid, but after standing for some time became clear; its re-action was alkaline; its specific gravity 1025. The fibrin was 5·16; the blood-corpuscles 77·52. According to Becquerel and Rodier, the cholesterine and phosphates are increased.

220. The appearances of the blood in puerperal fever will necessarily vary not only with the form and state of the disease, but also with the period or stage at which it has been taken away. During 1821, 1822, 1823, 1824, and 1825, and even in some following years, when the mischievous writings of Armstrong, and other insufficiently experienced authors, had misled those who trusted to ephemeral and unworthy authority, blood-letting had been resorted to in all cases of this disease to which I was called, some of them having been actually moribund, or even dead before I reached them, in consequence partly of the practice; and on every occasion I was struck by the peculiar faint odour and very dark hue of the blood; by the very soft state of the clot, when the blood did separate into crassamentum and serum; by the appearance, which occasionally presented itself, of a mass exactly resembling in colour and consistence a common jelly, the colouring matter covering the bottom of the vessel in the form of a precipitate; and by, in some instances, a slight separation only of serum, the large, loose, or gelatinous crassamentum consisting chiefly of this jelly-like matter, the lowest stratum of which contained the black or dark-brown precipitate of colouring matter. These appearances of the blood were presented, in several cases in the hospital in 1823, and three or four subsequent years, in which cases blood had been taken before I saw the patients. It may be here remarked that I have seen many cases of this form of the disease in which leeches had been applied to the abdomen; but, in nearly all, and especially in those which occurred in the hospital, the blood which flowed from the bites did not coagulate; and great difficulty, amounting almost to an impossibility, of arresting the bleeding from them, was generally

observed, owing both to the state of this fluid and to the impaired vital cohesion of the tissues characterising the advanced stage of the malignant form of this domestic pestilence.

221. V. Appearances after Death.—The lesions observed after death from puerperal fevers vary remarkably, according to the type and form and complication of the malady; the mode and nature of the infection; and the manner in which the infection appears to have invaded the frame. In the more *inflammatory type*, or in those cases which present much of a *sthenic diathesis* — in which vascular re-action are more developed, and the pulse less frequent and attended with more tone and resistance, the alterations of structure, whether limited to the *uterus* or *appendages*, or to the *peritoneum*, or to all these parts, approach more or less closely to those which are consequent upon primary and uncomplicated inflammations of these structures, and are not materially, if at all different from those described when treating of inflammations of the *uterus, ovaria*, and *peritoneum* (§§ 80—98.).

222. *A*. In the *asthenic* or more *malignant varieties* of this distemper, the alterations of structure present different characters from those observed in the more sthenic states, or in those cases which are characterised by greater vascular re-action and vital resistance. In the *most malignant* of these (§§ 198, *et seq.*) the changes consist chiefly of impaired cohesion of the tissues generally, often with more or less of a turbid serous effusion into the serous cavities, more especially into the peritoneal cavity. I examined several bodies after death from this state of the disease, in the years between 1822 and 1830; and during that period, as well as subsequently many others, in which the fever manifested an intermediate grade of intensity between that state and the more sthenic or inflammatory, I made notes at the time of the appearances; and the description of them are derived from these sources.

223. *a*. It was but rarely that death takes place previously to the effusion of fluid into the *peritoneal cavity*. Such an occurrence, however, was sometimes observed in the most malignant form of the malady, especially when the powers of life rapidly sunk, and the patient expired within thirty-six or forty-eight hours. In these cases the peritoneum was finely ingected or congested throughout, especially its venous capillaries; but the injection was not generally diffused; it was usually in the form of spots, patches, or streaks. Those parts of this membrane which were closely in contact, as if pressed upon, were less vascular. The congested patches were generally of a reddish-brown, or livid hue; and the peritoneum throughout of a dirtier and more unhealthy colour than usual. The membrane was soft, easily torn; and with this loss of cohesion it appeared somewhat thickened. These changes were not limited to a single or to several situations, but were general. In some cases, however, they were most remarkable in the peritoneal coat of the intestines, in others, in the *omentum*, which was often contracted, or pushed upwards, very much softened, of a reddish-brown colour, and sometimes so readily torn as to be incapable of sustaining much more than its own weight. This diminution of the usual cohesion of the peritoneum was occasionally attended by little or no effusion in the most rapidly fatal cases, or merely by a delicate film of exudation most remarkable in the en interstices between the convolutions of th intestines and viscera. This film of exudation ay be unobserved until the finger is passed over th urface, when it will be collected in a sensible sem uid mass. In several of these cases the inspectio was made whilst the body was still warm.

224. In these cases there was but little flu effusion — not above too or three spoonsful nd that was of a dirty, light-brown, or reddish b wn hue; or of a whey colour — more rarely resembled a sanguineous ichor; but it alway ossessed an offensive odour. In some instanc at least, it may have been the result of *post m em* transudation. In cases in which life continued l ger to resist the fatal tendency of the malady, or ere attempts at re-action had partially taken ce, with a nearly similar state of the peritone to that now described, there was a greater o ess quantity of fluid effused. This fluid, in the ore rapidly fatal instances, and where depression the powers of life, with flaccidity of the muscles nerally, was most remarkable, had a dirty or m dy, or sero-sanguineous appearance and fœtid o ur, in some cases; and was more abundant in c ers, and was then, either whey-like, or of a dirt ellowish tinge. When death had not occurre ntil about the end of three or four days, the e sed fluid was often very abundant, consisting f a curdled substance; of which the more con ent part nearly resembled recently curdled mil the curd being soft, gelatinous, and friable, of a am colour, or approaching it; and the serous p ion closely resembling a pale whey. This effusio was generally most abundant in the pelvis, in the ore depending situations and opener spaces be een the viscera, and convolutions of the bowels. t is obviously this state of the effusion which in ced several French physicians to ascribe the mal y to metastasis of the milk. In other cases, the ef ion was equally great, but it presented the appeara e of an emulsion of a more or less deep yellow, yell ish green, or greyish yellow hue. In some inst ces, it consisted of a dirty serum, with semifluid, buminous, or puriform matter mixed with the s um. Occasionally the effused liquid was almos puriform, or sero-puriform.

225. *B*. In those cases, in which the di ase, owing either to the robust constitution the patient, or to the less intense action or conc ration of its exciting cause, has not rapidly su the frame into dissolution without some deg of sthenic vascular re-action, the peritone in addition to a large effusion of a serous or whe like fluid, containing flakes or masses of lymph, of a puriform or albumino-puriform matter of v ous sizes floating in it, was very generally covere y a thick coating of lymph, or of a substanc f a yellowish or greenish-yellow colour, of a so onsistence, in some places slightly agglutinati the opposing surfaces, in others occasioning n adhesion, however slight, and containing i the opener spaces the fluid just described. The exudations were most abundant in the pelvic p ion of the cavity and lower abdomen, and som nes also in the vicinity of the liver, spleen nd diaphragm; and around the omentum, ich seldom presented the same appearances i wo cases. The odour of this effusion was pe liar and disagreeable, and it, as well as the uid previously described, was often so acrid as to i ate

cks of the hands of the examiners of the

. *a.* Even in cases of the greatest effusion, the *eum* was often the most devoid of redness; gested state of its capillaries, particularly of ous capillaries, noticed in those cases which ated most speedily and without effusion, was ed only in parts, streaks, dots, or spots; its being of a dirty greyish colour. This ane itself was opaque, thickened, and somesoftened, and readily torn, more especially se parts reflected over the viscera of the and lower abdomen, but sometimes also in ac fossæ, even more remarkably in the um, and occasionally in the mesentery, and reflected over the abdominal parietes. In nstances only were slight ecchymoses under itoneum remarked. In rare cases only has ne of the peritoneum been observed, and n those portions reflected over the fun- the womb and the appendages, and over c fossæ; and in still rarer instances has it l in the peritoneal covering of the bowels. ne cases, probably, this change had taken or become more marked, after dissolution. xternal or adhering surface of the perito- or rather the *connecting cellular tissue*, in ost rapidly fatal cases, was sometimes y œdematous, or infiltrated by a serous or neo-serous fluid, and this was most fre- y seen in the omentum, when it was re- bly softened, and in the Fallopian tubes; was associated with no farther change in the , appendages, or veins, than slight softening former, from participation in the loss of vital on so remarkable throughout the frame. In which had continued three or four days, and ch vascular re-action had partially appeared, infiltrations of a serous or a sero-sanguine- r a sero-puriform, or even of a pus-like under this membrane were found, occa- y so minute as hardly to be detected, until squeezed out upon dividing the parts. thus slight the peritoneum was opaque, ad a dirty macerated appearance. These tions were most remarkable under the re- s of the peritoneum over the pelvic viscera ac fossæ, and in the omentum and folds of sentery.

b. The *viscera* enveloped by the peritoneum requently sound, excepting their impaired ohesion, and old or pre-existent lesions, e changes observed in the *sexual organs* *eir vessels*, which were the next in import- to those found in the peritoneum. These in the most malignant and most rapidly ases, as in those which occurred in the l during 1823, 1824, and 1825, generally ted no further change than remarkable re- n, flabbiness, or softening, without any nt matter having been found in the or sinuses of the *uterus*, this organ being tle or not at all contracted, although seve- ys had elapsed from delivery. The perito- vering presented the changes just described, e cases in a great degree, and in those the uterine appendages participated very kably.

. These were often the principal changes in st malignant states, or when the disease, at mencement, was not localised in any particular region of the pelvis or abdomen, as in those cases which occurred in the most unfavourable circumstances of deficient ventilation and contamination of the air. But, in the less rapidly fatal, or intermediate states of the malady, where the duration of the morbid action admitted of the development of various complications, or, when the disease appeared to originate in the absorption of morbid matter from the uterus and vagina, or from contamination in these situations, not only were those organs more or less altered, but serious lesions were observed also in remote parts. The *uterus* was generally flabby and relaxed; its substance softened throughout, but most remarkably towards the inner surface, or infiltrated by an ichorous, sero-puriform, or purulent matter; its *sinuses* and *veins* containing also puriform matter, or a substance resembling that found in the uterus, a similar matter irregularly filling or distending the veins and *lymphatics* not only of the viscus, but also of all its appendages. None of the cases which I examined during 1823 and 1824 presented these changes in the vessels; the first case in which I found the vessels of the uterus and its appendages inflamed or containing purulent matter, occurred in the spring of 1825, Mr. **Mullins** having assisted me in the autopsy.

229. The inner surface of the womb was often covered with a gelatinous layer coloured by partially decomposed blood, or by a dark green, or greenish brown exudation of soft lymph, sometimes by a thick purulent coating of a greenish yellow, or yellowish brown matter; these matters were generally offensive, or even had become putrid at the earliest period of inspection. The changes in the uterus were always most remarkable in the part where the placenta was attached, whether those seated in the substance of the organ or in the veins and sinuses. The *Fallopian tubes, broad ligaments* and *ovaria* were swollen, injected with blood, infiltrated with an ichorous serum, or with pus; their vessels charged with similar matter, and their substance more or less softened, and readily broken down.

230. *c.* The *veins and sinuses* of the uterus are frequently changed, and the *lymphatics* sometimes also implicated, the changes occasionally extending to the whole sexual apparatus and along the spermatic and renal vessels to their trunks. The coats of the vessels, in a few cases, were thickened, the canals partially obliterated, or their parietes contracted in parts and dilated at intervals. The internal surface of the veins was sometimes covered with a false membrane, although it was pale when examined. The adjacent cellular tissue was often infiltrated, or contained purulent or sero-puriform deposits, especially in the iliac fossæ. These changes in the coats and contents of the vessels were in some instances limited to the uterus, in others extended to the appendages; and they occasionally did not exist in the uterus, but were found in the latter parts, and in a few cases they were observed only or chiefly in the spermatic or renal veins. Puriform or other morbid matters were, in a few instances, most abundant in the lymphatics, forming in them small pouches, and more rarely they were found in both the veins and lymphatics. The veins often contained not only ichorous or puriform matter or pus, or these more or less mixed with small, greyish, or light-brown coagula, or with blood variously altered,

but generally fluid or grumous, without any marks of inflammation of their parietes.

231. *d.* The *heart* was usually flabby, softened, or friable. In the more malignant cases these changes were often remarkable; and the endo-cardium was often deeply stained; this change of colour generally extending to the arterial trunks. The cavities of the heart sometimes contained fluid dark blood. A small quantity of a dirty serum, or of a sero-sanguineous fluid, was occasionally effused in the pericardium, especially in the most rapidly fatal states of the malady.

232. *e.* The *diaphragm*, especially at its peritoneal aspect, partook of the changes observed in the peritoneum. Slight infiltrations of sero-puriform, or sero-sanguinolent matter, were seen in a few instances in the connecting cellular tissue, but they rarely extended into the muscular structure. The *mediastinum* was sometimes infiltrated with a similar matter. The *pleura*, in some of the most malignant cases, presented nearly the same alterations as were found in the peritoneum, more especially the diaphragmatic and pulmonary pleura. This membrane was more easily torn than usual, or was softer, or appeared in places œdematous and discoloured, owing to infiltrations of a dirty serum, or of a sero-sanguineous fluid in the connecting cellular tissue. The pleural cavities contained, in some cases, a turbid, or whey-like serum — more rarely a scanty sero-sanguineous effusion. In some of the most rapidly fatal cases little or no effusion was found, whilst in some of the more prolonged malignant cases, the effusion in, and the state of the pleura were similar to those of the peritoneal cavity (§§ 223, *et seq.*), excepting that the quantity of the fluid was much less. In those cases in which the changes were seated chiefly in the uterus and appendages, and in the more prolonged and sthenic form of the disease, the pleura presented either slight or no material alteration.

233. *f.* The *lungs* were generally more or less congested with dark fluid blood, especially at their posterior or more depending parts. Their substance was soft and friable in the most malignant states of the malady. In the more prolonged cases, and when uterine phlebitis existed, they sometimes contained small puriform deposits or infiltrations, or larger collections or abscesses, with greyish hepatization or other changes consequent upon congestive pneumonia.

234. *g. The digestive canal* presented few changes in its mucous surface. Sometimes, however, inflamed patches were observed; and more or less softening of the mucous membrane, especially of the *stomach*, was not infrequent. Occasionally the softening of this organ was attended by erosions and perforations; and more frequently a brownish, transparent, and gelatinous substance was found between the mucous and muscular coats. Softening and perforation of the stomach has been more frequently observed by Dugès and others, than I have seen them. This physician thinks that the brownish viscid matter exuded from the perforated portion of the stomach acts upon the adjoining parts as a caustic, softening, dissolving, and perforating them. But these changes, as they respect the stomach and adjoining viscera, are in my opinion, in a great measure, *post mortem*; and are much more rarely observed when the inspection has been made a few hours only after death. The *intestinal parietes* seldom presented other changes than deficient physical cohesion, especially in the most rapidly fatal cases. In a few of longer duration, the glands of Peyer and Brunner were enlarged or otherwise changed; but I rarely observed ulceration of them, or in their vicinity. The whole digestive canal was remarkably distended with air, and contained much brownish, or brownish-green fluid matter; that which was found in the stomach and œsophagus being similar to the matters thrown up shortly before death.

235. *h.* The *liver* was covered by the matters described as above as being found in the peritoneum; and a layer of soft lymph, or of a substance similar to that covering the fundus of the uterus, was often interposed between it and the diaphragm, or between it and the stomach, even, in some instances, where the abdominal portions of the peritoneum were comparatively but little altered. The substance of the organ was often softened, more friable than natural, in some cases congested, in others, pale, soft, as if it were par-boiled, and deficient of blood. In rare instances it contained purulent deposits. The *gall-bladder* often contained much greenish bile, which was occasionally thick and ropy. The *spleen* was softened, somewhat enlarged, and, in the more malignant cases, it was so friable and soft as hardly to admit of being handled, even when the examination was made whilst the body was still warm; and the blood contained in it resembled treacle.

236. *i.* The peritoneal coat of the *kidneys* generally participated in the changes existing in other portions of this membrane. The veins of the kidneys in some instances contained puriform matter mixed with grumous blood; and deposits of pus were found in the substance of the kidney generally on the same side as that in which the ovarium and ligaments were most altered or their veins inflamed. The *brain* and *membranes* were rarely diseased, even in cases attended by delirium. Slight softening was met with in a few instances of the more malignant form of the malady.

237. *k.* Effusions of sero-puriform, or purulent matter in the *joints*, especially the hip, elbow and knee-joints, and more rarely into the shoulder, ankle, or wrist-joints, were met with in the states of the disease complicated with uterine phlebitis, and when the case was protracted beyond five or six days, infiltration of a sero-puriform or sero-sanguinolent fluid into the cellular and muscular tissues were sometimes observed. These fluids were hardly ever encysted; they always infiltrated, softened, and, as it were, decomposed the texture which they infiltrated, the parts around the softened places gradually passing to a healthy appearance. The muscular structure presented a pale-brown hue where it was thus softened and infiltrated; the skin was lurid or dusky, and the part swollen or boggy, occasionally to the extent of some inches. The soft solids passed rapidly to decomposition; the internal viscera, especially the abdominal, being the first to evince the change. In the more malignant form of the malady this change commenced before the animal warmth had altogether departed. Nearly all my examinations were made before twenty-four hours from dissolution had elapsed, most of them from eight to twelve hours after death. I believe that several of the changes which have been described by some writers have taken place after death, or at least have become more remarkable during the period

b veen this event and inspection of the body, for
d mposition follows death more rapidly in this
d ase than any other.

38. ii. *Results of post mortem examinations made*
b ome other physicians. — *A.* M. Dugès adduces
tl results of 341 deaths. In these *peritonitis* was
o rved 266 times. Of these 266 peritonitic cases
tl uterus was affected in three cases out of each
f . But M. Dugès remarks that, if the cases
ir hich pus was found in the veins, and which he
b eves, with considerable probability, not to have
b cases of uterine phlebitis, be abstracted, the
r of *metritis* would be very remarkably lowered,
a reduced to 29 in 266, or 1 in 9. He states
tl the *ovaria* are affected in the proportion of one
t even cases; and that in the 266 cases, the
s ach was perforated in 10; the stomach and
i stines were inflamed in four; there was single
o double *pleurisy* in 40; *pericarditis* in 6;
a hnitis in 1; *purulent deposits* in muscles in
8 It is not improbable, however, as stated above,
tl the perforation of the stomach in some of the
c s at least, was either a post mortem change, or
v increased after death.

39. *B.* The researches of M. Tonnellé are more
p ise. — (*a.*) Of 222 dissections he found *peri-*
t tis in 193; — alterations of the *uterus* and *ap-*
p lages in 197; — lesions of both the *uterus* and
p toneum in 165; — the *peritoneum alone* affected
i 8; *uterus alone* in 29. — (*b.*) The alterations
o e *uterus* and *appendages* were — simple metritis,
7 — superficial softening, 29; — deep softening,
2 — inflammation of the ovaries, 58; — inflam-
n ion of the ovaries with abscess, 4,=190. —
(The alterations of the *vessels* were — pus in
tl veins, in 90; — pus in the lymphatics, in 32;
p in the thoracic duct, in 3; — suppuration of
tl lumbar and inguinal glands, in 9,=134. —
(The *combinations* of these lesions were —
s uration of veins, and uterus, in 32; — sup-
p ation of veins and putrescence of uterus, in
1 — suppuration of veins with metritis and soften-
i in 5; — suppuration of veins with peritonitis
a e, in 34; — suppuration of veins alone, in
8 90. — *Suppuration of lymphatics*, and veins,
i 0; — suppuration of lymph. and uterus, in
1 — suppuration of lymph. and softening of
u us, 6; — suppuration of lymph. and simple
p tonitis, 3; — suppuration of lymph. alone,
2 =44. — *Inflammation of ovaries* with peritonitis
a e, 29; — with various uterine lesions, 27; —
v metritis alone, 8; — with softening of uterus,
7 — with suppuration of vessels, 12; — with all
tl preceding lesions, 6,=89. — (*e.*) The *se-*
c lary affections were, in the *pleura*, — pleurisies,
2 — effusion of blood, 6; — of serum, 8,=43.
- n the *lungs*, — pneumonia, 10; — tubercles,
4 — abscess, 8; — gangrene, 3; — pulmonary
a plexy, 2,=27. — In the *heart*, dilatation, 4;
- ypertrophy, 3; — pericarditis, 1; — hydro-
p carditis, 6,=14. — In the *digestive canal*, —
s ening of the stomach, 8; — perforation of sto-
r h, 5; — ulceration of stomach, 5; — gastro-
e ritis, 5; — entero-colitis, 1,=24. — In *other*
p s, — abscess of the liver, 3; — of pancreas, 2;
- bscess in muscles, 14; — infiltration of blood
i muscles, 3; — abscess in pubes, 2; — in the
e w, 2; — in knee, 6; — alteration in cellular
t e of pelvis, 6; — sanguineous infiltration,
=40.

40. *C.* Of forty-five dissections made by Dr. R. Lee, the *peritoneum* and its appendages were inflamed, in 32; — the uterine *veins*, in 24; — softening of the *uterus*, in 10; — pus in the *absorbents*, in 4. The peritoneum was not altered in thirteen cases of the forty-five; and there was no phlebitis in seventeen. Dr. Collins found, in thirty-seven dissections, the peritoneum more or less affected in all; and in seven, fluid was effused in the thoracic cavities similar to that found in the abdomen. The effusion into the peritoneal cavity was of a straw colour in twelve, and sero-purulent, or of the consistence of thick cream in eighteen. It consisted of a sanguinolent serum in seven, and had a glutinous feel when rubbed between the finger and thumb. All these last cases were rapidly fatal, and no coagulated lymph was found in them. In the other cases lymph was deposited in large quantities, and generally, but more especially in the vicinity of the uterus. "The uterus in the great majority was quite natural in appearance; in some it was soft and flabby, and in a few unhealthy matter was found in the sinuses. The ovaries in many instances had suffered much from the effects of inflammation; being generally enlarged, and so softened, as to be broken down by the least pressure." — (p. 398.)

241. VI. Pathological Inquiries respecting Puerperal Fevers. — i. *Is inflammation or alteration of the blood-vessels, or absorbents of the uterus, a necessary consequence of the passage or imbibition of morbid matters, or of other infecting agents from the sexual passages into the circulation?* — Although uterine phlebitis exists chiefly in cases which originate in an extrinsic or intrinsic local infection, — which are caused by an internal or external contaminating or infecting agent, — and occurs less frequently or more equivocally when the malady is produced by the general infection of the frame received through the medium of the respiratory organs, I nevertheless believe that, in the latter class of cases, more especially if the patient has experienced flooding, or is vitally depressed, or continues under the influence of an impure or infected air, morbid matters or fluids may be imbibed by the uterine vessels, or absorbed from the sexual passages and carried into the circulation to such an extent as to contaminate the circulation and infect the whole frame, without producing any inflammatory alterations of the vessels. I was so impressed by the symptoms and course of the disease, and by the examination of the bodies after death, in 1823 and the following years, as to infer at that time, and subsequent experience has confirmed my belief, that morbid matters, or altered or putrid fluids are imbibed, in the circumstances just mentioned, and passed into the circulation, producing the effects now specified without inflaming the vessels, or producing such a change in their internal surface or in their parietes, as may be recognised by the unaided senses; and that the passage of these matters from the uterus into the circulation may take place so rapidly and so efficiently as to produce their effects in so malignant a manner, and in so short a time, as not to admit of the production of the usual alterations consequent upon irritation of the vessels along which these matters have passed. From this it may be inferred, that the absence of change in the uterine vessels is not a conclusive proof, in rapidly fatal cases of puerperal fever, that morbid matters, or altered fluids, or other infecting agents,

have not been imbibed from the uterus and carried into the circulation. When the imbibition of such matters or agents takes place without causing in the first instance irritation, inflammation, and its consequences in the vessels, there is every reason to believe that the effect upon the frame will be the more immediate and intense, owing to the absence of these changes, and to the free passage thus afforded to the morbid agents about to enter into the current of the circulation. Whereas, there are equally cogent reasons for concluding that, when the morbid matter excites inflammation of the vessels which imbibe it, the passage of it into the circulation will be either altogether prevented, or retarded, or diminished by the inflammation thereby produced.

242. ii. *Are the uterine vessels actually inflamed in all, or even in the majority of instances, in which they contain pus, puriform, or other morbid matters?* — When the disease is not arrested by the prompt adoption of rational and decided means, or when such means have not been employed early, or not at all, then the altered fluids, an offensive or putrid lochia, or the secretion produced upon the internal surface of the uterus may be imbibed by the vessels, and either inflame them, or contaminate the blood without inflaming them, as inferred above (§ 241.), or may both inflame the vessels and contaminate the blood. That the vessels are inflamed, and present the changes consequent upon inflammation, are amongst the most frequent changes observed in this disease; and that matters similar to those covering the internal surface of the uterus, or in its cavity, are also found in the veins, and that even puriform matter is seen in these vessels, sometimes without any marks of inflammation of the containing vessels, are undisputed facts, and serve to confirm the view, already stated, that these matters may pass into the circulation and change the blood without leaving any signs of phlebitis. It is not improbable that, when the passage of morbid matters from the cavity of the uterus into the veins takes place towards the close of life, or when it has been increased at this period of the malady, the change of the blood remaining in these vessels will then be more manifest; and the contents of the vessels will more closely resemble the morbid matters existing in the uterus, or will be more or less altered, owing to admixture of these matters with the blood; and that, whilst the matters found in the vessels will thus be much altered, the state of vital power and vascular action at this period of the malady will preclude the occurrence of inflammatory changes in the vessels by which these matters were imbibed. It may, therefore, be concluded: — 1st. That the morbid matters found in the uterine vessels may be the products of inflammation of these vessels, and, in this case, inflammatory appearances or changes are also found in the coats of the vessels; — 2d. That they may have been imbibed from the uterus, and their presence may have caused irritation and inflammatory alterations in the vessels; — and 3d. That they may be imbibed by the vessels, pass through them, or be retained in them, especially at an advanced period of the disease, or near the close of life, and yet fail of producing any marks of phlebitis, although contaminating the blood and all the frame.

243. iii. *Are the softening and other changes often found in the substance of the uterus and of its appendages the results of inflammatory action, a to what other pathological conditions may they imputed?* (*a.*) Certain of these changes are undoubted consequences of inflammation, oth are the results of a very different state of vi and vascular action. Even the most obviou inflammatory lesions are not referable to p sthenic action, but rather to an asthenic or fusive state, unattended by the exudation o healthy lymph, and characterised by its tende to spread, to soften, dissolve, or disorganise parts which it affects; and to infiltrate them w a sero-puriform or sero-sanguinolent matter. flabbiness of the parts, their swollen, soften, and infiltrated states, their friable and almost trescent conditions in some instances, and the posits of puriform matter, without any cyst or udation of firm lymph in others, evince the thenic character of the vascular action, of wh these changes are the results. In some cases, pecially when vital power is less depressed, the disease is more prolonged, the matter fo in the substance of these organs is more c sistent, in larger collections, and more ne y approaches that produced by sthenic action.

244. (*b.*) The depression of vital power d contamination of the circulation caused by e exciting or infecting agents, when they ope e energetically, occasion changes in the lochia r so affect the fluids exuded from the internal face of the uterus and sexual passages as t merely to irritate the parts with which they c e or remain in contact, but also to contami e them locally, so as to partially dissolve their l cohesion, to soften and almost liquefy or pu y them, even before life has taken its depart . This local contamination thus supervenes u n the general infection produced by the poiso us agent, and in proportion to the intensity o ts operation, relatively to the remaining powe of vital resistance, will be the extent of chang — of softening or disorganisation that will resul n the uterus, in the ovaria, and in the ligame s, the mischief extending moreover to the pe neum, and spreading throughout its surface w a rapidity proportionate to the reduction of al power and to the contamination of the circul g fluids. In many of these cases, the softening d disorganisation of the uterus and append s, especially of the ovaria, are carried to the ut st extent. If, however, the examination of the y be delayed beyond eighteen hours after d h, these changes may be viewed as partly *post* *tem.*

245. iv. (*a.*) *Is the peritonitis existing i he majority of cases of puerperal fever a pri y morbid condition;* — (*b.*) *or is it consecutive o he infection and febrile action;* — (*c.*) *or is i he result of an extension of the morbid action m the uterus and appendages to this membr ?* These are questions by no means easy to s e, for they admit of being answered both affi a- tively and negatively, inasmuch as there is re on to believe that the procession of changes is f- ferent, or even opposite, in different case or forms of the malady, and according to the c n- nels through which the causes invade the fr e. — (*a.*) Instances have occurred in which I e believed the disease to originate in inflamm on of the peritoneum, of greater or less extent e accompanying fever preventing varying grad of

on between the sthenic diathesis on the one
l and the asthenic on the other. The peri-
al affection may be primary, and yet appear
a complication, or as a consecutive lesion,
cially when it occurs very soon after labour,
s developed with the reaction following the
k produced by parturition. Indeed, both the
r and the peritoneal affection may be coeta-
usly produced ; the latter, commencing as re-
on, follows the depression caused by delivery,
y the exciting causes of the malady. This
r mode is probably that which actually ob-
most frequently, whether the disease is cha-
erised by sthenic or inflammatory action, or
sthenic action, or marked deficiency of vital
er. But, as reaction is adynamic and imper-
in the latter cases, the prominent affection of
peritoneum in these is modified accordingly,
presents alterations varying in extent and
acter, especially as regards the fluid effused,
the intensity or concentration of the cause,
the state of vascular action and vital power,
the constitutional peculiarities of the pa-
, and with the several circumstances of the
.

46. (*b.*) That the peritoneal affection may,
ever, be consecutive of the constitutional in-
on and febrile action, at least in some in-
ces, is shown by the fact, that death has taken
e, although in comparatively rare cases, before
peritoneum has presented a more remarkable
nge than other parts — before exudations of
ph or fluid in its cavity had supervened ; such
s having occurred in the same ward, and in
lar circumstances, with those in which the
toneal symptoms and effusion into the cavity
most prominent ; in some of these cases,
ions of fluid have also taken place into
pleural cavities, and even into the pericar-
n.

47. (*c.*) That the changes in the peritoneum are
n an extension of those which had previously
n place in the substance or vessels of the
us and its appendages cannot be disputed.
phenomena characterising the progress of the
ady ; the occasional limitation of these changes
ne peritoneum reflected over the pelvic viscera,
uterus and appendages, in some one or more
heir constituent structures, being more or less
ed ; and the frequent extension of the pe-
neal changes, as distinctly marked by the sym-
ns, from the pelvic peritoneum to the reflections
his membrane over the abdominal viscera and
hragm, demonstrate that the abdominal altera-
s often commence and advance as now stated.
hose cases which originate in a local infection,
even in those where the general infection is
owed by a local contamination, it may be rea-
ably inferred that the morbid irritation and its
sequences, thus produced in the internal surface
ne uterus, extend along the sexual passages —
g the Fallopian tubes to their fimbriated ex-
nities, and thence to the peritoneum, over which
reads with a rapidity great in proportion to the
nsity of the infection, and to the prostration of
l power and resistance.

48. v. *In what manner are the consecutive changes
ne joints, cellular and muscular tissues in the eyes
in the viscera, to be explained?* These consist
fly of the deposit of puriform matter, in smaller
arger collections, and of infiltrations of this matter in the softened, disorganised, or otherwise altered structure; and are only sometimes observed. That they are to be referred to the imbibition or absorption of puriform, or ichorous or putrid matters from the uterus into the circulation, or to the passage of a purulent or ichorous fluid into the blood from irritation or inflammation extending from the sinuses and capillary veins of the uterus and appendages, is generally admitted; either modes of contamination, or both occurring according to the early states and peculiarities of the case. The morbid matter, having thus passed into the blood, excites and developes a diffusive form of inflammation, with puriform deposits, softening and disorganisation of those parts which are most predisposed by previous disorders, by depressing influence, or by impaired vital resistance. These consecutive or secondary purulent collections and destruction of parts have been viewed by some as resulting from the mere deposit of the morbid matter circulating in the blood; whilst others more correctly consider it as the termination of an asthenic, gangrenous or destructive form of inflammation produced by the presence of the imbibed contaminating matter in the circulation. This matter, by acting upon the interior surface of the capillaries, produces effects much more disorganising and diffusive than those resulting from the usual states of inflammation consequent upon external irritation. Although these secondary lesions are most frequently seen after puerperal fevers, and uterine phlebitis occurring in the puerperal state, they supervene in various other circumstances; and as I shall show in the article Uterus, sometimes upon ulceration of the *os uteri*, and of other parts. This subject is more fully discussed in the articles Abscess (§§ 24, *et seq.*), Absorption (§§ 15, *et seq.*), Cellular Tissue (§§ 10, *et seq.*).

249. VII. Diagnosis. — After what has been remarked respecting the forms and states of puerperal fever, and the descriptions of these forms and of the appearances after death, it is unnecessary to do more than briefly to notice this topic. The *diagnosis* of fevers in the puerperal state has, however, been very loosely stated by some writers, and most inaccurately by others; whilst, by nearly all those who have written, with a dogmatism and self-sufficiency which would be ridiculous if they were not most mischievous, and actually destructive of life in the most interesting epoch of female existence, the inflammatory form has been assumed as the type of all the others. Most writers, even the most recent, have described and attempted the diagnosis of puerperal fevers, with reference only to the local or prominent affections presented at their commencement or their course, and with entire neglect of the different states of vital power and resistance which characterise their several forms, more especially the synochoid and malignant. The vital depression, the poisonous contamination, the mental apathy, or rather the despondency conjoined with indifference, characterising the worst cases from their commencement, and the origin of such cases in infectious causes, — in foul air, poisonous effluvia, contagious emanations, &c., even of a domestic nature, and which I have fully described at another place (see Pestilence, Preservation from, §§ 10, *et seq.*), — heightened, favoured, or predisposed to, by the exhaustion consequent upon parturition, and the state of almost inanition, or of deprivation of requisite nourishment and even of

accustomed stimuli in which puerperal females are often kept too strictly or for too long a period — are pathological conditions, and etiological circumstances, of the greatest importance, not only as respects the diagnosis, but even more as regards the indications and the means of cure.

250. *A.* The *inflammatory form* of the disease, occurring either as *peritoneal*, or *metro-peritoneal, puerperal fever*, are indicated by the mode of accession, by the seat of pain and tenderness, by the vascular re-action consequent upon shivering, by the state of the pulse, especially its hardness in the former and its fulness and firmness in the latter; by marked diminution or suppression of the milk and of the lochia; by thirst and dryness of the mouth and tongue; by the often costive state of the bowels at the commencement and by irregularity afterwards, the evacuations being offensive, and by scanty urine, the excretion of it being more or less disordered. Peritonitis, occurring in the puerperal state, presents most of the symptoms described when treating of *inflammations of the* PERITONEUM, the disease assuming more or less of a sthenic form on the one hand, or of an asthenic on the other, according as the disease is inflammatory, synochoid, or malignant, the symptoms and lesions found after death very closely approaching, or being identical with those described under that head, the chief differences arising from the constitutional influence exerted by the puerperal state, by the constitutional infection, or by the exhaustion, or inanition, or other circumstances of the patient. — (*a.*) Peritoneal puerperal fever cannot be confounded with *gastro-enteric irritation* (§§ 103, *et seq.*), if the abdomen be carefully examined; for, in this latter, the abdomen is not tympanitic, nor tense, nor very tender on pressure; nor does it usually appear so soon after delivery, nor cause so marked constitutional disturbance, as the peritoneal or metro-peritoneal disease. — (*b.*) *Ephemeral fever* cannot be mistaken for any state of inflammatory or synochoid puerperal fever, inasmuch as the former is unattended by the severe abdominal pain, tympanitic distension and tenderness characterising the latter; and is moreover a much less severe disease, of much shorter duration, soon terminating in a copious perspiration, the lochia being uninterrupted, and the breasts continuing distended.

251. *B.* Puerperal fever, commencing either as *hysteritis* or as *ovaritis*, or affecting chiefly the *ligaments*, and either limited to these, or extending thence, to a greater or less extent, over the peritoneum, whether it assumes an inflammatory or sthenic type, or a synochoid or asthenic, will generally be recognised by the severity of the constitutional symptoms; by the persistence of the local signs, especially the pain, tenderness, fulness, and tension in the hypogastric and iliac regions, shooting through the abdomen, to the loins and tops of the thighs; by the rapidity of the pulse, prostration of strength; by the dysuria and irregularity of the bowels; and by the diminution, irregularity, and offensive state of the lochia. If the *peritoneum* continue unaffected, the abdomen will be neither tympanitic, nor tense, nor tender; excepting towards the pelvic regions, where the pain, tenderness, and fulness will be considerable, and the uterus will generally be felt hard and enlarged. The persistence and duration of these symptoms, the grave character of the attendant fever, the disordered states of the secretions discharges, will distinguish these states of puerp al fever from *after-pains*, from *ephemeral fever*, d from *gastro-intestinal irritation.*

252. *C.* The *malignant form* of puerperal fe often arises from similar infectious and contam t-ing sources to those which produce putro-adyna ic fever; and it may be considered in every res ct a putro-adynamic fever in the puerperal s e presenting all the characters of this fever i n aggravated form. It is distinguished chiefl y the absence of chills or rigors at its accession y a remarkably rapid, soft, broad, open, and o-pressible pulse, which soon becomes small, w k fluent, and irregular; by a broad, flabby, or e-mulous tongue, covered by a slimy or cr a-like mucus; by the little, or almost entire b-sence of thirst; by the character of the disch es from the stomach and bowels, as above desc ed (§ 214.); by the persistence of the milk d lochia, or the greater abundance and more p id state of the latter; by the dusky, lurid, or sa w appearance of the general surface and cou n-ance; by the free, clammy, and peculiarly c n-sive perspiration; by the frequent recurren of faintness or of a sense of sinking, with n al apathy and vital depression; by the manifest n-tamination of the circulating fluids and imp ed vital cohesion of the tissues; by the quick d peculiar state of perspiration; by the extre ly tympanitic distension of the abdomen, an he almost constantly rapid progress of the mala to dissolution, if not early arrested by judi us means; singultus, eructations of flatus and rk fluids from the stomach, a dirty livid hue o he face and general surface, and loss of the p er of and control over the sphincters, usheri in death. After death, the rapid accession o u-tridity, especially of internal organs, the p ic particularly, and the little or no diminuti of bulk — the almost entire absence of emaci n, notwithstanding the free discharges from he stomach, bowels, and skin during the diseas remarkably attract attention.

253. The malignant form of puerperal fev has been considered by many, especially when the ri-toneum is prominently affected, as an *erysipe* of internal surfaces and organs in the puerperal e; and by others, as *typhus*, or *typhoid fever*, mo ed by this state. — (*a.*) The evidence adduced ve (§§ 151, *et seq.*), and the facts which have en under my own observation as early as 182 nd 1827, have convinced me of a connection bet en *erysipelatous* and *puerperal fevers*, arising c fly out of a similarity if not identity of their resp ve predisposing and exciting causes, and of the n-stitutional — nervous and vascular — cond ns existing in their progress, and characterising eir terminations; the connection being remar le chiefly as respects the synochoid or interm te states of puerperal fever, more especially that ith prominent affection of the peritoneum. It c not be said that both maladies are *identical*, for eir respective seats are altogether different. The n-nection or similarity I now point out cer ly obtains in a remarkable manner, and is of eat importance as respects both the origin and at-ment of puerperal fevers. A similar conn on may, however, be traced between several er malignant maladies, arising out of their ex ng causes, and their prominent pathological di-

ıs, tendencies, and terminations. A septic or
ıtaminating animal poison, varying in kind, ad-
ıistration, application, and avenue of invasion,
he exciting cause of them all; and, whilst this
ıse depresses organic nervous power, contami-
es the circulating fluids, loosens the vital cohe-
n of the tissues, weakens constitutional or vital
istance, and disposes the whole frame to disso-
ion, it thereby generates miasms, exhalations,
l secretions, equally poisonous with itself, and
duces effects altogether similar to, if not iden-
ıl with, those which itself had produced. In
s category of effects may be arranged the
erer forms of erysipelas, diffusive inflammations
the cellular tissue, poisoned wounds in dissec-
ı — the necroscopic poison — puerperal fevers,
ecially the synochoid and malignant, putro-
ynamic fever, and other fevers of a malignant
m, which are generally produced by animal
anations or poisons.

54. (*b.*) The opinion as to puerperal fevers being
vailing *typhoid or other fevers*, occurring in the
erperal state, may be thus disposed of: — 1st.
e most malignant form of puerperal fever does
produce typhus or typhoid fevers in other
sons however susceptible they may be, by age
l otherwise, of the infection of these fevers; as
wn on several occasions both in lying-in in-
utions, and in private practice. 2d. When
er fevers, both typhous and exanthematous,
ur in the puerperal state, whether the inva-
ı of such fevers have taken place immediately
ore or very soon after parturition, these dis-
es retain their distinctive characters, although
y are generally much more severe in the puer-
al state, as I have observed on various occa-
ıs. As respects the exanthemata, the diagnosis
ıires no remark; but in respect of typhus fever
earing after delivery, a few observations may
here offered.

55. (*c.*) *Typhus* or *typhoid* fever may appear
r delivery, from infection either shortly before
oon after this event. And it is not improbable
t an adynamic or typhoid fever may occur in
puerperal state, owing to great anxiety of
ıd, or other moral emotions, or to exposure to
ious morbific exhalations. When, however,
hoid or adynamic fever occurs during child-
, it generally assumes a more than usually
ere and almost malignant form. The patient
ıplains, after chills or rigors, of severe pain of
head, back, and lower extremities; rapid
se; dry, hot, and acrid skin; wandering or
delirium, occurring first at night, and becom-
permanent, the ideas running upon one sub-
; deafness, and suffusion of the conjunctivæ;
ıding of the teeth, thirst, and dryness of the
uth, the tongue being loaded, brown, or furred,
k, and dry. The position of the patient is on
back, with the knees but little or not at all
wn up. During the delirium, the patient gives
rt but rational answers when roused. The
ntenance is sunk, livid, or sallow; the fea-
es are afterwards sharpened; and the delirium
ses into coma, with subsultus tendinum. The
se varies from 100 to 120 or 130, and is gene-
y soft and quick; respiration is quick, and
ompanied with frequent sighing; the abdomen
ıot remarkably, or but slightly, tumid or ten-
; the bowels, at first, are slow or costive, sub-
uently irregular or relaxed, the stools being offensive; the urine is scanty and turbid, sometimes suppressed; and the milk and lochia are early diminished, and soon afterwards entirely suppressed. At last the patient sinks down in bed; the tongue is dry and dark; the evacuations are involuntary, and without consciousness; and eschars form on the parts most pressed upon. The duration of the fever is generally longer than that of any of the forms of puerperal fever, and is seldom shorter than fourteen days, and is sometimes above twenty-one days. The history of typhoid fever in the puerperal state shows several points of difference from puerperal fevers; indeed, the phenomena just described are distinctions between these fevers, most of them not existing in the latter; and, in addition to these, petechiæ are observed in typhoid, and the measly eruption in true typhus, these never appearing in any of the forms of puerperal fever.

256. VIII. PROGNOSIS. — An opinion of the result of a case of puerperal fever should depend chiefly on the form and state of the disease, in respect both of the character of the constitutional disturbance and the prominent local affection, and on the period of its progress, and the effect produced by treatment. — *a.* In the *inflammatory form* of the malady, a *favourable issue* may be anticipated from a gradual abatement of the acute symptoms; from a return, or an increase, or a more natural state of the secretions and excretions; from a diminution of the pain, distension, tenderness, and tension of the abdomen; and from a less frequent and more natural state of the pulse. An *unfavourable result* is indicated by the appearance of delirium; of increased distension of the abdomen, which becomes round and very prominent; by an aphthous eruption in the throat; by increased frequency and irregularity of the pulse; by a sudden cessation of pain; or by evidence, by percussion, of copious effusion into the peritoneal cavity; by sinking and sharpening of the features; by continued eructations of flatus with dark fluid matters from the stomach, and singultus; by rapid or gasping respiration; by cold, clammy perspiration, or a similar state of the extremities; by involuntary evacuations and restlessness; these latter phenomena indicating speedy dissolution.

257. *b.* The *synochoid*, or *intermediate, grades* of puerperal fever furnish nearly similar phenomena to the above, by which their terminations may be anticipated; for, although the sthenic diathesis obtains at the commencement, or during the early progress of the inflammatory form, still it more and more nearly approaches the synochoid or asthenic, as respects both the constitutional disturbance and the local changes, as the disease continues, especially as it proceeds towards an unfavourable issue; so that an advanced stage of the inflammation differs but little from the same period of the synochoid form, as respects the indications of the ultimate result. In this latter form of the malady, treatment is seldom availing, unless it be early and decidedly prescribed; and unless symptoms of amendment, or at least of alleviation, soon follow the remedies employed. If the secretions and discharges have been suppressed, the return of these; an improvement in the states of the pulse and of the abdomen, as ascertained by a careful examination; and the capability of turning or of lying for a time on

either side, are the chief indications of a *favourable issue;* and these may not continue long, an exacerbation of all the symptoms sometimes occurring, and soon carrying off the patient; or an alleviation of the more painful symptoms may take place, the pulse still continuing rapid, and after a very few days be followed by secondary affections, as described when treating of the metro-phlebitic state of the malady, which ultimately destroy the patient.

258. An *unfavourable issue* is indicated by the symptoms already mentioned (§ 256.), and especially by the character of the vomitings and of the matters thrown up; by singultus and the state of the respiration; by faintness or leipothymia; by failure or irregularity of the pulse; by the amount of effusion in the abdomen, as indicated on percussion, and by the toleration of percussion in connection with effusion; by the suppression of urine; by the indifference of the patient to her child, and to all other objects; and by an early entertained idea or anticipation of an unfavourable result by the patient herself. Sinking of the animal heat and of the features, and a lurid hue or lividity of the face, extremities, or surface generally, indicate approaching dissolution.

259. *c.* The *malignant form* of the malady often manifests the result from the accession of the attack, especially in the suddenness and severity of the appearance of the abdominal symptoms. This form of the disease is seldom recovered from, if it continue but a few hours, without the administration of appropriate and energetic means; and, unless these soon procure an alleviation of the symptoms, especially of the vomitings, and of the pain and distension of the abdomen, and an improvement in the pulse, particularly in diminishing its frequency and in improving its tone, hopes of recovery should not be entertained. The symptoms just enumerated usually precede a fatal issue; and that issue may be expected if the lurid, dark, or nearly livid hue of the countenance and surface; the clammy and peculiarly offensive state of the perspiration; the putrid odour of the lochia; the moral apathy, and mental and physical depression, appear soon after the attack; inasmuch as these symptoms indicate a contamination of the circulating fluids, and a depression of organic nervous energy which is rarely removed. A soft or flabby state of the tissues in conjunction with the gastric symptoms described above; a pulse too fast to be accurately counted; loss of power over the sphincters; absence of abdominal pain, the abdomen continuing tumid, with a swagging or tremulous motion when struck or examined, loss of pulse and coldness of the extremities, are rapidly followed by death.*

260. IX. Pathological Inferences. — (a Puerperal fevers are varied in the character or typ of the constitutional disturbance, and in the seat c seats of the prominent local changes. — (b.) The present the most inflammatory and the most m lignant forms — the most sthenic, or the mo asthenic or ataxic, with all intermediate grade according to the nature of the exciting causes, an the mode of operation or avenue of invasion these causes — as the local affection is primary consecutive, and as the constitutional disturbanc with its secondary changes, are the effects of i fection by an animal miasm or poison. — (c Owing to these varied constitutional conditions to these different grades of vital power and r sistance, and diverse complications, the arrang ment of the forms of these fevers must necessari be arbitrary and conventional, inasmuch as ea form is not defined by any precise limit or line demarcation, but passes insensibly into that near it in grade or character. — (e.) The contaminati or poisonous influences of the causes upon t circulating fluids and their depressing effects up organic, nervous, and vital power, affect the sta

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* Dr. Collins, formerly the resident physician of the Dublin Lying-in Hospital, states that of *eighty-eight* cases *one* was attacked before delivery; *one* in six hours after delivery; *one* in nine hours; *one* in ten; *three* in twelve; *one* in thirteen; *one* in fifteen; *two* in seventeen; *one* in eighteen; *one* in twenty; *one* in twenty-one hours, and *two* in thirty hours. *Thirty-two* were attacked on the first day; *twenty-nine* on the second day; *eight* on the third; *two* on the fourth; and *one* on the eighth day. The attacks were earlier than those observed by me in Queen Charlotte's Lying-in Hospital in 1823, and the seven following years. During that period, the majority of the cases were of the most malignant type, and the largest proportion of the attacks were on the second, third, and fourth days. In one most rapidly fatal case the attack was on the fifteenth day from delivery. The statement of Dr. Collins that in only thirty-three cases out of eighty-eight was t accession of the malady attended by shivering, v nearly agrees with my own experience, which also is accordance with the following: — In *fifty-six* deaths, t termination took place at these periods from the atta viz.: — *Two* in twenty-four hours; *one* in twenty-seve *one* in thirty-six hours; *nine* on the second day; *fift* on the third day; *thirteen* on the fourth; *four* on fifth; *four* on the sixth; *three* on the seventh; *two* the eighth; and *one* on the eleventh day. "*Forty-f* of the eighty-eight cases occurred in women who l given birth to *first* children; *sixteen* with *second* ch dren; *nine* with *third;* *six* with *fourth;* *seven* w *fifth;* *two* with *seventh;* and *four* with *eighth* childr *Thirty* of the forty-four women delivered of *first* cl dren died. *Fifty-four* of the eighty-eight gave birth *male* children." Dr. Collins adds, that "when he assistant physician in 1823, puerperal fever raged to alarming extent. The Master (physician) of the h pital was a strong advocate for the free removal of bl *generally* at the commencement of the attack. W his approbation it was resorted to with great frequer and in the promptest manner. The effect on the pati and the mortality was such as to satisfy him fully of inexpediency of adopting this line of treatment." may be remarked in palliation of such adoption, t just before this outbreak of the fever several works appeared filled with the results of an experience of a months' duration of this malady, most of them writ before the authors were of legal — certainly not of dical, age, although distinguished by the title of doct which results were dogmatically, and, to my own kn ledge of one of these productions, falsely adduced favour of blood-letting. In the case of this malady in that of a somewhat similar pestilence, blood-letti was once extolled as the "*sheet anchor*" of treatm especially by the naval wielders of the lancet, who Dover of old rendered this minute instrument of mig mischief one of the greatest importance with those credulously received assertions as facts, and believed assertions according to the confidence with which t were made. Early in the present century a work peared on the diseases of inter-tropical countries which blood-letting was the first "sheet anchor," calomel was the second. In it all preceding writers v ridiculed, and told they knew nothing of what they written upon, and these remedies were considered good that patients could hardly have too much of th This work was the guide of all the inexperienced in pical diseases, and the results may be inferred from statement made to me by an inspector of hospitals, w I was travelling within the tropics, in answer to my quest to know his opinion of the treatment of the fe of the country, that, for the first nine cases of feve treated he prescribed blood-letting, relying on the co dently expressed results of the experience of the aut of the work alluded to, and they all died; that he tried large doses of calomel, but was not more success and that he lastly had recourse to cinchona (quinia not then discovered), but he could not get it to remai the stomach. I suggested to him that he would suc better if he conjoined the bark with capsicum. He s time afterwards was himself a victim to this fever.

all the secretions and excretions, and ultimately pair the vital cohesion of the tissues and the ne of the vascular system and of the capillary ssels, thereby occasioning effusions into serous vities, and increased discharges from exhaling d secreting surfaces, and all the phenomena aracterising the progress of the more malignant rms of this malady. — (*f*.) The most important rts of the pathological conditions of puerperal ver are the states of vital power and of vascular ne characterising the disease, inasmuch as these tes, more than the seat and amount of local ion, mark the kind and tendency of the malady, d either resist, or remarkably favour, the ex- sion of the local changes. — (*g*.) According to mode of operation of the exciting causes, or to avenue by which these causes invade the me, either the constitutional infection, or the al affection may be primary; but, whichever y be secondary, an aggravation of the primary order will be produced by it, the one re-acting on and increasing the other until disorganisation l death result, if the procession of morbid ac- ns be not arrested by agents capable of changing states of vital power and vascular action, and enabling them to resist further alterations, as ll as to restore those which have already taken ce. — (*h*.) A due recognition and estimation of t states of vital power and of vascular action are t basis on which a rational treatment of puer- p al fevers should be placed, inasmuch as it is l means of agents affecting these especially that w are enabled to arrest the progress of the ma- l y, and to resist the extension, and even to r ove the effects, of the local disease.

61. X. Treatment. — It is obvious that, in c er to be successful, the treatment of puerperal f rs should be appropriately assigned to each of i orms; and that, as these forms are characterised r only by different, or even opposite states of v l power and of vascular action — by very dif- f nt pathological conditions, — so the treatment s ld be assigned accordingly. Has there ap- p red in the numerous works on puerperal fevers, o n the still more numerous productions on the d ases of females, either a due estimation of the d rent forms of these fevers, or a satisfactory e osition of the treatment suited to each form — s osing that the forms and states of these fevers a there duly set forth? Let the reader, who n be supposed to be excited by a desire to k w as much as possible of the opinions of those w profess themselves to be experienced by at- te ting to instruct others, — of opinions of the g test importance to the community, respecting, m eover, the most fatal disease known in this c ntry, and that disease attacking only females in e most interesting and most important period of th existence, — refer to the works enumerated at th end of this article, and then let him answer not o the above question, but also the following tw questions: — Have these numerous produc- ti s, which have appeared since the latter part of e last century, advanced our knowledge of th pathology and treatment of these fevers in any in rtant particular, or in any way excepting as re ects a few subordinate details? Have certain re dial measures, confidently recommended m y years ago by physicians possessed of ex- pe ence, and capable, by ability and education, of bserving and of reasoning with at least an average degree of accuracy, been satisfactorily tested, or adopted, or at all appropriately employed, in those institutions, which are most notorious for the generation of these maladies? Leaving these questions to be answered by those whom they may concern, and suppressing those painful and humiliating reflections which the subject suggests to the minds of those even partially informed as to its ethical as well as therapeutical relations, I proceed, *first*, to consider the treatment which my experience has shown me to be most appropriate to the different forms and states of puerperal fever, and *next* to notice the several methods and means advised by other writers, and the value which I believe to be attached to them.

262. *A*. The Inflammatory Form of Puerperal Fever, in its more sthenic manifestations, whether commencing as *puerperal peritonitis*, or *hysteritis*, or as *metro-peritonitis*, requires the prompt and decided antiphlogistic treatment recommended for inflammations of the Peritoneum (§§ 137, *et seq.*) and of the Uterus, with a due consideration of previous sanguineous losses or exhaustion of the patient, of the state of her constitution, and of the several circumstances and symptoms connected with the case. It should not be overlooked, that all cases of these inflammatory states of the disease are not possessed of an equal amount of sthenic diathesis; but that, owing to the nature of the causes, and to the constitution or previous state of the patient, the febrile disturbance as well as the local affection may approach nearer the asthenic than the sthenic condition, and thus the synochoid or intermediate grade of the malady be nearly approached, if not altogether reached. In these states it may be a matter of doubt as to the extent to which vascular depletions, either general or local, ought to be carried; or, if they have been already employed, as to the propriety of repeating them. In these circumstances, and especially in large towns, or in a vitiated atmosphere, less risk will accrue from the rational adoption of other measures, — from a due recourse to calomel and opium, conjoined, in the more asthenic cases, with camphor, to terebinthinate embrocations or fomentations, and to the other means recommended for *peritonitis* (see Peritoneum, §§ 138—143.), than from large or frequent bleedings. When the disease commences in the uterus, in the form either of *hysteritis*, or of *metro-peritonitis*, or in the uterine appendages, as *ovaritis*, too large depletions may only favour the extension of the inflammatory action, unless the *sthenic* diathesis exist, or the patient be not remarkably exhausted by previous losses or inanition. When the local affection assumes an *asthenic* character, the most appropriate treatment is that which I have advised for the asthenic form of peritonitis (see *art.* Peritoneum, § 150.), and which is equally suited to the other prominent affections appearing in this and in the synochoid forms of the malady.

263. *B*. The Synochoid or Intermediate Forms of Puerperal Fever, however commencing — in whatever organ or structure, as fully set forth (§ 185, *et seq.*) — require a treatment which should have strict reference to the states of vital power and vascular action — to the predominance of either the sthenic or asthenic diathesis; for, however obvious may be the local seat of mischief, the treatment is not materially or at all different as respects the local affection, especially

at an early stage, or until the disease is far advanced. In this form of the disease especially when commencing with rigors, the early re-action associating the local disease assumes more or less of a sthenic, or inflammatory character, which, however, soon passes into the asthenic, especially when the patient breathes a close or impure air, or is morally or physically depressed; or when the veins are more especially affected. In many cases of this form, vascular action is often attended by great irritation or excitement, and by an expansive or open state of the pulse, indicating an alteration in the state of the blood, both in quality and in quantity — in quantity especially as relates to the capacity of the vascular system, and to the power of adjusting itself to the quantity of blood contained, — and in these, *vascular depletions* are often injurious, whether general or local; and although in some instances a small or a local bleeding may be of service, yet if it at all pass a very moderate amount, the most irreparable mischief may ensue. In this form of the malady, the inflammatory states of the parts so generally complicating it, if not altogether asthenic at the commencement, soon passes into this condition, especially when the treatment is calculated to lower the powers of vital resistance; and, as vascular depletions not merely possess this property, especially with females confined in lying-in wards, or in the close and impure air of large towns, &c. but also remarkably favour the imbibition and absorption of the discharge retained in the uterus and sexual passages, the occurrence of uterine phlebitis or lymphangeitis, and contamination of the circulating fluids, they are most liable to be injurious, and they ought to be most cautiously and moderately prescribed.

264. *a.* A large proportion of the cases of this form of puerperal fever originates in imperfect contraction of the uterus, owing to deficiency of vital power — or to the vital depression more immediately following the impression of the infectious or poisonous cause; the imperfect contractions favouring the retention of an unusually large quantity of lochia within the cavity of the organ and in the vagina, followed by changes in this discharge of a septic and contaminating nature. Thus altered, the lochia not merely affects the surfaces with which it is in contact, but is also imbibed by the vessels, inflaming or irritating them, and altering the blood. With the view of enabling the uterus to throw off the coagula and fluid which may be retained in it, I have advised, in cases where the contraction of the organ after delivery appears to be weak or imperfect, those remedies which are most calculated to produce or to promote a tonic or contractile action of the womb. With this intention I have directed the early application of the infant to the breast; and, if the uterus fails to contract sufficiently, an occasional dose of the biborate of soda, or of ergot of rye, or an enema containing spirits of turpentine with assafœtida. When, therefore, the disease commences thus locally, the cause is, owing to the circumstances just stated, more or less septic or contaminating, although the vascular re-action may be considerable, when the strength and habit of body of the patient is capable of developing it; and the local effect produced by this cause is generally of a diffusive kind. Admitting that the effect produced locally by this cause, or by any other calculated to occasion it, is of an i flammatory nature, the question still remains, the inflammation of a sthenic or asthenic natur or to what amount may it be supposed possess of either of these characters? That it is n purely sthenic inflammation of the parts is show by the state of the pulse and other constitution symptoms, and especially by the rapid extensi and consequences of the local mischief; and th it is either wholly asthenic or largely possessed this property is proved by the constitutional d turbance, by the rapid diffusion of the local affe tion, and by the products of such affection. As has been demonstrated by JOHN HUNTER, a confirmed by all subsequent observers, that asther or diffusive inflammations, and inflammations of c culating vessels, are not arrested or even mitigat by general vascular depletions, and hardly ev by local depletions, but that they are aggravat in their most distinctive characters and con quences by this treatment, more especially venæsection, it is a matter of the utmost impo ance that some other than this most abused me should be resorted to. Cases, however, may oc where a nearer approach to sthenic inflammat action, and a more robust and plethoric state the patient may warrant a recourse to a moder depletion — locally in preference, and early the attack, especially when it is followed by remedies about to be mentioned; but cauti observation and experience should direct t measure, too often recklessly prescribed by insufficiently informed, or by the followers worthless authorities, not a few of which have peared in recent times.

265. Whether this form of the disease origin in the uterus or uterine vessels, or in the uter appendages, or in the peritoneum, as shown b here and in other places, to be probably the c in many instances; or whether it proceed fro constitutional infection, received through the ave of the respiratory organs, the local affection affections being secondary or contingent, as c tended for in respect of other instances (§§ 245 *seq.*), there is certainly no remedy so efficacious a decided and judicious use of *spirit of turpent* This medicine was first employed for this dise by Dr. BRENAN, of Dublin; and althoug has been "damned by faint praise" by subseq writers, who either have not had recourse to it have employed it insufficiently or injudiciou I can assert that it is the most efficacious rem that can be employed in this form of puerp fever. I state this from a lengthened and div fied experience of this substance in disease; yet in England, I know not of any other physi than myself who has given it a satisfactory tria puerperal fever, even up to the present day. I state this in order that the remark may be proved as regards the knowledge of others, that I may be enabled to record the fact. chief hindrances to the employment of this s stance are — 1st. A mistaken view of the na and consequences of its operation; — 2d. Its seous or unpleasant effects; — and 3d. The opi that it cannot be retained by the stomach w nausea and vomiting are complained of. A the *first* of these I can assert, that it is, accor to the mode of its exhibition, antiphlogisti acute inflammations, and more efficacious in resting the progress and consequences of asth

iffusive inflammations, than any other sub- ce; whilst it possesses the property of ac- modating, by its tonic and astringent operation, vascular and capillary system to the state and unt of its contents, of lowering the frequency e pulse, and of restraining effusion from se- and mucous surfaces. That it is unpleasant, that it is sometimes thrown off the stomach, I it; but, in many such cases, it is beneficial rtheless, its emetic action, independently of impression produced by it on a vital organ, sionally being of service, and even actually red. In those cases where the irritability of tomach is even the greatest, it not only is the easily retained, but is actually the most ef- nt remedy for the removal of the irritability, h, in the opinion of many, is the chief reason nst a recourse to it. But the exhibition of it e mouth is often not the only, and sometimes he most, beneficial way of prescribing it; for y also be administered in enemata, or applied nally and occasionally, according to the na- of the case, even more efficaciously than in other mode.

6. Although the spirit of turpentine may nore efficaciously employed in this form of peral fever than in the more sthenically in- natory or in the malignant, still it is a valu- emedy also in both these extreme forms, — e inflammatory after sufficient vascular de- ons, aided by other means, as described when ng of *inflammations of the* Peritoneum 41, *et seq.*); and in the malignant, as will be n hereafter. In this, the intermediate state e malady, whether commencing locally or a constitutional infection, this remedy is most icial when employed early, or before effusion serous cavities, or softening or disorgani- of the tissues has made much progress. is, as well as in other forms of the malady, ss depends upon a prompt recourse to treat- . If even a few hours elapse from the inva- changes beyond the reach of remedies may already supervened. If the symptoms and mstances of the case, and especially the state e pulse, indicate the propriety of a small or rate venæsection, or of local depletion, this d be immediately adopted; if the latter of depletion be preferred, a number of es, varying with the peculiarities of the case, be applied near the seat of tenderness and ; and when they come away, flannels wrung of hot water, and freely sprinkled with spirits rpentine, should be applied over the abdo- and covered by oiled silk or by a napkin; e spongio-piline may be employed instead of ; and contemporaneously with the applica- of leeches, a full dose of calomel, camphor, opium — (calomel gr. v—viij.; camphor gr. vj.; and opium gr. ij.) — ought to be given. v hours after this medicine has been taken, t half an ounce of spirit of turpentine, and, e bowels are not freely open, an equal quan- f castor oil, should be taken on the surface of omatic water, or on spearmint water, or on or in a cup of cold coffee. In most instances intention is not so much to evacuate the ls, for they are often sufficiently open, as it exhibit a remedy which is calculated, by its ge into the circulation, at least partially to the changes taking place in the blood and vascular system generally; and, at the same time, to procure the discharge, both from the bowels and from the uterus, of such morbid matters as would be inevitably most injurious if retained even for a short period. In prosecution of this intention, therefore, an enema containing spirits of turpentine should also be administered some hours afterwards; the quantity of this substance, the medicines conjoined with it, and the time of having recourse to it, depending upon the peculiarities of the case. If the bowels are too frequently acted upon, castor oil should not be conjoined with it, either when taken by the mouth, or administered in a clyster; but olive oil may be substituted. Indeed, the latter may be very advantageously given with the spirit of turpentine in almost every state of the disease; for if the bowels should be too relaxed, the compound tincture of camphor or laudanum, or syrup of poppies, may be added; and emollients or demulcents may be made the vehicles for its administration, with olive oil, in enemata. The repetition of these medicines, of the turpentine more especially, the quantity of each, and their combinations, must necessarily depend upon the acumen and experience of the physician, upon the appropriate use of them, and upon the effects produced. But, with their internal employment — by the mouth or in clysters — a recourse to the turpentine embrocations or stupes should be persisted in as long as tenderness, pain, or distension in any part of the abdomen is complained of; and the above dose of turpentine should not be given by the mouth oftener than twice or thrice at the most.

267. If the urinary organs should become affected, either by the quantity of turpentine prescribed, or by its retention by the alimentary canal, the effects will soon disappear if demulcents are freely exhibited; and, if much depression be experienced, either from the operation of this medicine or the state and period of the malady, restoratives, such as quinine with camphor and capsicum, or wine taken in Seltzer water, or opium conjoined with aromatic stimulants, &c., may be administered, according to the state or urgency of the case.

268. *b. Metro-phlebitis* is one of the most frequent complications of this form of puerperal fever, although it is rarely recognised at an early stage. But, if recognised, should the treatment be different from that now recommended for the arrest of this serious state of the malady? I believe that no other plan of cure will be found more beneficial for it than that now advised; that no other than powerfully restorative, tonic, and soothing means will be found beneficial in this form of phlebitis, or, indeed, in any other form. Dr. R. Lee, who has attached so much importance to metro-phlebitis as a pathological condition of puerperal fever, adds nothing to the treatment of this condition, and is even unaware of the means recommended, with great propriety, and often with great success, by John Hunter in cases of phlebitis. Dr. Lee gives us no further information on this topic than to profess his want of confidence in the use of mercury for this state of the malady. Hunter's treatment of phlebitis was powerfully tonic, stimulant, and restorative, and he directed it with the view — correct both in pathology and in therapeutics — of enabling

the vessels of the diseased part to throw out lymph capable of coagulation, and of assisting the powers of life, by these or other means, to resist the progress and to retrieve the consequences of the disease. Of the use of oil of turpentine in this malady, Dr. R. LEE entertains a most unjust opinion. I question much the fact of his having given it a satisfactory trial. He distrusts the evidence furnished by Dr. BRENAN's cases, is not convinced that the lives of those to whom it was administered were saved by it, and says that he has seen many recover without turpentine, in whom the symptoms were more unfavourable than in the cases described by Dr. BRENAN; and that he has seen other patients in whom the disease appeared to be aggravated by its use. Now it would have been most desirable if Dr. LEE had favoured his readers with an exposition of the treatment which was so fortunate as to restore many cases, in which the symptoms were more unfavourable than in those described by Dr. BRENAN, seeing that in those turpentine had not been used; "sed de non apparentibus et non existentibus eadem est ratio." Having myself since 1815 prescribed this substance in numerous diseases, malignant, febrile, and inflammatory, and having for many years — since about the above period — employed it in puerperal diseases, I have been induced to make inquiries respecting its use by other physicians; and yet, notwithstanding the notoriety of the practice, and its undoubted success if duly and appropriately prescribed, I have not heard of its having been employed by any other physician in this metropolis besides myself. This is somewhat singular, when the general fatality of the disease, and the highly favourable reports of the practice which have been made by Dr. BRENAN, Dr. DOUGLAS, and myself, are considered. What are the obstetric practitioners, who appropriate the treatment of puerperal diseases, about? Should the obstetrician cease to be physician, in respect of liberality and candour of sentiment, and of a due appreciation and adoption of remedies recommended by others?

269. Let the opinion given by Dr. DOUGLAS, in an excellent memoir on puerperal fever, be the answer to this question, as regards the remedy in question. He states that, in the epidemical and contagious puerperal fever, ℥iij of the turpentine should be given, with an equal quantity of syrup, and ℥vj of water, three or four hours after the first dose of calomel; and that after an hour this should be followed by an ounce of castor oil, or some other purgative; or the turpentine and castor oil may be given together; and he restricts the internal use of turpentine to twice only. I have, however, given it even in a larger dose — in half an ounce — thrice in the same case, besides administering it in enemata and externally, with complete success; although I have found one or two doses more generally sufficient. "The external application of turpentine," he adds, "without either its internal use, or the aid of blood-letting, I have frequently experienced to be entirely efficacious in curing puerperal attacks; and although I have hitherto omitted to speak of turpentine for the cure of the other varieties of this disease, yet I should not feel as if I were doing justice to the community if I did not decidedly state, that I consider it, when judiciously administered, more generally suitable, and more effectually remed , than any other medicine yet proposed. I a safely aver, I have seen women recover, appare y by its influence, from an almost hopeless conditi , certainly after every hope of recovery under o -nary treatment had been relinquished."—(*D* . *Hosp. Rep.* vol. iii. p. 157.)

270. Now, without referring to my own -perience and authority in the matter, and to statements of that experience which have appea d in various quarters, I may remark that Dr. B -NAN's publication was in 1814, and Dr. DOUGL s statement, now quoted, was made in 1822; d yet, unless in those cases for which I prescri d this remedy in Queen Charlotte's Lying-in H -pital, I am not acquainted with any sufficient al which has been made of turpentine in any of e lying-in wards of this city. The eminent se r physician to the General Lying-in Hospital, v -ing in 1839, remarks as follows: — "I hav o experience of the use of this remedy (turpent) introduced by Dr. BRENAN in 1814, and pra d by Dr. DOUGLAS of Dublin, and KINNEI of Edinburgh, in puerperal fever."

271. *C.* THE MALIGNANT OR PUTRO-ADYN IC FORM OF PUERPERAL FEVER (§§ 198, *et seq.* if not recognised at its commencement, and prom y treated, is always fatal. If even a few h rs elapse from its seizure, the changes which ve already taken place in the fluids, and eve in the vital cohesion of the structures, are r ly arrested in their onward course by any treatn t. The means of cure should therefore be e y, promptly, and decidedly employed. When as prescribed they are generally efficacious — at st they proved so in several outbreaks of this for of the malady in Queen Charlotte's Lying-in Hos l, especially when I had the advantage of the a t-ance of an intelligent resident pupil. In o of the most severe of these epidemics I had the a of Dr. VOWELES, an intelligent and well-educ ed young physician, who was constant in his at d-ance, and who, immediately upon an attack, ad recourse to the treatment about to be re n-mended, varying it according to my direc ns with the peculiarities of the case and the e ts produced by the early part of it. On this occ on almost every case recovered. When I was st called upon to prescribe for this disease i he hospital, the most malignant form prevailed, nd every case that had occurred had terminate a-tally. I first had recourse to DOULCET's pl of giving emetics, but it failed, probably owing t ny being called at an advanced period of the dis se. Having frequently employed the spirit of turpe ne in the more malignant states of fever, and ng aware of Dr. BRENAN's recommendation of or this malady, I next prescribed this subst e, both by the mouth and in enemata, trusting it principally; but without obtaining from it a he advantages which I had expected. It sh ld, however, be stated, that frequently I was not c ed to a case until it was far advanced. I was ne n-duced, by my experience of the effects of ge doses of calomel and opium in some acute dis s, to try the effects of these; but they still re signally failed. I afterwards had recourse to th modes of treatment, and prescribed, every r, five, or six hours, a large dose of calomel nd opium, and the spirit of turpentine with casto l; the turpentine being employed both internall nd

ernally. From this practice more success ac- ed than from either of the plans adopted singly. t as the success did not equal my wishes, and ecting upon the phenomena, pathological con- ons, and structural changes of the disease, I olved upon trying the effects of camphor, in ge doses, in conjunction with calomel and um, and sometimes with opium alone, or with nine and capsicum, omitting the calomel, aided the turpentine, in the manner about to be stated, l upon preceding these by an emetic when its was indicated by the symptoms.

272. Immediately upon the accession of the ease, or as soon afterwards as possible, from ten wenty grains of calomel, from eight to sixteen ins of camphor, and from one to three grains of um, were administered in the form of bolus, h conserve of roses, the quantities of these me- ines thus varying with the apparent severity of case, and the state of the pulse. In some in- nces, when vital depression was extreme, or the ease farther advanced, the camphor was con- ed with capsicum and opium, and occasionally er with ammonia or with sulphate of quinine, calomel being omitted. The above were the reme doses of the camphor, calomel, and opium; l when the largest quantities were given, five or hours were allowed to elapse before they were eated. If smaller doses were given, three or r hours only were sometimes allowed to pass. n after the second exhibition of these medicines, out half-an-ounce of spirit of turpentine, with or hout castor-oil, according to the state of the vels, was taken as above directed; and a few rs afterwards a larger quantity was administered an enema, with castor-oil or with assafœtida, l demulcents or emollients, as circumstances gested. The intention was to make a strong ression on the constitution by means calculated arrest the morbid action, and to counteract the nges taking place in the blood. Very soon r the development of the abdominal symptoms, ecially the pain, distension, and tenderness, eral folds of flannel, sufficient to cover the ole abdomen, were directed to be wrung as dry possible out of hot water, sprinkled very freely h turpentine, and applied as already described. s application was renewed at intervals, if the gress and symptoms of the case required a ourse to it.

273. In two or three hours after the treatment l advanced thus far — or after one or two of the uses had been taken, and one dose of the pentine and an enema administered — the symp- s had generally much abated, if these means l been early employed. In this case, the doses the camphor, calomel, and opium, or of the er combinations of which the bolus was com- ed, were diminished, and wine also given at longest intervals above mentioned. The tur- tine draught was seldom prescribed oftener than ce, and one only was taken in the twenty-four urs. It sometimes also contained an aromatic e, as capsicum, &c. If the enema was soon own off, another was sometimes administered a v hours afterwards, and the fomentation was ewed. If the malady resisted the first or ond doses of these substances, the bolus was eated a third and sometimes a fourth time, er the longer intervals, and, in a few instances, hird dose of the turpentine was ordered; or the enema containing it was repeated and conjoined with other medicines according to the state of the bowels. If vital depression was extreme, the turpentine was given in small doses or withdrawn, and capsicum, or carbonate of ammonia, was taken in the bolus, instead of the calomel; and a dose of decoction of cinchona, with chlorate of potash, carbonate of soda, and the compound tincture of cinchona or tincture of serpentaria, was ordered in the intervals. If the lochia were very offensive, injections containing the solution of chlorinated soda were employed; and the same solution, or a solution of chloride of lime, was used in the wards.

274. If the symptoms evinced marked biliary disturbance or congestion, and the other indications for the exhibition of an *emetic* were present (§ 278.), fifteen grains of ipecacuanha were given immediately and previously to the first dose of calomel, camphor and opium; and the free operation of the emetic was promoted by the repetition of the same dose in an hour, and by the infusion of chamomile flowers. The emetic generally procured the early evacuation of much altered bile, both by the stomach and by the bowels, and also caused a copious sweat, which the camphor and opium further promoted, and the terebinthinate embrocations on the abdomen tended to encourage and to perpetuate. But of the use of emetics in these cases, I shall take further notice in the sequel (§ 278.).

275. When the above treatment was employed early, or before either effusion into the peritoneal cavity or other structural change had supervened or made any considerable progress, it was generally successful both in preventing or arresting these changes, and in resisting further alterations of the blood, as well as in removing such as may have already taken place, by increasing the depurating actions of the several excreting organs. The successful employment of the above means required the constant attendance of an intelligent assistant as well as the frequent visits of the physician. During the prevalence of the disease I visited the cases three or four times in the day, directing the repetition, succession, or modification of the above remedies according to their effects or to circumstances. If beneficial results did not follow after a very few doses — after the repetitions of the medicines as now stated, — or if they did not appear in from twenty-four to forty-eight hours after their first exhibition, the patient rarely recovered. In some extremely malignant cases, for which I did not consider the calomel to be indicated, as well as in others which I did not see sufficiently early, I prescribed camphor in large doses with capsicum and moderate doses of opium, and sometimes also in conjunction with the sulphate of quinia, which, at the time of the occurrence of these worst cases, was coming into frequent use. In some of these very hopeless cases, these means, aided by an occasional dose of turpentine, given either by the mouth or in an enema, and by the external application of this substance, proved almost unexpectedly successful. In others, however, a temporary check only appeared to be given to the disease, the duration of this improvement being seldom longer than a few hours; these cases suggesting the conviction that the changes observed after death had advanced too far to be removed by the agents employed in

medical practice. Of the other means which were occasionally tried in this and the preceding varieties of the disease, mention will be made in the sequel.

276. *B.* Remarks on several Means of Cure, &c. In many of the works which have appeared on puerperal fevers, some particular remedy or method of cure has been recommended, empirically rather than conformably with rational views of the pathology of these diseases; and, in most of these, the treatment, which seemed, in the eyes of those recommending it, successful to an extent which satisfied their expectations, was lauded as altogether applicable to all appearances of these maladies which may hereafter occur. But whilst each held forth his own method as most worthy of adoption, other methods which had been equally praised, by equally sanguine predecessors, met with little approbation, if indeed they escaped a complete condemnation. It would neither be gracious nor profitable to trace the various differences of opinion as to the treatment of these diseases to their sources; for some of them may be referred to those imperfections of our nature, which medical practice is calculated to develope and to foster when not directed and elevated, in its ethical relations, by the higher and more generous sentiments; whilst others may appertain to the very different forms of these maladies, in different occasions, circumstances, and epidemic constitutions. With no marked disposition to be sceptical on the one hand, or to be credulous on the other,—not disposed, with saintly faith, to place much confidence in that which I cannot explain, or to believe in what appears impossible — still I cannot attempt to set limits to the operations of nature, or to the influence of mind and its numerous manifestations on the vital actions. What may appear now as at least improbable, may hereafter be found to be entirely in agreement with some principle hitherto concealed from our superficial knowledge. The unknown may seem difficult, complex, unfathomable, and even unattainable, but once known it may be easy, simple, obvious, and within the reach of every intellect. The malady which is found to-day fatal, malignant, and pestilential, may be proved to-morrow to be possessed of these properties only in virtue of our ignorance, and of our endeavours to encounter a formidable calamity by complex and ill-understood means; simpler agents, promptly and efficiently applied, accomplishing the ends, with a direct and beautiful simplicity, which were attempted, under the delusions of "false science," by multiplied and inappropriate measures and jarring influences.

277. *a. Vascular depletions and other antiphlogistic measures* were advised for these fevers at an early stage by Hulme, Kirkland, Gordon, Horn, Armstrong, Campbell, Macintosh, and others; and, whilst some carried these depletions to a great extent, others recommended greater circumspection; whilst a still greater number of writers prescribed very different or opposite measures. All were equally sincere, and all equally erred — all applied, as true of the genus, what was true only of the species. For, as I have shown above, there are *sthenic* inflammatory, *asthenic* inflammatory, and *malignant* or putrid, states or forms of the malady, this last state having no inflammatory attribute whatever, and to each
of these different or opposite means are requisi
In the *first* of these, venæsection, carried to
amount which can be truly assigned only by t
closely observing physician, to the peculiar ci
cumstances of each case, is absolutely necessar
in the *second* of these forms, local depletions,
a number of leeches, are only contingently r
quired, and often then with a caution, whi
should never be laid aside; and in the *third*, va
cular depletions of any kind are certain agents
destruction. Thus, the different forms of the m
lady, depending upon very different states of vi
power, of vascular action, and of constitution
disturbance — upon different pathological con
tions — occurring at different periods and in p
culiar circumstances, required very dissimil
methods of cure, the method which is quite a
propriate to the one form being inappropriate
the others; the great error of writers being th
recommendations of what they found most ben
ficial in their limited sphere of observation, a
in the short period of their experience, for
other outbreaks or manifestations of these feve
without reference to form, character, or epiden
cal constitution. There is one circumstance co
nected with the employment of leeches in t
more asthenic states of this malady which shou
always be kept in recollection; namely, the di
culty of arresting the hæmorrhage from them owi
to the states of the blood and the impaired tone
the capillaries and tissues. Many years a
when all cases of this disease, under the delusi
created by those who, in the fulness of th
ignorance, rushed into reckless print, were trea
by bleeding of some kind or other, a large nu
ber of leeches were applied over the abdomen
a patient, and, upon these falling off, were f
lowed by a warm fomentation. When this fome
ation was looked to after a time, she was fou
lying dead in a pool of blood. In another ca
which occurred in the hospital, leeches were p
scribed by one of my colleagues, and the ni
nurse who was left to attend to them fell aslee
and although no long period could have elap
the patient was found dead when she awo
These facts prove not only the risk of copi
hæmorrhage from leech-bites in certain states
the disease, but also the impropriety of hav
recourse to them in these states, when eve
small loss of blood may occasion fatal sinking.

278. *b. Emetics* had at one time a great re
tation in the disease, and have received the co
mendations of Willis, White, Doulcet, Ba
Lentin, Walsh, Le Roy, Hufeland, Osiand
and Desormeaux; whilst Kirkland, Horn,
Lee, and many others are opposed to the exhi
tion of them. Ipecacuanha has generally b
preferred as the emetic substance, and is certai
most deserving of adoption whenever a trial
this practice may be determined upon, althou
it may be conjoined with other substan
Amongst the experienced writers favourable
ipecacuanha emetics, Doulcet is most dist
guished. Observing in 1782 that the disease of
commenced with vomiting, he viewed this as
indication of nature, and he assisted her eff
by giving fifteen grains of ipecacuanha, wh
were repeated the next day. "The patient
covered. This unexpected success led him to
it on all the rest, and two hundred were sav
while six, who refused to take the emetic, di

treatment, when methodised, consisted in
fifteen grains of ipecacuanha, repeated in
ur. The last dose acted generally on the
ls, an action which he sustained by a potion,
sting of olei amygdal. ℥ij; syrupi malvæ,
ermes mineral, gr. j. M.; a table-spoonful of
was taken every two or three hours. He
ted the emetic the next morning if the symp-
were alleviated, and the rather if they were
If the belly remained meteorised and pain-
r several days, he looked upon it as a reason
rsevering. The previous devastation of the
ly, and the consequent despondency in the
itioners of France, caused the news of **Doul-**
success to be hailed with enthusiasm
ghout the kingdom. The government com-
ted the discoverer largely. The Faculty of
cine drew up minute instructions for this
of treatment, and distributed gratuitously
the whole of France. On the following
the malady was once more epidemic, and
emedy of **Doulcet** resorted to, in full and
st faith, but this time it was quite unsuccess-
Dr. **Ferguson**, from whose work I have
quoted, justly remarks that the failure arose
want of discrimination between the varieties
is malady, and from applying in all cases
which is useful only in some. The evidence in
r of emetics is quite as great as that for
ling or mercury; and it is not supported
ly by **Doulcet**'s remarkable success, but
e experience also of **Richter**, **Cruveilhier**,
nellé, and **Desormeaux**. The question is,
ver, *What are the cases to which this remedy*
plicable? When there are nausea and vomit-
n the accession of the disease; when there
lious vomiting or diarrhœa, with bilious or
y suffusion of the skin, or signs of congestion
e liver; when the upper regions of the ab-
n are the earliest or chief regions affected;
the invasion of the attack is unattended by
s; and when the disease presents more of the
gnant than of the inflammatory or synochoid
acters, then the early exhibition of an ipe-
anha emetic has proved most serviceable.
he other hand, when the painful symptoms
ared in the hypogastrium, or when the pain
distress of the abdomen were aggravated by
ting; when the disease had advanced; and
signs of effusion into the peritoneal cavity
appeared, emetics were manifestly contra-
ated and were not prescribed. In a few of
ost malignant cases which I treated, I pre-
ed, previously to other means, when the pa-
was seen at the commencement of the seizure,
ll dose of sulphate of zinc with powdered
icum, in order to procure a more immediate
ation, and to prevent any contingent depres-
which I dreaded from the use of ipecacuanha.
last substance, I sometimes gave also thus
ined. I remarked, however, that when the
cuanha was thus combined, the emetic effect
liable to be prevented by the capsicum, whilst
operation on the bowels and skin was evi-
ly increased by it.

9. Dr. **Ferguson**, in his very instructive
, remarks as follows upon this important part
e treatment of this most dangerous malady: —
sides the examples of the utility of emetics
ded by **Tonnellé**, I have been informed by
riend Dr. R. **Maunoir**, that his father, the celebrated **Maunoir** of Geneva, looks on ipecacuanha as the remedy most to be relied upon in the treatment of puerperal fever, — a faith founded on repeated experience in an extensive practice. Among the older authors, **Willis**, **White**, and A. **Petit** were advocates for its employment. In our own times, **Osiander** and **Hufeland** in Germany; **Recamier**, **Cliet**, **Tonnellé**, and **Desormeaux** in France, have all borne their testimony to the signal benefits to be derived from the use of ipecacuanha as an emetic. It would appear that some seasons, or some portions of the year, are more favourable for its exhibition than others. **Desormeaux** first tried emetics in the end of 1828, with great success. During the greater part of the following year they failed; but their use did not aggravate the symptoms. In September, 1829, being cold and humid, they were again given with great benefit. Towards the end of October they lost their power, and in November were totally useless. When it is considered that puerperal fevers are often cured, or alleviated, by copious spontaneous perspiration, or by purging and vomiting, we ought not to wonder at the success of an agent like ipecacuanha, which is capable of producing, and usually does produce, all these effects at once." (*Op. cit.* p. 210.)

280. *c. Purgatives* have been recommended by **Hulme**, **Selle**, **White**, **Denman**, **Stoll**, **Aaskow**, **Leake**, **Butler**, **Hey**, **Chaussier**, and others. Dr. **Ferguson** states that **Cederskiöl**, a Swedish physician, tried them extensively, and concluded that the more drastic purgatives are prejudicial. This is also the opinion of **Baglivi** and **John Clarke**. The treatment which I have advised above almost precludes the necessity of having recourse to any other purgative medicines than those comprised in the above plan. For the large doses of calomel, sometimes preceded by an emetic, and the subsequent recourse to turpentine and olive or castor oil, and to enemata containing the same substances, as circumstances may require, are sufficient to answer all intentions as to biliary and fæcal evacuations, and to produce at the same time an impression on the economy calculated to arrest the progress of the malady, and to augment the functions of the several emunctories. Dr. **Ferguson** justly remarks, that in the wielding of this remedy, as of every other useful one, the disputants have each tacitly assumed the universal similarity of all puerperal fevers, — an assumption, I may add, which has been fatal to thousands. His own experience with regard to purgatives is, that whenever they create tormina, there is the greatest risk of an attack of metro-peritonitis succeeding. In order to avoid this, he invariably mixes some anodyne — usually **Dover**'s powder, or hyoscyamus, or hop — with the purgative.

281. *d. Mercurials* in various states of combination and modes of administration have been advised for puerperal fevers. Calomel, however, is the preparation generally preferred, and is usually conjoined with opium, as recommended by **Hamilton**, and subsequently by **Wolff**, **Hufeland**, and many others. The inunction of strong mercurial ointment over the abdomen has been suggested by **Gebel** and J. **Davies**, who have likewise advised the weaker ointment to be applied over the blistered surface of the belly.

But the larger doses of calomel, as I have employed them above, appear to me most deserving of adoption; for it is not so much from the specific action of this medicine that benefit is to be expected, in many cases, as from the operation of it on the biliary organs, and secretions and excretions generally — by its depurating action on the blood, through the medium of the liver and of the other excreting organs. It should not, however, be inferred that calomel or other mercurials are equally beneficial in all the forms of this malady. They, especially calomel, are most serviceable in the inflammatory varieties — in the sthenic after blood-letting, in the asthenic after local depletions, or after an emetic. In the malignant form of the malady, calomel was most serviceable at an early stage, conjoined with stimulants and opium; and was employed chiefly with the view of increasing the actions of the liver and other emunctories. It was often followed by powerful tonics and restoratives. If the large doses of calomel failed early in the disease, they were seldom of any advantage at an advanced stage, although this substance was given subsequently in smaller quantities. When the bowels are irritable, Dr. FERGUSON recommends the abdomen to be kept constantly covered with the linimentum hydrargyri compositum. He agrees with Sir B. BRODIE in considering the bi-chloride of mercury to be preferable when the disease is presumed to be connected with uterine phlebitis; and in this complication the bi-chloride may be conjoined with camphor and opium, or taken in a decoction of cinchona, as I have given it in several analogous pathological conditions.

282. *e. Opium* has long possessed considerable reputation in the treatment of puerperal fevers and peritoneal inflammations. (See *art.* PERITONEUM, § 150—153.) For the former, it has been much confided in by GEBEL, HOLST, HORN, MICHAELIS, BATES, &c.; for the latter, by HAMILTON, ARMSTRONG, GRAVES, STOKES, BATES, and others. It has been variously combined with other medicines for these states of disease — with calomel, or with antimonials, or JAMES's powder, or with ipecacuanha, or with musk, or with camphor, or with valerian, or with capsicum, &c., according to the views of the physician and circumstances of the case. The influence of opium in these maladies has been very justly estimated by Dr. WATSON, who truly remarks — "Of the great value of this remedy in certain cases, and after sufficient bloodletting (in the treatment of inflammations), I have long been satisfied. I presume its beneficial operation is to be explained by its known power of tranquillising disturbed and uneasy nerves. Mere nervous irritation appears sometimes to keep alive or to rekindle inflammation, which depletion of the blood-vessels had almost or for a time extinguished; and opium, given in a full dose, will often prevent this renewal of disturbance in the vascular system, by quieting the nervous irritability. I am, indeed, persuaded that opium is, of itself, equal to the cure of some forms of inflammatory disease, in which bleeding would be improper; the disorder of the capillary vessels subsiding spontaneously, as soon as the teased and teasing condition of the nervous system is allayed. Accordingly, the opiate treatment has been found the most effectual in persons who possess by nature, or who have acquired through disease or intemperance, undue i ability of frame. It is especially useful, o, whenever local inflammation is attended by m h bodily pain, which in all persons is a sour of irritation." It is most satisfactory to me to d my views, as to the pathology and treatme of INFLAMMATION (§§ 7—9. and 206.), in acc dance with those of so able and discriminati a physician as Dr. WATSON.

283. Mr. BATES, of Sudbury, confides ch ly in opium for the treatment of puerperal inf amations and fevers. According to *one plan*, w h appears to be directed against the more in nmatory states of disease, he directs bleeding m the arm to about a pint, except there be at exhaustion; and an opiate enema, consistir of ʒj to ʒij of tinctura opii in ℥xij decocti a li calefacti, to be repeated in twelve hours, if re be no return of pain, and whenever there is enewal of the symptoms. The patient is all ed only barley water or thin gruel, cold, an in small quantity. When the bowels are con d, and after the pain and sickness are removed, d the abdominal tenderness somewhat abated b he foregoing means, he prescribes the following ster: — ℞. Vini aloes, ʒiij; magnesiæ sulp is, ℥j ad ℥ij; olei olivæ, ℥j; aquæ calidæ, ij. Misce. He further directs bottles of warm er to the feet; fomentations and linimentum aponis cum opio to the abdomen; and le es when great tenderness is present. Accordi to *another plan*, the following bolus is to be tak as soon as possible, and repeated in an hour, nd then to be continued every two hours unti he pain has ceased. Ease ensues, he says, fro he administration of the fifth to that of the th bolus; if not, he resorts to the enemata. ℞. Pulveris opii, pulveris acaciæ, pulveris timonialis, āā, gr. j; confectionis rosæ ca æ, q. s. Misce. Fiat Bolus.

284. *f. Stimulant, restorative, and even ic remedies* have been recommended by se al writers, and are more or less serviceable i he more malignant states and far advanced stag of the disease. I have very often had recour to them; and almost always in conjunction th opium. The substances belonging to this egory which I have most frequently prescribe re camphor, as directed above, capsicum, amm ia, and sulphate of quinine. Musk and val an have likewise been advised, but commonly njoined with opium, by HORN, MICHAELIS, d others. The ammoniated tincture of valer I have found of service in some instances, vari ly conjoined with tincture of opium and other licines, according to the peculiarities of the se. These stimulants and tonics are efficacious i he more malignant states of the disease only en given early, with full, large, or frequent dos of opium, in large doses, and aided by the tu ntine, as prescribed above (§ 266.); and, er the second or third dose, I have not found ny benefit derived from calomel, in these states c he disease, when repeated more frequently.

285. *g.* Of *other internal remedies* recomme ed for this malady but little notice is required. u*lumba* has been preferred by some writers wl a tonic is required; and *alkalics* have been nployed by BARKER and ALLAN. *Borax* has en given by BREFELD, BANG, and myself; and is certainly of use, under certain circumsta s,

ally in promoting the contractions of the
, and the discharge of coagula or retained
rs from this organ ; and thereby removing a
of the disease, or an obvious source of ag-
tion and contamination. Boer attributed
ccess, in the treatment of an epidemic ap-
nce of this malady, to his use of an anti-
l preparation, which was without doubt the
nown James's powder, which, when con-
with opium, or with camphor and opium, is
nly extremely beneficial, and when pre-
d after vascular depletions, in the inflamma-
tates of the malady, or when given from the
encement in the synochoid or intermediate
so as to produce copious diaphoresis.

. *h.* Of *clysters*, or *enemata*, it is unneces-
to add any thing to what I have already
. The medicines which are most beneficial,
thus administered, are the spirit of turpen-
live oil, castor oil, opium, camphor, assa-
, &c., according to the form and stage of
ease.

7. *i.* *Injections into the vagina*, and even
he cavity of the uterus, have been recom-
ed by several physicians, and by the author
the lochia is acrid, excoriating, and offen-
Collingwood, Schmidtmann, Dance, and
ellé have advised frequent injections of
water only, or chiefly. I have seen benefit
ed from the addition of a small quantity of
f the chlorides, or of crèasote, to the fluid,
the discharge was manifestly offensive.
aelis directed vaginal injections, consisting
infusion of valerian and linseed, and they
probably of service in washing away the
d discharge, and in soothing the irritation of
xual passages produced by it — the chief in-
ns which these means are calculated to
plish.

. *k.* It is hardly necessary to notice any
external means of cure besides those already
oned. General warm *baths* and *hip-baths*
been directed by several writers; but there
veral difficulties placed in the way of them ;
n many of the most severe cases they are
of doubtful or of no advantage. Still they
not to be entirely overlooked in the more in-
atory states of the malady, after depletions,
ccasionally in other circumstances, which
uggest a recourse to them, but which hardly
of description. The application of a *large*
to the abdomen has received the approba-
f Goodwin, Michaelis, Hufeland, and
vies, and is certainly deserving of adoption
eral states of the disease; although a more
diate and decided advantage is derived from
rpentine stupes mentioned above (§ 266.),
ally when early and perseveringly employed.
se cease to be of service, or are insufficient,
ppropriate to certain advanced states of the
prolonged cases, a blister will occasionally
use.

. C. Prophylactic Measures. — I have
ly noticed certain topics connected with the
ntion of puerperal diseases generally (§ 43,
); but there are others more especially re-
to the prevention of puerperal fevers, that
e a very brief notice. Prophylactic measures
— 1st. To the management of the female
, and subsequently to, parturition ; — and
o the prevention of foul and contaminated air in the ward or apartment in which she is confined, and to the destruction and counteraction of these and all other infectious and contagious agents. — (*a.*) As to the former of these it is unnecessary to state more than that an officious interference with the parturient process, violent measures used to hasten it, or the neglect of means to promote it, when the efforts of nature are either insufficient or exhausted, the admission of a foul and contaminated air to the generative organs after parturition, or the retention of such an air or of foul exhalations in the vicinity of these organs, and neglect of due measures of cleanliness and of the frequent removal of the discharge, are calculated to cause or to favour an attack of this malady, and consequently that a careful avoidance of these causes should always be observed.

290. I quite agree with Dr. R. Lee that the administration of acrid cathartics soon after delivery should be avoided ; and that the greatest care ought to be taken in performing the requisite operations of midwifery. The hand ought not to be passed into the cavity of the womb unless with the greatest gentleness, when the introduction of it is quite indispensable ; and portions of the placenta should be prevented from remaining to become decomposed within the uterus.—" It is impossible to condemn too strongly the practice recommended by Dr. Gooch, in cases of flooding after the expulsion of the placenta, of passing the hand into the uterus for the purpose of compressing the part where the placenta was attached, and from which the blood is flowing." — (*Op. cit.* p. 113.)

291. (*b.*) *The prevention of infection or contagion* in respect of puerperal fevers can be accomplished only by the adoption of those measures which I described when treating of Infection (see § 55, *et seq.*), and by the avoidance of those *causes* (§ 41, *et seq.*) which are productive of these fevers, as well as of those sources of contamination described when treating of *the prevention of* Pestilence. The measures recommended in that article are especially applicable to the prevention of, and protection from outbreaks of puerperal fevers in lying-in wards ; and for the purification of these and other chambers, and of the bed-clothes and bedding on the occasions of these outbreaks. To that article I must, therefore, refer the reader, and more particularly to what I have stated at § 77., and when treating of the "*domestic sources of pestilence.*"

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LSE. — *Pulsus.* — Σφυγμὸς. —*Pouls*, Fr.; —
uls, Germ.

Classif. — General Pathology. — Semeiology.

The *arterial pulse* is produced by the blood
wn into the aorta by each contraction of the
ventricle. There are *three elements* which
ribute to the production of this phenomenon:
st. The arterial tubes or vessels which manifest
the touch;— 2d. The blood, or contents of
tubes, which, upon receiving the impulse
the heart, affect the condition of the arteries;
d, 3d. The heart itself, which originates the
lse transmitted through the blood to the vessel,
by the vessel to the touch. According to the
itions of these three elements or constituents of
ulse—the arteries, the blood and the heart—
to the various combinations which they may
ally produce, will the pulse vary in disease,
even in health, although within a much more
ned range. These three constituents of the
require an individual and particular con-
ation, in estimating the states of the pulse, or
r as the causes of these states, and in con-
ng these states with functional and organic
ges — with the manifestations of vital power
ction.

I. Historical Notices as to the Pulse.—
mention is made of the pulse by Hippo-
es; and Celsus notices it chiefly to record
pinion as to its fallacies. Galen may be
viewed as the first who attempted to inves-
the pathological relations of the pulse, and
d this at great length. An abridgment of
eatises on this subject has been made and
shed by Andræa Lacuna. As far back pro-
as the days of Galen, if not even further,
hinese had published treatises on the pulse;
by means of their acquaintance with it, and
chiefly, they pretended to a knowledge of all
ses. The importance attached to the pulse
alen, and by all the writers on medicine, in
n countries, in ancient times, appears to
been such as to have given rise to the greatest
atanry and pretence in the practice of me-
. It was supposed in those times, and down
present day in these countries, that the pulse
hed all the information which the physician
ed, both as to the seat and as to the nature
lisease; and it was not until past the middle of the seventeenth century that attempts were made by Bellini to investigate the subject with some reference to scientific principles; the researches and discoveries of Harvey having opened paths by which the ruins of ancient opinion might be removed, and laid foundations for permanent structures. The publication of Sir J. Floyer's "pulse watch," in 1707, first imparted precision to our estimation of the pulse; and various conditions of it, possessing much importance in practice, especially as being sources of prognosis, were pointed out by Solano, in 1731, and more clearly illustrated by Nihell, in 1745, in his "New and extraordinary Observations concerning the Prediction of Crisis by the Pulse." The subject was further pursued by Fouquet and Bordeu about the middle of the last century in France; and towards the close of that century by Heberden and Falconer in this country; these latter divesting the subject of much of the inanities and puerilities which had become connected with it since the days of Galen. Although these writers had thrown aside much of the incumbrances under which sound observation was more or less concealed, still correct views as to the states of the pulse were very far from being entertained. Nor could such views be exhibited, whilst the morbid conditions—functional and organic—of the heart itself, the prime factor of the pulse, remained hardly or very imperfectly known.

3. II. Physiological Pathology of the Pulse.— Before the various states of the pulse can be duly considered, some notice must be taken of the conditions of each of the *three constituents* of the arterial pulse—of the *arteries*, of the *blood*, and of the *heart*. — *A*. The Arteries, as I have shown in other places (see articles Irritability and Sympathy), are not inert tubes, but living vessels endowed with certain *vital* as well as *physical* properties. — *a*. Their *physical properties* are chiefly expansibility, extensibility, and elasticity — *expansibility* in the expansion of their diameters or enlargement of their calibres, *extensibility* in their elongation to a certain extent during muscular movements, and other causes, and *elasticity*, or the recovery of their natural states immediately upon the removal of the expanding and elongating causes. These properties are possessed by arteries in a very eminent degree, and in virtue of their conformation — of their fibrous coats, and of their serous and dense cellular and connecting tunics. They are evinced to a great extent after death; but they exist to a greater extent during life, vitality not only endowing these vessels with peculiar properties, but also increasing their physical qualities.

4. *b*. *The vital properties of arteries*, and which contribute very remarkably to form the character of the pulse, depend especially upon the organic or ganglial nerves, which not only accompany all the arterial trunks and ramifications, form reticula around them, and are lost in their fibrous and serous coats; the states of organic nervous energy affecting the vital conditions of these vessels. These conditions or properties are referable to different states of one vital endowment, viz. *tone* or *tonicity*. According to the state of vital tone will the arteries manifest a greater or less degree of *expansion* or of *constriction*, both when subjected to the sense of sight, and when examined by the sense of touch. The *expansion* and the *constriction*

are states of vital tone — or different states of vitality manifested by the arterial system, through the medium or influence of the organic or ganglial nervous system supplying it, and are easily made apparent by means of various agents; as by plunging the hand in warm water, a certain increase of the vital expansion of the arterial vessels will follow, and the vessel will become full and broad; and by plunging the hand in cold water, the artery will become small and more constricted. In an excellent lecture by Dr. C. J. B. Williams (*Lond. Med. Gazette*, vol. xxi. p. 594.), he observes, that he repeatedly observed the aorta of an ass recently killed, contract very remarkably when plunged in cold water; whilst the pulmonary artery did not contract so much. The vital conditions of the arterial system vary remarkably: — 1st, With the states of vital energy of the whole frame—with the states of constitutional power; — 2d. With the influence of agents acting externally or internally on the vessels, the operation of agents varying according as they are thus external or internal; —3d. With the conditions of the capillary and venous circulations, and with the freedom from obstacle to the onward transmission of blood circulating through the arteries.

5. (*a.*) When *constitutional or vital power is unimpaired*, the arterial pulse then presents a state of healthy or natural tone, modified somewhat with the peculiarity of constitution or the amount of vital energy. In these cases the pulse evinces neither broadness, nor expansion, nor softness, nor weakness, on the one hand, nor undue constriction, hardness, or smallness on the other. It is then possessed only of moderate firmness and fulness; its frequency or number in a given period depending upon the action of the heart. When vital power is *reduced*, and in proportion to the reduction, is the tone of the artery weaker and rendered soft, compressible, and otherwise changed according to the states of the blood and heart's action (see §§ 6, *et seq.*). When, on the other hand, the vital energy is *excited*, the state of the vessel is then firm, round, or hard, and otherwise altered with the action of the heart, and the quantity and quality of the blood. Marked modifications in the state of the arteries result from agents influencing the conditions of the organic nervous system; but these agents frequently also co-ordinately affect the heart — both the arteries and the heart; whether these agents affect this part of the nervous system *primarily* and *externally* to the arteries and heart, or *secondarily* and *internally* to the vascular system, by imbibition and absorption, or through the medium of the blood; the state of the arterial vessels being, in either case, thereby more or less changed, according to the nature of, and the influence exerted by, these agents. The natural conformation of the arterial system is sometimes different in different individuals, some persons possessing a more powerfully constituted state of this system than others, especially in respect of the fibrous coat, the vessels thereby acquiring increased tone, and often a greater degree of hardness or firmness, both in health and in states of excited action.

6. *B.* The Blood is another necessary constituent of the pulse; the uninterrupted column of blood, extending from the commencement of the aorta to the part of the artery to which the finger is applied, when feeling the pulse, being essential to the sensation communicated by the artery to the organ of touch. It is presumed, in our examinations of the pulse, that the states of this column of blood are the same throughout the arterial system, the difference being only as respects the diameter and length of the column, according to the artery which is felt. This, however, is not always the case, as slight modifications will occasionally follow from local determinations, influenced by the state of nervous power, and from local impediments or obstructions to the venous or capillary circulation of a part. But without reference to these modifications, we shall find sufficient sources of alterations of the pulse in the *conditions of the blood* circulating through the arterial system. The conditions of the blood which affect the pulse are, — 1st, *Quantity*, — 2d. *Quality*, or alterations in its physical and *sensible conditions*, and probably also its *vital states*.

7. *a.* Adverting first to *quantity*, it is obvious that any deviation from that quantity which is adapted to the capacity of the vascular system generally will affect, in a very sensible manner, the arterial pulse, as respects both the state of the arteries, and the contractions of the heart. When there is a *due correspondence* between the capacity of the vascular system and the quantity of blood circulating in this system, the coats of the arteries will be kept in that state of healthy tension, or tone, favourable to a regular, firm, free, natural, or healthy pulse, varying chiefly in frequency with the state of the heart's action, which will depend upon either exciting or depressing causes. — (*a.*) When the quantity of blood in the system is *excessive*, more or less of oppression may be evinced in the state of the artery, as well as either of increased or of diminished frequency, much of these changes arising from existing states of vital excitement or depression. Excessive fulness of blood however may exist, and, being attended by congestion of one of the minor circulations, — of the lungs, of the liver, or of the sinuses of the cerebro-spinal axis, — may not materially affect the pulse. But as this state will not long continue without evincing its connection with either depression or reaction of vital power, so will the pulse, through the medium of the heart's action, be slow or frequent, as well as oppressed; the degree of frequency depending on the heart's contractions, and these contractions depending upon the state of the organic nervous or vital influence, and other causes, to be noticed hereafter. The sensation produced by an artery in cases of excessive vascular fulness I have designated that of oppression, the vessel feeling as if it were kept in a state of tension, or of distension, in the intervals between the beats; and, if the pulse be at the same time much accelerated, an idea suggests itself that the heart is excited by the load, and, by its more frequent contractions, is endeavouring to disembarrass itself, and the vascular system generally; whilst if, with this state of the artery, the pulse is slow, the notion presents itself that the organic nervous energy actuating the heart is insufficient for the amount of blood circulating through the frame. Under these circumstances, it is found that the abstraction of blood renders the pulse more free, less tense or oppressed, and more natural, whilst it diminishes the acceleration in the former circumstances, and increases it in the latter.

(*b.*) *Deficiency of blood* is attended by a
different state of the arterial pulse; the fre-
cy of it depending, as in all other cases, upon
ardiac action, and the tone of the vessel very
h upon the state of vital power. When the
l is very deficient in quantity, the state of the
will depend much upon the power of the
l, and of the vascular system generally, to
nmodate themselves to that deficiency. If
vital or the organic nervous power is not
essed to a very low state, the vessels will
e merely less fulness, or become more con-
ed, or smaller, yet, at the same time, soft or
pressible. If vital power is excited or irri-
, notwithstanding the loss of blood, the vessel
rts, with great frequency, much quickness, or
nness of impulse against the finger, and
er constriction. If it be extremely depressed,
ulse may be either rapid or slow, according
irritability of the heart, but the vessel feels
soft or compressible, the slightest pressure
ucting its canal, whilst the impulse com-
cated to the column of blood in the artery is
or rapid, when the heart's action is excited,
vessel feeling as if it were nearly empty
een each impulse, and is slow, undulating,
weak when the contractions of the left ven-
are much weakened, and irritability ex-
ed. Much, however, of the changes in the
of the pulse, with alterations in the *quantity*
ood in the body, is owing not only to the
iated state of cardiac action, but also to the
ty—to the constitution and states of the
l, physically, sensibly, and vitally.

b. The *quality of the blood*, as well as the quan-
has been shown in various parts of this work
rt. BLOOD, DISEASE, FEVER, PESTILENCE, &c.)
remarkably changed in its sensible appear-
, and in its vital states. I have, in several
s, attempted to show that the blood, in addition
to excess or deficiency in its quantity, may
either an excess or deficiency of its red glo-
, or of its fibrin, or of any other of its con-
nts; and that it may, moreover, abound in
id or in foreign matters, owing either to im-
on and absorption, or to imperfect depura-
nd excretion. Still there are manifestly ad-
ial morbid states of this fluid, which also
the pulse, although these cannot be accu-
estimated in grade or kind: these are the
conditions of the blood, derived from the
ls and body generally, through which this
circulates. That there is a very intimate
on, and even connection, between the vital
tions of the vascular system and the con-
ion of the blood, especially of its globules
liquor sanguinis, cannot be doubted; and,
ugh the vital states of the blood are derived
or dependent upon, those of the vascular
n, still they react upon this system, es-
lly if they continue for any time, or are not
ved by the efforts of the constitution, or by
ids of medicine.

. During the progress or continuance of
ges in the sensible qualities and vital states
blood, especially as evinced in the course of
natic, inflammatory, or of adynamic, malig.
and pestilential maladies, the pulse can only
fectly manifest such changes, which usually
ence in the nervous and vascular systems,
ugh most apparent in the blood. In cases of *vascular excitement*—in inflammations, in acute rheumatism, &c. the fibrin of the blood is abundant, and the vital crasis of the coagulum is firm or even increased, and these states may continue after repeated blood-lettings, showing that these changes of the blood proceed from vascular excitement or reaction, rather than that the changes in the blood cause the vascular reaction; the condition of the blood being the effect, not the cause of the state of the pulse, which is always more or less quick, sharp and rapid, owing to the increased irritability and irritation of the heart. When, with this state of vascular excitement, there is also vascular fulness, then the pulse will feel full and hard, as well as sharp, quick, or rapid; but, if the vascular excitement continues, or is fed by irritation or pain, or by the state of organic nervous sensibility and energy, after the vascular system is depleted, or after large losses of blood, then the pulse will become sharp, constricted, rapid, and of various grades of tone or strength, according to the nature and seat of the disease, as observed in acute rheumatism, &c.

11. In cases of *depressed vital power*, or when the organic nervous energy and vascular action are more or less weakened, as well as otherwise altered, as in the course of malignant, pestilential, or specific maladies, the fibrin of the blood is diminished, the constitution of the hæmato-globuline is altered, and the crasis of the blood remarkably impaired. In these circumstances, the pulse is affected, and the experienced and close observer may even predicate from the state of the pulse the character of the changes proceeding in the blood, although he may not infer their exact amount; but, according to their nature and extent— in proportion to the loss of vital power and of the crasis of the blood, will the pulse become open, broad, soft, weak, and compressible, the artery suggesting to the mind of the examiner ideas of defective or lost tone, of impaired elasticity, and of relaxation. But, with these changes in the vessel, others are associated depending upon the amount of blood, and the state of the heart's action. If the blood be abundant in quantity, and in proportion to that abundance, will the pulse be full as well as broad and soft. The artery will furnish a sensation of largeness, and feel full and broad, but still soft between each impulse communicated by the contraction of the ventricle, the parietes of the vessel feeling as if they yielded to the impulse, especially if the heart's action be excited. If on the other hand the amount of blood be deficient, the pulse is not only soft, weak, relaxed or open, and very compressible, but the vessel feels to the examiner as if it were nearly empty between each wave of fluid undulating through it, the impulse of each wave being quick or sudden, whilst the heart's action continues excited; but weak, or languid, or slow, as the irritability of the heart becomes exhausted. The action of the heart will be noticed hereafter, but it may be now stated, that, in these as well as in many other circumstances, to it belong those changes in the number of the pulse in a given time, with the qualities of quickness, sharpness, or suddenness of the impulse of the column of blood against the parietes of the vessel where it is pressed upon by the finger, or with the opposite qualities of languor, weakness, smallness, &c., ac-

cording to the excited or weakened, or nearly exhausted irritability of this organ.

12. *C.* The Heart furnishes, besides *frequency*, several other qualities, as already noticed, to the pulse. The influence of the heart on the pulse is — 1st. *Functional*, or dependent upon the strength or weakness of the contractions of the organ, and upon the grades of irritability possessed by it; — and, 2d. *Structural*, or owing to lesions in the parietes of the cavities, or in the valves or orifices of the heart. — *a.* The *functional influence* of the heart on the pulse varies with different diseases, as these diseases are characterised by excited or increased organic nervous energy and vital power, and increased irritability of muscular and contractile parts on the one hand, or by impaired or exhausted power and irritability on the other. The heart being, by nervous supply from the ganglial and cerebro-spinal nervous systems, and by muscular structure and vascular connections, intimately associated with all the vital functions, is not only influenced by these functions, but also influences them. But whatever may be the state of the heart's action, thus influenced and influencing, the *frequency* and the character of the *impulse* communicated to the column of blood in the artery is produced by the contractions of the left ventricle. When the actions of the heart are unimpaired in tone or in strength, if the irritability of its structure is unexhausted, the frequency of the pulse is seldom very great, although the excitement may be very considerable. In strongly constituted persons, the pulse seldom rises above 100 in a minute, even during inflammations; and it is only as the excitement or irritation becomes associated with diminution of vital power, this latter always gradually supervening upon, and increasing with the continuance of, excitement or irritation, that the pulse becomes very frequent, or much above 100. In delicate, susceptible, or nervous females especially, the pulse is often very rapid during nervous excitement; or in various febrile or inflammatory diseases, or in states of irritation; but in them power is deficient, and although the irritability of the heart is readily excited, it is the more rapidly exhausted.

13. But frequency of pulse may be occasioned not only by nervous excitement, by increased irritability, or by febrile or inflammatory action, but also by losses of blood, and by the want of due correspondence between the quantity of blood and the capacity of the vascular system in general. It is difficult, however, to determine whether or not the increased frequency be caused by this want of correspondence, and the efforts made to compensate for deficient quantity by accelerated motion, or by augmented excitability consequent upon the loss of blood. Most probably, this latter effect is that which is immediately caused by this loss; the former effect, or the compensating influence of accelerated motion, being the result of exalted excitability. But the acceleration of the heart's contractions caused by losses of blood has always a more or less obvious relation to the amount of such loss, and to the conditions of the blood which remains. If the quantity lost be very great, the irritability of the heart soon becomes exhausted, even although the morbid state of the remaining blood, or other sources of irritation, may tend to excite and to prolong the irritability of this organ. Thi s evinced by various diseases for which large scular depletions are ordered, and by acut or active hæmorrhages, &c. At the commencer nt of the former of these, whilst the vascular sys m is full, vital energy excited, and the blood un ntaminated, or at least not very materially alte d, the pulse is full, firm, or strong, and not rem kably frequent, the contractions of the heart b g energetic, without abruptness or quickness. A er a considerable loss of blood, the pulse becomes t, the impulse of the column of blood against the ll of the artery pressed on by the finger much re frequent and more abrupt, and the vessel is lt more empty in the interval between each imp e. The contractions of the ventricles are more equent and sudden, because the excitability of th rgan is at first increased, probably not only in nsequence of the loss of power, but also owi to the state of the blood supplied to the structu of the heart itself. If still more blood be lost he constitution of the remaining blood is mo or less altered, the pulse becomes more acceler d, more abrupt and quick, softer, smaller, or re compressible; the contractions of the heart re numerous and abrupt, but much less energ c; and, if the patient be not aided, or if still re blood is abstracted, the action of the hear ecomes weaker and weaker; in some cases sc equent as not to be counted; in others as rer kably slow, according to the states of the rema ng blood, and of the organic and cerebro-spina ystems, by which the vital properties of mus lar structures, irritability and excitability, are veloped and influenced.

14. A somewhat similar procession of ch ges in the pulse follows acute hæmorrhages. D ng the vascular excitement often preceding th oss of blood, the pulse is very full, more or les equent, and often bounding, the impulse o the column of blood against the walls of the sel apparently exciting a reaction, or developin the elastic property of the artery. In this cas the contraction of the ventricle, and the conse ent momentum transmitted to the column of bl is so great or energetic as partially to overcon the vital tonicity of the artery, and to manife the resiliency of its walls — hence the boundi or hæmorrhagic pulse. But as soon as blood i ost, particularly if the quantity be large, the lse becomes still more frequent, quicker, or ore abrupt, much softer and opener, the vessel f ing more empty, or at least much more compre ble, in the intervals between the abrupt or s den pulsation. If the hæmorrhage be still progr ve, and excessive or fatal, the pulse will p ent changes similar to those just mentioned, mo ed, however, by constitution, by the seat of h orrhage, and by the diversified circumstances ecting the patient externally and internally In many cases, however, commencing in the nte manner described, a moderate loss of bloc by relieving the vascular system of a loa too great for the tonicity of the vessels, and by vering the increased action of the heart, restor this system and the pulse to their natural state nd, with such restoration, a cessation of the h orrhage results.

15. *b.* The influence of *lesions of the* art upon the pulse is necessarily remarkable. But the changes in the pulse which these produ be-

to the diseases of the membranes, the valves,
orifices, and the structure of this organ. (See
HEART.) These changes consist of intermis-
, irregularities, smallness, weakness, remark-
slowness, and numerous other states of
ulse, which, however, can never be duly es-
ted without a close examination of the sounds
impulses of the heart simultaneously with a
ar examination of the pulse, and a comparison
e phenomena furnished both by the heart and
he artery. Many of the states of the pulse
ed by structural lesions of the heart may also
eed from nervous and functional disorder;
ired nervous power of the organ, with or
out other functional changes affecting the
of the heart or large vessels, so disordering
ctions of the ventricles, as to produce inter-
ions, irregularity, inequality, remarkable fre-
cy or slowness, or smallness, &c., which soon
pear as nervous power is restored, or the
tional disorder is removed. A pulse may pre-
intermissions, although the heart contracts
g the intermission, the contraction being only
weak to communicate a momentum to the
mn of blood, sufficient to be felt by the ex-
er, or the quantity of blood thrown out by the
ricle being two small to produce any manifest
ge in the column of blood in the artery.

. III. SEMEIOLOGICAL NOTICES OF THE
SE. — Having considered the *principles* on
h our knowledge of the pulse is based, and
due reference to the principal conditions of
hree *constituents*, or elements of the pulse, it
be useful to take a brief view of those states
e pulse which attend, and hence indicate
in morbid actions, and their several seats.
he view which has just been taken of the
entary principles of the pulse, it has been
n, that changes in the vital manifestations of
rame — in the organic nervous energy, in the
bility or excitability of living fibres, and in the
tity and quality of the blood, remarkably and
dinately affect the tone of the vessels, and the
ractions of the ventricle; and that, whilst an
ation may originate in any one of the three
tituents of the pulse, and affect it, chiefly, for
me, it will not long exist thus limited, but
implicate, more or less, the others. Changes
mencing in the blood, will affect both the to-
y of the vessels and the actions of the heart,
generally, co-ordinately, in grade and in
. Changes, moreover, originating in the or-
c nervous system will necessarily extend them-
s, not only to the heart, but also to the
ies, as it is this system which supplies and
ates both heart and arteries, and ultimately to
lood and structures generally; and the alter-
s thus superinduced in the blood will react
n both the heart and arteries. Hence in the
se of disease, the pulse becomes a more or less
rate index of the vital conditions of the heart,
e vascular system, generally, and even of the
d; the indications furnished by it being ac-
te, according to the powers of the physician
terpret them correctly, the want of accuracy
nding more upon the observer than the
ct of observation. — The pulse varies in *dis-*
, and even slightly in *health*, as to its *develop-*
t and *rhythm*.

7. i. The DEVELOPMENT of the pulse differs in
rent cases, and in different stages of the same case, in *force*, *consistence* or *tone*, and in *volume*; and, according to these differences, and to the various combinations of these, the following states of the pulse occur, without reference to frequency or rhythm: — 1st. Hard, resistent, tense, firm, or sthenic; — 2d. Contracted, constricted, or concentrated, and small; — 3d. Full, large, broad, ample, or open, and bounding, rebounding, &c.; — 4th. Soft, compressible, empty, weak, feeble, unequal, small, &c.; — 5th. Precipitate, quick, rapid, sudden, vibratory, &c.; — 6th. Languid, undulatory, &c. Several of these terms are, however, nearly synonymous, and convey the same, or very nearly the same, idea. — ii. The RHYTHM of the pulse, in its various grades, is *superadded* to any of the above, and differs remarkably in frequency, regularity and inequality, or intermittence.

18. *A.* A *hard*, *resistent*, *tense*, *firm*, or *sthenic pulse* are terms applied by writers to convey nearly the same notion, and are met with, attended by more or less *acceleration* of the pulse, in young, robust persons of the sthenic diathesis and muscular habit, and irritable temperament, during the early stage of reaction in inflammatory fevers, in inflammations of serous membranes, in acute rheumatism, in inflammations of the membranes of the brain, in the hot stage of intermittents, and in excentric hypertrophy of the heart, and when the arterial system is strongly developed. They always indicate the sthenic diathesis, and excited power and action, and admit of large vascular depletions.

19. *B.* A *contracted*, *constricted*, *concentrated*, and *small* and *hard pulse* are various terms applied to the same state, and are intended to convey an idea of that pulse, which is met with, in some cases of the diseases just mentioned, especially when there is less fulness of blood, and which is usually attended with greater acceleration of the heart's contractions, and indicates a more violent and less favourable disease. This state of the pulse as well as the foregoing seldom continues long without passing into some one of those about to be noticed; and it more especially indicates the supervention of structural lesion, and a dangerous issue if not promptly or actively treated, especially by moderate and early depletion, diaphoretics, relaxants, and derivatives.

20. *C.* A *full*, *large*, *ample*, *broad*, *open*, *bounding or rebounding pulse* are states not altogether identical, but very nearly approaching each other. They are met with in various diseases. — *a.* In inflammatory fevers, especially at an advancing stage or after a moderate depletion. — *b.* During inflammations of mucous, cellular, and parenchymatous structures. — *c.* In inflammations of serous membranes after the preceding states of the pulse have been removed by large blood-lettings. — *d.* Preceding and accompanying hæmorrhages, the pulse being also much accelerated when the hæmorrhage is abundant, and when inflammations have been treated by copious blood-lettings. The pulse is frequently then open and compressible, rather than full, and often passes into the two next states to be noticed. A full, large, or broad pulse is often observed in inflammations of the structure of the lungs, and of the substance of the liver, with various grades of acceleration. It is generally met with in young, plethoric persons, and in the sanguine temperament, also in the scrofu-

lous and hæmorrhagic diathesis. It indicates a less degree of tolerance of blood-letting than the preceding states; and if it assumes an open, bounding, and at the same time a compressible quality, blood-letting should be prescribed with great circumspection.

21. *D.* A *small, soft, compressible, feeble, empty,* and *unequal pulse* are modified conditions, which severally indicate important states, both of the vital power and of the blood. *Smallness* is generally dependent upon diminished quantity of blood, or an afflux of the fluid to a quarter remote from that where the pulse is felt. *Softness* and *compressibility* indicate defective tone and vital power. *Feebleness* is merely an advanced state of the same qualities, showing still greater depression of power, especially of the heart; and a feeling of *emptiness* in the vessel suggests the same condition, and a deficiency of blood in addition. *Inequality* of the tone, or strength, or fulness of the pulse usually attends, as well as the other qualities just instanced, diseases characterised by debility, or a far advanced stage of acute maladies; and, in these several circumstances, it presents certain modifications. The strength, tone, and fulness of the pulse may differ in different parts of the body; and this is not uncommon in the course of various nervous diseases. It generally occurs also in connection with local congestions and determinations, and in various states of exhaustion and of the blood. The inequality may exist as regards the character of the pulse in the same vessel; and it may then present a modified form in different diseases. It may be unequal, inasmuch as it varies in strength and fulness, for three or four or five beats in an ascending scale, or in a descending scale, returning for two or three or more pulsations to a natural standard, or to a more constant rate or grade. This state of the pulse is often met with in the advanced course of diseases of the abdominal viscera, when inflammations of serous surfaces terminate in effusion, after hæmorrhages or during convalescence from them, and it is generally attended by a varying rhythm, or by different degrees of acceleration.

22. *E.* A *precipitate, rapid, quick, sharp, sudden, vibrating pulse* should not be viewed as indicative of increased frequency. These terms, which are expressive of the same, or nearly the same quality, have reference merely to the character of the impulse of the column of blood in the vessel against the finger, and as the impulses are thus brief, the intervals between them are more distinct, or even prolonged, when the pulse is not accelerated, which, however, it generally is, more or less, when it presents this character. These states of the pulse are caused by the rapid or precipitate contractions of the ventricle, and are indicative of morbidly excited irritability in connection with deficient power, and often also with more or less anæmia. It is met with in chlorosis, in anæmia, in diseases of debility characterised by increased susceptibility and excitability, in the advanced stages of acute diseases, especially after copious hæmorrhages and blood-lettings, and in the advanced progress of fever, and when the blood is either contaminated or deficient. When there is no deficiency of blood, the pulse may, at the same time, be full, large, or open, or even bounding (§ 20.), but it usually is also soft or compressible, indicating the defective vital power which attends it. More or less frequency is a present, especially in the advanced stages of ac diseases, when the acceleration is generally v great — and great in proportion to the exhaust of vital power. This combination of quickness precipitancy with extreme frequency is charact istic of the operation of contaminating poisons poisoned wounds, of malignant puerperal a other fevers, and of that state of morbid act which surgeons have called irritative fever, a which is owing to excessive irritation in connect with depressed vital power, and often, also, wit poisoned or contaminated state of the blood. t suggests active means of a powerfully restora e nature, and diametrically opposite to vascular pletions; and yet I have seen these latter insi l upon, and even employed, to the rapid destruc n of the patient, the quickness and great accel tion of the pulse having been misunderstood, f n a culpable ignorance of the states of the pulse, d of the indications furnished by a true interpr tion of them.

23. *F.* A *languid* and *undulating pulse* oc s in the course of diseases characterised by hausted vital power, especially in melanch c temperaments and leucophlegmatic habits of e body. When the pulse is merely langui a weak and protracted contraction of the vent le may be inferred, owing either to exhausted o weakened excitability, or to visceral conges n. If the pulse be also small, deficiency of b d generally also exists, and this is still more li y to be the case if the pulse assumes an undula g character. Languid and undulating states y coexist with various grades of frequency; bu e latter is most manifest when the pulse ra es below, or but little above, 100 or 110 a minute.

24. ii. The RHYTHM, or frequency of e pulse differs both in *health* and in disease.—A n HEALTH it varies with the *age, sex,* and the *tem a- ment* and *diathesis* of the individual.—*a.* As to *e,* the pulse usually ranges from 120 to 130 soon er birth; and it is generally somewhat more freq t, or from 130 to 150 during the early cour of dentition, or from three to six or seven mo s. After six or seven months, the pulse become ss frequent with the advance of age; so that at a ut two years of age and up to four it varies m 115 to 110; and from four to ten, it ranges m 110 to 90 or 80. — After puberty and d ng middle age the pulse varies, in different per s, from 60 to 80 in a minute; and, as old ag d- vances, the pulse generally falls to 50 or 6 or ranges between these numbers; numerou x- ceptions, however, occurring, and even inst es of an increased frequency sometimes being et with.

25. *b. Sex* has some influence on the frequ cy of the pulse. In *males* the pulse in health ies from 60 to 75, with the position of the body, c., from 65 to 70 or 72 being the most con on grade of acceleration. In *females* the se usually ranges from 70 to 80 or 85, and it i lso more excitable, particularly upon mental emo ns, especially in early age, a similar excita ity being also often observed in males, abou he age of puberty or soon after. The most co on range in females in good health is from to 80; but the pulse is usually more frequen nd more developed during pregnancy.

6. *c.* The *temperament* and *diathesis* affect the
se in a slight degree even in health and in
ose, as the pulsations are somewhat more fre-
nt in the nervous, the irritable, and sanguine,
ı in the melancholic, bilious, or leucophleg-
ic or lymphatic temperaments, and the action
he heart is more excitable in the former than
he latter; and in the scrofulous, than in the
ımatic diathesis. Habit of body also affects
pulse more or less; but much depends upon
actual fulness of the vascular system; for if
hora exist, the pulse may be a little slower
ı the usual rate, especially in a state of repose;
if the blood be somewhat deficient in quan-
the pulse may be much accelerated, and
excitable. In all our investigations of the
e, not only the above causes of variation in
uency should be recollected, but others also
ot less influence, as the *position* of the body,
the states of *sleeping* and *waking*.

7. *d.* The *position* of the body varies the fre-
ıcy of the pulse more or less; but, according
ıy own observation, in no definite grade, the
t in health, and still more manifestly in
e and febrile diseases, differing in amount
different individuals, in some cases in a very
ırkable degree, and in others very slightly.
recumbent position generally reduces the pulse
ewhat below the standard of health, as ob-
ed in the *sitting posture;* whilst the standing
ure raises the pulse above this standard even
e than the recumbent depresses it. As to
scale of depression in the one posture and of
tation in the other, it is impossible to de-
ıine with satisfactory accuracy, as the va-
on, which is wide in different cases, and even
ıe same case at different times, depends most
ably upon several causes besides those al-
y adverted to; and it is not more easy to
n the *causes*, than to determine the exact
nt of variation. The complete repose of the
and absence of muscular exertion during
ecumbent position may be supposed likely to
the heart also in a state of quietude; but
ably other circumstances favour this state
he circulation. The slight retardation or
ırrassment of the respiratory movements,
ı a person lies on either side, the position of
heart with reference to itself and its large
ls, and to that of the trunk and the contained
ra, the disposition to congestion of the lung
e side on which the person lies, and the state
e circulation within the cranium, seem to me
rally to combine to slightly retard the circu-
n in the recumbent position. In the *sitting*
re these causes are removed, and with them
etardation of the pulse, whilst the heart is in
sition the most favourable for its action. That
standing posture should accelerate the pulse
be inferred, although to a less amount than
en observed, from the circumstances of this
ıre admitting not only of a free circulation,
ılso favouring it by the slight degree of mus-
r action required to sustain this position. It
favours the full exercise of the respiratory
tions, which will also influence the circulation
or less.

. *e.* *Sleeping* and *waking* favour different
s of frequency of the pulse. During *sleep*
pulse becomes slower than in the sitting
ıre, and even sinks below what the recumbent posture generally manifests, and it is at the same time softer. The influence of sleep in reducing the frequency and tone of the pulse is most remarkable in nervous and irritable persons, in females, and in early age, in whom the pulse often then becomes unequal. *Dreaming*, however, often excites the pulse much above the healthy standard; so that the individual may awaken up remarkably excited with palpitations, flushings, or with pallor, and a rapid, small, or weak pulse, according to the nature of the dream — as the dream occasions fear, anxiety, depression, or anger, &c.

29. During the *waking hours*, the pulse is liable to be remarkably affected, not only by the emotions of mind, but also by the impressions made on the senses, according to the various states of excitability of the heart. The influence produced on the pulse in the *course of the day* is not very remarkable, as so many causes of deviation are apt to occur, and affect the individual more or less — the external or physical influences to which he is exposed, the emotions of mind, the *ingesta* and *egesta;* and the states and stages of digestion and assimilation. It was stated by Dr. Knox, that the pulse is more frequent soon after waking in the *morning;* but Dr. Christison has shown that the heart is only more excitable in the morning, the pulse continuing nearly the same throughout the day, all things being equal; but much depends upon the nature of the food, even in the absence of all stimuli.

30. *B.* Disease furnishes the widest range in the *rhythm* of the pulse, and the greatest deviations from the healthy condition. The *morbid pulse* may range from twenty or thirty to two hundred, or even more, beats during the minute; but neither of these extremes can be looked upon as being compatible with a probable, or even with a possible recovery, or with the continuance of life for any time. — *a.* Remarkable *slowness of the pulse* may be caused by pressure on the brain, especially near its base and the medulla oblongata, or by intense vital shock; but the more extreme states of slowness most frequently depend upon structural or vital lesions of the heart itself. A more than usually slow pulse may, however, be constitutional, or be met with in health. I have thus found the pulse range from 50 to 60 in a minute; and a pulse from 55 to 60 is not infrequent in bilious, melancholic, and leucophlegmatic temperaments and diatheses; and it is sometimes hereditary. Great slowness of the pulse occasionally is observed on the invasion of acute diseases, particularly periodic and continued fevers, and shortly before death from malignant fevers, from some acute maladies, and from diseases of the brain, or of the heart itself, especially when vital power is either suddenly or violently depressed, or remarkably exhausted by previous inordinate excitement.

31. *b.* It is often difficult to determine the *degree of acceleration* of the pulse which should be viewed as morbid; for nervous, weak, susceptible females, and the irritable and sanguine temperaments in this sex, sometimes present, in states of very slight mental excitement, or even soon after a full meal, a very considerable acceleration of pulse, and yet preserve their usual good health; and these temperaments, in this sex particularly, are often attended by the greatest frequency of

pulse during acute diseases, more especially when these diseases occur during the puerperal state. A pulse ranging above 110, in a person older than twenty-five years, of the male sex, and not of the nervous or irritable temperament, is not without risk, the amount of which will depend on concomitant circumstances. If it rise to 120, or above this, the danger is great, unless in nervous and susceptible temperaments, and in females. In this sex, especially the nervous, the hysterical, irritable, or delicate, the pulse may range as high as 130 without any risk; but this will depend much upon the nature of the disorder, upon its seat, and upon other circumstances.

32. The frequency of the pulse is seldom very great in the early stage of acute diseases, whilst vital power is unimpaired, as of inflammations, fevers, &c., unless in the class of patients just mentioned. It is chiefly when these diseases have gone on to the exhaustion of vital power, or to the contamination of the blood, and in this class of females, and in the puerperal state, that the pulse rises above 120; and at that amount or frequency, and more especially if the number is increased, it behoves the physician to be cautious as to his prognosis, and as to the treatment he may adopt; for, unless the pulse be also firm, or full, or hard, or at least not deficient in tone, venæsection, particularly if it be large, may aggravate the disease, remarkably increase the frequency of the pulse, and even endanger the patient. Great acceleration of the pulse, as above 110, should be viewed as militating against, rather than in favour of, vascular depletions, unless in small quantity, or locally. If, however, this frequency be attended by fulness, hardness, or firmness, vascular depletions, to an amount which concomitant states and symptoms will regulate, may be prescribed, especially when serous surfaces are affected. When the acceleration amounts to 110 or 120 and upwards, and when it is attended by a very soft or compressible, precipitate, small, feeble, or languid state of the pulse (see §§ 8, *et seq.*), then restorative measures, rather than depletory or depressant, are required, — and required with an urgency proportionate to the greatness of the acceleration and the want of power or of tone in the vessel, and other concomitant symptoms.

33. *c. Inequality* or *irregularity* of frequency of pulse, as well as of fulness and power, is often observed, especially in persons far advanced in life. It is sometimes met with in *children* when asleep, even when in health. It occurs in diseases of the heart, in affections of the liver, in those of the brain, and not infrequently in the maladies of the puerperal state. When, with this inequality, the pulse is small, weak, or precipitate also, or when the inequality is very great, then a serious or even dangerous state may be inferred. Leroy says (*Du Prognostic dans les Maladies Aiguës*, § I. ch. i.), that when this state of the pulse is accompanied with hæmorrhage, or with bilious vomiting or purging, a favourable crisis may take place.

34. *Irregularity*, or marked inequality, of the pulse is not infrequent in the puerperal states, especially at the accession and in the advanced progress of puerperal fevers, and should be viewed as indicative of great danger, especially if the pulse is at the same time very rapid, broad, precipitate, or undulating. In these cases, as well as in the advanced stage of malignant fevers, s state of the pulse is generally connected v failure of vital power and an altered conditio f the blood.

35. The pulse is necessarily always of the sa e frequency in different parts of the body; t it varies often in strength, fulness, and to , in opposite or remote parts. In hemiplegia, e pulse is often weaker, smaller, and softer in e paralysed side, and, in paraplegia, in the lo r extremities. In cases of local determination f blood, and in susceptible and nervous persons, e pulse varies in fulness, volume, and strengt n different parts, according as the local irrita n and vital power may determine an increased v of blood, and thereby disturb the natural ec- bility of the circulation and distribution of e blood.

36. *d.* An *intermitting pulse* is not uncom n in every period of life, and in different dise s. It is rarely observed in children, unless when y are the subjects of rheumatic endocarditis or i- carditis, or of the more dangerous states of dis e of the brain. It is in rare instances also obse d in children when they are asleep, but not so en as inequality and slowness of pulse. An i r- mittent pulse is much more common in aged r- sons, and common in proportion to advanced e. At this period of life it is often caused by org ic change; but it is sometimes, although not so e- quently, the result of impaired organic ner us energy, and is connected with dyspepsia, or th flatulence or torpor of the liver. In these l er circumstances, however, the intermissions ar ot so frequent, nor so complete, as in cases o r- ganic lesion; and the pulsations between th n- termissions are more equal. At all periods of e, functional intermissions of the pulse may oc r, although most frequently in advanced age in the dyspeptic, the flatulent and the sedent ; and in these it is generally irregular, or er various numbers of regular pulsations, ar is caused by impaired organic nervous power, nd by flatulence either pressing on the diaphrag or rising in the œsophagus, and embarrassing he dilatations of the auricles and ventricles. In many instances, however, of these intermiss s, the ventricle does not altogether fail to cont t; it only contracts too weakly, or throws o n insufficient quantity of blood to occasion the ul impulse of the column of blood in the vess on the finger (§§ 8, *et seq.*). In these cases, there e, the heart should always be examined by percu n, and by the ear, in order to ascertain the state of n- traction of the left ventricle, and to ascertai he cause of the intermission, and its dependence on functional disorder, or upon organic lesion as well as the nature of that lesion as far as this ay be inferred. When the intermission is com te, is frequent, and depends upon organic lesion he danger is greater and more imminent than whe he intermission is merely incomplete, and caus by impaired vital power, unless indeed at ar advanced stage of low or malignant fevers, in acute diseases attended with effusion into ut cavities. Our opinions, however, as to th n- dications furnished by intermissions of the se, should depend much upon the nature and h ry of the diseases in which they are observed nd upon the character of the pulse and of the s ds of the heart's contractions between the inte is- sions. An intermittent pulse, in connection th

t frequency or even with remarkable slowness, a small, weak, languid, or undulating state he vessel, occurring in hæmorrhagic diseases, at an advanced period of fevers, especially n they are attended by hæmorrhages, is gene- a fatal indication.

7. It is unnecessary in this place to consider at ter length the several irregularities of the e, as they are noticed, more appropriately n treating of these diseases, in which they are apt to occur. Nor will my limits admit of notice of the influence of diverse stimuli, or of ous depressants, on the pulse. I may, how- , simply mention, that the remarkable in- nce of the exciting emotions of the mind on one hand, and of the depressing emotions on other, upon the frequency and character or lopment of the pulse should never be over- ed; that the nature of the usual food and rages of the patient is also important, especially either has been partaken of shortly, or even ome time, before the pulse is examined; and great frequency of pulse, especially when ed by exhaustion and vital depression, will be reduced most remarkably by suitable uli and restoratives, even although the skin be hot, if other symptoms do not decidedly ra-indicate them. The effects of various getic agents on the pulse will be seen by ring to the symptoms produced by poisons. art. POISONS.)

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PURPURA.

— SYNON. — Πορφύρα, Galen.; — *Purpura*, Riverius; — *Petechiæ sine febre*, Auct. Var.; — *Scorbutus*. — *Hæmorrhœa petechialis*, Adair; — *Phœnigmus petechialis*, Sauvages; — *Porphyra*, Good; — *Morbus maculosus hæmorrhagicus*; *Morbus maculosus Werlhoffii*, *Purpura hæmorrhagica*; — *Purpura sine febre*; — *Miliaria rubra*, Auct.; — *Pourpre*, Fr.; — *der Purpur*; *das Purpurfriesel*, Germ.; — *The Purples*.

CLASSIF. — 3d *Class*, Sanguineous diseases. — 4th *Order*, Cachexies (*Good*); — 3d *Order*, 5 *Genus* (*Bateman*). CLASS IV. ORDER IV. (*Author*).

1. DEFINIT. — i. NOSOLOG. — *The occurrence of small, distinct, purple specks or patches in the cutaneous surface, attended by languor, general debility, sometimes by pains in the limbs, and always by evidence of disorder of the digestive, the assimilating, and excreting functions.*

2. ii. PATHOLOG. — *Depressed organic nervous energy giving rise to impaired tone of the capillaries, especially of the mucous and cutaneous surfaces, and to diminished crasis of the blood, thereby permitting the passive exudation of this fluid.*

3. This disease is intimately related to the *hæmorrhages* on the one hand, and to *scurvy* on the other; being intermediate between them, or forming the link which connects them; certain cases hardly admitting of any distinction between them and hæmorrhage from mucous surfaces, and others being almost identical with scurvy. *Purpura* usually appears independently of fever, with a number of reddish, purplish, or livid spots, of various sizes, on the cutaneous surface, these spots being usually termed *petechiæ*, *vibices*, and *ecchymoses*, according to their sizes; and, in the severer cases, it is attended by hæmorrhage from one or more surfaces, but chiefly from the mucous surfaces. The spots or patches are rarely elevated above the surrounding level of the skin, are not attended by any uneasy sensation, and, when examined closely, they are found to consist of exudations of blood between the layers of the dermis, or in the subjacent cellular tissue, or rather of serum coloured by the red globules variously altered. They cannot be viewed as an eruption, or rash, but are strictly a passive hæmorrhage of the vascular tissue of the skin.

4. Several acute diseases present, in their advanced stages, when organic nervous or vital power is exhausted, and the crasis of the blood diminished, or its constitution contaminated, or otherwise changed, this state of cutaneous hæmorrhagic exudation, in the form of petechiæ, vibices, ecchymoses, &c. and they have hence been denominated petechial fevers, or febris petechialis, or febris

purpurata; and, in these fevers, hæmorrhages from some mucous surface is very apt to supervene. These changes of the capillary vessels and blood, manifesting themselves more especially and visibly on the cutaneous and mucous surfaces, are not infrequent in low and asthenic fevers, both simply continued and exanthematic, and were more common formerly when a heating regimen, insufficient purging, and ventilation were generally employed. But, in these fevers, the petechiæ and purple spots are merely *symptomatic* — are consequent upon a series of changes produced by the fever, whilst they constitute one of the chief phenomena of the disease under consideration, although attended by others, and often followed by several of most serious import — the former being a continued or exanthematic fever *with petechiæ or purpura*, the latter, a *purpura sine febre*, or *purpura nonfebrilis*.

5. Riverius first distinguished purpura from the petechiæ sometimes symptomatic of the typhoid, adynamic, or malignant states of fever; and Werlhoff long afterwards briefly described it. Strack next noticed it, and was followed by Behrens and Graff; and almost contemporaneously with these last, by Duncan, sen., Adair, and Ferris. Soon afterwards Tattersall, Walker, Willan, Bateman, Berenger, Acrel, Pierquin, Brachet, and others referred to in the Bibliography, treated of purpura as an idiopathic malady. Willan considered the disease as nearly identical with scurvy; but this opinion was shown to be untenable by Parry and Harty, although an intimate connection cannot be disputed; and the alliance is certainly closer than these last writers have endeavoured to show.

6. Writers have generally divided the disease into certain varieties, respecting which they have not been quite agreed. Willan and Bateman have designated the *Purpura simplex*, *P. hæmorrhagica*, *P. urticans*, *P. senilis*, and *P. contagiosa*. Rayer has recognised the *simplex*, the *hæmorrhagica*, and the *senilis*, to which he has added the *febrilis*. Biett considers that the first and second of these varieties only deserve notice, and that the others are rare occurrences, or are symptoms belonging to other maladies. Whilst Goldie retains only the first, second, and third varieties of Bateman's arrangement, Wilson has divided the varieties of purpura into *simplex*, *hæmorrhagica*, *urticans*, *senilis*, *cachectica*, and *febrilis*.

7. The *exudation* of blood in minute spots, or in larger patches, from the capillary vessels of the integuments, constituting either petechiæ or ecchymoses, takes place in the superficial layer of the dermis, or beneath the epidermis, especially when it forms merely petechiæ; and in the cells of the corion, or even in the subcutaneous cellular tissue, particularly when it appears in the form of vibices or ecchymoses. The *colour* of the spots varies with the quantity of red globules in the effused serum, with the quantity of blood and with the time elapsed from the exudation. At first the *petechiæ* are usually a dark-red, and successively purple, livid, and reddish brown. As they are absorbed, or further changed, they become yellow, and at last disappear as pale yellow stains. The *ecchymoses* are not only larger than the petechiæ, but are of a purplish or darker hue from the first, the exudation of blood being greater; and they become by degrees successively blackish, reddish brown, greenish yellow, and yellowish, until they entirely disappear. The spots, whatever may be their size, are of a deeper or darker colour in their centres than in the circumferences, which latter pass into the hue of the surrounding skin.

8. I. Description. — Var. i. — Purpura Simplex. — Synon. — *Petechiæ sine febre*, Auct.; — *Phænigmus petechialis*, Sauvages; — *Porphyra simplex*, Good; — *Pétéchies sans fievre*, Fr.; — *Rothe punkt*, Germ.; — *Petechial scurvy*; — *Simple purpura.* — This variety, like all the others, although less remarkably than they, is preceded by more or less constitutional disorder. The patient has complained, and even still more complains, of languor, loss of muscular power, of weakness of the joints and pains in the limbs, increased on slight exertion. The complexion becomes pale and sallow; the pulse is weak, soft, and excitable; the tongue is loaded, and its edges often marked by the impressions of the teeth; the bowels are confined, the stools offensive, and the urine loaded, or thick upon cooling. The appetite is impaired, and sometimes there are nausea and headach. The petechiæ and small ecchymoses, usually attending and characterising this variety, may affect the surface either partially or more or less generally. When partial they are limited chiefly to the lower extremities, or affect also the upper. But very frequently they are numerous on the insides of both the lower and upper extremities, and on the breast, neck, and abdomen. They vary in size from a minute point to that of a pea, are rounded, do not disappear on pressure, and are not attended by itching, nor other uneasy sensation. They may be either simultaneous in their appearance, or nearly so, or successive; in the former case the tints they assume may differ little; in the latter the hues of each point, or spot, vary more or less with their respective durations. The face is often free from them; but if they appear there they are usually observed also in the conjunctivæ, and in the mucous membrane of the mouth and fauces. Their *duration* varies, as they are simultaneous or successive in their appearance, being usually two or three weeks in the former case to as many months in the latter. When this variety is neglected it may pass into the next.

9. Var. ii. Purpura Hæmorrhagica. — Synon. — *Hemorrhagia Universalis*, Wolf; — *Morbus maculosus Werlhoffii*, *Morbus maculosus hæmorrhagicus*; — *Porphyra hæmorrhagica*, Good; *Pourpre*, *Hæmorrhagie pétéchiale*, Fr.; — *Land scurvy.* — This variety is often *preceded*, for some weeks, by great lassitude, and by the constitutional symptoms now enumerated (§ 8.), but in a more marked degree. In some instances it occurs much more suddenly. It is always, however, accompanied with extreme debility and depression of spirits; by marked disorder of the digestive, assimilating, and depurating functions; by morbid states of the evacuations; by a feeble, soft, incompressible, and excitable pulse; by slight chills alternating with flushings or perspiration; by pallor or sallowness, or duskiness of the skin; and a loaded, flabby tongue, and spongy state of the gums. In some instances the hypochondria are distended; syncope or faintness is complained of; or the extremities swell when in a dependent position. The breath is fœtid, and the odour of the body is offensive. Pains in the limbs, or about the præcordia, back, or abdomen, are not unfrequent. The pulse may be slow, or of natural

uency ; but it is readily excited. More or less
ciation is commonly observed.

0. The petechiæ, in this variety, are inter-
sed with ecchymoses and vibices, sometimes
livid stripes or patches, resembling the marks
by bruises. They commonly appear first on
legs, and, at varying periods afterwards, on
thighs, arms, and trunk of the body. The
ds are seldom spotted with them, and the face
enerally free. They are usually of a bright
colour when they first appear, but they soon
ome livid or purple, and when they are about
isappear they change to a brown, greenish
ow, and pale yellow hue. When they arise
essively, then the surface presents a variety of
ur. The cuticle over them is smooth and
ing, but is not sensibly elevated; in rare in-
ces only has it been raised, or assumed the
earance of a vesicle containing dark blood.
s appearance has more frequently been ob-
ed as regards the spots in the gums, cheeks,
te, and fauces, where the slightest force
tures the epithelium and allows the blood
sed to escape. Slight pressure also in any
of the surface often produces the exudation
lood, and ecchymoses and vibices in that part.

1. In connection with this disposition to ex-
tion of blood in the integuments, there is a still
e marked disposition to exudation of this fluid,
often in large quantity, from the internal
aces, especially the mucous. These hæmor-
ges are not only sometimes profuse, but are also
ained with difficulty, and are even occasion-
suddenly fatal. In a majority of cases, how-
, they are less abundant; and in a few instances
have recurred daily at stated periods. Other
s present only occasional and irregular ef-
ons of blood; and some are attended by an
ost constant oozing. The bleeding occurs
t frequently from the gums, cheeks, fauces,
ue; from the stomach and bowels; from the
eys, bladder, uterus, or vagina; from the nose,
chi, or lungs; and more rarely from the con-
tiva and external ear. There is the utmost
ety as to the period of the disease in which the
orrhages commence and cease, and as to the
ortion which they bear to the exudations in
integuments which chiefly mark the character
e diseases, in connection with the general dis-
tion to hæmorrhage.

2. The *duration* of this variety is extremely
ertain. It may continue for weeks or months,
even, in very rare instances, for years; and
ome period, especially upon sudden exertion
xcitement of the circulation, hæmorrhage may
ur to a profuse, dangerous, or even fatal ex-
. When the disease terminates fatally, the re-
is to be imputed to the amount of hæmorrhage,
rnal or external, or to the vital exhaustion
e slowly caused by a continued oozing of
d; and, in this case, emaciation, œdema of the
emities, and occasionally serous effusions into
er of the shut cavities, precede dissolution.

3. Var. iii. Purpura Urticans. — Synon.
orphyra urticans, Good. — *Nettle-rash Scurvy.*
This variety is merely a rare modification of
first. It is distinguished by commencing in
ded reddish elevations of the cuticle, resem-
g the small weals of urticaria, but it is not
nded, like them, by any tingling or itching
these small weals dilate they subside to the
l of the surrounding surface, assume a darker, and at length a livid hue. As they generally appear in succession, in different places, they present different tints; the more recent being of a brighter colour, the older spots being level, and of various degrees of lividity. They are most frequently seen on the legs, mixed with petechiæ, but they sometimes also appear on the thighs, arms, and breast. The *duration* of this variety is from three to six weeks. Hæmorrhages very rarely occur in the course of it. This variety sometimes attacks delicate young females, and in them it is generally attended by some œdema of the extremities. In one case, which occurred in a young lady under my care, it soon disappeared after an attack of menorrhagia and the treatment adopted for this attack.

14. Var. iv. *Purpura senilis.* — Synon. — *Senile purpura.* — *Scurvy of old age.* — This variety is rarely met with, and occurs chiefly in aged females, who live on a poor and insufficient diet. It appears principally on the legs and fore-arms, in successive dark or purplish spots or blotches, of irregular forms and various sizes. Each of the spots continue from ten to fifteen days, when the exuded blood is absorbed, and they disappear; but a repeated series of these blotches may continue to appear for months or even years. The health does not appear to suffer so much in this variety as in the preceding. I have not seen among several cases that I have observed, one instance of hæmorrhage supervening in the course of this variety. Dr. Bateman states, that he has met with this affection only in elderly women, and on the outside of the fore-arm. I have seen it sometimes in elderly males, and more frequently in the legs than in the fore-arm.

15. II. Complications of Purpura. — The complications of purpura are extremely diversified; for, not only may this change in the skin supervene in the course of the adynamic and malignant states of fever, but it may be almost, although in very rare instances, co-existent with fever, the purpura assuming a *febrile character*, and not being merely a contingent phenomenon in the advanced progress of fever. Moreover, even the non-febrile purpura may be complicated not only with hæmorrhages, from mucous surfaces, and into various structures, but also with various states of visceral lesion. It will be useful to notice these several associations more fully.

16. i. *With fever.* — *Purpura febrilis.* — *Exanthema hæmorrhagicum*, Graves. — This complication of purpura may be *sporadic* or even *epidemic*, as shown by Lordat, Latour, Rayer, and others. *Febrile purpura* may attack persons of all ages and of every state of constitution. It usually commences with great lassitude and a feeling of vital depression, by chills or rigors, followed by heat, pains in the back and limbs, headach, a sense of oppression or of heat over the body, by nausea, retching, and by rapid pulse. Petechiæ and ecchymoses appear from the third to the sixth day, sometimes without hæmorrhage from the mucous surfaces — *purpura febrilis simplex*, sometimes with such hæmorrhage — *purpura febrilis hæmorrhagica.* — In most cases, the more or less fever precedes the change in the skin, for a few days; very rarely is the fever and the purpura nearly simultaneous; and not unfrequently, with the vascular reaction characterising the febrile attack, or about the second

or third day, exanthematous patches, resembling urticaria, first appear, and are followed by purplish petechiæ and ecchymoses. Hæmorrhage, from the mucous surfaces seldom occur in febrile purpura, until the characteristic change has taken place in the skin, the hæmorrhage being consequent upon the purpura, as the purpura usually is on the fever; both forms of sanguineous exudation being strictly symptomatic of the fever, or complications of it.

17. The *duration* of this complication is usually from fourteen to twenty-four or thirty-one days; but it may terminate *fatally* at an earlier period, and seldom later than the twenty-fourth day. This event generally takes place in consequence of hæmorrhage from the bowels, the stomach, the lungs, &c.; or into the substance of an organ, as the brain, lungs, spleen, &c.

18. ii. *The cachectic association* of purpura is the most frequent; indeed purpura is eminently a cachectic malady, proceeding from causes which affect the vital tone and condition of the tissues, and consisting of changes not only in the condition of the textures, but also in the state of the blood. This cachectic habit of body both precedes the purpura and attends it, and favours the occurrence of hæmorrhage, which so frequently takes place, and is one of the most important complications of the malady. The evidence of cachexia is, however, not limited to the supervention of hæmorrhage, but is supported by the appearance of the countenance, of the cutaneous surface, even before the purpura appears, by the states of several assimilating and excreting functions, and by the condition of the whole frame.

19. iii. *Visceral complications* are very common, especially in the more chronic and severe cases. Very few of these cases are unconnected with functional or structural disease of the liver, or spleen, or both. I have repeatedly seen purpura, even in children, associated with great enlargement of the spleen; and in these cases the cachectic appearances have been most marked. I have seen, also, purpura follow protracted intermittents, the abdominal viscera being also more or less diseased; and in rarer instances associated with chronic diarrhœa, and enlargement of the mesenteric gland.

20. iv. The *hæmorrhage in purpura* occurs chiefly in the variety denominated hæmorrhagica, and but rarely and contingently in the other varieties. It appears most frequently as epistaxis in children and young subjects; as metrorrhagia in females; and as intestinal and pulmonary hæmorrhage in adults. When it takes place from the mouth or gums, it is often associated with bleeding from the edges of the tongue, from the fauces, and from the nose. Hæmatemesis is also then not infrequent. When purpura occurs at an advanced age, it is often attended by hæmorrhage from the bowels, or urinary organs.

21. v. The *appearances of the blood and urine.* — (*a.*) The chief changes in the *blood* consist in the physical conditions and appearances of this fluid, rather than in its chemical constitution, which, however, is so far altered, that a very marked deficiency of fibrin has been ascertained. I have treated several — indeed many, cases of purpura, but I never had occasion to bleed one. The appearances of the blood, which has escaped, furnish no small proof of its condition. Cases, however, have occurred, in which blood has been taken from a vein; but these cases have be attended either by signs of vascular plethora, by excited vascular action — states likely change the blood, or at least to be connec with a condition of the blood, very different fr that which usually exists in this malady. In case of marked purpura hæmorrhagica, wh much blood was lost, recorded by Dr. Dunc the blood, while flowing slowly from the ve resembled diluted arterial blood, formed a lo coagulum, from which no serum separated; coagulum being like jelly, tremulous, transpare, and colourless, the colouring matter having s sided to the bottom of the vessel. In other cas detailed by Jeffreys, Gairdner, Fairbairn, Combe, the blood was pale, coagulated slow, formed a tremulous jelly, separated no seru, and nearly resembled that described by Dr. D can. The blood which I have observed in hæmorrhages occurring in the course of the ease, did not coagulate, and appeared with t fibrin and vital crasis, and deficient in hæ tosine.* — (*b.*) The *urine*, in the cases where I h e had an opportunity of observing it, was gener y of a dark colour, emitting an ammoniacal od, and usually presenting an alkaline reaction. It appeared to contain much of the earthy p phates, and soon became offensive and y alkaline.

22. III. Appearances on dissection vary markably with the form, complication, and am t or seat of *hæmorrhage*. — *a.* The membranes of e *brain* are seen, in some instances, spotted h ecchymoses; and small clots of blood and e chymoses of various sizes, from that of a 's head to that of a bean, are found in the conv tions of the brain. The surfaces of the ventr es present small petechiæ, and these cavities co n much serum. In some instances, the effusio f blood within the cranium is in larger quan y, forming one or more large coagula, the pat ts having died comatose or apoplectic, with or w out palsy. The mouth, fauces, and pharynx, d often also the œsophagus, are covered with b k spots and ecchymoses. — *b.* The external su e of the *lungs* is often thickly studded with ec y moses. This organ is commonly congested h dark blood, and parts of it sometimes pr nt circumscribed engorgements; and in rare n stances circumscribed hæmorrhage into its b stance, or pulmonary apoplexy. — *c.* The *pl a* and the *pericardium* also often present nume us ecchymoses or livid patches. The substan of the heart is often somewhat soft and easily tor —

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* In a case of this disease, the blood discharged m the mouth was examined by Simon. It contained ch saliva, and some flocculi of mucus, but no fibrin. I ad a faint disagreeable smell, was of a dark (almost b k) red colour. It was composed of —

Water	9 89
Solid residue	11
Fat	77
Albumen and mucus	32
Globulin	10
Hæmatin	02
Alcohol-extract, bilin, and salts	35
Water-extract, ptyalin, and salts	55
Biliverdin	66

In a case analysed by Routier, in 1000 parts he nd

Water	7 44
Solid constituents	2 56
Fibrin	05
Blood-corpuscles	1 01
Residue of serum	05

—(Simon's *Animal Chemistry*, by Day, vol. i p. 316—319.)

ie *serous*, and, still more, the *mucous membranes* ie abdomen almost always exhibit ecchymoses atches of exuded blood; the mucous epi- um, and even the membrane itself, being de- ed or softened in parts.—*e*. The *urinary sur-* ; are sometimes similarly changed. —*f*. I : seen the *spleen* remarkably enlarged and ned; and the *liver*, also soft, friable, and of le hue. The most remarkable change, and which has not been sufficiently considered, cially with reference to the pathology of the ise, is the general want of vital cohesion, or softening and friability of the tissues, which immediately after death.

3. IV. DIAGNOSIS. — It is scarcely requisite dvert to the *diagnosis* of this malady. Its rnal characters mark it sufficiently; and n it assumes the features of hæmorrhage on one hand, or of scurvy on the other, the ological condition is that which should be re- ised, and not the nosological distinction. In vy, however, the gums are more prominently ted, and the ecchymoses are most evident on xtremities, and are larger. (See *art.* SCURVY.) namic and malignant fevers, continued and ex- ematic, are often accompanied with petechiæ urple spots or patches, identical with those of ura, and sometimes also with hæmorrhages; these maladies retain their own distinctive or ific characters, and proceed from determinate es, which are entirely unconnected with this ise.

4. V. PROGNOSIS. — *Purpura hæmorrhagica*, h shows itself by ecchymoses on the skin, is re serious disease than that which appears by chiæ; and even this latter form is more dan- us than *purpura simplex*, or purpura without orrhage. RAYER observes that *purpura fe- s* and *hæmorrhagic fever* are less serious than e forms of *hæmorrhagic purpura* which com- ce without fever, but become febrile after orrhage has recurred several times; and that all, hard, and very frequent pulse — from to 140 in a minute — is often precursory of a wal of the hæmorrhage, or of other serious ptoms.

5. Ecchymoses on the nose are often followed rofuse epistaxis; palpitations or oppression e chest, with or without cough, are frequently wed by hæmoptysis; and pulsations in the astrium by hæmatemesis. If these hæmor- es recur often; if the blood does not coagu- or is thin and watery, or exhibit a sanious arance; if the signs of cachexia are mani- and if those of anæmia are also present; if pulse be very small, rapid, or weak; if the els become relaxed with black or bloody eva- ions; if the matters vomited present a black, nous appearance; if the evacuations be at- ed by faintness, or by syncope; if hæmorrhage place from the tongue and from the urinary ns, the danger is great, and the patient should be allowed to assume, especially suddenly, er the sitting or standing posture, or to make least exertion. All the evacuations should be ed in the recumbent position, lest fatal syn- e take place on passing them. If a prompt decided treatment fail of affording relief in s attended by one or more of these symptoms, danger ought to be viewed as not only great, also imminent. The occurrence also of leth- , or coma, or apoplexy, especially when the case has been unattended by external hæmorrhage, is generally fatal.

26. VI. CAUSES.—This malady occurs at every period of life, and in both sexes; but most frequently in women, and in boys before the age of puberty; especially those of delicate constitutions, who live in cold, humid, and miasmatous situations, or in low damp cellars, or in apartments which allow the dampness or exhalations from the soil to pass through them, and in houses which have no cellars or sunk areas. It affects chiefly, also, those who live in close, crowded, and ill-ventilated lanes, closes, or houses; who are employed in sedentary occupations, in close and densely inhabited towns; who suffer from mental anxiety, the depressing emotions, from fatigue and want of sleep; and those more especially who live on a poor, innutritious, or unwholesome food, or who have too little food. It may attack those, also, who live too exclusively on animal food, and deprive themselves of a sufficient quantity of fresh vegetables and fruits. It was remarkably prevalent during 1846 and 1847, when the crops of potatoes and of vegetables were generally blighted and scarce; potatoes and other vegetables, farinaceous food and milk, in due quantity and proportion, manifestly tending to preserve the blood in a state incompatible with the existence of purpura and scurvy.

27. Purpura has also followed other diseases, or appeared during convalescence from them, especially from small-pox, measles, scarlet fever, and affections of the liver or spleen; and in children after various disorders of the digestive organs. It has also followed remittent and intermittent fevers. It has occurred, however, in persons previously healthy, and in those who have appeared to live well, and in healthy localities; but I suspect that even in these the modes of living may not actually be wholesome; that too much animal food is habitually partaken of, either absolutely or relatively, to the proportion of vegetable substances, and that the animal food is not always of the most wholesome kind; that it is either imperfectly preserved or cured, or consists of pork, veal, and other indigestible or hurtful articles, or of the blood or viscera of animals; and that, in connection with an excessive use of animal food, congestion and oppletion of one or more of the internal viscera, especially the abdominal viscera, are produced. Hence the relief often observed to follow losses of blood in the course of purpura, and, in some cases, the entire disappearance of the disease after such losses. Purpura is said to have been hereditary in a few instances; it may even be epidemic, or endemic in some parts; and instances of its prevalence as an endemic and epidemic have been recorded. The nature of the causes will readily account for such manifestations of it on some occasions, especially when several of these causes concur to produce it.

28. VII. TREATMENT. — The *treatment of purpura* depends essentially upon the habit of body and age and strength of the patient. If the patient be plethoric, and the pulse full and strong, or if evidence of visceral congestion or oppletion exist, and if the purpura be simple or not complicated with hæmorrhage, or if the hæmorrhage has been inconsiderable, a moderate blood-letting will then be of service; but the disease may be removed without it; and it ought not to be pre-

scribed if there be evidence either of anæmia, or of deficient crasis of the blood. By bleeding in these circumstances, we do not only diminish the already deficient proportion of blood globules, and the impaired vital crasis of the blood, but we also lower the already depressed vital tone of the vessels; and we also disturb, or even altogether overturn, the mutual dependence subsisting between the blood-vessels, especially the capillaries and their contents. If we at all base our treatment upon the pathology of the disease, blood-letting will rarely be required, and only in moderation, in the circumstances just mentioned; and probably, also, when the cases thus circumstanced have presented somewhat of a febrile character.

29. *Viewing the disease as essentially dependent upon impaired vital tone, and cohesion of the capillaries and of the several tissues, with more or less manifest change in the blood, either proceeding from, or connected with, impaired assimilation and excretion* (§§ 26, 27.), I have hardly ever directed vascular depletion, but have prescribed those remedies which appeared to me the best suited for the removal of these pathological states; and I have never found, in the many instances in which I have prescribed it since 1817, the *oleum terebinthinæ* fail in removing the disease, when prescribed in a suitable form or dose, or in such combinations as the peculiar features of the case required. Numerous other means will often succeed in curing this malady; but there is none so efficacious as this in the hæmorrhagic states of the disease, and none which will be more beneficial conjoined with purgatives, in the several circumstances requiring a purgative treatment. If we wish to arrest the hæmorrhagic disposition, the turpentine should be given in doses varying from half a drachm to a drachm, three or four times daily; and, if the vital powers be much depressed, a few drops of tincture of capsicum, or of some aromatic tincture, may be conjoined with it. If it be more desirable to act upon the bowels, then it may be prescribed in much larger doses, with castor oil on the surface of an aromatic water, or in any other mode; or it may be administered similarly conjoined in enemata. If the exhibition of it by the mouth produce *vomiting*, this occurrence may prove salutary, or may even be promoted, as tending to emulge the biliary ducts, and to remove congestion of the abdominal viscera. If, on the other hand, it should be preferred neither to risk nor to produce this effect, or even the unpleasant sensations which it may produce when thus exhibited, then the administration of it in enemata, in moderate doses, with a few drops of tinctura opii, or with a drachm or two of tinctura camphoræ comp., repeating the enemata frequently, or according to the period of their retention, and to their action on the bowels, will be very beneficial. If the patient complain of abdominal pains and flatulence, epithems of turpentine, or liniments or embrocations containing it (see Appendix, Form 295—297. 311.), may be applied over the abdomen, or frictions with these may be directed.

30. Many other remedies will be found more or less serviceable in the various states of purpura. When the disease is complicated with enlarged spleen, or when there is manifest *anæmia* produced by losses of blood, and especially when the attendant hæmorrhage has been restrained by the turpentine as advised above, then the preparations of iron will be most beneficial. The tinc re of the sesquichloride of iron may be given e er alone, or with an addition of hydrochloric aci in the infusion of calumba; or the sulphate of in may be conjoined with the sulphate of quina, m- phor, and as much of the purified extract of es as will act sufficiently on the bowels, this l r, when conjoined with the quina, operating ficiently in very small doses. These and other t cs may likewise be prescribed with purgative ts, and with the acids which are compatible th them. If the functions of the *liver* are to d, the nitro-muriatic acids may be given in ic infusions; and even a dose of a mercurial y be prescribed occasionally. In these cases, d especially when the purpura is associated th congestion of the abdominal viscera, a full se of calomel, with an aromatic, should be give at bed-time, and either a turpentine or casto il draught, or other purgatives, with tonics, the lowing morning and day, until the bowels re freely evacuated. The compound infusio of roses, with either of the sulphates and a ic tincture; or the compound infusion of gen n, with the sulphate of magnesia, sulphuric d, and tincture of orange-peel, or similar com a- tions, may be prescribed with this intention, d repeated according to their effects; the cal el being also repeated if the congestion continu

31. In the *febrile state*, as well as in other f s and complications of the disease, the decocti of cinchona may be directed, with liquor amm æ acetatis, the acetic acid being in excess; o he same decoction may be conjoined with the o- rate of potass, or with the hydrochloric acid he hydrochloric æther, and tincture of serpent a, purgatives being employed from time to time c- cording to the state of the case. Purgative e- mata also may be occasionally employed, espec ly those containing the spirit of turpentine. In ne instances, I have found the decoction of cinc na and tonic infusions more serviceable when n- joined with small doses of the nitrate of p sh and carbonate of soda or of potash. The t t- ment I have advised for the more asthenic f ns of Hæmorrhage (§§ 45, *et seq.*) will als e found appropriate to this disease; and tha or Scurvy will often prove as successful in th as in that malady.

32. The *diet* and *regimen* during the t t- ment requires attention. The *causes* (§ .) should be avoided as much as possible; and e food ought to be light and digestible. lk should be freely allowed, in conjunction with e and farinaceous articles. Animal food oug to be partaken of sparingly, and fresh vegetables d fruits freely allowed. The beverages may co st of lemonade, or of diluents rendered pleas ly acid with lime juice or pomegranate juice. Sp e- beer, especially the Dantzic spruce; seltzer w r, soda water, with sherry or hock, or seltzer v er with milk, or water made pleasantly acid th raspberry vinegar, will generally be both agree le and beneficial.

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1. PUS — *Pus*, Fr.; — *Eiter*, Germ. — is a m id secretion, from an inflamed or otherwise al ed animal tissue or tissues, depending upon a cl ge from the healthy state of the capillaries of th ffected part, and probably also of the organic ne es supplying the capillaries and tissues implica l. It is one of those pathological formations w h is foreign to the œconomy, and is incap e of organisation, beyond that which it alre y possesses in its independent cells. Its path gical relations are fully considered in the ar les ABSCESS, DISEASE (§§ 131, *et seq.*), and INFI IMATION (§§ 44, *et seq.*); but since these were w en recent microscopic researches have thrown fu er light upon the constitution of this fluid, alth gh much yet remains to be determined respecting ts relation to the blood in the capillaries of th parts, upon or in which it is formed.

In order to understand recent views resp ting pus it is necessary to premise the princi l topics connected with the *cell-theory* of fo ation, nutrition, and morbid fomentations, w h has very lately been promulgated in Germ y. According to SCHWANN, the author of th theory, development is always dependent u n a formation of cells in an amorphous *plasma*, w h, when giving rise to organised formations, o e production of cells, either in independent fo s, as in the fluids, or variously continuous or co esced, as in the several tissues, he has termed *cyblastema*, or, for brevity, *blastema*; and the fo ation proceeds in this manner, according to th description of VOGEL. In the first place, one o more minute granules — *nucleoli* — appear, a nd which the cytoblast — *nucleus*, — is fo ed; and this again becomes surrounded by a m brane — the *cell-wall* — which at first closely e elopes it — the nucleus; but subsequently th cell-wall, in the course of its growth, becomes se rated from the nucleus, thus leaving a cavity b veen them. This is termed the cavity of the ce and is filled with a substance differing essentially in character both from the nucleus and from the cell-wall. In the cell thus produced, the nucleus is not in the central point, but is situated eccentrically at a point on the inner surface of the cell-wall. It is from these cells alone, by a process of further development, that all organised products arise.

3. That this mode of development from cells takes place in morbid as well as in normal formations may be readily shown in numerous cases; and, as VOGEL remarks, can be most obviously traced in the formation of pus corpuscles. SCHWANN describes the corpuscles of pus as peculiar cells which are formed in the serum of pus — the *cytoblastema*, exuded during inflammation, in increased quantity and of anomalous composition, — precisely in the same manner as mucus-corpuscles originate in mucus, and, indeed, as all cells form in their cytoblastema. Pus corpuscles appear to be earliest formed upon the surface of the granulations, owing to the circumstance of the pus-serum — their cytoblastema being constantly exuded at that part, and with the greatest amount of plastic force. SCHWANN considers it most likely that the nuclei of the pus-corpuscles are first formed, and that the pus cells pursue an independent growth for a period. The more healthy the pus, the greater is its plastic force, and the greater the number of cells which are formed in it, so that in healthy pus the quantity of serum is small in comparison with the number of cells.

4. VOGEL states, that when pus is produced from a fluid blastema on a free surface, or in a cavity connected with the exterior of the body, numerous isolated granules are first seen, and that these granules become surrounded by a very delicate transparent cell membrane, which subsequently forms so thick and opaque a wall that the nucleus can no longer be seen through it; but the addition of acetic acid, which either dissolves the cell-wall, or renders it transparent, again renders the nucleus visible. As to the early relations of the nucleus and nucleolus, he cannot determine whether or not the nucleolus exists prior to the nucleus — that the nucleolus is, as it were, the means of forming the nucleus in the same way as the nucleus forms the cell. In some cases he thinks that this may happen, but certainly not in all. VOGEL agrees with HENLE, in opposition to REICHERT, in believing that SCHWANN's cell-theory represents only one of the various forms of development, of which the type in different cases may present very numerous differences. The English reader will find this theory developed in Mr. HENRY SMITH's Translation of SCHWANN and SCHLEIDEN's researches for the SYDENHAM Society, and this and other pathological subjects fully discussed in Dr. DAY's very excellent translation of, and additions to, VOGEL's *Pathological Anatomy of the Human Body*, where the pathology of *pus* is ably considered and at great length. The recent literature of this formation is abundant; but there is nothing furnished by the numerous authors who have written on it essentially different from the results furnished by SCHWANN and VOGEL.

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PUSTULAR ERUPTIONS. — SYNON. — *Pustulæ*; — *Pustulie*; — *Φλυκταιναι*; — *Ecpyesis*, Good; — *Pustules, Boutons*, Fr.; — *Eiterblattern*, Germ.; — *Pimples*.

CLASSIF. — 5th *Order* (Willan). 6th *Class*. 3d *Order* (Good). III. CLASS. I. ORDER (*Author*).

1. DEFIN. — *A pustule consists of a small and nearly rounded elevation of the cuticle, with an inflamed base, containing pus from the commencement of this elevation.*

2. WILLAN and BATEMAN distinguish four varietes of PUSTULES. — 1st. *Phlyzacium*, a pustule commonly of a large size, raised on a hard circular base of a vivid red colour, and succeeded by a thick, hard, dark scab. — 2d. *Psydracium*, a small pustule, often irregularly circumscribed, producing a slight elevation of the cuticle, and terminating in a laminated scab. Many of the psydracia usually appear in clusters and become confluent; and after the discharge of pus they pour out a thin watery humour, which often forms an irregular incrustation. — 3d. *Achor*, a small acuminated pustule, containing a straw-coloured pus, having the appearance and nearly the consistence of strained honey, and succeeded by a thin, brown, or yellowish scab; and, 4th. *Favus*, a larger and flatter pustule than achor, not acuminated, and contains a more viscid matter. Its base, which is often irregular, is slightly inflamed; it is succeeded by a yellow, semi-transparent, and sometimes cellular scab, like a honey-comb; whence it has obtained its name.

3. Pustules arise from an inflammation of the skin, and the consequent formation of purulent matter under the cuticle, elevating this latter into small circumscribed tumours. Most commonly the inflammation of the base of each pustule is distinct; but sometimes several or even many pustules arise from an extended inflamed surface. The fluid contained in the pustules desiccates and often terminates in a scabby incrustation, varying in hardness according to the tenacity of the contained fluid; sometimes in superficial ulceration. The number, form, and aspect of the pustular ulcerations, in these latter cases, and even of the cicatrices which succeed them should be attentively considered, as they are characteristic of the particular species of the pustular eruption. There is no class of diseases, and especially no class so limited as this is, that has so little in common in their constitutional characters as this presents. It is only in the pustular eruption that they have any resemblance to each other; for some are contagious, and others are not, and some are acute, al others chronic.

4. Pustules are liable to be confounded w h vesicles, especially when the latter, by a sor f reparative action, and by the greater intensit f the inflammation in their dermic bases, form p, which mingles with the serum, and forms at fir a sero-puriform, and subsequently a purulent or e h a pustular vesicle. In such instances the erup n is actually vesicular, the pustular eruptions c- taining pus from their earliest formation.

5. Much difference of opinion exists am g writers on diseases of the skin as to the erupt s which should be classed as strictly pustu . WILLAN and BATEMAN comprise *five species* — 1st. *Impetigo*; — 2d. *Porrigo*; — 3d. *Ecthyma* — 4th. *Variola*; — and 5th. *Scabies*. The disci s of BIETT, especially RAYER, CAZENAVE, d SCHEDEL, give a different arrangement. RA R reckons *seven forms* of pustular eruptions; — *riola*, including varicella; *Vaccinia*, compri g Vaccinella; *Acne, Rosacea, Mentagra* or *Syc s*, *Impetigo, Favus*, and *Ecthyma*. To these M. CAZENAVE and SCHEDEL add *Glanders*. r. WILSON, however, reduces the species of pus æ to two, namely, *Impetigo* and *Ecthyma*, and ceeds to remark that the genus *Porrigo*, of WIL , comprises eruptions of the most opposite kind, d has been the source of much confusion, so m h, indeed, that it would be well that the term fo e future should be discarded. *Scabies*, again, a disease presenting several elementary forms of which both vesicles and pustules are accide l, and only occasionally present.

6. Although *variola* is a pustular disease, s it is more appropriately classed with the exanthe a, and others comprised by RAYER would be as ll arranged under different genera. The *causes*, *a- racters*, and modes of *terminations* of pustules ve reference merely to the individual species, as ne er of these is common to all the species, however eir number may be limited. Their *diagnosis* and *t t- ment* are therefore to be considered under eir several heads, where they are treated of b he names usually applied to them; the questic as to the eruptions which should be viewed as st ly pustular becoming apparent in these places - ll arrangements of these eruptions being ent ly conventional.

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PUSTULE, MALIGNANT. — SYNON. — *a- lignant Pustule*; *Pustula maligna*; — *Co gi- ous Carbuncle*. — *Persian Fire*; *Charbon n in.* — *Pustule maligne*, Chaussier; *Bouton m n*; — *Anthrax malin*; — *Anthracion*, Raye — *Gangrenous Pustule*; *Malignant Carbunc*

CLASSIF. — III. CLASS. I. ORDER *u- thor*).

1. DEFIN. — *A large vesicle filled with a sa us or sero-sanguineous fluid, under which a lent ar induration is formed, which is speedily surro ed by a phlegmous erysipelatous areolar swelli a larger or smaller portion of which soon be es gangrenous.*

2. I. CAUSES. — This malady is very rarel en

is country, although it is not uncommon in e parts of France and of the continent. It is rally caused by the contact of some poison- animal fluid or matter, which, from the nature ts effects, may justly be classed as a *septic n.* **Enaux**, **Chaussier**, and many others, f opinion that malignant pustule constantly ws contagion or inoculation, or the contact of gangrenous tumour, or of the offal or blood imals, affected by it. They state, in support is opinion: — 1st. That it has been seen most ently in smiths, veterinarians, shepherds, iers, tawers, tanners, butchers, knackers, ress-makers, &c. or those who have the care imals, or who handle their carcases and offal. d. That it appears exclusively on parts of the which are most exposed, as the face, neck, ls, arms, &c., or have been exposed accident- — 3d. That it has been most frequently observed in human subjects during opizooties, at- ed by buboes and carbuncles. They further that the sanies poured out by the disease e of the means by which it is propagated. **Rayer** observes, that the blood of a sheep ted with this disease having flowed over a herd's hand produced malignant pustules; that a butcher was attacked in the tongue, having taken the knife, with which he was ing an ox, between his teeth for a few seconds. e statements, M. **Rayer** adds, are in accord- with the results of M. **Qeuret**'s researches e changes undergone by the blood in different ses. It has even been contended that the d of over-driven cattle has produced this ma- , and instances have been adduced in support e fact; but this requires confirmation, or er investigation.

It is stated by **Thomassin** that a woman, t dressing the gangrenous sore of her hus- l, having touched her cheek soiled with some e discharge from the sore, became affected in hours with anthracion, in this situation, that d with alarming rapidity. **Hufeland** says a woman caught this malady from a female ted by it with whom she had slept. But it is ended by **Jemina**, on the authority of several titioners, and supported by various experi- ts communicated to **Malacarne**, that the gnant pustule caused by contact of an animal ted with it cannot be transmitted from one idual of the human species to another; and **Rayer** states that one of his pupils, M. **Bonet**, ulated himself with the matter of Anthracion, out being infected.

It has been supposed that malignant pustule occur sporadically in the human subject, g to the nature of the ingesta, or of other es, as a modified or malignant form of fur- lus. The nine cases of *gangrenous pustule*, led by M. **Bayle**, certainly closely resemble s of malignant pustule, or anthracion, and the ons who were their subjects had never touched emains of any animal which had died of an- cion, or had partaken lately of any suspected al food. M. **Davy la Chevrie** has recorded cases of this malady in which no evidence d be detected of infection from another person, om a deceased animal. It would appear that, ugh many cases of anthracion may be traced e contagion or contact of morbid matters from lower animals, and to contagion from the an subject, as contended for by some, and most probably with truth, in certain circumstances, yet other cases may occur sporadically, as it has been impossible to trace the malady to contagion in some instances. But it is not unlikely some severe cases of carbuncle have been mistaken for the contagious malignant pustule.

5. M. **Rayer** says that anthracion is pretty common in several districts of Franche-Comtè, in Lorraine, and especially in Burgundy; but that it is rare in Paris. He has, however, met with it in butchers, tanners, and more frequently in workmen engaged in dressing hides, skins, and wool; and he met with several cases which came from a manufactory of which the business was cleansing and dressing hair from Russia.

6. II. **Symptoms.** — The *description* of malignant pustule has been fully given by **Rayer**, **Rochoux**, and the writers already mentioned; but I shall chiefly follow that given by M. **Rayer**. When the malady is caused by contagion, the *interval* between the time of infection and the eruption of the gangrenous spot, varies from a few hours to five or six days. If the intensity of the disease be made the basis of a division, the cases may be arranged under three heads: — 1st. *Slight anthracion*, with circumscribed mortification. — 2d. *Severe anthracion*, with diffused gangrene. — 3d. *Fatal anthracion*, with alterations in the blood, and in one or several of the viscera.

7. *A. Anthracion with limited grangrene*, or the "*pustule maligne prominente*," begins with a sero-purulent or sanious elevation, the base of which is hard, tense, and deeply seated, and is soon surrounded by a phlegmono-erysipelatous inflammation. The central point of the tumour is attacked with gangrene; but it rarely happens that the mortification extends beyond this primary seat; the disorganisation soon stopping spontaneously.

8. *B. Severe and diffuse gangrenous pustule, or anthracion*, commences with much pruritus, followed by the appearance of a red spot like a flea-bite. The vesicle, at first of the size of a millet-seed, soon acquires larger dimensions, and, if not ruptured by the patient, bursts spontaneously. From twenty-four to thirty-six hours after the pruritus, a small hard circumscribed nucleus, of the form and size of a lentile, is felt under and around the vesicle; and in the circumference a soft, but somewhat resisting swelling is developed, of a reddish or livid colour, covered by and by with secondary sero-sanguinolent vesicles, at first discrete, but speedily becoming confluent. The central spot, now of a brownish hue, extremely hard, and very insensible, becomes gangrenous. The inflammation extends to a considerable distance and depth; the adjoining skin is dark-red and shining; and the sub-cutaneous cellular tissue is puffy, tense, and apparently emphysematous. The central part is numb or insensible, and gangrene advances rapidly.

9. If the malady continues to proceed, or tends to an *unfavourable issue*, the constitutional symptoms assume a severe form; the pulse is small and weak; the tongue is dry and brown; the skin is parched; the patient complains of a feeling of anxiety; is attacked with fainting, or with leipothymia; his features are shrunk, and his eyes are glassy; his mental and physical powers are depressed; and cardialgia, eructations, hiccup, and low delirium precede dissolution. The *duration* of this variety of the disease varies from two or three days to several days.

10. If the malady ceases to make further progress, and tends to a *favourable result*, a vivid red circle appears around the eschar; the swelling, which had spread extensively, diminishes at the same time, and the patient feels an agreeable warmth, accompanied with a pulsating motion of the affected part. The pulse acquires power, the strength and spirits increase, and, if febrile re-action is considerable, it is resolved by a gentle perspiration. Suppuration takes place between the living and dead parts; and the detachment of the eschar leaves a suppurating surface of various extent in different cases.

11. *C. Malignant pustule, with fatal contamination of the blood and viscera*, advances with frightful rapidity, death sometimes taking place in eighteen or twenty-four hours from its invasion. The local alteration in the integuments is occasionally of no great amount; the formidable symptoms and the fatal termination are explicable only on the supposition that changes in the blood, or in the internal organs, or in both, have taken place to an extent incompatible with the continuance of life. M. RAYER has adduced two cases of this form of the malady which were treated by him and examined after death.

12. *D. Certain local modifications* of the malady have been observed. When anthracion attacks the *face*, it is attended by a phlegmonous erysipelas of the features often extending to the neck and anterior of the chest. When the eyelids are the seat, it occasions an enormous and very painful tumefaction of the face, with intense headach and delirium, often with the loss of the eye, always with eversion of the eyelids, which are then formed by the orbicularis muscle and the conjunctiva alone. Wherever muscular fibres are contiguous to the skin, there the gangrene extends less deeply. Nevertheless, when the lower lip is attacked with anthracion, it is apt to be destroyed through a considerable extent, either by the disease or by the caustics employed to arrest its progress. When the *neck* is the seat of the malady, the deep extension of the inflammation impedes respiration and deglutition; and ptyalism, epistaxis, swelling of the face, &c. generally take place. If the parietes of the *chest* are attacked, the inflammation generally extends to the subcutaneous cellular tissue of the thorax and axillæ. When the back of the *hand*, or the *instep*, is the seat of anthracion, every part of the limb is successively attacked with a phlegmonous-erysipelas inflammation.

13. *E. Appearances after death.* — In the more severe and general states of the disease, unequivocal symptoms of an altered condition of the blood, of congestive inflammation of the lungs, or of asthenic gastro-enteritis, or of the absorption of purulent sanies into the blood, are observed before death. M. LITTRÉ, in a case of anthracion of the lower lip, found pus within the veins of the face, and a number of small abscesses in the substances of the lungs. In addition to the destruction of the integuments and adjoining cellular tissue of the affected part, marks of congestive inflammation, with ecchymoses have been observed in the lungs, liver, spleen, and digestive canal. M. VIRICEL states that he found malignant pustules in the colon; and M. LAMBERT says, that the gelatinous serous deposits always found in the adjoining subcutaneous cellular tissue is occasionally also found in the cellular tissue of the mediastinum. A quantity of sanguinolent serum is commonly - fused into the serous cavities. The several tiss s are more or less softened, and the viscera l blood present the same changes as are found in e malignant carbuncle of animals.

14. III. DIAGNOSIS.—On its first appeara e the malignant pustule may be mistaken for the e of an insect. But it wants the minute central - lowish point of an insect-bite; and soon pres s the painful indurated base, and the sanious ves e with which malignant pustule commences, d which, with the diffuse or erisypelatous and - physematous-looking inflammation surroundin , also distinguishes it from furuncle, *carbuncle* r *anthrax*. Malignant pustule, in some instan s, however, can hardly be distinguished from e more gangrenous form of carbuncle (see ar e FURUNCULAR DISEASES, &c. 14, *et seq.*); and is most probable that the one affection runs int e other, those cases of sporadic anthracion, w h have not been traced to contagion, being onl - stances of very severe carbuncle, the local d constitutional characters of which they have r- tainly possessed.

15. On the other hand, anthracion ma e confounded with phlegmonous or gangre s *erysipelas*, and with the gangrenous or sphac t- ing ulceration of the cheeks, and labia ma a vulvæ met with in children, or even with the o or *carbuncle* of plague; and certainly case of these occasionally very closely resemble an a- cion, and if they be not seen at an early stag or at their commencement, the diagnosis will b f- ficult, if not impossible, in some instances. T e, however, do not present the sanious vesicle o e puriform pustule with which anthracion origin s; and the gangrenous affection of the cheek of children commences in the inside of the m h, and extends to the skin. From pestilential r- buncle and bubo, anthracion is distinguishe y the absence of the symptoms characterising pl e, and by the several circumstances attending e er the one or the other. Cases of anthracion, w- ever, are not so readily distinguished, as M. R. n supposes, from the carbuncles, in cases of spo ie or scattered plague. Indeed he endeavou to draw distinction, but conceals close resembla s, between this malady and those which are y closely allied to it, if they be not altogether n- tical with it. I would, however, infer that he sporadic or uncontagious cases of malignant pu le —or the affection described as such—are s re cases of carbuncle (see FURUNCULOUS DISE s, § 14, *et seq.*); that the malignant pustule o n- thracion, caused by the contact of a poisono or morbid animal matter, consists of local ch es which closely resemble the worst cases of r- buncle, and of a constitutional disturbance en of a more intense and more rapidly fatal tend y, than in the latter; and that the true anthr on or malignant pustule is generally infected b he morbid fluids of cattle, &c., and especially b he malignant carbuncle of animals, or that atta ng sheep and other woolly and hairy animals, d which I shall briefly describe.

16. *The malignant carbuncle*, or *charbo* of animals is characterised by the appearance n voluminous uncircumscribed tumour, which ds to pressure, crepitates like emphysema, and ex es a peculiar putrid odour. The centre of the s ll-

s black, as if carbonised, and the circumfer- is infiltrated with a brownish or yellowish , and distended by a very fœtid gas. After the substance of the *heart* is softened, and xternal surface ecchymosed in the course of lood-vessels. The *blood* in the heart and large ls is generally fluid. In the veins it is very k, sometimes containing clots of a black or wish colour. The *lungs* are covered by small ymoses, which are also seen penetrating their tance. The *stomach* and *intestines* present sanguineous ecchymoses, of various sizes, een the inner coats and under the perito- , and variously distributed in different parts e canal. The *liver* and *spleen* are gorged dark blood. The *nervous system* is said not to any change.

. The same changes, local and visceral, h are found in the malignant carbuncle of als, are also found in the blood, heart, lungs, stive organs, and other viscera in cases of malignant pustule in the human subject; moreover, the discharge from the disease of brute produces the same malady in man — gnant pustule or anthracion. The identity oth these diseases cannot, therefore, be disd, although the spontaneous or sporadic apance of anthracion in man may be disputed, ay want confirmation.

3. IV. PROGNOSIS.—The *first variety* may rer of itself, the gangrene terminating spontaney, or being readily arrested by treatment. The *d* is much more serious, but it will generally be d by the prompt and energetic use of caustics. *third variety* is generally mortal; and it may atally in twenty-four or forty-eight hours from ppearance. The danger is always greater from econd variety, when it attacks the face, head, eck, than when it affects the extremities. It so aggravated by extremes of temperature.

9. V. TREATMENT. — M. RAYER states, that on as the existence of anthracion is ascertained, part must be deeply scarified and extensively erised. To be effectual, the incisions should nd to all the gangrenous parts, but not beyond . The vesications on the surface ought to be ediately opened and the fluid absorbed, and denuded surface covered with a dossil of lint ed in the liquid muriate of antimony, or with all fragment of caustic potash, kept in its e by a strip of plaster and a bandage. Five ix hours afterwards this application may be oved, and the eschar covered with lint spread the unguentum resinorum, or some other e of a similar kind. Instead of the caustics sed by M. RAYER, I would recommend the *c acid* to be freely applied, and to be followed he usual dressings and the internal treatment cribed for gangrenous inflammation of the *lar tissue* and for *carbuncle*. (See articles LULAR TISSUE, §§ 35, *et seq.*, and FURUNCUs DISEASES, §§ 20, *et seq.*)

0. Next day, if it be found that no vesicular la has been formed around the eschar, and if patient complains of but little pain without rting or pungent heat, it may be inferred that cautery has included the whole of the disease. on the contrary, a hard and deep-seated tur has appeared around the primary seat of the ady, and symptoms of phlegmous-erysipelatous mmation are present, the caustic must be applied again, having first removed the gangrenous parts, after dividing them by a crucial incision. This procedure is also necessary when the slough, which forms the centre of the swelling, has already become hard and impermeable like a piece of leather; for it must be removed to admit of the action of the caustic being exerted on parts not yet sphacelated; after which they are to be covered with a stimulating poultice.

21. The value of *escharitics* in the treatment of malignant pustule is incontestable. They are indicated as long as the gangrene shows a disposition to spread, or whilst its limits are undefined. But, in order that the constitutional or vital powers should be enabled thus to limit the extension of the local mischief, and to resist the imbibition and absorption of the morbid matters of the gangrenous part — should oppose the general infection, and contamination which the peculiar matter of anthracion produces, and the consequent congestions, congestive inflammations, and visceral lesions which are observed in fatal cases, the powerful internal restoratives, aided by the aperients and enemata, that I have recommended in similar states of constitutional and local disease should not be overlooked, but be promptly and efficiently prescribed. (See CELLULAR TISSUE, *diffusive inflammation of*, §§ 35, *et seq.*; ERYSIPELAS, §§ 73, *et seq.*; INFLAMMATIONS, §§ 236, *et seq.*; GANGRENE, §§ 66, *et seq.*; and POISONS, §§ 698, *et seq.*)

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PYLORUS. See STOMACH, DISEASES OF.

PYROSIS. — SYNON. — Πυρωσις (from Πυρ, fire, and πυροω, fut. ωσω).—*Pyrosis*, Sauvages, Sagar, Cullen; — *Cardialgia sputatoria*, Linnæus, Good; —*Ardor ventriculi*, Hoffmann;— *Soda*, *Gastrorrhœa*, *Ardor stomachi*, Auct.;— *Ardeur de l'estomac*, *Cremason*, Fr.;—*das Brennen; das Sodbrennen*, Germ.; — *Blackwater*, *Water-brash*, *Heartburn*.

Classif. — 2d *Class.* Nervous Diseases. 3d *Order.* Spasmodic Affections (*Cullen*).— — i. *Class.* Diseases of the Digestive Function. — i. *Order.* Affecting the alimentary Canal. — I. Class. I. Order. (*Author.*)

1. Defin. — *Constrictive pain at the pit of the stomach, extending to the back, and bending of the body forwards, followed in a short time by eructations, without nausea or retchings, of a large quantity of a thin, watery, and often insipid fluid, that afford relief.*

2. The *description* furnished by Dr. Cullen has generally been considered as most accurate, his experience of the disease, in a country where it is prevalent, having been considerable. But it is liable to the objections which may be urged against nosological descriptions, namely, that it represents merely a single type or phase of the disease — a single and distinctly characterised form; without any notice of the modifications and gradations which ally it to other disorders of the digestive organs. I shall first describe this affection nearly in the terms used by Dr. Cullen, and afterwards notice such variations as have fallen under my observation.

3. I. Symptoms. — *Pyrosis* appears most commonly in persons under middle age, but seldom before the age of puberty. When it has once taken place it is apt to recur occasionally for a long time after; but it seldom appears in persons far advanced in life. It affects both sexes, but more frequently the female. The fits of the disease usually come on in the morning and forenoon, when the stomach is empty. The first symptom is pain at the pit of the stomach, with a sense of constriction, as if the stomach were drawn towards the back. The pain is increased by raising the body erect, and is alleviated by bending forward. It is often severe, and after continuing for some time, it is followed by an eructation of a thin, watery, limpid, or nearly clear, and often ropy fluid in considerable quantity. This fluid is generally insipid; but it is sometimes more or less acid. The eructation is for some time repeated frequently, and does not immediately give relief to the pain; but it does so at length, and terminates the attack.

4. I may add to the above, that I have seen this affection more than once in males much below puberty; occurring at any hour of the day when the stomach was empty, and affecting patients with good appetites and rapid digestion. I have seen it also unattended and not preceded by any actual pain at the pit of the stomach, but by slight uneasiness only in that situation; and in more than one case the patient complained of the great coldness of the fluid thus ejected. The pain is quite different from that of cardialgia, or heartburn, when the fluid brought up is abundant, insipid, ropy, and colourless; but, when it closely resembles cardialgia, the sensation of constriction, with bending forwards of the trunk is not present, and the fluid rejected is often acid, and less abundant than when the pain is of the constrictive character above described. In no case is the disease attended by fever or by nausea or retchings. The fluid is always regurgitated or eructated by a similar inverted action of the œsophagus to that producing rumination. It has appeared to me, during a careful observation of some cases, that the constrictive pain, as well as the rejection of the fluid, partly may be referred to e diaphragm.

5. *Complications.* — Pyrosis may be indepen t of indigestion, or be attended by rapid digesti ; it also may be associated with either of the fo s of dyspepsia or with flatulence. It is comm y complicated with costiveness, and often with to d function of the liver, or even with disease of is viscus. That it is often associated either with org c or with functional disease of the pancreas, se s probable. Indeed it has been long supposed, d by various writers, that the fluid thrown o is merely an excessive discharge of the pancre c fluid, regurgitated into the stomach, and th e into the mouth; but, as Dr. Kerr has justl marked, if this were the case, we should ex t the fluid to be mixed with some bile. Beside it could hardly be expected that so large a qua y of fluid could be furnished by the pancreas i o short a time as during a fit of pyrosis. I am t aware of any instance, in which organic disea f the pancreas has followed pyrosis, or in w h such disease had taken place in a patient who d been at any previous period the subject of is affection. Dr. Seymour adduces a case in w h organic change in the liver followed pyrosis; ut the cases which I have observed have not n associated with any organic change, excepti n one instance, although various functional diso s have often been present. It is not unusual, e cially in northern countries, where pyrosis is st prevalent, to observe it in the course of pregn y, and in both married and unmarried females, n plicated with leucorrhœa. I have seen it i e instance associated with disease of the ovari and frequently in these countries with ch ic rheumatism.

6. II. Diagnosis. — *Pyrosis* is readily d n guished from other affections of the stomach by the absence of the usual symptoms of indiges n; by the appearance of the fluid ejected, — its c r, colourless, generally insipid nature, and abu nt quantity; by the absence of fever, of nause or retchings; by the manner in which the flu is thrown off; by the mere regurgitation wi ut nausea; and frequently by the little inconven ce or general disturbance attending it. The er a tions which often accompany *cardialgia*, or er forms of indigestion, are usually observed d ng the progress of digestion; the fluid eruc ed being generally in small quantity, and a d, always discoloured, and often furnishing in a tions of the indigestible matters. When the id of pyrosis is at all acid or acrid, these properti re much less marked than in cardialgia, or the ed states of dyspepsia (see article Indigestio §§ 13, 14.); it furnishes no indications of undig ed matters, and is thrown up from a stomach ch has digested its contents, and contains nothin ut the fluids which it thus ejects. Pyrosis can be confounded with simple *gastrodynia*, inasmu as the former is attended by the copious discha of a peculiar fluid, without nausea or vomiting nd as this discharge may be abundant althoug he pain may be very slight; gastrodynia being ly a symptom of several gastric diseases. Dr. st states, without however adducing his aut ty, that the secretion of true water-brash is com ed of water, albumen, and a trace of sodaic salt ith an excess of soda; and that, when it is aci his property is owing to the muriatic and acetic ds. A recent analysis of the fluids thrown o the

stomach has been published; but they do not appear to have been the fluids ejected by pyrosis, as they were mixed with undigested food, and contained much acetic acid. (SIMON's *Animal Chemistry*, by DAY, &c. vol. ii. p. 393.)

III. PROGNOSIS.—Having once taken place, pyrosis is very apt to recur, and it is often very difficult to cure; but I have not met with an instance of it having passed into serious or structural disease, or been attended with danger. I am intimately acquainted with a gentleman who was long subject to this disorder when he was a boy residing in the north of Scotland, and who was afterwards frequently attacked by indigestion; but he is now well and strong at an advanced period of life. Persons who are subject to it generally are able to pursue their avocations without much inconvenience; and often continue free from it for a considerable time, without any very obvious cause, and then are attacked, owing either to some error of diet, or exposure to cold and moisture. When the complaint is prolonged, the patient frequently becomes pale, considerably emaciated, and debilitated; and when it is protracted in females, scanty, or difficult, or painful menstruation is a common consequence.

IV. CAUSES.—*A.* Pyrosis is more frequent in females than in males, and in the unmarried than in the married. It may occur at any age, after six or seven years, but it is most common after puberty and until far advanced age. It is so prevalent in some countries as to be considered endemic in them, especially in Sweden, Norway, Lapland, Scotland, and the Isles, &c. It has been attributed to the diet used by the natives of these countries—to the use of rye, barley, oats, potatoes, &c. and the want of animal food. It has been supposed that the use of unleavened or unfermented bread may be concerned in producing it. The share that these causes may have in occasioning it can hardly be determined. But it is also prevalent in countries where not only these causes prevail, but others which may concur with them, as the use of dried and smoked meats in considerable quantity, and of dried fish — both the dried meats and the dried fish being preserved without salt, or with very little. Pyrosis is certainly also much more frequent in cold and humid climates, than in temperate, dry, or warm countries; and among the poor and ill-clothed, than among the wealthier classes; although the latter are not exempt in these climates. LINNÆUS states that nearly one half of the population, men and women, living near the mountains in Lapland, were in his time the subject of this complaint, and that in some it endured through their entire lives.

B. The *exciting causes* of pyrosis are chiefly long fasting, errors in diet, tasting savoury articles of food without partaking of them — cold and humidity, especially when their influence is prolonged, and the warmth of the body is not promoted by exercise; cold applied to the lower extremities; powerful mental emotions; a poor and unwholesome diet; the privations often contingent upon a laborious life in a cold and humid climate; and the want of salutary stimuli, or of wholesome beverages experienced by persons who are thus circumstanced.

C. The nature of this complaint has been much discussed. Pyrosis has been viewed as a form of indigestion, and it is probably allied to indigestion in many instances as it occurs in this and other temperate countries; but, in northern countries, I have seen instances of it attended by powerful and rapid digestion. Dr. PEMBERTON viewed it as a morbidly increased secretion from the stomach, analogous to a diabetic secretion of urine by the kidneys. Some physicians imputed it to obstruction or congestion of the collatitious viscera; and in this light it appears to be viewed by Dr. SEYMOUR. Others have considered it as actually a disease of the pancreas; this organ furnishing the fluid which collects by regurgitation into the stomach, where it causes pain and irritation followed by its expulsion. The reasons which militate against this opinion have already been noticed (§ 5.); and the analysis of the the fluid is said to demonstrate that it is not pancreatic, although this is not a sufficient proof, for the pancreatic fluid may be considered just as likely to be altered in quality as in quantity. I once considered it as not improbable that this fluid partly consists of the gastric juice; for, having observed it in persons possessed of powerful digestion, and who live on food requiring strong digestive and assimilative powers, I inferred an abundant secretion of this juice, which would not infrequently be continued to be secreted in excess, especially in circumstances favouring the determination of blood to the digestive viscera, and in the very circumstances by which I have observed a fit of pyrosis to be produced, although there existed no food in the stomach to excite the secretion of the gastric juices: or, in other words, that pyrosis is produced by the continuance of the secretion of the gastric juices after the food taken into the stomach has passed into the duodenum; and that these juices, by irritating, or otherwise acting on the stomach, cause the pain attending the disorder, the inverted action of the organ, or the regurgitation by which they are thrown off; the complaint ceasing for a time with the rejection of these juices, and returning only when the exciting causes (§§ 8, 9.), the nature of the food, or prolonged abstinence from it, or other circumstances, which may favour the secretion of these juices, without furnishing food to the stomach on which they may act, are brought into operation. According to this view, the frequent discharge of secretions, so instrumental as they are in the assimilative processes, must necessarily be followed, in protracted cases, by pallor, emaciation, anæmia, and the other complications and consequences mentioned above (§ 5.).

11. V. TREATMENT.—The *indications of cure* should be based upon sound views of the nature of a disease; but if these views are not to be found, we must fall back upon the results of experience as far as they may be trusted. If the above opinion, that the disease is generally produced by a diet requiring a copious secretion of the gastric juices, but that the attack is excited by the want of that supply of food which is usually furnished to the stomach, or which is required for the quantity of the juices habitually secreted, or secreted in excess under the influence of circumstances, be at all correct, the intentions of cure may be readily devised. Indeed this view, as well as the treatment, or rather the no treatment, founded on it, is not infrequently adopted by persons subject to this complaint; for they generally endeavour to prevent long fasting, rather than to cure the attack

by eating, when the pain characterising an attack has commenced; for, if food were attempted to be taken at that time, unless in the slighter fits, it either could not readily pass into the stomach, or it would be rejected along with the fluid which has now occasioned a retrograde action of the stomach. According to this view, a change to a more digestible diet — to food habitually requiring a less abundant secretion of the gastric juices, and avoiding long fasting, will often be sufficient to cure the disease. This, in most places, cannot be even attempted; although a popular recourse to several articles has been recommended as substitutes for change of diet, and to prevent the ill effects of long fasting or of improper food. Thus, opium, spirituous liquors, nux vomica, canabis Indica, tobacco-smoking, and chewing, &c. are severally used in some countries with these intentions, and are more or less efficacious in warding off an attack in persons who are subject to this complaint. These substances, by allaying the morbid irritation of the nerves of the organ, diminish or prevent the excessive secretion of the gastric fluids, causing the disorder; but, as long as the diet is persisted in that causes the complaint, the continued use of these substances is required to prevent a recurrence of the disorder, and thus the remedy often becomes as great an evil as the disease itself.

12. Many systematic writers, as well as authors of works on diseases of the digestive organs, appear either to have had no experience of pyrosis, or to have observed it imperfectly, for they have confounded it with cardialgia and other forms of indigestion on the one hand, or with the more common occurrences and states of gastrodynia or gastralgia and of vomiting on the other, and have treated it accordingly. Doubtless, there is a more or less close approximation of cases of these affections to each other; still they are distinct. The *pain* of pyrosis is different from that of cardialgia, or of the more usual painful affections of the stomach termed gastrodynia, or gastralgia, and it may be so slight as to amount only to uneasiness. The *matters* brought up from the stomach are either not acid, or very slightly so, are unmixed with undigested matters, are clear and colourless, are so abundant, and are so peculiar, even as respects their low temperature, as to constitute the chief feature of the complaint. The substances ejected either by eructations or by retchings, in the ordinary forms of disordered stomach, are generally acrid, acid, or rancid; consist partly of, or contain, undigested articles; and proceed from an unloaded, or a partially loaded, as well as irritated stomach. They are often the products of excess, or are consequent upon errors of diet, and are owing to a weakened or an irritated state of the stomach. But pyrosis occurs only when the stomach is empty, after the usual diet, taken in very moderate or even in insufficient quantity, and the fluids, by which it is chiefly characterised, are regurgitated without nausea or retchings, and always unmixed with undigested matters, as already stated (§ 6.).

13. States of disorder, quite distinct in themselves, and different in their natures and characters, have thus been confounded with each other; and substances which have been found of service in one or more of these have been recommended as cures for pyrosis, although they are either altogether inappropriate, or only temporarily bene cial. Indeed, unless the chief causes of the disord be removed — unless many of those who are t subjects of pyrosis live on more nutritious a digestible food, and are better protected from c and wet than usually fall to their lots — no p manent advantage can be expected from treatme Most of the remedies which have been prescri for pyrosis, and have been said to remove , merely alleviate the attack, but seldom succeed preventing a recurrence of it. These medici are generally appropriate in cardialgia, and most cases of indigestion which are attended acidity and flatulence, and by the eructation f fluid matters, more or less acid, or acrid, conta ing undigested, or partially digested substanc. But these cases are not cases of pyrosis; a , although these medicines are sometimes usefu this latter affection, still they are not permane beneficial unless they be aided by change of d , especially by an improved diet. Amongst remedies thus recommended, those usually scribed for the severer forms of indigestion l prominent places, especially absorbents, as li water with milk; soap with small doses of opiu ; magnesia with various antispasmodics, and cotics (RANOË, &c.); the oxyde of bismuth, h aloes or henbane (ODIER, MARCET, &c.); d ammonia in bitter infusions. As pyrosis was s generally viewed as a form of indigestion, and t as an affection, caused by the nature of the t and by the influence of cold and humidity un the surface and extremities, and independen f defective digestive power, numerous other dige e aids were prescribed for its cure; and an g these I may mention, as being sometimes benefi l, the mineral acids, particularly HALLER's or M SYCHT's sulphuric acid — the acidum sulphuri n aromaticum, — the preparations of iron, and e balsams, especially the Peruvian balsam, B r almonds with ammonia and the preparation of angelica root were much praised by several Ger n writers; and inspissated ox-gall *, with assafo la and soap, by NIEMANN and others. LINNÆU e-commended nux vomica in powder for the n ve Laplanders subject to pyrosis; and most prob y, if it had been long or often used, in the es (20 grains) to which he allowed it to be ca d, the remedy would have been soon found se than the disease. (See article POISONS, § 1, *et seq.*) Dr. BAILLIE prescribed a drachm o e tincture of benzoin suspended by mucilage, d Dr. PEMBERTON, ten grains of powdered kino th half a grain of opium, every fourth hour, a he commencement of the attack; or a bolus, co t-ing of six grains of alum with two or three g ns of the soap and opium pill, the bowels being pt in an open state by rhubarb, or other aper ts. There can be no doubt of the occasional eff cy of these, and of other remedies, especially se prescribed for the more painful forms of dysp sia (see articles INDIGESTION, §§ 49, *et seq.*; d STOMACH, *painful affections of*), when the re

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* It may be mentioned that the *ox-gall* was r m-mended in several places of the first part of this k, and numerous formulæ, in which it formed the ch in-gredient, were given in the *Appendix*. These wer ub-lished in Sept. 1832; but this medicine was emp ed by me in practice since 1820; and was not viewe s a novelty, as it had been for centuries prescribed he Continent. Yet has it recently been paraded as is-covery by some writers in medical journals.

ed by diet and warm clothing; but without h aids they will often fail. Change to digestible wholesome food, due promotion of the cutaneous functions, and an open state of the bowels by ans of stomachic or tonic aperients, are most erving confidence, both for the cure, and for prevention of attacks of this complaint, which therwise treated will always prove most obstie.

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ARTAN FEVER. See Fever, Intermitent.

INSEY. See Throat, Affections of.

OTIDIAN FEVER. See Intermittent ever.

BIES. — Synon. — *Hydrophobia* (from ὓδωρ, ater; and φόϐος, dread); — Ὑδροφοϐια, Galen; *ydrophobica passio*, *Pantaphobia*, *Aquæfuga*, uct. Var.; — *Rabies canina*, Boerhaave; — *abies contagiosa*, Parry; — *Erethismus hydrohobia*, Young; — *Lyssa* (λύσσα); — *Lyssa nina*, Good; — *Clonos hydrophobia*, Parr; — *ynolyssa*; *Phobodipsia*; *Phrenitis latrans*, uct.; — *La Rage*, *Hydrophobié*, Fr.; — *undtollheit*, *Hundswuth*, *Wasserscheu*, Germ.; *lrofobia*, Ital.; — *Canine madness*; *Rabidity*; *ydrophoby*.

Classif. — *Class* 2d. Nervous Diseases. *Order* 3d. Spasmodic Diseases (Cullen). — *Class* 4th. Diseases of the Nervous Function. — *Order* 3d. Affecting the the Muscles (Good). — II. Class. III. Order (*Author in Preface*).

Defin.—*A disease which is said to occur sponusly or sporadically in the canine race, and is communicated by contagion to man and other ials; and is characterised by dread of water other fluids, by anxiety or distress at the epiium, by nervous spasms and choking sensations e throat, and by paroxysms of uncontrollable lsive violence (rabidity), terminating in death in a few days from the accession of the symptoms.*

Although the term *Hydrophobia* has been rally applied to this terrible disease, I have erred that of *Rabies*, or *rabidity*, as being more acteristic of the chief phenomena manifested by th in man and in the lower animals. The dread ater, or hydrophobia, is a very rare symptom of r diseases, which differ in every respect from the now defined; and is only one of the phenomena rved in cases of rabies affecting the human subject. There is even reason to believe that it is not a characteristic symptom, or not always present, in cases of the disease occurring in several of the lower animals. But this topic more appropriately falls under the diagnosis. In whatever manner the poison communicating the distemper may have originated — whether the malady is perpetuated only by contagion, without the contagious virus being renewed, or generated *de novo*, by certain animals, or whether this latter alternative obtain — it propagates itself throughout animals of different species, of different races, and of distinct kingdoms — from the highest to the lowest, and probably from the lowest capable of inoculating the poison up to the highest animals; the inoculated animal acquiring a disposition by the development of the malady to inoculate others, and thereby to perpetuate itself. The slight mention which has been made of this disease before the Christian æra, and the silence of the Hebrew writers respecting it, have induced some to believe that it is more prevalent in modern times than during periods of remote antiquity. In many places of continental Europe, rabies appears so frequently in some of the lower animals, and so destructively as respects the attacks of the rabid animals on man, as to require a closer investigation of several topics connected with it than it has hitherto received.

3. *The Literary History of Rabies* has been investigated by Sprengel, Bardsley, Hoffmann, and Adams. But, although many of the ancient writers, from Homer down to the commencement of the Christian æra, made allusions to, rather than special mention of, this malady, Cælius Aurelianus was the first to describe the symptoms with accuracy. Celsus and Galen concerned themselves more particularly with the prevention and treatment, than with the history of the progress, of the distemper; yet Galen attempted to explain the prolonged period which the poison sometimes requires to develope its effects, and which he states to be occasionally as long as a twelvemonth. The Arabian writers add but little to what may be found in the medical works of the Greeks and Romans. Avicenna, however, notices the affection of the urinary organs, and the occasional termination of the malady by apoplexy; whilst his description is more full than those of his predecessors. As to the prevention and treatment of the malady, the ancient writers are as instructive as many recent authors; although that which is really valuable and appropriate is often mixed up with much that is either absurd or irrational; yet not equalling the extreme absurdity and irrationality of some of the doctrines and means of the present day.

4. I. Description.—This disease presents well-marked specific symptoms both in the human subject and in the lower animals; yet these symtoms vary somewhat in different animals. In the domestic dog it assumes two forms — the *sullen* and the *furious*; whilst, in the feline race, it generally presents only the latter form. In some animals, the dread of water is said not to exist, at least at one period of the progress of the malady; whilst in man it is a very prominent symptom, although it frequently disappears shortly before death. Whether the disease arises only from contagion or inoculation, as supposed by some, or whether it is spontaneously evolved in certain

circumstances, in the canine or also in the feline race, and is communicated by these modes from the subject of its spontaneous evolution, as believed in by many, the period of its incubation is generally long, whilst its course is extremely rapid when it has once declared itself. These are its characteristics in all animals inoculated by the poison producing it; but there are also others which mark the *periods* or *stages*, into which it may be divided.

5. (*a.*) *Stage of incubation — the latent period.* — In this, the first stage, the symptoms of disorder may be either wanting or so slight as to escape observation. The wound, by which the distemper is usually inoculated, whether dressed or neglected, generally heals up as kindly as similar injuries; if indeed not more rapidly than they, leaving a cicatrix which differs in no respects from those usually following such injuries. In some cases, however, pain has been felt in the cicatrix a considerable time after the accident, and in a few a slight fever, or a rapid pulse has been remarked to continue from the receipt of the injury to the outbreak of the distemper. The *duration* of this period is seldom shorter than forty days, or longer than two years. Undoubted instances have, however, been adduced by M. TROLLIET, whose experience of this disease has been most extensive, in which the characteristic symptoms appeared as early as the eighth day, and he even quotes instances of their occurrence as early as the day following the injury. That the duration of this period sometimes extends to six or nine months has been satisfactorily proved. Apparently authentic cases have been adduced of a much longer time. J. HUNTER, R. HAMILTON, and S. BARDSLEY have endeavoured to show that all credible cases on record have occurred before the eighteenth month; whilst other authors have contended for even a longer period. Dr. URBAN states confidently that he has known cases to occur as late as twenty months, and four years after the injury; and similar prolonged periods have been adduced by others. In these, the question is, whether the disease has been actually inoculated at a period so far back, or has there occurred a re-inoculation at some intervening period? The solution of the doubt as to the possible duration of this period is one of some importance as respects the fears of a person who has sustained this most distressing injury.

6. The circumstances which, in man especially, seem to shorten the duration of this period on the one hand, and to prolong it on the other, have not been fully inquired into. It is not improbable that a small dose of the poison communicated to the wound will take a longer time to produce its effects upon the constitution of the injured person, than a stronger or larger dose — that the rapidity of the effect will have some relation to the virulence or quantity of the inoculated poison, and the constitutional powers of the subject. In cases, however, where symptoms of hydrophobia with spasms, &c. follow immediately or very soon after a bite, a question suggests itself, Are the symptoms actually those of inoculated rabies, or are they merely induced by the nature of the local injury, by the laceration of a nerve, by the puncture of a tendon, or by the fright or mental anxiety consequent upon the accident? This topic requires only to be kept in recollection in relation to this part of the subject, fuller consideration will given to it in the sequel. The causes which mo especially tend to hasten the development of t distemper after inoculation, are debility of co stitution, previous ill-health, the fright experienc at the time, the fear and anxiety afterwards e tertained, the depressing passions, venereal e cesses, exposure to the sun's rays, and inju received on the cicatrices. Whilst, on the otl hand, a vigorous constitution, and absence of dread, and of all causes of mental depression o bodily exhaustion, probably either prolong period of incubation, or successfully resist influence of the poison, especially when the qu tity inoculated has been small.

7. Although the period of incubation has p sented no disorder, or the patient has made complaint of any, still instances are commo f more or less disorder being experienced. Stil t is doubtful whether or not this disorder is cau by the silent and slow operation of the poison the economy, or by the mental anxiety caused the risk in which the patient finds himself plac. I am inclined to impute whatever disorder m appear to the former cause, without, howe, under-rating the influence of the latter. In a ce in which this period was about the duratio f seven weeks, and in which but little fear of e result appeared to have been entertained, patient gradually became more sallow than us, the eyes more sunk, the pulse somewhat celerated, more excitable and weaker, and e complained of general debility. In another c, in which this period was of more than four mo duration, the patient continued apparently until shortly before the accession of the mal, when the *precursory symptoms* became well mar l. In some instances, however, the patients gloomy, desponding, retiring, and timid or me choly, the countenance being anxious and pal sallow; and all the digestive functions impair*

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* About 1820 Dr. MAROCHETTI, who had visited e Ukraine, stated, that in that country the formati of vesicles or pustules under the tongue had been rema d during this period, and that, the opening and caut ation of these pustules prevented the development of is malady. The matter has not attracted my attentic n this country; but M. MAGISTEL, in France, has st d that in 1822, at Boulay, ten persons of both sexes, d some sheep were bitten by a rabid dog. The wou s, however, were not cauterised until forty-eight h s from the infliction of the injuries had elapsed. He fully watched for the appearance of the pustules tioned by MAROCHETTI, and he observed pustules e, without occasioning pain, or cramping the moveme of the tongue. Some of these pustules appeared on e sixth day, others subsequently, and the last on e thirty-second day. He distinguished two species *crystalline* and the *opaque*. The former were projec g, rounded, and the size of hemp-seed: they were t parent, and contained a limpid serous fluid. The l r were flattened, of a circular form, of the size of a l il, and without transparency. The *crystalline* were s d superficially in the inferior surface of the tongue e *opaque* penetrated more deeply, and presented, n opened, a small ulcerated cavity. Almost all these tules were situated on the sides of the frænum lir e, and on the lateral parts of the inferior surface o e organ. The crystalline appeared early in the l t stage, and not in all the persons who were bitten e opaque appeared at a more advanced period, all the exhibiting them. The cauterisation of both sp s was soon followed by perfect cicatrisation, and th *coctum genistæ*, recommended also by MAROCHETTI, s perseveringly continued. Five out of the ten bitten e seized with the malady and died. M. MAGISTEL proves the idea, formerly entertained, that rumin g animals, labouring under rabies, do not bite. Se l sheep which were bitten and became rabid, endeav d to bite other sheep which were with them.

. II. SYMPTOMS.—(*b.*) *The precursory stage*
a *symptoms* more immediately precede the out-
b k or development of the malady, and continue
fo a short period merely. This stage commences
w morbid sensibility of, or with pain in, the
b n part, and with alterations in the appearances
o e cicatrix, which becomes painful, tender, tu-
m , and livid; and, according to Dr. URBAN,
s ounded by small phlyctenæ containing a bluish
fl l, which fluid he contends is capable of com-
m nicating the malady. This physician asserts
tl , although he has treated about forty cases of
r es, he has not seen the pustules under the
to ue, described by MAROCHETTI and MAGISTEL;
b as he wrote soon after these physicians, it is
v probable that he never examined the parts
a e period of the appearance of these pustules.
W are, however, still insufficiently informed as to
th e pustules, and especially on their pathological
a therapeutical importance and relations.

With the accession of changes in the cicatrix,
a sometimes even without any very obvious
c ge beyond a greater fulness or itching, an ach-
i pain, resembling that of chronic rheumatism,
e nds from the seat of injury in the direction of
th nerves. If the injury have been received in
th and it proceeds along the arm to the shoulder
a to the muscles of the neck or back; if it have
b received in a lower extremity, it extends along
th high to the hips or loins. Sometimes with this
p the cicatrix becomes more irritable, of a dark
li red, and in rare instances opens up, and dis-
c ges a watery or ichorous fluid. Occasionally
th ain shoots from the seat of injury to the epi-
g ium or præcordia, and it is often attended
w headach, frequent sighing, oppression at the
c t, with short attacks of difficult breathing,
a with acceleration or irregularity of the pulse,
w h is usually soft or weak, occasionally full.
T sleep is very disturbed, accompanied with
fr tful dreams, often concerning the animal that
in ted the injury; loss of appetite, or nausea,
oc sionally vomiting; slight rigors or chills al-
te ting with flushes; constipation of the bowels,
pa in the back and limbs, sunk eyes, with
di ation of the pupils, and sometimes intolerance
of ht. These symptoms may usher in any acute
di se; but when they occur in a person who
ha been bitten by any animal they should be
vi ed with strong suspicion; and more especially
if veral of them be conjoined with marked
ti lity and increased nervous susceptibility and
se bility, with an anxious expression of counten-
ar , with fatigue on slight muscular exertion, and
co nued lassitude, with unusual depression of
th nimal spirits and sometimes extreme sadness,
w increased acuteness of the intellect and of the
se s, with slight cardiac palpitation, and with
th changes in the cicatrix. It has been ascer-
ta d by several physicians, as well as by myself,
th the painful sensations do not extend from the
ci rix in the course of the bloodvessels or ab-
so nts, but in that of the nerves. The absorbent
gl ls are never affected. The *duration* of this
st varies from two days to three or four, or five,
or obably to a longer period in some instances,
if e commencement of the symptoms, in their
sl ter or incipient states, were ascertained.

. (*c.*) *The hydrophobic period, or fully deve-*
lo disease, is attended by increase of the uneasy
se tions, and other symptoms experienced in the cicatrix and extending from it, as well as of the precursory symptoms just enumerated. Added to these, there are often drowsiness, chilliness, frequent sighing, a bloated or tumid state of the face, a peculiar pain or distress referred to the epigastrium; alternations of chills and flushes of heat; a sense of constriction at the throat, with stiffness or pain about the root of the tongue and angles of the jaws, extending to the larynx and *pomum Adami;* the respiration is hurried and loud, and attempts to swallow any thing, especially liquids, are attended by pain and distress, and by spasms of the pharyngeal muscles, causing the forcible ejection of such matters from the mouth. These spasms are accompanied with feelings of distress, with epigastric suffering, and with a state of general spasm and excitement, creating a dread of swallowing fluids, although food and the more solid substances are taken with much less difficulty or distress. The alarm and suffering on attempts to swallow fluids rapidly increase; and even the idea of making the attempt, and the running or splashing of liquids, occasion the most distressing spasms of the muscles generally, but more especially of those of the throat, face, and neck; followed by sobbings, tremor, forcible respiration, and exhaustion.

11. As the malady proceeds, or about the second day, the above symptoms are more severe, and are attended by dryness of the mouth and throat; by distressing thirst, and the utmost dread at attempting to quench it; by flatulent distension of the stomach and bowels; by flatulent eructations and vomiting of greenish or dark-coloured matters; by a rapid pulse, pain at the epigastrium, and in the course of the diaphragm; by restlessness, headach, a peculiar expression of countenance, or that of alarm and anxiety conjoined; by contracted brows, staring eyes, with a wild and sparkling appearance; and by retraction of the angles of the mouth. Pains are experienced in the neck, sometimes extending along the spine, and occasionally shooting under the sternum to the epigastrium. The mouth and tongue are clammy, although a frothy saliva is secreted, and repeatedly and forcibly thrown out. A burning heat and dryness of the fauces and throat are now constant; and, with the viscid state of the saliva, increase the distress of the patient. The respiration is now hurried, laborious, or loud, and the voice, owing to the dryness of the throat, becomes hoarse; and all attempts to relieve the dryness and thirst are followed by returns of the spasmodic or convulsive paroxysms, and by signs of alarm and distress. In the advanced state of this stage, the susceptibility and sensibility of the surface are extreme; a breath of cold air, the slightest touch, a fly settling on the skin, &c., often inducing a return of the spasms. Frequent micturition is experienced, sometimes with priapism, the splashing of water, the sight of bright objects; the jinkling or rattling of glass, hardware, or metallic substances often reproducing the spasms and general distress, and occasionally also the micturition. All the senses are now morbidly acute; and light and sound become distressing. Yet the mental powers are often undisturbed, or even unusually acute, although they are as frequently slightly disturbed, especially as respects morbid impulses, and the

entertaining of suspicions or dislikes of particular persons.

12. The mental disturbance accompanying rabies may be so slight as to escape observation; it is rarely very manifest or prominent, unless during a paroxysm, when it consists of an involuntary impulse to run against any one who is opposite, and of a desire, which the patient states himself to feel, but only momentarily, and for which he expresses his regret in the intervals, of tearing in pieces who and whatever opposes him. This rabid impulse, although only momentary, distresses the patient; he struggles to suppress it, and it is often strongest against those to whom he is most attached. I have seen it in two cases; and in one, attended by Mr. Dendy and myself, the patient called out to be held, so that he might not dart upon the person opposite to him. Actual delirium is rarely present, nor is the mental disturbance greater than that now stated; nor does it often proceed further than greater loquacity than usual. In a few there is frequent muttering, unconnected talking, and even certain hallucinations or illusions, especially as respects the animal that inflicted the injury; but the patient answers rationally when addressed. These illusions sometimes excite alarms, and occasionally violent efforts to avoid the objects of them; but he is readily influenced by the friends around him, although some degree of restraint is often required during the convulsive or rabid paroxysm.*

13. The above symptoms may have all been observed by the end of the first day from the appearance of the hydrophobia; but they are more generally observed in the course of thirty-six forty-eight hours, or by the third day. About th period, the tongue is generally clean, but dry there is still thirst, and sometimes also hunger, whi become more and more urgent. The heat and dr ness of the fauces increase, and the saliva is visci adhesive, and, not being swallowed, owing to t distress caused by deglutition, is either forcib thrown out, or accumulates in the throat a vicinity of the glottis, occasioning the unnatu noise during respiration, which has been fancifu likened to the barking of a dog; or it adheres and collects about the lips, sometimes produci a frothy appearance. This accumulation of muc in the throat, together with the distress and stra gulating sensation on attempting to swallow, casions the difficulty of breathing, or the feeli of impending suffocation, often now complain of. Restlessness, tremors, and guttural and gen ral spasms return more frequently, are excited the slightest causes, and are often attended b sort of furor, or rabid violence. The sensibil of the surface and senses is extreme, and is pa fully excited by the slightest contact or stimul The patient dislikes strangers, or dreads the the pulse is now very rapid, small, weak, or ir gular; the skin is cool, and the excretions pres no very morbid appearances. Vomiting of gre ish, dark, and glairy fluid, or bilious matter, of occurs, and is attended by pain at the epigastri and flatulent distension of the abdomen. Dur the paroxysms, especially when the spasms af severely the abdominal muscles, the urine is o passed involuntarily, or without control, and so times with erections. The blood taken fro vein, at this period, presents nothing beyon somewhat loose coagulum, and a deeper col than usual. The powers of life either sink s denly, or evince a gradual but rapid depressi the debility characterising the disease from commencement quickly passing into exhaus from the frequent recurrence of the nervous muscular exacerbations, or spasmodic paroxy At length, after one or two violent exacerbati life is extinguished.

14. In some cases the patient suddenly comes tranquil, and most of the symptoms side. The hydrophobia disappears, and he drink and eat, even voraciously. Occasion the difficulty of swallowing still continues or less, but the attempt is not attended by former spasmodic attacks of suffocation, or gen spasms. Still the impulsive paroxysms, or att of furor, may be as frequent or severe, or so. The sound of water, of splashings, the j ling of glass, the sight of bright objects, w excited attacks of guttural strangulation and g ral spasm, often with micturition, no longer tress him. This state of calm occasionally p into more complete repose, upon waking which, or from an apparent sleep, he sudd expires. But more frequently he is carried o this state of calm by an impulsive paroxysm general spasm, extending to the respiratory cles, or whilst making some effort. In cases no calm is observed, but the exacerba or paroxysms become more violent and frequ the debility in the intervals more marked, life is terminated during an exacerbation. I the cases which I have seen, the surface bec cool, and dark or lurid, the eyes sunk, the p

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* The following extract from the history of a case attended by Mr. Dendy and myself will illustrate this advanced period of the disease: — "The previous night was passed in a restless manner, with little or no sleep. He still talked rationally during the interval between the fits of violence, and exerted his faculties in praying more than his years (aged twelve) or knowledge promised. He was fully impressed with the idea of dissolution. The pulse was fluttering, small, weak, irregular, and about 135 in a minute. The bowels were freely evacuated: the stools were dark. The characteristic symptom, hydrophobia, had entirely disappeared: he drank a considerable quantity of ginger-beer without difficulty. The rabid paroxysms were now more frequent and severe, but of very short duration. They sometimes occurred without any exciting cause; but were induced by the mere mention of them, or by whatever excited his dislike, his sensations, or his temper. At our visit this morning, while Dr. Copland was making some inquiries respecting the fits of rage at his mother, on whose knee he was then sitting, he sprung forward at Dr. C. by an involuntary and irresistible impulse, which required the strength of his mother to restrain, although he expressed great attachment to Dr. C. and a desire of seeing him frequently. As soon as the momentary paroxysm had subsided, he excused himself very rationally, and stated that his conduct arose from a violent impulse, and a feeling as if he could tear in pieces whatever came in his way, which was beyond the influence of his will to prevent or control. Deglutition was now much less affected, and he felt considerable appetite. He ate bread and cheese, and drank porter in our presence. But the sensibility of the surface was increased. He could not bear the least breath of fresh air; even the touch of a fly caused him distress. He sighed less profoundly, but more frequently, and his timidity and fear of strangers were greater. There was now no spasm present, unless during the act of swallowing, and then it was only perceived in the abdominal muscles in a slight degree. The vital energies of the system were much more sunk than yesterday; yet he could still walk across the room, but with an unsteady step. He complained of no pain, but of considerable uneasiness between the shoulders, when he wished the place to be pinched or pressed. The pupils were dilated, but readily contracted from the stimulus of light." He died six hours afterwards when attempting to walk out of the house.—(See Mr. Dendy in *Lond. Med. Repos.* vol. xviii. p. 296.)

l, and the lips and tongue livid or dark,
death, and covered by much viscid, thick,
hy mucus. The eyes, however, retain their
ness. Dr. **Bardsley** states that the muscles
rigid long after death; but in a case which
immediately after dissolution, the muscles
ited the usual relaxation observed at that
, although the *post mortem* rigidity followed.
igidity observed in other cases is probably
ntinuance of the general spasm, which some-
terminates existence.

Such are the usual symptoms and pro-
of this advanced stage of the disease. The
on of it may vary from thirty-six hours or
two or three days to five or six. But it is
n longer than eighty hours after the symp-
are fully developed. Dr. **Bardsley** men-
the more prolonged period of eight or nine
n a few instances; but in, these cases, the
must have been reckoned from the first
rance of the premonitory symptoms (§ 8.),
stemper rarely continuing longer than this
period from the first manifestation of pre-
ry signs. Individual cases often present phe-
na either different from the more common
above described, or in addition to them.
me, severe pains are complained of in the
especially the cervical region; in others,
re experienced at the epigastrium, and are
led by violent contractions of the abdominal
es. The sensibility is always increased, and
ionally it is most remarkably great, the slight-
uch, polished surfaces, strong light, noises,
exciting the paroxysms. The patient often
ives odours and hears sounds which others
t perceive or hear. **Magendie** states that a
t who was deaf and dumb from birth heard
g the paroxysm. The distress experienced
the throat is not accounted for by the ap-
nces, which seldom are more serious than
vascular turgescence, or redness of the
us surface.

The paroxysms are rather those of spasm
convulsion, or consist chiefly of violent im-
ve actions of the muscles, impelled by an
trollable volition; and the spasms which
xcited by attempts to swallow, are accom-
d with violent contractions of the abdominal
les, of the cremasters, and of the sphincters;
imes with micturition, by priapism, and even
minal emissions. The pulse is always acce-
d, and becomes more and more rapid with
uration of the disease; it varies remarkably
ength, fulness, and regularity; but it is usu-
rom 126 to 150, and very weak, small, and
lar during the last few hours of existence.
breathing is at first loud or convulsive, and
led by profound sighs or sobs, and by fits of
gulation during the paroxysms. In the in-
ssions it is more easy, but is always accom-
d with sighs, which are more frequent, but
rofound, as the disease advances. The tongue
netimes clean, more commonly furred, with a
, viscid, or frothy saliva, and mucus adhering
sides. A disposition to bite is certainly pre-
in some cases, although not generally, as in
ower animals, and only occurs in the pa-
sms towards the close of the malady. It is
ally successfully resisted by the patient.
t is constant, but nausea and vomiting are
requent. The skin is generally cool, unless during the paroxysms, when it becomes warm, or covered by perspiration; it becomes dark or lurid towards the close, and the lips purplish or livid. The bowels are generally costive, and, shortly before death, both fæces and urine are sometimes passed involuntarily. The patient is aware of his condition, of the result, and of the nature of his disease, although they may have been attempted to be concealed from him. *Death* takes place by asphyxia, caused either by complete palsy of the respiratory nerves, or by protracted spasm of the respiratory muscles, according as the degree of pressure or of irritation existing near the origin of these nerves; the respiratory functions being impaired, or otherwise affected, from the first manifestation of the malady; an aggravation of the changes inducing this affection of respiration at last suddenly extinguishing the function.

17. (*d.*) *Symptoms of rabies in the dog and other animals.*— It is of importance to know the phenomena characterising this malady in the lower animals, chiefly as respects the determination of the question as to the existence of rabidity, which the medical man is often called upon to determine. Mr. **Youatt**, whose experience of the disease in the dog and other animals was greater than that of any other person of whom I have heard, has described the disease as it occurs in them; and from his descriptions, as well as from many such cases which I have seen under his care, the following may be viewed as the usual course of the disease in these animals. One circumstance of great importance, much insisted upon by Mr. **Youatt**, is that the disease in quadrupeds is not in some respects similar to that observed in man; and that, whilst hydrophobia is never, or very rarely absent, in the latter, it is never seen in the former. Hence many think, that, because the animal has no dread of water, and does not appear wild or furious, he is not rabid; and hence he is allowed to commit further mischief, and the injured person is prevented from having recourse to proper preventive measures, which may have saved a life which is soon sacrificed to the security caused by ignorance.

18. The first symptoms observed in the *dog* is a change in the usual habits of this animal; in some there is a disposition to pick up straws, rags, bits of paper, or any small object; others are frequently or constantly licking cold surfaces, as stones, iron, or parts of other dogs with which he is domesticated. In a few instances the dog becomes attached to animals to which he was formerly indifferent, but much more frequently he exhibits a marked antipathy to strange dogs and cats. This antipathy appears very early, and is greatest to cats. The animal becomes lonely, or sullen and irritable; is less eager for, or neglects his food; but he is constantly thirsty. There are sometimes redness and watering of the eyes; the expression is suspicious, the look haggard; and the ears and tail droop. The respiration soon afterwards becomes difficult; and saliva flows from the mouth, and soon assumes the form of a viscid foam. Vomiting is occasionally observed. The rabid dog now shows great irritability or snappishness, with a disposition to bite other animals, but is still obedient to the voice of his master. He now flies at every creature he meets, but seldom attacking the human subject unless enraged. The holding up of a whip or stick never intimidates

the animal, but always excites great fury. Towards the close of the malady, the breathing becomes more laborious, and death takes place during strong spasms or convulsions. In no period of the disease, as observed in the lower animals, is there any dread of water. "The dog, although unable to swallow, runs to it with eagerness; and all other quadrupeds in the rabid state, with perhaps an occasional exception in the horse, drink with ease and with increased avidity. In most instances, also, there is not the savage fury which persons in general expect to find, but rather a snappish irritability." In many instances, however, the most furiously rabid dog is obedient to his master.

19. III. Appearances after Death.—*a.* The *body* externally presents the usual *post mortem* rigidity, which is, however, of shorter continuance than after death caused by most other diseases. The depending parts are generally livid, from the accumulation of dark blood in the venous capillaries. The *bitten part* presents nearly a similar state to that observed during the disease, but with less vascularity and lividity. Autenreith, Brandreth, and Sallin, have seen the nerves communicating with the cicatrix inflamed.—*b.* Of internal parts and organs the *throat* has been most frequently affected, — the *fauces, pharynx,* and commencement of the *œsophagus*, either generally, or in some part more especially, being reddened, injected, covered with lymph, or presenting some sign or other of what has been considered inflammatory irritation or action. These changes partly — but by no means altogether — explain certain phenomena of the malady, and have been noticed in various grades by Morgagni, Sauvages, Rush, Bader, Dalrue, Ferriar, Hunter, Verdeil, Baillie, Loftie, Rossi, Willan, Marcet, Ribes, Bardsley, and others. But it should also be stated that these parts have been found hardly, or not at all, affected by Morgagni, Rolfinc, Stoll, and myself, although some degree of change in them is most frequently found. The lower portion of the *œsophagus*, the *stomach*, and even the *intestines*, have presented slight inflammatory changes in their villous surface, which have been more remarkable in some instances, and in divers parts, than in others; and in a few cases they have been attended by some degree of ecchymosis. These appearances have been recorded by Sauvages, Hunter, Rush, Loftie, Willan, Bader, Dalrue, Rossi, and others. Very marked inflammatory appearances in the stomach have been remarked by Powell, Ballingal, Oldknow, and Dupuytren. — The *salivary glands* have been stated to be enlarged and vascular, by some writers, and to present no alteration, by others. In many instances they have not been examined with any intention, or even not at all.

20. *c.* The *respiratory* and *circulating* organs have, until recently, received only slight notice. M. Trolliet first directed especial, but much too exclusive, attention to these organs. Previously to the appearance of his work, inflammatory appearances had been remarked in the *larynx* by Morgagni, Babington, and Watt; in the *trachea* by Rush and Oldknow; and in the *lungs* by Morgagni; but these received only a passing notice; and, although not deserving the importance attached to them by M. Trolliet, they serve to explain certain symptoms often attending the malady, and to illustrate the more immediate causes of death. The alterations which have been most remarkable in the respiratory passages and lungs, as observed by Portal, Marshall, Ballingal, Trolliet, Faure, Ribes, Lalouette, myself, and others, and which have been by some considered inflammatory, but incorrectly, are — 1st. Injection or congestion of the capillaries of the bronchial mucous membrane with very dark blood, extending to the trachea and larynx; — 2d. The presence of a thick, greyish, viscid, frothy mucus, which covered the respiratory mucous surface, and which in places almost filled the bronchial cavities; — 3d. Congestion of the lungs, these organs being of a very dark colour, especially posteriorly, and containing black fluid, or semi-fluid blood. These changes are certainly more congestive than inflammatory; and certainly the cases I have seen have presented no true symptoms or signs during life, nor appearances after death, which I could consider as actually inflammatory. The *heart* and *pericardium* have presented no other changes than congestion of the auricles and adjoining vessels, which have sometimes contained gelatinous clots. The *blood* has almost invariably been very black and fluid; a state more immediately resulting from the mode of death in this disease, namely by asphyxia consequent either upon paralysis of the respiratory nerves, or upon interruption to the changes produced on the blood during respiration, owing to the accumulation of mucus in the bronchi. These changes in the blood have been remarked by Morgagni, Sauvages, and others, who have stated that the blood is early decomposed after death. There can be no doubt, however, of a dark, black, and fluid state of the blood being found after death in every case of rabies, and that it must be assigned to either or to both the causes just mentioned.

21. *d.* The *nervous system* has, in various parts, been found more or less changed, but these changes have neither been always observed, nor have they been the same in different cases; and they certainly have not been observed, even when present, with due precision. As respects the *brain* and its *membranes*, the most frequently remarked alterations are congestion of the vessels and sinuses with black blood, and slight effusion of serum into the ventricles (Morgagni, Ferriar, Marshall, Rossi, &c.), and within or under the arachnoid; but these changes are usually slight, or almost absent, although more remarkable in some instances. M. Trolliet found them in six of the cases which he examined, and remarked also increased vascularity of the surface of the cerebrum, and congestion of the plexus choroides. In two cases blood was extravasated near the base of the cranium, and in others a plexus of injected vessels surrounded the origins of the optic and pneumogastric nerves. Dr. Bardsley states, that of five cases which he examined, three presented marks of increased vascularity of the brain. In one there was only slight turgescence of the vessels of the pia mater and of the choroid plexus. In another the brain was natural. Other changes have also been remarked within the cranium, as slight softening of the brain in some instances, increased firmness or induration in others, with various other appearances of slighter moment; but these, with other contingent lesions of a chronic nature, are most probably quite unconnected with this malady. Bonetus, Van Swieten, Lieutaud, and many

have seen no change of the brain or its
ranes, — certainly none to account for the
oms; and I may add that, even the most
kable alterations presented by these parts are
insufficient to explain the phenomena, the
ess, and termination of the disease.

e. The *medulla oblongata* and *spinal cord*
received insufficient attention in pathological
ches respecting this malady; and it is only in
aratively recent times that these parts have
examined after death from this malady.
estion in this situation has been found by
a, Salin, Saunders, Reid, Trolliet,
rich, Ollivier, Ribes, Bardsley, and
; but this state is extremely equivocal, is
the result of the mode of death, and of post
m fluidity of the blood. Of two cases re-
d by Dr. Gregory and Dr. A. T. Thomson,
resented no change of these parts of the
us system; but in the other the spinal cord
remarkably congested, particularly in the
al and dorsal regions; and the whole of the
ar tissue between the theca vertebralis and
es of the canal was loaded with suffused
, which, in several places, lay in black
la. In a case also by M. Clot, adduced
llivier, the cellular tissue, in the same situ-
as in the former case, was very red and in-
ed with blood; the substance also of the
al portion of the cord was intensely inflamed,
ontrasted strongly with the whiteness of the
and lumbar portions. In a case mentioned
Medico-Chirurgical Review for 1817, in-
atory appearances were observed in the
ngs of the pons Varolii, medulla oblongata,
pper part of the cord. In a case recorded by
right, the substance of the inferior portion
dorsal spinal cord was completely softened;
similar change in the same part of the cord
und in a case detailed by Ollivier. Fluid
lso been found in the spinal canal; but it is
ful whether or no the fluid has been, in
ity or quality, such as to constitute a morbid
ion. Dr. Bright mentions the existence,
case, of small plates of bone in the arach-
f the spine, a lesion which I have seen con-
with increased vascularity of the membranes
cord, in cases of tetanus. MM. Dupuy,
helemy, and several others, have seen in-
atory changes in the medulla oblongata,
portions of the cord, and their membranes,
lower animals. Laennec and Orfila have
served inflammatory appearances in the spinal
and in a dissection described by Mr. Cope-
these appearances existed chiefly at the base
brain, on the crura cerebri, and tuberculum
are. M. Gendrin, however, and some others,
d that many cases of this malady present no
ce of disease in the spinal cord, or nervous
a.

It may, however, be remarked, that the
character and amount of change in the
la oblongata and spinal cord in this malady
not been sufficiently investigated, — that the
e of all lesion in these parts has not been
ctorily shown; and whether the existing
be one of an inflammatory nature, or one
ting the intimate structure of these parts in
a manner as to escape the detection of our
sted senses, there are strong reasons for in-
; that some change actually exists in these situations, although it may not be limited to them, but may extend to the related or associated nerves, and even to the parts supplied from these sources, and by these nerves. In a case assiduously attended by Mr. Dendy and myself in 1821, I was induced to examine the state of the larger nervous ganglia, expecting to find inflammatory or other changes in these parts of the nervous system, but they presented no appearances which could be considered as morbid, or could be detected without the aid of the microscope. Since then Mayer and Vilette have stated that the ganglial nerves have been seen inflamed by them, but these ganglia are generally very vascular even in health. In the dissection of a case by Dr. Brandreth, the par vagum was seen covered by a blush of inflammation, its sheath was injected, and small ramifications of blood-vessels were seen running parallel to the nervous fibriles in the cellular tissue connecting these fibriles. The fourth, fifth, sixth, and seventh cervical nerves were also highly vascular, both in the sheath and between the fibres. Some of these were so much altered as to resemble muscular fibres, being scarlet externally and pink internally.

24. *f*. The states of the *urinary* and *sexual organs* have not been examined in most of the dissections which have been recorded. The only change which I have remarked has been an empty and contracted state of the urinary bladder. Bader says that he found, in one case, the *uterus* tumid, and both it and the *vagina* very vascular. The abdominal viscera, excepting the changes observed in the villous surface of the stomach and intestines, have presented no alterations which could be imputed to this malady. Astruc, Morgagni, Sauvages, Enaux, Chaussier, and Rochoux, state that the body of the rabid patient undergoes a more rapid putrefaction than in ordinary circumstances. This may depend upon the debility and nervous exhaustion characterising the disease, and upon the fluidity of the blood after death, decomposition generally supervening more rapidly when the blood does not undergo the usual coagulation consequent upon dissolution. That the dead body exhales a peculiar fœtor is a circumstance noticed by M. Rochoux and myself.

25. IV. Diagnosis.—(*a*.) The existence of true rabies—of hydrophobia from the bite of a rabid animal—cannot always be determined with ease; for several of the symptoms of this malady may attend other diseases; or may even be induced by alarm. The dread of water — the hydrophobic characteristic — has had too great importance attached to it in all histories of cases and descriptions of this disease; and many cases have been very loosely detailed, in which this symptom was very prominent, as closely simulating rabies, the resemblance often existing more in the minds of the describers than in the cases themselves. When this symptom occurs in other diseases, which are so characterised by their history, and other phenomena, as not to be confounded with true rabies, as in the course of fevers, and inflammatory affections of the throat, &c., there can be no difficulty in the diagnosis; but, when it occurs in certain states of *hysteria*, or when it is associated with the severe nervous affection consequent upon alarm, then the diagnosis may be most difficult. Pinel states that a soldier was alarmed at midnight by his comrades, and was immediately attacked with convulsions, burning and constriction of the throat, dread of liquids,

and expectoration of a copious frothy saliva. "In the morning, the horror of fluids and burning pain in the throat were more intense, accompanied with a sense of weight in the head, hurried and irregular respiration, feeble intermittent pulse, and intolerance of light, but without alteration of the intellectual functions. He was certain that he was never bitten by any animal. The symptoms increased and he died. The examination presented nothing extraordinary. A quantity of mucus only was found in the throat." A case fully reported in the *Journal des Savans* (August, 1757, p. 81.), is referred to by Dr. Bennett in his able treatise on this malady; and in it all the symptoms of true rabies are said to have existed, and to have terminated fatally, no other cause having been ascertained than fatigue during a hot day. This writer also refers to a case in Hufeland's Journal, where the person was bitten five weeks before the symptoms appeared, by a dog which was perfectly healthy, and remained so after the individual bitten had died with all the symptoms of rabies. Either these persons had been inoculated with the virus producing rabies at some antecedent period unknown to themselves, or alarm and other causes are capable, on some rare occasions, and owing to peculiar combinations of causes, of producing a disease which, if the relators of these cases are to be relied upon, is identical in its course and termination with true rabies. The hydrophobic symptom observed in rare instances in hysterical, epileptic, and tetanic attacks; or in the course of exanthematous, febrile, inflammatory, or rheumatic diseases, is associated with very different groups of symptoms from those which either precede or accompany rabies, and, even when it occurs in the worst cases or forms of these maladies, it is not attended by the alarm, the violent spasms and distress extending from the throat to the epigastrium and abdominal muscles, generally observed in rabies. The symptomatic hydrophobia, observed in connection with these or with other maladies, is seldom the prominent or most important part of the disorder, and, in many cases where it has been observed, an undue importance has been imputed to it.

26. (*b.*) It has been supposed that, when the rabid symptoms follow almost immediately upon, or soon after the bite of a rabid animal, the disease is not caused by the inoculation of the virus, but by the mind of the patient. There may be some truth in this opinion, for the influence of the mind in causing, in aggravating, or in developing a malady of this nature, so greatly dreaded by every person, is undoubted in certain circumstances and in some temperaments. The mental influence strongly or uninterruptedly determined through the medium of the nervous system to a particular organ or part, especially if habitually influenced by acts of volition, will change the sensibility, painfully excite this vital manifestation, and more or less disturb every function it performs in health. But that true rabies will be produced, in a bitten person, by the influence of the mind, independently of the operation of the inoculated virus, can hardly be demonstrated, and, although not impossible, should not receive complete credence in the present state of our knowledge of the mode of operation of the poison causing the malady. Extreme or prolonged alarm may rapidly develope the action and the effects of the inoculated poison, or may have the same influence upon an inoculation of it on some previous occasion, so remote as to have escaped the recollection. I have met with three instances of ladies of a highly nervous temperament, where the mind was most anxiously and distressingly affected by rabies having occurred in their dogs, and by the circumstance of their hands or face having been licked by these favourites shortly before the disease was recognised. The animals were removed to the care of Mr. Youatt, and soon afterwards died; and although the mental anxiety and distress of these ladies were extreme for a considerable period, and were attended by slight dread of fluids, still the symptoms were chiefly of an hysterical character, and no time closely resembled rabies, their duration and the progress of the disorder soon demonstrating the nature of the affection, which subsided with the lapse of time.

27. (*c.*) The early symptoms of rabies may be mistaken for *hypochondriasis* or *meluncholia*, especially when the injury has been inflicted long previously, or has been forgotten; but the rapid development of rabies, the precursory symptoms (§ 8, *et seq.*), and the painful and convulsive deglutition, with the dread of water, will prevent any mistake. *Hysteria*, however anomalous its symptoms may be, or however closely it may simulate rabies, by the presence of hydrophobia, of painful and convulsive attempts to swallow, will be distinguished from rabies, by the presence of borborygmi, by the globus or clavus hystericus, by the states of the urinary and uterine functions, by the appearance of the salivary secretion, by the vacillations of the mind and temper, and by the history and duration of the case.

28. (*d.*) The resemblance between *tetanus* and rabies is not so close as some writers have believed, especially in their fully developed states. The spasms in the latter are only occasional, continue but for a very short period, and are followed by complete relaxation — are altogether clonic. In the former they are constant, although presenting slight remissions and exacerbations — are tonic and violent. Tetanus commences and is attended with distress, or pain or anxiety under the sternum, with pain and stiffness in the muscles of the jaws, which are gradually fixed, closed, and cannot be opened. Rabies commences with uneasy or painful sensations, extending upwards from the seat of injury, with uneasiness at the pharynx and root of the tongue, and the precursory symptoms described above, the mouth opening and shutting readily. Thirst and vomiting are common in the latter and very rare in the former malady. Hydrophobic symptoms and difficulty of swallowing are very rarely observed in tetanus; whilst the spasms occurring in rabies as rarely present the form and characters of tetanus, which, moreover, is never accompanied with the extreme sensibility of the surface and of the senses, with the rabid or convulsive paroxysms, and with the symptoms referrible to the urinary and genital organs that are characteristic of rabies.

29. V. Prognosis. — The opinion which may be formed as to the ultimate result, has reference — 1st. to the disease, when the symptoms, precursory or developed, have appeared; — and 2d. as to the probable occurrence of the malady after the bite of a rapid animal. — (*a.*) When even the precursory symptoms of rabies make their appear-

and *a fortiori* when the symptoms are more leveloped,— are undoubtedly those of rabies, onsequent upon the inoculation of the rabid I doubt the existence of a single well nticated case which has been cured. A few ces of recovery have been recorded, but the ice is not sufficient to convince me that they ever caused by the inoculation of this poison, at they were not caused entirely by fright, or continued alarm. The fatal issue of rabies so general, if not universal, when the malady es itself, it may be next —(*b*) enquired, is the prospect of escape furnished to those are bitten by a rabid animal? The prospect remarkably with the species of the animal, he seat and circumstances of the injury, with ason of the year, with the period after the at which prophylactic measures were re- to, and with the nature and efficiency of measures.

The bite of a rabid wolf, which generally t the face, is much more dangerous than that rabid dog. This latter animal most fre- ly bites through the clothes, which intercept ison and prevent the inoculation. M. TROL- tates that, at Brives, seventeen persons were y a wolf; of these ten died; and that, of y-three persons bit by a she-wolf, thirteen although in most of these precautions had resorted to, but in many after some time had d from the infliction of the injury. "Mr. NTER has stated, that one occasion a dog bit y persons, of whom only one was infected the disease. In 1780, at Senlis, a dog bit persons, of which three only died of hydro- a."—(BENNETT.) Of those persons who are by the same animal, the first injured, and who have been bitten in parts unprotected thes, are the most liable to become infected; liva, or virus, is most abundant in the first and is intercepted by the clothes in the . M. JOLLY thinks that the poison of a rabid l is more dangerous in warm seasons and tes, than in cold or temperate periods and ries. Accidents from rabid animals, especi- rom dogs, are certainly more frequent in seasons; but it is doubtful whether or no the ncy be owing to the more frequent occur- of rabies in these animals at these seasons, an increased intensity of the poison — most bly to the former circumstance. Wounds are deep, irregular, sinuous, and bleed but are more dangerous than others, inasmuch imbibition of the poison from them is more r rapid, and the prophylactic measures can- so completely employed. When more than jury or bite has been inflicted, when it is d on the face, or on the neck, or on the regions of the trunk, the danger of infection eased, and the rabid symptoms are more y developed, the period of incubation being ally shorter. It is obvious, that the longer iod which has elapsed from the infliction of jury to the employment of preventive mea- the greater are the chances in favour of oculation of the disease. As to the efficacy se measures, more particular notice will be in the sequel.

VI. CAUSE.—*A*. Rabies being the ultimate of a specific animal poison, which is capable ing upon all animals; upon every constitution, temperament, or habit of body; and upon both sexes, at all ages, and in all circumstances of climate, season, and locality, the *predisposing causes* of the malady cannot be determined. As the inoculation of a specific virus, or poison, is the only cause of true rabies, and as the inoculation may or may not have been effected in many cases of persons bitten by rabid animals, it is impossible to state with truth, that the inoculation had not taken effect owing to the predisposition of the person who had thus escaped, or that it had produced this fatal disease in consequence of predisposing circumstances in the unhappy sufferer. The most that can be said respecting predisposition is merely inferential. It may be rationally supposed that, when the quantity of the inoculated poison is great, the more rapidly will its effects be developed; that when the vital energies are strong, the longer they will be opposed; and that, when the nervous system is depressed by fear, anxiety, and other causes, the more rapidly will the malady be produced, and the more likely is the poison, even in a small dose, to take effect.

32. But, it may be asked, May not a small dose of the poison, inoculated by the teeth of a rabid animal, whether this poison consist of the saliva, or be conveyed in the saliva, or in the frothy matter in the mouth, or on the teeth and lips of the animal, fail of producing its dire effects in persons possessed of strong constitutional powers; or, in other words, may not a quantity of the poison, which would be productive of the malady in a debilitated, timid, and frightened person, fail in causing it in another person differently or oppositely constituted and circumstanced? The answer may be made, with seeming truth, in the affirmative; but we have no facts which can prove it, although the escape of many persons from the consequences of the bite, under circumstances which tended to prevent the full inoculation, or to diminish the dose, of the poison and the subsequent imbibition or action of it, appears to favour the inference. The circumstance of the full operation of the poison sometimes not appearing until months, or even years, have elapsed from the time of its inoculation, favours the idea that, in such instances, the dose of the poison is too small or weak, relatively to the powers or state of the constitution, to produce its specific action until some circumstance or change takes place calculated to aid, to determine, or to develope its influence.

33. *B*. The only *exciting cause* of true rabies in the human species is the inoculation, or application to an abraded or mucous surface, of the virus formed in a rabid animal; this virus either consisting of, or being conveyed in, the frothy saliva and mucus in the mouth, and on the teeth and lips of such animal. This I believe to be the sole cause of rabies. The very few cases of the disease which have been said to have arisen from alarm or other causes, have not been sufficiently verified in all their details to warrant the inference that rabies may appear in the human subject from other causes than the one now stated. It cannot be proved, that even in these the poison of rabies had not been communicated at some former period, or on some forgotten occasion, taking it as proved that the disease was actually rabies; and certainly most of the instances which have been adduced of spontaneous rabies have not been conclusive as to this origin. We have so many false facts in

medicine, that credence should be withheld from those which are opposed to the usual course of events, until they are satisfactorily demonstrated. One physician publishes the case of a child that died of rabies caused by the bite of a dog which, he says, was not rabid, as a proof of the spontaneous origin of this malady, or at least of the occurrence of it independently of contagion. But another physician states, that the animal which injured the child, and which was said not to be rabid, was actually killed shortly after in circumstances warranting the inference of its rabidity. The desire of publishing whatever appears singular or anomalous, chiefly from an insufficient recognition of all the phenomena, and often from the neglect of many which are most important, gives rise to an accumulation of false facts, which bewilder even when they fail of misleading.

34. It has been considered, that there is no reason wherefore rabies should not occur spontaneously or independently of contagion, because other contagious diseases occur in this manner. But other contagious diseases certainly furnish no very manifest evidence of spontaneous origin on many occasions. Syphilis, small-pox, measles, scarlet-fever, &c. present no such occurrences, and are propagated only by a specific poison, although certain seasons and epidemic influences or constitutions favour their prevalence and extension. The same is observed in respect of other contagious and pestilential maladies, which, with those now named, cannot be shown to originate *de novo* on all or any of the occasions of their appearing without contagion being traced as the cause of their appearance. It has likewise been considered that, when rabies occurs almost immediately after the bite of a rabid animal, the disease is actually not the consequence of the inoculation of the poison, but the result of alarm acting upon a susceptible nervous system, and producing a state of disturbance, which, in its characters and issue, is identical with true rabies. This is barely possible; but, because the poison requires several days, or even months, to develope its effects in most cases, there appears no reason, nor can this be considered a sufficient reason, against its immediate action in certain circumstances, such as the inoculation of a large dose of it, or unusual susceptibility of the nervous system to the morbid impression caused by it. As respects the few instances in which rabies has been said to have appeared consequent upon fright or other intense causes, and independently of the bite of a rabid animal, either the history and symptoms of the cases are deficient of precision of detail, and of a recognition of all the facts, or the probability of a previous infection, communicated in some way or other has not been disproved.

35. Much of the misapprehension existing on this subject has arisen from the circumstance of those cases of nervous or other diseases, especially those which have been fatal, and which have presented, with other nervous or spasmodic symptoms, a difficulty of swallowing or a dread of water—a *hydrophobia* — having been denominated cases of hydrophobia, and considered from this single symptom as an identical disease with that produced by the bite of a rabid animal. But to prove their identity, the communication by inoculation of the disease from these spontaneous cases to some lower animal ought to have been tried, but it has never been even attempted. That dread of water, generally depending upon difficulty of swallowing, upon disgust, or some antipathy temporarily entertained, and generally associated with spasms or other nervous symptoms, may assume a prominency in form, character, duration, and termination, to deserve the appellation of hydrophobia, cannot be doubted; and that it may, in certain circumstances of the individual affected, occur directly from the impression of various internal causes, or be associated contingently with other maladies in some period of their course, I readily admit; but I am convinced that either of these occurrences is not so frequent as supposed by some; nor is this hydrophobia, believed by a few writers to be instances of spontaneous rabies so prominent a characteristic in such cases as it has been made to appear. Viewing, therefore, hydrophobia thus occurring, independently of the contagion of the rabid poison, as a symptom rarely observed in other maladies, and as of doubtful or very rare occurrence as a primary or idiopathic disease, I shall dismiss the consideration of it in connection with this subject.

36. Believing that rabies — that the disease described above in its fully developed stage (§ 0; *et seq.*) — never appears in the human subject unless it be communicated by a specific virus or poison, it next remains to be inquired,—1st. What animals thus communicate it? — 2d. Do these animals generate or originate it *de novo*, or without previous inoculation or infection? — And 3d. Can the disease be communicated otherwise than by inoculation? — (*a.*) *Certain species of the canine and feline genera* most frequently inoculate the human subject with this poison; the dog, the wolf, the cat, and the fox, being the animals which most commonly become rabid and infect others by inoculation. But these other animals may, themselves being infected, communicate the disease to others, provided that they are capable, by the formation of their teeth, jaws, and mouth, of wounding the animals they may attack, and at the same time of applying to the wound the poison which may be present in their mouths or on their teeth. Ruminating and herbiferous animals, owing to the forms of their teeth and jaws, seldom inoculate the disease when they become rabid; and hence many have believed that the secretions of the mouths of these animals are not contagious. But M. Breschet has demonstrated that the saliva of these animals, when rabid, will communicate the malady, by inoculation, to other animals. The disease may likewise be transmitted to birds of all kinds; but, owing to the absence, as respects them, of the conditions just mentioned as being necessary to this mode of communication, the individuals belonging to this kingdom of nature can hardly be considered as capable of infecting others, although the possibility of their doing so may be admitted. Of all animals the carnivorous are the most frequent propagators of the malady to others as well as to man; owing chiefly to the circumstance of these animals having preserved the contagion among themselves more especially, by the frequent inoculation of it, and to the form of their teeth, which is the most calculated for inflicting a deep wound, and at the same time for the insertion of the poison,—the lacerations, and the other wounds they inflict, not only being very readily poisoned by the fluids of the mouth, but more tenaciously

ing the poison, in consequence of their depth ature; and of the slight hæmorrhage or ab- of all hæmorrhage characterising them.

. The possibility of this malady being com- ated by the human subject has been ed; and experiments have been performed dogs, with the frothy saliva of rabid per- by Vaughan, Babington, Giraud, Gi- , and others, in order to determine this but without having succeeded. More re- , however, the question has been decided M. Magendie and Breschet, who inocu- two dogs with the frothy saliva and mucus from the mouth of a man in the Hotel shortly before his death from rabies. One dogs became rabid at the end of four , and bit other dogs, which also became The result of this experiment should ren- rsons cautious, lest the saliva or fluid issuing the mouth of the rabid human subject come in contact with some abraded, in- or mucous surface of another person; as bability of infection in this way is certainly istrated by it; and the statements of MM. x and Chaussier, that persons have been with rabies in consequence of having wiped ips with napkins or cloths which were soiled he saliva of a rabid subject or animal, not to be viewed as being apocryphal, as ave been by some. Cælius Aurelianus that a person was attacked with this ma- ter having employed his teeth to undo the ngs of a mantle worn by a person who had it.

(*b.*) *Are certain species of the canine and aces, as the dog, the wolf, &c., capable of ting the malady* de novo, *without previous tion or infection, and of communicating it rds?* The generation of this disease *de* y the animals which appear to be most tly affected by it has been believed in by at majority of writers, yet I do not con- e matter to be at all determined. Experi- ave been made by Dupuytren, Breschet, die, Bourgelat, and others on dogs and ese animals being placed in those circum- in which they have been said to originate without this disease having appeared in a instance among them. This point is most t to be determined; and probably a just ion respecting it will be more likely to be at by careful observation of facts and by ve experience, than by experiments, the of which can prove nothing, whilst what pear as a conclusive result will admit of The late Mr. Youatt, a well-educated, nd candid observer, and possessed of the experience, remarked to me that he be- that the disease rarely, or perhaps never, ed *de novo*, but in contagion. It has cer- ot existed for ages in certain insulated or d places, until introduced by inoculation -ascertained occasions, whilst it has never served in other places similarly circum- . The matter deserves further investiga- serving to arrest the propagation of this ng malady.

Those who believe that rabies may occur eously in the dog, wolf, or cat, furnish ise information on the subject; and it y cannot be proved that, when it does appear in one of those animals, it is not the consequence of inoculation or infection at some previous period. The long time often required for the development of the disease, after undoubted inoculation, and the possibility of its being communicated otherwise than by inoculation — by the contact of the virus with a mucous surface — serve to render the proof of actual communication by contagion a matter of difficulty. Those who contend for the spontaneous origin of the disease suppose that protracted thirst or hunger, extreme heat, violent excitement or anger, the sexual heat, &c., severally, or variously associated, may develope the malady, independently of contagion. Still these are merely suppositions, and are unsupported by positive evidence. M. Trolliet states that the months of January and August, the coldest and the warmest, furnish the fewest instances of rabies; and that in March and April the greatest number of wolves are rabid; and that in May and September the greater number of dogs. Several writers have contended that the malady is very rare in very hot and very cold climates, whilst it is most frequent in temperate countries; but much uncertainty, and even obscurity, envelopes the subject of the spontaneous origin of this terrible distemper.

40. (*c.*) *Can the disease be communicated otherwise than by the bite of another rabid animal, or by the actual inoculation of the virus?* The bite of the rabid animal is merely the inoculation of the poison, which may be communicated by other modes of inoculation, as shown above. Schenck and Zacutus Lusitanus aver that rabies has been caused by wounds from sabres with which dogs had been killed long previously. That the virus of rabies may cause the disease when brought in contact with an abraded surface, or sore, or wound, cannot be doubted; and that it may produce its specific effects if allowed to remain in contact with a mucous or an absorbing surface or part has been argued for by some, and denied by others. It has been stated that both sheep and cows have been infected with rabies after eating the hay or straw on which rabid dogs, pigs, and other animals have died; and although these and similar occurrences admit of reasonable doubts, they are certainly not impossible. Numerous instances have been recorded of a rabid animal, especially the dog, having licked the lips, the hands, or abraded parts or sores of its master or mistress, and thus communicated the disease; and it has even been stated by Palmarius and others, that the kiss of a rabid person has actually proved infectious to the saluted individual. That the disease may be thus communicated, especially if there have been any abrasion of the lips, or even if the foam from the mouth of a rabid animal remain in contact with a mucous surface, is extremely probable, although the facts in proof of this mode of infection are few. They are, however, so probable, and are supported by so many analogies, as to deserve attention. The instances which have been recorded — certainly remarkably few — of rabies, or hydrophobia, occurring without any bite, may have been produced by the poison of rabies nevertheless, which had been communicated in some other way than by this mode of inoculation. Authenticated instances have been published (Fabricius Hildanus, Heister, Palletta, &c.) of the communication

of the malady by linen, rags, cloths, &c., which had been torn by, or imbued with the saliva of, rabid animals, and even by the cords with which these animals had been tied. The skins, fleeces, and furs of animals which had retained the saliva or foam that had issued from the mouth at an advanced stage, have even been the media of transmitting the malady, by having brought the virus in contact with an abraded or mucous surface of the infected person. Such occurrences, however, must be remarkably rare; but they are so possible as to render caution necessary, whenever an animal is in any way dealt with in this disease, or even when the existence of the malady is suspected. The statement which has been made, that the breath of a rabid animal, at an advanced stage, may communicate the malady, rests upon very insufficient evidence. The experiments of Magendie and others show that the blood, milk, flesh, semen, and abdominal secretions of a rabid animal cannot transmit the disease. As to the particular source of the rabid virus, I shall offer some remarks in the sequel.

41. VII. Nature of Rabies.—That the poison of rabies is not imbibed by the capillaries of the injured part and carried into the circulation, is shown by the long period which elapses from the inoculation until the disease is developed, and by the characters of the precursory and early symptoms. That it is not absorbed by the lymphatics is evinced by the absence of every sign of irritation of these vessels, or of their associated glands. It is therefore to the nervous system that we are compelled to look for the earliest changes consequent upon the inoculation of the virus. As to the pustules, said by Marrochetti and Magistel (§ 7. *note*) to appear under the tongue from three to fourteen days, and even, in some cases, at a later period, from the inoculation of the virus, their existence may not materially affect the question as to the mode in which the poison affects the constitution. But it is by no means determined that these pustules actually exist; and, even admitting their existence, their pathological relations and nature are unknown. It is possible that they are merely enlarged, or obstructed mucous follicles; but, as such merely, their presence ought to be positively determined, and their connection with rabies investigated in its several relations.

42. The history, progress, and character of the phenomena of rabies are entirely those of a nervous malady of the most intense form. The gradual accession of the symptoms; the altered, and especially the acute, sensibility accompanying them; the readiness with which this sensibility, either of the surface or of the senses, induces, spasmodically and in paroxysms, the reflex actions of the muscles of voluntary motion, even independently of volition; the intermittent character of these actions; the marked disorder of the organs influenced by the eighth pair of nerves; and the inordinate susceptibility of the nervous system generally, combine to demonstrate an important change of that part of the nervous system to which sensibility may be especially referred, and which either gives origin to, or is more particularly connected with, the pneumo-gastric nerves. The changes more recently and most generally observed in the medulla oblongata, often extending to various parts of the base of the brain on the one hand, and to the spinal cord on the other, explain the characteristic symptoms w enumerated. It is only in comparatively re nt times that our investigations have been dire ed to this portion of the nervous system in respe of this disease; and in all cases where the in ry has been duly instituted, some lesion, indic ve of extreme irritation or vascular excitement ir his quarter, has been found. Vascular injec n, ecchymoses, increased redness or congestion erous effusion, softening of the cerebral or ne us structure, &c., have been severally obs ed after death. M. Trolliet, one of the firs bservers who directed attention to this part o he nervous system in rabies, states that the ch id plexus is generally gorged with dark blood; at a small vascular plexus shuts posteriorly the f th ventricle, and extends to the origin of the e th pair of nerves and corresponding parts o he brain, which are found redder than usual; at this plexus is generally so deeply injected o oloured as to appear ecchymosed; and tha he most remarkable lesions are found in the vi ity of the origins of the optic and pneumo-g ric nerves, which latter perform so important art in rabies. A due recognition of the several nctions of the pneumo-gastric nerves, and of eir connections with the ganglial nerves both the the thorax and abdomen, will serve to ex ain most of the phenomena of this malady. Dr. Bennett justly observes, that a careful p sal of the experiments of Dr. J. Reid (*Edin.* ed. *and Surg. Journ.* No. 134.), and of other ysiologists, will show that congestion of the mebranes at the base of the brain, producing ore or less pressure on the origins of the eighth p of nerves, is capable of explaining all the phen ena the disorder presents.

43. Certain of the changes observed after ath may be directly referred to violent irritat or vascular excitement in the parts of the n ous system above mentioned; but others are alto her consecutive of these conditions, or are the ult of the paralysed functions of the eighth p of nerves, induced by the changes in these ner , or in the vicinity of their origins; whilst the are also others which depend either upon the m e of death — upon asphyxia either suddenly or dually induced, or upon cadaveric conditions, o ost probably upon both. Several of these conse ive changes, existing either in the digestive ca l or in the respiratory passages, have been vie l as the seats and origins of the malady; and, h ver slight, have had an importance assigned t em to which they are not entitled. Becau the pharynx presented appearances of irritatio Fothergill considered rabies as merely a spa dic angina, and, as this irritation often extended the larynx and trachea, Parry viewed these being chiefly concerned with the pharynx the production of the malady; subordinate a secondary changes being thus assigned as th onditions constituting the disease. The alte ions observed in the lungs, bronchi, and blood, obviously to be referred to the lesions found the medulla oblongata, base of the brain and v ity, and to the consequent paralysis or similar d rder of the functions of the pneumo-gastric nerv the circulation in the lungs and bronchial m ous surface, the secretion from this surface, a the chemical changes in the blood being t eby affected.

What are the humours of the rabid animal
contain the virus perpetuating this malady?
hat is the mode in which this virus acts in
ing its fatal effects? — These questions have
importance as respects the prevention and
ylactic treatment of rabies; but they are
with difficulties. — (*a.*) As to the *first* of
the evidence is rather negative than positive.
OLLIET, MAGENDIE, and others have shown,
ect experiment and observation, that neither
ood, nor the flesh, nor the milk, nor the
l fluid, nor the breath of the enraged animal,
able of propagating the malady. A similar
ice may be arrived at in respect of the
ons and excretions from the abdominal
. It is, therefore, to the secretions of
outh, or to those issuing from this outlet,
e must exclusively look, as the vehicles of,
the actual poison. The saliva has been
l from the earliest period of medical history
stituting, or as conveying, this poison; and
de of communicating the malady has been
f a strong proof this is actually the poison.
recently M. TROLLIET has contended, that
liva possesses no contagious properties, un-
becomes mixed with the frothy matter which
en out from the bronchi, this latter matter
uting the poison or virus which produces the
. He rests his opinion upon the absence of
vidence of disease, of enlargement, of in-
ation, or of congestion, of the salivary glands,
the morbid changes always existing in the
i of the rabid animal, and upon the ana-
furnished by other contagious maladies.* — Although I consider M. TROLLIET's opinion to be deserving due consideration in all our future investigations, still it cannot be altogether admitted that he has proved the saliva, unmixed with other fluids, to be devoid of the poisonous property, or that he has demonstrated this property to be present in the secretions of the bronchial mucous membrane. Nevertheless, his investigations and his views are deserving attention, far beyond what they have hitherto received in this country.

45. (*b.*) *As to the mode in which the rabid virus acts in producing its effects,* we know nothing more than of the operation of other animal poisons, and perhaps even less. The oldest opinion, as to the action of the virus, after being received into a wound, was that it is absorbed and mixed with the circulating fluids, and that it thus produces a general infection of the humours and solids of the body. A subsequent theory ascribed its action to the effects produced in the place injured, and the propagation of this lesion through the whole nervous system. That the fluids and secretions are, generally, infected by this poison is disproven by experiments and observation; and the local effects of the injury bear no proportion to the subsequent constitutional disorder, so as to furnish an argument in favour of the opinion, that the disease arises from the propagation of the local impression throughout the rest of the system. It has already been stated, that the virus does not act by absorption, because the lymphatics and glands betray no signs of irritation, and because the bloodvessels also present no lesion. It has been supposed, that the change locally produced is propagated to the nervous system generally: but granting that this is the case, we are still at a loss to explain the production of a contagious principle, and the limitation of the production of it to a particular part and to a particular secretion. We may, however, readily conceive, that the virus affects or irritates the nerves in the part injured, and that this local change in the nerves is propagated, by means of the sensory nerves, to the medulla oblongata, or to parts in its vicinity, to which they are more especially related; that the morbid condition or change thus produced, is reflected by means of the nerves arising in these parts of the cerebro-spinal axis, to the respiratory and gastric organs, and more especially by the pneumogastric nerves; and that, in consequence of the change in the influence transmitted by these nerves, the circulation, secretions, and functions generally of these organs are altered. — As to the source of the contagious virus, the evidence is inconclusive, although it cannot be doubted, that the secretions which are excreted from the mouth actually contain this poison, and that the formation of it takes place at that period of the disease when the functions of those organs, supplied by the pneumogastric nerves, present more or less disturbance. That the succession of changes just stated is followed by the formation of a specific poison — of a secretion capable of perpetuating the malady — is extremely probable; but the exact source or seat of its formation has not been demonstrated satisfactorily. The poison is evidently contained in the fluids issuing from the mouth;

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* this is a topic of the utmost interest to patho-
and as the lungs were never viewed, before the
hes of M. TROLLIET, as the chief seat (although the
tive seat only, in my opinion,) of morbid ap-
es in cases of rabies, and as furnishing the poison,
eloped effects of which human science has hitherto
o remove, I here adduce the conclusions at which
ves: — 1st. "The organs of respiration, and the
r system in the brain, present constant marks of
ment in rabies. The other organs offer nothing
n be rigorously attributed to this malady. — 2d.
livary glands, and the cellular tissue enveloping
present not the least vestige of inflammation, nor
nge in their volume, nor in their colour or tex-
3d. The mucous membrane of the mouth and
x are of a pale grey, and are lubricated by a slight
e: these cavities contain no saliva, nor any frothy
— 4th. The larynx is rarely inflamed, the trachea
equently, especially in its inferior portion; the
i always. In rabies, the capillaries of the lungs
cted; and this organ is red and congested. The
lity of this viscus is also greatly increased; a
g heat, pain, and constriction are experienced —
omonic signs of inflammatory action. — 5th. This
natory state of the lungs is specific, and arises
e virus of rabies, as the eruption from the virus
ll pox; the inflammatory appearances being pre-
different degrees, in different subjects. These
ances are seated in the mucous membrane of the
i and trachea; the cellular tissue and serous
g of the lungs being not affected. — 6th. A frothy
is generally found in the parts inflamed; some-
n the larynx, oftener in the trachea, towards its
portion; it is generally found in the bronchi, and
be squeezed from the air-cells. This frothy mat-
product of the inflamed mucous membrane, and
n over the lips of the rabid person in the last
f the disease, when the respiration is quick, forcible,
rtorous. — 7th. I consider this frothy matter, thus
by the spasmodic expirations, from the air pas-
ver the lips to be the true vehicle of the virus of
and not the saliva; because the salivary apparatus
he seat of any pain during the disease, and does
sent any lesion after death; because the bronchi
amed, are the seat of pain, and furnish a diseased
n; and because, in all contagious diseases, the
produced from the part inflamed; as in gonorrhœa,
ox, &c. The saliva, therefore, is no more the vehicle of the virus of rabies, than the semen is that of the virus of syphilis."

but whether it is present in the saliva, or in the mucus secreted by the respiratory passages, as contended for by M. Trolliet, or in the mucus secreted by the mucous follicles of the mouth, or more or less in all these, is very far from having been determined. Supposing that the poison emanates from one or other of these sources, it still remains to enquire, Does the poison consist in a material, organised, or chemical change in the secretion constituting the virus; or is the secretion merely the vehicle of a nervous aura or emanation, which is actually the infecting agent, and which is retained by its vehicle only for a short period? If this latter alternative be admitted; and if it follow, that the infecting influence is powerful in proportion to the exposure of the injured part to the mouth and teeth of the animal inflicting the injury, and is lost soon after removal of the secretion from its source, several phenomena connected with the propagation of the malady may be thereby explained. Hertwig's experiments, however, prove the former of these alternatives, namely, that the poison is of a definite character, that it may impregnate various substances, and that it retains its activity for a long period. Possessed of these characters, the circumstance of rabies appearing without the injury or contagion being traced, in rare instances, cannot be a matter of surprise.

46. **VIII. Pathological Inferences and Remarks.**—(*a.*) The *spontaneous occurrence of rabies* in man, although believed in by some, and supported by two or three instances loosely detailed and suggesting numerous doubts, rests on no foundation of a satisfactory kind: the fear of water and the nervous symptoms present in some instances of other diseases, furnishing no approximation in character to this dreadful malady.—(*b.*) The *spontaneous origin of rabies in the dog, wolf, fox,* or *cat* is a much rarer occurrence than many believe (§§ 38, 39.). I have stated my reasons for this inference. Ziegler, however, assigns such an occurrence to the want of the instinctive degree of nourishment from flesh and blood by these animals, and terms the malady, *blood-thirstiness, blut-durst*, or *flesh-craving, fleischgier.*—(*c.*) The *saliva* or *secretion issuing from the mouth* of the rabid animal conveys or constitutes the poison usually inoculating rabies. Hertwig's experiments show that its application to an open wound is not indispensable to the manifestation of its effects, and that it may infect a healthy animal when applied to parts with a thin epidermis, even without abrasion. He further states that it is inert when applied to the uninjured villous surface of the stomach; but, in opposition to Magendie (§ 40.), he considers that his experiments with inoculation prove the blood of the rabid animal to be contagious.—(*d.*) The *time of the development of the malady*, after the inoculation of the virus, varies with the corporeal and mental influences, dose of the poison, &c., from seven or eight days to seven or nine months,—usually from four to sixteen weeks. But there are cases on record, which are well authenticated, of years having elapsed from the infliction of the injury until the development of the malady.—(*e.*) When the disease is developed, the *pathognomonic symptoms*, in man, are the severe constriction about the throat, and spasmodic action of the diaphragm, with general spasm or convulsion, upon attempts to take any fluid, and b. sequently at the sight of water, or of any gl re ing object, or the least breath or current o ir, or the slightest touch of the surface*; th nacious and clammy state of the saliva; an he frenzied or rabid paroxysms, which become re frequent and marked with the progress o he malady. This frenzied or rabid state is not n- tinuous, or at all resembles delirium. It is e- sent only during the impulsive or rabid paro m, and ceases during the intervals; althoug at- tended, towards the close of the malady, in me cases, by certain illusions of sight, it is not ac m- panied by any mental delusion.† It may b le- nominated a momentary state of phren o madness; but it is neither insanity, nor n ia, nor delirium.—(*f.*) According to the obs a- tion of several writers, all the *premonitory* nd many of the *advanced, symptoms of rabies a* after the bite of a rabid animal, and eithe d- *denly or gradually disappear.*‡ It is diffic to assign this occurrence to its true cause, or t ny single circumstance. The symptoms in ese cases may have been developed entirely b the influence of the mind, and have suddenly b- sided, or gradually worn themselves out; the dose of the poison may not have been suf ent for the full development of the malady; the disease may actually admit of a sudden or gr ual

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* Dr. Elliotson, whose description is remarkabl cu- rate, justly states that the effect produced by these ses very much resembles that produced upon steppi nto a cold bath. A sudden and involuntary inspirat is made, followed by several shorter ones; "and, i ses of hydrophobia, the muscles of the throat are, the same time, violently contracted, so that the glott io- lently closes, and the attempts of the diaphragm de- scend, and of the muscles of the chest to elev the ribs, are frustrated from moment to moment. he closure of the glottis is, however, not continuo but alternates with relaxation of the muscles, so that uc- cession of sobs takes place."

† Chelius says that there is often an uncontr ble disposition to bite. Mr. South doubts the truth o is, as regards the human subject. I have, however een it in two instances; and it is also mentioned as ing observed by Powell and Magendie. According my own observations, the disposition in man is rat to strike, during the rabid paroxysm, and only to bite nen he is restrained forcibly at that period. The rem of Mr. H. Cline, that animals afflicted with this ase are invariably disposed to use their organs of defe ,— the dog and wolf to bite; the horse to kick an ite, &c., appears quite just. In the cases in which ave observed the rabid paroxysm attended by an imp to violence, the impulse was momentary, uncontr ble by the patient, and was always regretted and apol sed for during the intervals. In all the male cases ave seen, there were almost constant erections, and ous disposition for sexual connection, especially duri the rabid paroxysm — a symptom evidently connecte ith the seat and nature of the lesion of the cerebro- nal axis produced in the progress of the malady.

‡ Dr. Elliotson thinks it possible, that the sym ms may proceed no further than the precursory, an hat the disease may go off; and he instances the cases wo girls, who were bitten in the face by the sam og. "She who was bitten the second became hydro ic, and died. The other, at exactly the same tim ex- perienced the same premonitory symptoms as her er, but they all went off." Dr. Mead remarks, that vill not seem strange "that a poison so different in it rce and so alterable by many circumstances, should i me subjects produce symptoms of the same convulsiv nd, yet not to such a degree as to hinder deglutitio and these, too, only at particular times. A soldie f a strong habit of body, came to me, who once a mon vas seized with a great anxiety, palpitation of the hea nd difficulty of breathing. He had been bitten by ad dog about six weeks before he began to complai By bleeding, cold bathing, the powder of lichen wit p- per, and volatile medicines, during the oppressio he fits were every month less violent, and at last qu eft him" (p. 151.).

under the influence of vital resistance or of inal agents. But the occurrences in questre remarkably rare.—(*g.*) The *duration of lisease,* when distinctly formed, generally from somewhat less than seventy-four to six or seven days. The duration has not bserved to depend upon age, nor even upon th of constitution. The greater number of however, terminate on the second, third, urth days, and sink either very suddenly, or y, and often unexpectedly.—(*h.*) In the *d other lower animals* the dread of water is served, nor is it a sign of rabies. As the n the early stage of the disease, has a dison to lick the hands, face, &c. of persons, ould never be allowed, as I have seen, in l instances, the greatest anxiety and misery enced for many months by persons who permitted this filthy and dangerous habit, to the circumstance of rabies having ap- in the animal thus indulged.* —(*i.*) The *poison of rabies affects primarily and especially the nerves of the part,* and extends with various grades of rapidity to the medulla oblongata and origins of the pneumogastric nerves, and then the characteristic symptoms of rabies appear; the whole nervous system ultimately becoming more or less implicated, and the secretions and blood very manifestly changed.—(*k.*) The pathognomonic symptoms and changes observed in rabies more immediately depend upon the lesion of the *medulla oblongata and pneumogastric nerves;* but how such lesion gives rise to the formation of a specific poison, capable of perpetuating itself, does not appear, nor can the mode of production of this poison be shown: in this respect, rabies does not differ from other specifically infectious maladies.—(*l.*) The supposition, lately published, that there is no such specific disease as rabies, and that it is merely the result of mental anxiety, &c. is only one of the absurdities thrown up on the surface of medical doctrine, and hardly deserves mention, and much less serious refutation.

47. IX. TREATMENT.—The treatment of the bite of a rabid animal is *first* to prevent the imbibition or morbid impression of the rabid virus, assuming that inoculation of it has followed, and the consequent infection, or contamination, and other changes; and *secondly* to use reasonable endeavours to arrest the malady, or to ward off death, when the symptoms declare themselves. Although a small proportion of those who are bitten by rabid animals may be ultimately seized by the malady, especially when the bites have been inflicted through the clothes, precautionary measures should be taken, nevertheless, in order to prevent the distressing and, it may be said, the incurable effects contingent on these injuries.

48. i. PROPHYLACTIC TREATMENT.—The preventive measures usually had recourse to have generally been employed with the *intention* either of preventing the imbibition or contaminating impression of the poison, by removing or destroying the injured parts, or of fortifying the system against, or of counteracting, the influence of the poison. The former of these intentions are most to be relied upon, for we have no proof of any substance being possessed of the power of counteracting the poison when it has infected the frame, although numerous substances have been supposed to possess this property, owing to the non-appearance of the malady after inoculation of the virus was inferred. But, in many instances, the disease has not appeared, even after manifest proofs of inoculation, and when no prophylactic measures have been resorted to. Most of the means which have been advised as efficacious in counteracting, or in en-

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* ving given above (§ 17, 18.) some account of *the ms of rabies in the dog,* much abridged from the tion of Mr. YOUATT, I here add that furnished RTWIG and CHELIUS.—(*a.*) In the *furious form of s,* the dog evinces a change from its usual maneasiness, and disposition to change its bed or f residence, with a desire of licking cold sub-. There is loss of appetite, especially for firm and disposition to devour straw, wool, leather, &c. It licks up not only its own, but also other rine; and sometimes it eats its own dung. It is tely costive, evinces a disposition to bite, espehen excited or threatened, and snaps in the air, would catch flies. There is more particularly a r change in the voice and bark; the voice is peevish, and uneasy-sounding; the bark is followed by a peculiar howl. About the second day the eyes become reddened; the skin on the d is drawn into wrinkles, giving the animal a ppearance; and afterwards the eyes become dull guid. Mr. YOUATT remarks, that the glands ed in the secretion of saliva become increased in d vascularity. There is at first an increased se- of saliva; but it soon lessens in quantity, be- thicker, viscid, adhesive, and glutinous; and it to the corners of the mouth, fauces, and teeth. g furiously attempts to detach the saliva with its nd if, after a while, it loses its balance in these at- and tumbles over there can no longer be any mis- This is an early symptom; and is owing to the ecoming more and more glutinous, irritating the and threatening suffocation. Mr. YOUATT insists e alteration of the sounds uttered by the dog. In ase in which this animal utters any sound during ase, there is a manifest change of voice which is eristic. It is generally standing, or occasionally when the singular sound is uttered. Its muzzle ys elevated. The sound is, at the commence- perfect bark, ending abruptly in a singular howl. e cases this dismal bark and howl is absent, but s instead a hoarse inward bark, with a charac- elevation of tone; or there are two or three disrks, followed by the peculiar one followed by the

(In *dumb madness,* the dog changes its manner, s less lively and watchful, more quiet and me-y. The lower jaw drops as if paralysed. The flows down to the ground; and every thing, uid, which the animal wishes to swallow, drops ts mouth. It can, therefore, bite but little, inclination to bite, to run, or even to rest-s, is diminished. All the other symptoms re- those of furious madness. In the great ma- of both furious and dumb madness, there is an affection of the lumbar portion of the spinal There is a staggering gait, referable to the hind s, and indicating an affection of the lumbar motor . In a few cases it approaches a general paralytic n. Mr. YOUATT observes, that absence of pain in ten part is an almost invariable accompaniment of The dog will gnaw the flesh completely away e part. Is this owing to the itching of the part? ever severely a mad dog is beaten, a cry is never from it."

(*Diagnosis.*—Care should be taken to distinguish the ear in common canker from rabies in the dog. The ear is, oftener than any other part, bitten by the rabid dog; and when the wound in the ear becomes painful, the dog rubs its ear against every projecting body, scratches it, and tumbles over and over while thus employed. Canker, both internal and external, is a disease of slow growth. The length of time that the animal has thus suffered, will usually be a sufficient guide. The dog will often scratch violently enough when it has canker; but will not roll over and over like a football, except it is rabid. The presence of inflammation and ulceration of the internal membrane of the ear in the former, and hardly at all in the latter, notwithstanding the scratching, are deserving of remark. Mr. YOUATT states that he has never seen a case of rabies in the dog in less than fourteen days after the bite. The average time he considers to be five or six weeks. In three months he considers the animal tolerably safe. He, however, met with one case after five months, and another after seven months.

abling the system to resist successfully, the operation of the poison, have likewise been employed in various states of combination, or in different modes, when the effects of the poison begin to appear; but however successful they may have proved as prophylactics — doubtful at the best — they have very rarely or never been efficacious when the malady has declared itself. In noticing *the preventive measures* which have been recommended, I shall take them *in that order which the period at which they may be resorted to will suggest*; those means which may be employed the latest, or in the advanced progress of incubation, being often appropriate, in various associations, when the precursory symptoms appear, if they have not been prescribed previously, and their inefficiency been thereby proved.

49. (*a.*) *Ligatures or cupping-glasses* may be instantly employed, when a recourse to either is possible, until other measures may be adopted, especially excision, escharotics, &c. *Ligatures* have been advised by Percival and others, and they ought to be instantly applied, immediately above the seat of injury when this can be done. Where they cannot be applied, *cupping-glasses*, as recommended by Celsus, and recently by Sir D. Barry, may be resorted to, the glass being placed so as equally to surround the bitten part. In emergencies of this nature, any glass, or even deep cup, may be thus applied, with the aid of a piece of burning paper, especially after having been dipped in any spirit. Neither ligatures, nor cupping-glasses, however, should be trusted to longer than either excision or escharotics may be employed by a competent person.

49. (*b.*) *The complete excision* of the injured part has been next advised; and even amputation of the part, as recommended by Mr. S. Cooper, may be resorted to, when a finger or limb has been severely injured or lacerated, or when complete excision of the parts is almost impossible or dangerous. Mr. Youatt, whose experience attaches great importance to his advice, remarks respecting this operation, that it demands greater skill than is supposed; and that every portion of the wound with which the tooth could possibly come in contact must be removed. This is often exceedingly difficult owing to the situation and direction of the wound. The knife must not enter the wound, or it will be likely itself to be empoisoned, and then the mischief will be increased. Dr. Massey was convinced of this risk, when he advised that, "should the knife by chance enter the wound made by the dog's tooth, the operation should be recommenced with a clean knife, otherwise the sound parts will become inoculated." There is no doubt of this risk; and to this cause, as well as to the passage of blood into the bitten wound, to the contamination thereby caused, and to the communication of the contaminated blood with the excised surface, the occurrence of the malady, by no means rare, in cases of excision, is chiefly to be imputed. Aware of the risk arising out of excision unless completely accomplished without incurring it, many practitioners use the caustic after the knife. Nevertheless Sauvages, Sabatier, Chelius, South, and many others, trust chiefly to excision, and consider the objections just stated insufficient to cause the relinquishment of the practice. Mr. South remarks that, when the disease appears after excision, it is because all the infected part has not been removed. As a portion of e poison may remain, or be dried, upon the cuta- ous surface immediately surrounding the bit part, I would advise ablution of this part of e surface, with a caustic or alkaline solution, t before excision is performed; and that the reco- mendation of Mr. H. Cline to thrust a prob o the deepest part of the injury, and to remove l the soft parts around the probe, without cut g into the wound, so that they may be brought t like a glove-finger on the probe, should be adop . The subsequent free application of caustic pot , of nitric acid, or of the nitrate of silver, is also - visable, in order to destroy whatever poison y still remain, owing either to the penetration of e knife into the contaminated parts, or to the poiso d part having been not entirely removed.

50. (*e.*) Chelius states that, when comp e excision cannot be done, the *quick cleansing o e wound and its entire vicinity* with water, salt-w r, water and vinegar, &c., should not be neglec ; and that, when the wound is small, it should be - larged, and bleeding promoted by cupping-gl es or warm water. The whole he recommends t e thoroughly *cauterised* by the actual cautery, b er of antimony, caustic ammonia, or caustic po h, or with gun-powder, which is to be exploded. le adds that the slough is to be soon removed, a a free suppuration is to be kept up for month y scattering powdered cantharides, and by irrit g salves. He further advises mercury to be ru ed in around the wound until ptyalism is prod d. The same treatment is prescribed by him i e wound, already closed, begins to smart and s ll. Chelius here judiciously associates various a- sures which have singly found strenuous p- porters.

51. (*f.*) Mr. Youatt recommends, as a s- *charotic*, the nitrate of silver, as it may be sh ed into so sharp a form as to penetrate as far a he tooth of the animal can have reached, and it forms a dry eschar. The danger which he ri- butes to the alkaline caustics, and to nitric ac of suspending the virus, &c., I believe not t be justly dreaded; for these, in their caustic te, may be considered as capable of destroyin he poison, and as completely, as the nitrate of er possibly can. Of the several substances re n- mended as escharotics little need be said. Th ne is probably as efficacious as the other; that e, which, with efficiency, may be most promptl o- cured, being always preferable. — α. Mr. Youa as just stated, prefers the *nitrate of silver*, an d- duces the successful employment of it in hun ds of cases, in support of his opinion. — β. E r, Ferriar, Pinel, Rubièra, Martinet, Sc r, and others, advise the *caustic alkalies*, eithe he fixed or volatile. — γ. Meinhard, Agri a, Malden, Flajani, and numerous more r nt writers, recommend the *hydro-chloric* or *nitric* id, or the *sulphuric* or other concentrated acids. — δ. The application of *butter of antimony* to the rt, after enlarging the wound, has found advoca in Sabatier, Pinel and Le Roux; and a si lar application of *arsenic* or of *arsenical paste*, has en prescribed by Agricola, Zincke, Rouge t, Harles, and others. — ε. Fabricius Hild s, and Gockel, advise *boiling oil* to be poure nto the enlarged wound, so that it may reac he bottom, and produce a large eschar, follow by free suppuration. — ζ. Valentin recom da

of the part, even after several days, by s of the bark of the *fraxinus* burnt in the d.—η. Recourse to the *actual cautery* has long and generally had; but it cannot be lered efficacious unless early employed, and s it reach the bottom of the wound.

(*g.*) After a satisfactory employment of ctual or of the potential cautery, *suppura- f the wound,* kept up for several weeks, acng to some, or even for months, according to s, has found numerous supporters; very ent means having been used with this inn. Celsus, Galen, Fabricius Hildanus, egel, Schmucker, Baldinger, &c., attach importance to this measure, whilst Gei:, Plank, O'Donnel, and the Franks, be- it to be useless. The means which have most commonly employed for this purpose owdered *cantharides;* or the powder of the *proscarabæus,* or *scarabæus majalis* (Kem- ritsch, Müller, Hannover, &c.), *savine,* liluted *acids,* and strong brine, or a solution *mon salt* (Du Hamel, Paullini, Awsiter, Dr. Bennett states, that Axter, of Vi- applies a *blister* over the wound, and after- dresses it with powdered *lyttæ,* or some lating lotion, for six weeks; that he gives grain of powdered lyttæ and six grains of orum oculi internally for six days; and "during a period of twenty-seven years, no nt thus treated had been brought back to the tal under this disease." Dr. Hausbrand em- general *bleeding,* and makes deep *scarifi- s* of the wound, which he washes with *salt water,* after favouring the flow of blood as as possible. He then applies an ointment *guent. basilicum,* and *pulv. lyttæ,* and keeps discharge for three months. He also gives *hor* and *opium* internally, during the first days. "Eleven persons bitten by dogs ac- rabid escaped after this treatment." Dr. dt, besides keeping up, for six weeks, *sup- ion* of the wound by means of pulv. lyttæ, or irritating applications, employs *mercury* in- lly so as to produce salivation. Of 180 ns thus treated in the Breslau hospital, of half had been bitten by dogs actually ra- r supposed to be so, only two died. The an physicians generally confide in *prolonged ration of the wound:* but Mr. Youatt, who nployed the *lunar caustic,* having previously ged the wound, when this is necessary, to rds of 400 persons, and four times on him- fter bites from dogs decidedly rabid, has not the disease appear in one instance.

A. The foregoing measures are those which been most confided in when adopted imme- y or soon after the infliction of the injury. they have likewise been resorted to during *tent period,* or at a time more or less remote the receipt of injury; and various additional s have also been prescribed as prophylactics g this period. Dr. A. T. Thomson supposes he virus remains latent in the wound during period, and produces no marked effect until ate of the constitution favours its action; ence he infers that *excision* and other *local res* may be useful at any time before the rsory symptoms appear. Several facts have adduced tending to show that this opinion is ving of attention. Rush has related a case in which "excision was performed thirty-one days after the bite, and even after the hydrophobic symptoms had appeared, and the patient's life was saved." Dr. Harder relates a case (*Petersburg Med. Trans.* vol. i. p. 170.), in which hydrophobia supervened five months after the bite, and eight weeks after excision; but another excision and cauterisation then saved the child. In two weeks the symptoms returned, and a pale and painful excrescence formed in the bottom of the wound. This was excised, and the wound cauterised by nitrate of silver, and recovery took place. Dr. Bennett states that M. Recamier opened the cicatrices which were tumefied in a person who had been bitten by a rabid animal fifteen days before, and cauterised them with the crystallised *nitrate of mercury.* Baths and diaphoretics were also employed, and the patient escaped the malady; although another person who had been bitten by the same animal, at the same time, perished of rabies. These cases fully warrant excision and the cautery at any period, even up to the time of the manifestation of the disease, and especially when pain, swelling, itching, or discoloration of the cicatrix appears. At this period more particularly, Dr. Schæffer recommends the nerves going to the part to be divided.

54. (*a.*) Dr. Marochetti, who considers that small pustules form under the tongue during the latent or incubative period (§ 7. *Note.*), contends that the true preventive measures consist of *opening and cauterising these pustules,* within twenty-four hours after their formation, of washing the mouth with a decoction of the *genista tinctoria,* and of the patient's drinking a pint and a half of this decoction, daily, for six weeks. Salvatori and Rossi have been said to have succeeded in some cases, in which these means were adopted; but M. Magistel states that, of ten cases in which he employed them, five died; although more might have been affected if nothing had been done.

55. (*b.*) During the latent period numerous other means have been advised, in order to counteract the operation of the poison, or to enable the constitution to resist its influence. Many of these means have been recommended with more or less rational intentions, whilst others have been employed empirically. Of those, which have been advised with the former of these intentions, some have been suggested with the view of exciting certain emunctories, and thereby preventing changes affecting the constitution of the blood from taking place; and others have been prescribed with a view of supporting the vital powers, and thereby resisting the action of the virus, and of accomplishing other contingent intentions. Some of these means are both local and constitutional, and others are employed either externally or internally only.

56. (*c.*) *Powdered cantharides,* both locally and internally, have been recommended by Werlhoff, Alix, Wichmann, Vogel, Catani, Scaramucci, and Rougemont, for some time after the bite, and even when signs of irritation appear in the cicatrix; and Stahl and others advise that the use of this substance should be persisted in until the urinary organs are affected, or until bloody urine is produced, — a recommendation to which Avicenna attached importance in respect of the employment of other active diuretics in this malady. The *meloë proscarabæus* was similarly

prescribed by Sennert, Schrœder, Reidlin, and others, both immediately after the injury, and during the latent period.

57. (*d.*) *Chlorine, chloric,* and *hydrochloric acid,* have been much used both locally and internally, to dis-infect the wound and to resist the influence of the virus on the frame. Malden, Agricola, Meinhard, and Semmola, have attached much importance to these substances; but several instances have been recorded of the appearance of the malady notwithstanding a prolonged recourse to them. *Arsenical preparations* have likewise been employed in the latent period, both locally and internally, and continued for a considerable time, or according to the quantity prescribed and its effects. Harles, and others already mentioned, appear to have attached some importance to their use. An infusion of *rue* in *acetic acid,* or the *acetum rutæ,* has been employed both locally and internally by Wedel and others, and continued for several weeks after the injury; the *theriaca* being also taken for a considerable time.

58. (*e.*) There are few preparations whose local or external and internal use have been more frequently recommended than the *mercurial.* The *bi-chloride,* the *chloride,* and the *ointments,* have been severally employed both locally or externally, and internally, in the course of the latent period; and even when the precursory symptoms have appeared — and not only singly, but also in various quantities and combinations. The application of the *sublimate* to the wound was first prescribed by Fabricius Hildanus and Palmarius; and, more recently, Wedekind, Percy, and numerous writers in the Memoirs of the Royal Academy of Medicine of Paris for the years 1777, 1778, 1782, and 1783, advised its use, both locally and internally, as a prophylactic. *Calomel* was employed with *sulphuret of antimony, camphor,* and various other substances by Ranby, Westall, and others, and given in large and frequent doses until the mercurial action appeared. The strong *mercurial ointment* was applied to the wound also externally by *friction,* conjoined with camphor, by Baudot, Desault, Hannover, Postal, and others, and whilst this application was made to the wound Percival recommended *cinchona* and *wine* to be taken, in order to promote the nervous energy and the vital resistance of the constitution to the poison. Mercurial frictions, the ointment being mixed with camphor and musk, were directed over the parotid glands by Schrœder and Saulgier; and continued until salivation followed. Whether used internally or externally, or in any of the combinations just mentioned, or in any other, Holdefreund, Colombier, Falconer, and many others, advised the preparations of mercury to be persisted in until salivation was produced, and to be continued for a considerable time.

59. (*f.*) *Frictions with olive oil,* whilst this oil is taken internally so as to preserve a regular state of the secretions and excretions, were recommended by Shadwell, Sims, and Fothergill, and to be continued for a long time after the injury. Baudot and others advised that the frictions should be made with a combination of the oil with mercurial ointment and camphor; and Mease and Loftie with olive oil and the *oleum succini.* Watt recommended a seton to be introduced into the nape of the neck, and the discharge from it to be freely promoted — a su stion by no means undeserving of adoption, nsidering the very remarkable changes gene lly found in the medulla oblongata and its nbranes after death, and which the seton may event by the revulsive irritation produced by i

60. (*f.*) *Baths, cold, warm, and medic d,* salt-water baths, the cold affusion, &c., ve severally been mentioned by writers, from C us downwards; but they are of doubtful se e. Cold salt water bathing, and shower baths m most appropriate, as tending to diminish susc tibility and to invigorate the frame; but I an nacquainted with any satisfactory proofs of ir efficacy.

61. (*g.*) Numerous *stimulants, antispasm cs,* and *tonics* have been advised, with the inte on of enabling the nervous system to resist the eration of the rabid virus. *Musk,* in various nbinations, and more especially with opium as been employed by several writers; and *opiu* in numerous forms of association have been escribed by many authors. *Myrrh,* with op m, &c., was recommended by Schlegel; *serpen ia* with the wine of *absinthium,* by Valentini he infusion or decoction of the leaves of the *us baccata,* internally and externally, by Rc emont, Rœmer, and Hildebrand; the decc on of *rue* with that of the taxus baccata by Bl e; the powder, or infusion, or the oil of *valeria* by Bouteille and others; *ammonia* and its va us preparations, in large doses, and in various nbinations, as with the *anagallis purpurea* he *oleum* or *spiritus succini,* &c. by Andry, Ra nstein, and others; *assafœtida* with cam pr, musk, and opium by Schmucker, Alix, nd Nugent; the powder or extract of *nux v ca* by Schulze and Rougemont; *phosphori* m æther by Zincke; and *cinchona, wine, arom cs,* and various tonics, by Mease, Loftie, an umerous other writers. The *anagallis flore rpureo* was praised by Kæmpf, Andry, and avenstein, was given in doses of a scruple, ry sixth hour, and was prescribed with ammon by some, and both externally and internall by others; but Raymond and other writers stat at it is inefficacious.

62. (*h.*) Several *anodyne, narcotic,* and *se ive* substances have also been tried — during he latent period, with the hope of thereby preve ng the development of the malady; but wit no evidence of even such partial success as ay hereafter warrant recourse to any of them. se substances, as well as those belonging t he preceding category, were seldom prescribed a ne, but were generally conjoined with other int al or external means. Thus *stramonium* was escribed internally by Harles, with laurel v er, and *belladonna,* by Hannover, Munch, nd Henning, whilst suppuration of the wound as promoted.

63. (*i.*) It is unnecessary to pursue furth he history of means employed in order to preve he development of the malady after inoculati of its virus is either feared or presumed. A npartial view of all the circumstances involv in cases of injury by rabid animals, discloses va us fallacies which weaken the evidence of su ss which has been imputed to many substances ch have been employed as prophylactics; and, lst some have been insufficiently tried, and the n-

eff cy hence not demonstrated, others have been fou l to fail, upon the success of which much re- lia e had been previously placed. But it may be sked, should these latter be discarded al- to her, or should the facts stated in their favour be iscredited because they have been found to fai one, two, or even in a few instances? The an er I would suggest is, that they ought not to be iscarded unless in favour of means which pr ise a more certain success; for if they be rel quished for these reasons, then with equal rea n should all diseases be left to the unaided eff s of nature, inasmuch as no unvarying plan of ure, or no single remedy is efficacious in all ca of any specific malady; and, as regards the pr ention of rabies, means which often have pr ed efficacious in respect of some states of co itution, or against certain grades of infection ma nevertheless fail in other circumstances, either of nstitution or of inoculation.

. ii. Curative Treatment? — However do tful, or even hopeless, the success to be de- riv from treatment when the malady has declared its , nevertheless the attempt to cure the patient sh ld be rationally made. Instances of recovery fro the developed disease are so few as to induce m y to believe that they were not really cases of th disease, but of some other affection, in which dr d of water was a prominent symptom. Ne- ve eless, in a few cases of recovery — certainly ve few — the evidence as to the actual existence of tr rabies admits not of doubt.—(*a.*) In most, if no n all of these, *blood-letting*, carried to the ut- m extent, was the remedy to which recovery w chiefly imputed — a treatment advised by B rhaave, Mead, Fothergill, Ferriar, M se, Nugent, Hartley, Rush, Wollaston, ar others. I have referred to the published cases by artley, Peters, Innes, Tymon, Burton, S olbred, Wynne, Vogelsang, and Du H ume, in which very copious blood-letting was er oyed with success. This treatment has cer- ta y been resorted to by many physicians with- ou uccess; but I believe that in many instances it ha ot been carried sufficiently far, or has not been re ted to at an early enough stage of the declared m dy. I think that these causes of failure are m ifest in the cases detailed by Dr. Albers of B nen, Trolliet, and by others; and that the op ion expressed by Mr. S. Cooper, and by D J. L. Bardsley, as to the successful cases not ha ng been instances of true rabies, is not correct, as attentive perusal of the details of these cases co inces me that they were actually what they p essed to be. Berger, one of the earliest w ers who recommended blood-letting, advised th the blood should be taken from the frontal ve s; and Wedel that it ought to be drawn from th sublingual veins. In the vicinity of Breslau in 719, a cow, the subject of rabies, was cured by a normous venesection. The case of recovery re rded by Dr. Burton was treated by the ab- st tion of 122 ounces of blood within four days, a by calomel and opium. In the much earlier in- st ce recorded by Mr. Hartley about 120 ounces w taken, and the cold bath frequently resorted to; a nilar treatment, with the addition of opiates and s orifics, having been resorted to successfully by H lary. In Mr. Tymon's case, very copious b d-letting was accompanied with large and fr uent doses of opium, with calomel, James's powder, and mercurial inunction. Dr. Shoolbred, finding immediate relief to follow a very large venesection, trusted to this agent chiefly. In Dr. Du Heaume's case profuse blood-letting allayed the fully developed symptoms, and draughts with digitalis, hydrocyanic acid and morphia were given, and a drachm of the strong mercurial ointment was rubbed into his legs night and morning. Dr. Vogelsang, after insisting upon blood-letting as the remedy alone to be confided in, shows that it should be resorted to as early as the malady declares itself, and that it ought to be carried at first to the greatest length consistent with the immediate safety of the patient. Dr. Shoolbred's recommendation is to a similar effect; but he advises that the venesection should be with a large orifice in order that full syncope should follow.

65. It does not appear that the very large doses of opium, the calomel and mercurial ointment, the cold baths, or the diaphoretics prescribed in several of the successful cases in which large blood-lettings were practised, had much to do with the recovery; inasmuch as these means had, on numerous occasions, been employed to a very great extent without any benefit. Probably, however, the mercurials, the consequent salivation, and copious diaphoresis, produced some service, or aided in preventing the recurrence of the rabid paroxysms. That blood-letting is a rational method of treating this malady is not only proved by its recorded success, but also evinced by the inflammatory or congestive changes found after death in the medulla oblongata, lungs and brain (§§ 20—23.).

66. *B.* Other *evacuants*, beside bloodletting, have been employed, but with doubtful results. — (*a.*) *Emetics* often repeated were recommended by Massalien, Rougemont, Satterly, and others; the antimonial emetics conjoined with camphor, musk, &c. being preferred, with the view of producing also free diaphoresis. How far they may be of service I am unable to state; but the occasional imperfect retchings or vomiting, and the state of the alvine evacuations, indicate the propriety of an early recourse to them, or as soon as the hydrophobic period declares itself.

67. (*b.*) *Purgatives*, after blood-letting and emetics have been resorted to, have been advised by comparatively few writers; but I agree with the few who approve of their exhibition that the chologogue purgatives are required, more especially calomel, or the corrosive sublimate, or the turbith mineral, aided by purgative enemata. Most of the writers who have advised these latter preparations have entertained the intention of producing *salivation* by them as well as a free evacuation of bile; and have therefore aided this latter operation by the inunction of strong mercurial ointment; and by conjoining them with antimonials, or with camphor, or various other remedies according to the progress which the disease had made. These medicines have been much employed as prophylactics (§ 58.); and when thus resorted to, it is difficult to form a correct estimate of the amount of benefit derived from them; but when the hydrophobic stage has supervened, there is very slight evidence of decided advantage having been derived from them, although, in one or two instances on record, success even in this stage has been imputed to them.

68. (*c.*) *Profuse diaphoresis* has been said to

have proved successful when early procured and perseveringly promoted. It is most difficult, however, to produce the effect in a sufficient degree by internal medicines, unless they are promoted by the vapour-bath, or by heated air. This practice has nevertheless been sanctioned by Gockel, Vater, Waldschmidt, Paullini, Hillary, Richter, and others; but I doubt that it has been employed in so decided a manner as to test sufficiently its effects upon the malady.

69. *C.* The *sedatives*, *narcotics*, and *anodynes*, usually prescribed in medical practice, often have been employed as soon as the hydrophobic symptoms have appeared, but scarcely even with a palliative influence. — (*a.*) Of the several *sedatives* which have been suggested, the *cold affusion*, *prolonged shower-baths*, or *submersion* and *cold baths*, are the most energetic. They have been recommended by Ranby, Harris, Russel, Ward, and others, but upon no evidence of their efficacy; whilst Fothergill, Dickson, Waldschmidt, and many other writers, have considered them worse than useless. The same contradictory opinions have been emitted in respect of *warm*, and variously *medicated*, and *alkaline baths*, which have been advised from theoretical views rather than from any experience of their influence on this malady. In most of the instances, however, in which I find any record of the manner of employing these baths, they appear not to have received a satisfactory trial, and not to have been persisted in, or repeated, so as to produce a copious and prolonged sweat, or to an extent equal to that suggested above (§ 68.). Of other sedatives *digitalis*, *hydrocyanic acid*, and the *diacetate of lead*, are the most deserving of notice. *Digitalis* was suggested by Dr. Percival, and several instances in which it has been given without any marked effect have been recorded. No advantage can be reasonably expected from it unless it be prescribed promptly, and in nearly poisonous doses. *Hydrocyanic acid* was given by Dr. A. T. Thomson, but with little or no benefit. The remark just offered respecting digitalis is even more applicable to this acid when prescribed for rabies; and if it should ever again be given in the developed malady, I would advise it to be tried in the largest dose compatible with the continuance of life; and to be followed, during its sedative action, by the affusion of cold water over the head and occiput. I may add, that *laurel-water* was recommended with belladonna by Hecker and Schwabischer in the developed state of the disease, but it does not appear that the recommendation proceeded from any sufficient experience of advantage from them. The *acetate of lead*, advised by Hegewisch, and the *infusion of tobacco*, as an injection, prescribed by Mr. Sawrey, belong to this category, and hitherto no evidence has been produced in their favour.

70. (*b.*) Of *anodynes* and *narcotics*, *opium* and its various preparations and salts—the *acetate* and *muriate* of *morphia* — have been most employed; but, although severally prescribed in remarkably large and frequently repeated doses — although as much as 200 grains of opium have been given within twelve hours, no benefit was derived. Mr. Ward advised opiate frictions, and Dr. Booth the injection of a solution of the acetate of morphia into the cephalic vein. This latter measure was practised by Drs. Brandreth and Bardsley without any advantage. The preparations of opium and of morphia have been given in all combinations d forms — with camphor, with musk, with my n, with ammonia, with valerian, &c. — by the m th and in enemata, but with no benefit when n- fided in as the chief means of cure, and only th equivocal advantage when prescribed after l ge bleedings. — *Belladonna* has been recomme ed not only as a prophylactic, but also as a cur y Munch, Henning, Hannover, and others alr dy mentioned, aided by division of the nerves g ng to the cicatrix, or by re-opening the cicatrix nd procuring a copious discharge from it; an y combining the belladonna with the substances st enumerated. But there is no evidence of su ss having followed a recourse to this medicine. ne same remark is equally applicable to *stramon n,* which was suggested by Harles to be giv in laurel water; and *conium* is equally ineffi nt. More recently the tincture, infusion, or extra of the Indian hemp — *canabis Indica* — has bee e- commended, but I have not heard of any inst ce of success from the use of this intoxicating b- stance. Indeed, when the changes found er death are considered, no advantage can b a- tionally expected from any one of the anodyn or narcotics, when trusted in chiefly, or given i x- cessively large doses. It is extremely prob le, that *æther*, *chloroform*, and other substances o- ductive of insensibility when administered b n- halation, will receive an early trial in this mal y; but, for the reason just assigned, no sanguine l es of success from them can be entertained. N r- theless, "Anceps remedium melius est m nullum;" and the remedies of this class m be productive of some benefit, either when inhal or taken internally, or when administered exter ly or locally. The local application also of se anodynes may be of use, both in the premor ry stage, and in the advanced course of the mal .

71. *D.* The most powerful *antispasmodics* nd *stimulants* have been advised, and often empl d, but with no proof of advantage having bee le- rived from any of them. — (*a.*) The *æthers*, sk, *camphor*, *ammonia*, *castor*, *assafœtida*, *turpe ne,* *valerian*, &c. have severally received satisfa ry trials, and their want of efficacy in this malad as been sufficiently demonstrated, both when en alone or in conjunction with other medicin in which latter form they have been most comn ly prescribed, more especially with *opium*, or th *belladonna*, or other narcotics, as mentione y Mease, Bucholz, Nugent, and many o rs. And these medicines have not only been a i- nistered by the mouth, but also in enemata, a in various combinations. *Æther* was thus given th opium by Mease; with *phosphorus* by Zi e; with the succinated spirit of ammonia, th camphor, &c. by several other physicians. *sk* has been exhibited in similar modes and n- binations—with opium, belladonna, camphor, ; and with cinnabar, creta, and opium, formin he pulvis Cobbii or Tunguinensis; but there no sufficient evidence of its efficacy. In a case h I attended with Mr. Dendy, the spirit of *tu n- tine* received for the first time a sufficient tria a trial demonstrative of its want of efficacy in is malady. — (*b.*) *Electricity* and *galvanism* we e- commended by Rossi and Aldini, but no r- manent benefit was derived from them. — Th i- *trous oxide gas* was administered by Dr. Bar ey with little effect.

. *E. Tonics* of various kinds have also been , but with no marked benefit. *Nux vomica* given by ROUGEMONT and SCHULZE, and *hnia* by Dr. BARDSLEY. The *mineral acids*, especially the *hydrochloric*, have been re- nended by MEINHARD, AGRICOLA, MALDEN, ELLI, BRUGNATELLI, and others; and, proba- after bleeding, the *chlorate of potash*, and the *ic æther*, are deserving a trial. The *mineral* , especially the nitrate of *silver*, the prepara- of *zinc*, the muriated tincture and other pre- tions of *iron*, have likewise been prescribed; last by Dr. ELLIOTSON, BRIGHT, and others. several *vegetable tonics*, especially the *cinchona* *cascarilla* barks, *sulphate of quina*, &c., have been suggested, variously combined, and aided other means, as wine, aromatics, antispas- ics, &c.; but, although MEASE, LOFTIE, and rs, have conceived that advantage might be ved from this class of medicines, especially n thus associated, or combined with anodynes arcotics, no satisfactory evidence that benefit been derived from them, when the disease is loped, has hitherto been furnished. Dr. MOLA has insisted upon the employment of rine, both internally and externally, as a pro- actic, and as a means of cure.

3. *F. Diuretics* were recommended for rabies AVICENNA; but STAHL considered that no ad- age could be derived from them unless they given in so large doses and so frequently as to luce bloody urine; and with this view cantha- s and the meloë proscarabæus have been pre- bed by numerous writers, even since the em- al reputation of the latter in rabies has been vn to be, like all other nostrums, without any idation.

4. *G. Tracheotomy* was advised to be performed Drs. RUSH and PHYSIC in America, and re- ly by Mr. MAYO, with the view of averting h as long as possible; believing that this issue more immediately produced by spasm of the ngeal muscles; but it is doubtful whether or pasm of these muscles is more concerned in lucing this result than spasm, or even than ilysis, of other muscles or parts.

5. *H.* M. MAGENDIE, believing that the fluid s of the blood were diminished by the inability he patient to swallow fluids, and by the con- ed transpiration from the surfaces, injected int of water, of the temperature of 30° of AUMUR, into the veins of a man in an advanced e of rabies. The patient immediately became iquil, and his pulse, in twenty minutes, fell n about 150 to 80. The spasms ceased, and drank a glass of water. He continued to im- ve until the fifth day, when abscesses, primary secondary, appeared in consequence of por- s of lancets, which had broken during attempts bleed him in the feet during the paroxysm, ing remained in the wounds. He died early on ninth day.—(*Journ. de Pysiol.*, t. iii. p. 386.)

6. In a malady so little under the control of dical treatment as this confessedly is, reliance not reasonably be placed on any single remedy; hence, various means have been often em- yed, coëtaneously or successively, to arrest its gress, or to combat its more distressing symp- ns. Numerous *combinations of the medicines* iced above, either as prophylactics or as cura- agents, have been advised by writers — but advised rather as suitable means for trial, than recommended from satisfactory, or even from any, experience of their efficacy.

77. (*a.*) B. D. MAUCHART long ago directed blood-letting from the arm of the side in which the injury was inflicted, and a quantity of blood to be taken great in proportion to the time which had elapsed from the infliction of it. If the patient had become melancholic, or if any of the symptoms of the invasion of the malady existed, he ordered the blood-letting to be carried to the production of full syncope. He next ordered the cicatrix to be scarified and the bleeding from it to be encouraged; afterwards the mithridate, rue, theriaca, &c., to be constantly applied to it; and these and similar substances to be taken internally. He further directed a copious diaphoresis to be kept up, and prescribed the same or similar means both to prevent the malady, and to cure it when it appeared; success having been said to follow this plan even where the disease was fully developed. It would be impossible for me to notice, within reasonable limits, other associated means which have been suggested by authors. The reader will find most of them in the numerous works and papers referred to in the sequel; and he will further observe that substances confidently recommended, either empirically, or by professional credit, as most efficacious remedies in this malady, have after a time altogether lost their reputation, not merely from having been displaced from public or medical favour by newer means, but because they have been found totally inefficacious when employed.

78. (*b.*) The uncertain or fluctuating views as to the pathology of rabies, have tended not only to render equally uncertain the plans and means of treatment, but also to increase the number of substances advised as specifics with the utmost confidence which ignorance imparts to empirical means. As certain contagious maladies have been cured by medicines, viewed as specific means, or such as may be depended upon for the removal of these maladies, so has it been expected that rabies was to be cured by some particular remedy which, if once found out, might be proclaimed as the true panacea. Hence various substances have been, from time to time, thus dignified, and enjoyed a short-lived popularity. At a time when credulity was not limited to a few individuals, but extended to scientific and corporate bodies, or rather when individuals were so generally credulous as to impart this character to the societies which they constituted, certain substances received a reputation from this weakness of the human mind; and at a time when it was most implicitly believed by all physicians from Oxford and Cambridge, but by themselves only, that all learning and knowledge were concentrated in themselves alone, the ash-coloured liverwort was dignified by these physicians with the name of the *Pulvis antilyssus*. Subsequently other empirical remedies have thrown the college nostrum in the shade, and the virus inoculated by the *bite of a viper*, the *guaco-juice*, the *Scutellaria laterifolia*, the *Alysma Plantago*, the *Ophiorhiza mungos*, the *Genista tinctoria*, the *Thalictrum flavum* and *angustifolium*, the *Delphinium consolida*, the *Anagallis purpurea*, *phosphorated æther* or *phosphorated water*, and numerous other substances, have in different countries, and at successive periods, enjoyed their undeserved and short-lived reputations, and sunk into congenial

oblivion. It may be added, for the information of those who take delight in empirical remedies, that in almost every town, in every country, may be found some old man or old woman, who rejoices himself or herself, or knowingly deceives the neighbours and all the credulous within reach, in all ranks, with the professed possession of a specific against rabies; and that these specifics, according to the amount of patronage conferred upon them, have at different times enjoyed a reputation, which was overturned only after numerous proofs of their want of efficacy. The Ormskirk powder, and the pulvis Tunguinensis are sufficient illustrations of the popular faith in vaunted but worthless specifics, and the credulous confidence they inspired. Numerous recent deceptions, absurdities, and fooleries — deceptions on so large a scale as to comprise the whole range of disease — have thrown these and other absurdities into the shade, and have proved humiliating illustrations of human nature; demonstrative of the extent to which knavish pretension, with a designing sacrifice of human life to selfish acquisition, on the one hand, and credulous patronage on the other, lower the just estimate of moral and intellectual endowment, and sink the general standard of common sense and sagacity, as manifested throughout the community, from the highest places, through all ranks, classes, and grades, down to the lowest sinks of wretchedness.

79. *I. Treatment advised by the Author.*— After the review which I have now taken of the treatment which has been recommended for the cure of rabies in the earlier as well as in the more advanced stages of the developed malady, and reflecting upon what I have myself observed, I may be permitted to state the means, in which I am disposed to place reliance when the disease has declared itself: — *Bleedings* from the arm to syncope, or large *cuppings* on the nape of the neck, repeated, or carried as far as the habit of body, and circumstances of the case will permit, have a greater amount of evidence in their favour, than other remedies, and are moreover more consistent with the lesions observed after death. After bleeding, the nerves proceeding to the cicatrix may be divided, and the cicatrix itself laid freely open, suppuration from it being as speedily and freely produced as possible. Immediately upon opening the cicatrix, &c. a free perspiration should be procured and kept up by a hot-air bath, for which the materials are always at hand — namely, blankets and a lamp, — or by a vapour bath. In other respects the treatment must depend much on circumstances, and on the predominance or urgency of particular symptoms, for which emetics, mercurials, purgatives, enemata, anodynes, narcotics, antispasmodics, stimulants, tonics, &c. may be employed according to the procession and severity of the morbid phenomena.

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RECTUM AND ANUS, Diseases of the. — Classif. — General and Special Pathology.

1. Disease is rarely limited to either the one or the other of those parts, but commonly extends to both when originating in either. Affections of the rectum and anus, whether functional or structural, cannot be satisfactorily understood unless the *structure*, *functions*, and *sympathies* of these parts are duly considered. — (*a.*) As respects *structure*, the fully developed states of the mucous membrane, of the connecting cellular tissue, and of the muscular coats of the intestinal outlet; the numerous mucous follicles with which this part is provided; the connections of the veins of the rectum and anus with the mesenteric and portal veins, and the nerves with the ganglial and spinal; the cated state of the internal surface, admitting great distention when accumulations of fæces o flatus take place in the rectum; the folds of cous membrane, both transverse (*transverse va* — *rectal valves* of Houston) and longitudi existing in the internal surface, and the devel ment of these folds during irritation or contract of the bowel; the liability to congestion of congeries of veins of the rectum and anus f irritation of the mucous surface, or from in rupted circulation through the mesenteric portal veins, or from certain positions; the in position of, and the support furnished by, adip matter; the various alterations of sensibility, the numerous sympathies, in which nervous vascular connections involve the rectum and a constitute an assemblage of circumstances, wh individually and collectively, require due co deration in all our investigations into the na and treatment of the affections to which th parts are liable.

2. (*b.*) The *functions* of the rectum and anus not confined merely to the giving exit to contents of the bowels. The rectum allows some degree, the fæces to accumulate within, until opportunity and the consequent irritation distension admit of their expulsion; and on quent occasions, when want or neglect of opportunity, or mechanical obstruction at the v of the anus, or a weakened or paralysed stat the muscular coats of the bowel, causes accu lations of fæces and of flatus, remarkable distens not only of the rectum, but also of the colo thereby produced, so that the former fills up a large space in the pelvic cavity. The rect moreover, in connection with the colon, prod more or less of change in the blood circula to its mucous surface. The numerous folli with which this surface is studded, actively in depurating the blood, and in removing mater which, if allowed to remain, might act injurio when carried into the portal and pulmonary ci lations, whilst the secretions which they fur constitute a portion, and facilitate the evacuat of the intestinal excretions. The rapidity amount of absorption by the internal surface o rectum, whether by venous imbibition or by l phatic absorption, as demonstrated in health disease, and by the injection of fluids, simple, dicated, or poisoned, are of great importanc respects not merely disease of this bowel, but the administration of medicinal agents.

3. (*c.*) The *sympathies* of the rectum and are of importance not only as respects the dise of these parts themselves, but also those of other divisions of the alimentary canal and of several associated and related parts, more e cially the urinary and generative organs. *tinuity* of surface, membrane and structure; *tiguity* of position, and the mutual support der therefrom, and from the interposed and surroun adipose tissue; the *connections* consisting of cular communications and of nervous distribu — an abundant distribution of organic or gan nerves in connection with the ganglia and plex supplying the urinary, generative, and intest viscera,—an evident accession of spinal nerves, sensory and motory, to these nerves and gan and to the structures of the rectum and anus,

ac sion becoming more marked and abundant as e anus is approached,—and the muscular ap atus with which the outlets of the intestinal, the rinary and the genital canals are provided, co ine to associate various phenomena affecting the parts, and to develope numerous sympathies in ease. A knowledge, or a due recognition, of the sympathies, especially in respect of their sou es and relations, very materially assists our res ches into the nature and treatment, not only of e affections to which the intestinal outlet is lia , but also of those which implicate the rest of canal, and which are seated in the urinary an exual organs. This knowledge, moreover, is oft one of the chief aids which we possess in the ap priate administration of curative means.

(*d.*) The *diseases* of the rectum and anus will rec ve but a brief consideration in this place, esp ially as several of them require surgical treatme , although neither so generally nor so frequ ly as many surgical writers maintain. The str y medical discussion of these diseases will ch y engage my attention, and with a due rega to the importance of the topics which will su ssively come before me. Much misapprehe on has existed, and still more misrepresentatio have gone forth, respecting the sources, the na e, the frequency, and the treatment of several of ese diseases, both medical and surgical; and wh t not only in practice, but also in publications, de tion, mystification, and injurious means have be resorted to or recommended by a few, the na e and treatment of these maladies have been elu dated by several able, experienced, and honest wr rs, to whom, and to my own observations, I sh chiefly refer.

I. MALFORMATIONS OF THE RECTUM AND A fall not within the province of the physician be nd a recognition of their nature and conse ences, as all attempts to remedy them belongs to e province of the surgeon. These malformatio are,—1st. Imperforation of the anus:—2d. In erforation of the rectum:—3d. Unnatural te ination of the rectum:—4th. Termination of ot organs into the rectum; and, 5th. Absence of e rectum. It is chiefly the first and second of ese which admit of surgical aid; and the wr rs referred to furnish ample directions for the be manner of affording it. I may add, that the an may be so formed as hardly to amount to a m ormation requiring surgical, although someti s occasioning, or heightening disorders which ar more or less medical. This outlet may be ei r too *small* or narrow, congenitally, or too *la* . The *former* may be so considerable as to in fere with the function of defæcation, and lead to rious consequences. Hence the occurrence of su a conformation should be kept in recollection in ases of fæcal retentions during infancy and c lhood. A *large* or *wide anus* is not infrequent; a when the sphincter ani is impaired in power, p apsus of a portion of the rectum is thereby fa ured; and a portion of the mucous secretion o e lower part of the bowel, sometimes with a li fluid fæces, occasionally escapes.

II. FOREIGN BODIES IN THE RECTUM, AND L ERATION OF THE RECTUM AND ANUS, although st tly belonging to the surgeon, should receive d attention from the practical physician.—*A.* *F ign bodies* may be lodged in the rectum in th e ways;—1st. The body may have been swallowed, and have passed along the alimentary canal without occasioning much or even any disorder, until it reached the lower part of the rectum, where it is retained;—2d. Concretions may form in the bowels, or indigestible substances may collect and concrete in them, or gall-stones may pass into them and occasion obstruction in the rectum. Although these are not always foreign to the œconomy, they are as respects the healthy functions of the bowel, and there act as foreign bodies;—3d. Various substances or bodies may be introduced accidentally or voluntarily into the rectum through the anus, and occasion mechanical irritation, or obstruction, or ulceration, or inflammation, according to the nature, form, or consistence of such bodies.

7. (*a.*) *Foreign bodies* are often swallowed by infants, and accidentally by children or older persons, and, after passing through the bowels, causing either little or no disturbance, or more or less suffering, are arrested at the sphincter ani, producing painful tenesmus and straining, and much consequent disease, if the state of the anus and rectum be not carefully examined. Instances are not infrequent of infants and children having swallowed rings, with various kinds of stone, coins, pebbles, the large stones of fruit, pieces of glass, &c. and experienced little or no disorder until they reached the sphincter by which they were arrested. An attentive examination of the anus, as soon as straining at stool is complained of, and a careful introduction and turn of the finger in such cases, will readily turn out the obstructing body.

8. (*b.*) *Concretions* formed in the bowels are occasionally passed along the canal until they reach the anus; and, when much fæcal matter and flatus are collected in the colon and rectum, behind the concretion plugging up the inferior portion of the rectum and anus, the nature of the disorder is often misunderstood, and a mischievous perseverance in the exhibition of purgatives by the mouth often increases, instead of removing the evil. Nor is the cause of disorder always ascertained by prescribing enemata; for these may pass the cause of obstruction—the pipe of the instrument may either pass by the side of the concretion, or may even perforate the substance of the concretion so formed, and be retained, or pass off by the channel formed by the pipe, without any effect. But the patient may not escape so fortunately; for the enema may be administered by an ignorant or a careless nurse, who in attempting to introduce the pipe of the instrument, and to overcome the obstacle which the concretion furnishes, may actually push the pipe into, or even through, the parietes of the bowel, and convert an easily remedied disorder into a dangerous or even fatal disease. Concretions of various kinds have formed in the bowels and been thus arrested at the sphincter ani, occasioning remarkable disturbance, sometimes without the exact seat and nature of the obstruction having been for some time ascertained. Hardened fæces may collect to such an amount as to fill up the greater part of the pelvis, the muscular coats of the rectum being paralysed by the inordinate distention. But, when the parts are irritable, small concretions, or hardened fæces of comparatively small bulk, will produce great disorder from the irritation, and the consequent straining they occasion, and from the accumulations of fæces and flatus, and of retained secretions and excretions above them. In the

course of practice, I have been called to cases where the concretions obstructing the rectum and anus consisted in one case of brown paper which had been habitually chewed and swallowed; in another of wax, which had likewise been chewed and swallowed; in a third case of sealing wax of various colours which had been likewise swallowed; and in a fourth of chewed cedar of which drawing pencils are made. The first and last of these cases occurred in girls at school, the substances having been reduced to a pulp, and having passed into the bowels, were cemented by mucus into balls so hard as not to be capable of changing their form so as to pass the sphincter without producing great disorder. The second and third of these cases occurred in married women, under thirty years of age, without children; the wax being agglutinated into large hard balls. These concretions were numerous in all the cases, had evidently existed long in the cells of the colon, until the irritation they produced and the treatment adopted had dislodged them, and carried them to the rectum, when they were arrested by the sphincter. Besides these, magnesia, the carbonate of iron, and other substances, may form concretions productive of the disorder, to which attention is now directed.

9. (*c.*) The *treatment* of indurated substances, whether altogether foreign, or partly or wholly formed in the bowels, is generally simple; and if judiciously managed may be brought to a successful issue without much or even any surgical aid. Warm olive oil should be carefully injected; and the concretions, if still retained, should be turned out by the slow introduction of the finger; and the gradual resistance thereby furnished to the irritable contractions of the sphincter will facilitate their expulsion. When the concretions are less indurated, or consist of hardened fæces, they may be broken down by the handle of a spoon, or by a marrow-spoon, and then oleaginous enemata will remove the parts which still remain. As respects the effects produced by *foreign bodies* introduced through the anus, and the removal of these bodies, I must refer the reader to the surgical works enumerated or referred to in the Bibliography.

10. (*d.*) *Lacerations of the rectum and anus* are not infrequent occurrences. They vary much in their extent, in their seat, and as respects the direction in which they occur. They may be complete or incomplete as regards the coats of the intestine; and they may be limited to either the rectum or anus, or extended to both. The rectum or anus, or both, may be torn partially by the passage of large concretions, or hardened fæcal matters, passed hastily, or after violent straining. Such occurrences are rare; and the laceration is generally *partial* or *incomplete*, or involving merely the inner coats. *Complete laceration* takes place almost always from external injury or accident, and from parturition. *This form* of laceration may be limited to the anus, or not extend above the sphincter; and it commonly is caused by parturition. An instance, however, came under my notice of its occurrence from sitting upon a chamber pot which had been previously cracked. A *second form* is that consisting of rupture of all the coats within the sphincter, the anus, especially at its origin, not being injured. This form may be caused by foreign bodies in the rectum, by an unnatural position of the child during parturition, or by the unskilful use of instruments for this process.
third form of laceration consists of a division of
rectum and anus, and is caused by parturition.
this variety the recto-vaginal partition, the p
neum, anus, and sphincter are all torn, the rec
and vagina forming one cavity.

11. (*e.*) The *treatment* of partial and comp
laceration of the rectum and anus is chiefly surgi
When the laceration is only partial, medical tr
ment will generally be sufficient. A prudent
course to olive or castor oil, to oleaginous
demulcent enemata, occasionally to suitable c
ments, to the supine posture, and to a spare
naceous diet, will commonly remove this lesio
the course of a few days. Inattention or r
treatment, a too full diet, or a too heating regin
may cause partial laceration to be followed by
flammation, or by ulceration, or by abscess, o
fistula — lesions which will be considered in
sequel.

III. Inaction of the Rectum and Anus

Synon. — *Local Paralysis of the Rectum*
Anus, — relaxation or atony of these parts.

Classif. I. Class. I. Order. (*Au*
in Preface.)

12. Defin. — *Retention and accumulatio*
fæcal matters in the rectum, with constipation a
sense of fulness and weight in the pelvis, and
an inability to expel the contents of the bowels.

13. This complaint, which is not infrequen
aged persons, especially in old females of seden
habits, in aged debauchees, and in other per
who have exhausted the energies of the gang
and spinal nervous systems, has hitherto
confounded with the more common states of
stipation. It is moreover the usual form of
stipation in connection with palsy, especially
paraplegia and general palsy; costiveness or
stinate constipation thus proceeding not only
various kinds of obstruction in the vicinity of
anus or in the rectum, but also, in a different
of cases, from defective contractility of the
cular coats of the rectum, owing to impaire
lost power of the ganglial and spinal nerves
tuating these coats.

14. i. Causes. — (*a.*) The circumstances ch
predisposing to this complaint are the usual ca
of debility or exhaustion, more especially
advanced age; sexual excesses, masturbation
excessive voluntary or involuntary polluti
want of exercise in the open air, sedentary o
pations and habits; the rheumatic and g
diathesis, especially when accompanied by p
in the loins from congestion of the spinal sinuse
veins, and low or nervous fevers, or convalesc
from them.

15. (*b.*) The most common *exciting causes,*
neglect of the early intimations to evacuate
bowels, the rectum thus becoming over-disten
by fæces and flatus, and the muscular c
thereby losing their powers of contraction; p
plegia or paralytic affection of any kind; hyster
disorders; inordinate sexual indulgences; dise
of the kidneys; congestion of the spinal vein
sinuses, however produced; exposure to cold
to currents of air, especially when directed on
loins or sacrum, and an excessive use of calo
or aloetic purges. But whatever impairs
vital energy of the ganglia and ganglial plex
of the pelvic viscera, or whatever suppresses,
moves, or diminishes the influence of the sp

ner s, with which the pelvic ganglia are re- inf ed, as congestion, inflammation, injury, or str ural lesions of the spinal cord, will generally be llowed by inaction or paralysis of the coats of e rectum, and generally also with relaxation of sphincter ani.

ii. Symptoms. — Besides the usual symptoms of nstipation, the patient feels a weight and dis- ten n, sometimes with pain or aching in the pelvis tov ds the sacrum. The desire to evacuate the bo ls is often slight or absent; or if it be expe- rie d, there is an inability to accomplish the int tion. In many cases, the retained fæces wh are the lowest in the rectum become re- ma ably indurated, and furnish an obstacle to the eva ation of the portions above. In some of these cas the sphincter ani is so relaxed or paralysed as to mit of the hardened fæces being seen through the pen anus. Not infrequently these cases pr ed from neglect of local examination, and fro purgatives given by the mouth being con- fid in alone, until a fatal issue ensues; and, if the dministration of enemata be entrusted to an igr ant nurse, the nature of the disorder is equally un own; and these medicines are reported to ha been either inefficacious, or immediately re- tur d.

. If the complaint continues, without removal of fæcal accumulations, ulceration or sphacela- tio f some portion of the parietes of the rectum, wi absorption of excrementitious materials into the irculation, is a common result; occasioning low rritative fever, pains about the sacrum, vo- mi gs, suppression or incontinence of urine, rest- les ss, followed by coma and nervous symptoms, va ng with the circumstances and complications of dividual cases. In some instances, violent pa , occurring in paroxysms, are complained of tov ds the close, or at an advanced stage of the dis se, and dart down into the pelvis and to the an ; but contingent phenomena vary remarkably wi the age of the patient and the morbid associa- tio or peculiarities of the case.

. iii. Complications.—This affection occurs mu more frequently in connection with some otl malady, than as a simple or primary dis- ord . In the latter form, it is occasionally met wit in aged persons or exhausted constitutions, mc especially in sedentary females; and it may co nue until the unfavourable issue mentioned ab (§ 17.) supervenes. It is a common at- ter nt upon paraplegia, partial or complete, or fro whatever cause, and upon general paralysis, an he palsy of the insane; and, in these mala- die it is often associated with relaxation of the spl cter ani, fæcal accumulations being thereby pre nted, the evacuations passing off involun- tar , or as position and gravitation may favour the exit. It is also not infrequently complicated wi diseases of the uterus and ovaria; with dis- pl ments or enlargements of the uterus; or with dis ses of the kidneys or urinary bladder, or with en gement or other lesions of the prostate gland. It often associated with impaired function of the res f the digestive canal, or with torpor, obstruc- tio r organic lesions of the liver.

. iv. Treatment. — In the more simple states of is disorder purgation requires to be aided by sti lating enemata. Often a combination of di- su ate of quina with the purified extract of alc , or this latter with the compound galbanum pill, or these three medicines conjoined, will sufficiently excite the action of the rectum. If these fail, the more violent cathartics, as croton oil, the extract of elaterium, &c., will occasion more disorder than benefit; for, if this latter be derived, it is only temporary, inaction of the bowel being increased by them. Suitable enemata are generally required, and the addition of the spirit of turpentine to the injection is usually beneficial. It is not uncommon to find the rectum enormously distended with hardened fæces, when proceeding to administer an enema; but the state of the rectum and anus ought to be previously ascertained; and the accumulation should be removed, at least in part, by direct and mechanical means, before an injection is administered. The kind of enema adopted ought to depend upon the circumstances and complications of the case, and the effect produced; but a daily recourse to it is generally requisite.

20. In *complicated cases*, the treatment should also be directed to the associated malady; but, in these generally, the means now recommended will prove more or less serviceable, although others may be required in addition. In all cases, the state of the urinary functions requires attention; and undue accumulations of urine in the bladder must be prevented. The condition of the sphincter ani, and of the sacrum, or other parts unduly pressed upon, should be ascertained; for, when the sphincter is relaxed, much inconvenience and increase of disorder, with bed-sores, &c., will follow, and will with difficulty be prevented, although the greatest care be exercised, especially in aged, paralytic, and debilitated persons. In these persons especially, not only are the muscular coats of the bowel paralysed, but the secretions from the villous surface and mucous follicles are remarkably diminished, thereby favouring induration of the contents, and delaying or preventing their passage from the bowel. In these cases, the injections, whether saponaceous, saline, oleaginous, or terebinthinate, may be advantageously thrown up as high into the colon as possible by means of the flexible tube, as recommended by Dr. O'Beirne, for in such instances fæcal accumulations may exist far above the rectum. The combination of di-sulphate of quina, aloes, and compound galbanum pill, recommended above (§ 19.), or the two former with inspissated ox-gall, as advised by me in 1832, will generally restore the action of the bowels, unless in extreme or seriously complicated cases.

IV. Inflammations of the Rectum and Anus.

—Synon. *Proctitis* (from πρωκτος, anus);—*die Afterentzündung*, Germ.

Classif. — III. Class. I. Order (*Author in Preface*).

21. Defin. — *Pain and heat in the anus, extending up the sacrum and pelvis, with continued tenesmus or straining.*

22. Inflammations of the rectum and anus have been most unaccountably neglected by medical and surgical writers, and too generally overlooked in practice, more especially by those empirical physicians who plume themselves upon being "bold" or "active" practitioners, and who are so on inappropriate occasions, "ad captandum vulgus," rather than from a conviction of the benefit derived by those who are subjected to the infliction. *Proctitis*, in some form or other, I

have frequently found produced, either as a sequence, or as a complication, of some other disorder, by "heroic" practitioners, who claim for themselves a special consideration and notoriety, —actually produced by the excessive doses, or frequent repetition, or prolonged use, of those substances which irritate the lower bowels. How remarkably indebted must the surgeons of the present day, and indeed of the last half century, have been to physicians and others, for their frequent recourse to large doses of calomel and other medicines which have either excited or perpetuated, or in both modes developed, not merely inflammation of the rectum and anus, but also the various organic lesions about to be noticed as consequences of inflammation of these parts.

23. *Inflammations of the rectum and anus* are not of one only type or kind as respects the nature of the morbid action, and the consequences which follow. As I have shown when treating of Inflammation, and of Dysentery, proctitis may be *sthenic*, or *asthenic*, or *acute*, *sub-acute*, or *chronic*. The inflammation may commence in the rectum and extend even to the verge of, and around the anus; or it may begin in this latter situation and mount upwards, not merely to the rectum, but also to the colon, and even to the cæcum and small intestines. In all cases, and these by far the most numerous, the disease extends to the colon and cæcum, and often still further; constituting, according to the character of the constitutional and local symptoms, the forms of Dysentery which I have so fully considered, as not even now to admit of any addition, alteration, or correction. When inflammation is confined chiefly to the rectum and anus, although closely allied to dysentery, it is nevertheless more or less distinct from that malady, more especially when it is sub-acute or chronic, and is produced, as I have seen it in numerous cases, by the treatment which has been either adopted on erroneous principles, or carried too far. When thus produced by medicinal agents, proctitis may commence in the rectum, or in the lower part of the colon and rectum, or extend from one to either. When it is caused by agents acting externally, or locally, upon the anus, it may be then limited to this part, if the agents are not contaminating; but if they are infecting or contaminating, the rectum is soon invaded, and the inflammation, always then of an asthenic and spreading character, extends much higher, and to an indefinite extent.

24. i. Symptoms of Proctitis.—The phenomena of this disease vary with the cause, with the constitutional powers of the patient, and with the severity of the morbid action.—*A. Acute sthenic Proctitis* is attended by heat and pain at the anus, shooting or extending to the lowest part of the back, or under the sacrum; and by a continual desire to go to stool, with straining, and with the passage merely of mucus, sometimes streaked with a little blood. In some instances an exudation of lymph, similar to that in croup, takes place, and is thrown off in a more or less consistent or membrane-like form. If fæculent matter be passed at any time, it is usually with much increase of pain, and after having been retained for a longer or shorter time by the irritable and constricted sphincter; and the passage of pellets of fæces, with the straining or tenesmus, often occasions a slight prolapse of the inner coats the bowel, which appears swollen, red, hot, injected, partially covered with mucus, or w exudations of lymph, and with the mucous fo cles enlarged. When the prolapsus is more c siderable, and is accompanied with spasmodic c striction of the sphincter, the pain and restlessn are much increased, and shoots upwards al the sacrum in severe paroxysms, a distress aching being constant in this latter situation.

25. The *symptomatic disturbance* varies w the constriction and severity of attack. Th may be neither rigors nor chills at the commen ment, unless the disease follow the local ac of cold, or the cause be of a severe charac But more or less febrile action, with a white loaded tongue, heat of skin, impaired secre and execretion; scanty urine of a high col voided frequently and with difficulty, owing the extension of irritation to the prostate gl and neck of the bladder; an accelerated, full strong pulse; loss of appetite, but rarely vo ing, unless the disease has been neglected, fæcal matters have been long retained and larg accumulated, and constipation of the bowels.

26. The *terminations* of this form of proc are—1st. resolution;—2d. In hæmorrhagic udations, which may resolve the inflammati or, if the disease be associated with a vari state of the hæmorrhoidal veins or hæmorrh as often is the case, in a hæmorrhoidal discha —3d. In ulceration of the inner coats of bowel, the ulceration commencing either in mucous follicles, the ulcers being either few number or several; or in the abrasion of villous coat, the ulcer being single, or very f —4th. Rarely in sphacelation, unless that por of the inner coats of the bowel which has truded and been strangulated by the sphincter 5th. In abscess in the vicinity of the anus, or ternal to some portion of the parietes of the bo or in the connecting cellular tissue between rectum and neck of the urinary bladder, or tween the rectum and vagina, the abscess mately terminating in fistula; or in one or small abscesses in the connecting cellular tiss the rectum or anus;—6th. In inflammation o hæmorrhoidal veins, especially when the disea complicated with hæmorrhoids;—and 7th. chronic inflammation of the rectum and anus, the several structural changes consequent upo (§§ 43. *et seq.*)

27. *B. Sub-acute and chronic Proctitis* be either primary or consequent upon the a form now described, the symptoms of the l gradually subsiding to the sub-acute and chr states successively. If the chronic form come prolonged, various changes of struc and complications may follow, attended by tressing symptoms; and, if the complaint rec not due attention, the life of the patient be endangered.—(*a.*) *Sub-acute sthenic pro* is characterised by similar symptoms to t above enumerated, the chief difference consi in their milder form; and, if not appropri treated, in their longer duration. This for not infrequent in females; and in them the currence of the catamenia is often followed b solution of the inflammatory action. With exception of sphacelation, the same *termina* as I have stated to follow acute sthenic pro

lso follow the sub-acute form, but generally sequences of neglect or improper treatment, often occasion this form to pass into the ing and its consecutive organic lesions.

(*b.*) *Chronic Proctitis*, although often con- t upon the acute or sub-acute states, may ccur primarily, especially in persons who bject to hæmorrhoidal affections, or who abitual recourse to calomel or aloetic and s purgatives, or who are exposed to the ce of certain noxious agents. This form of ease may be seated chiefly in the mucous s, or in the mucous surface itself, or it may , especially when it is of considerable du- to the connecting cellular tissue, occa- more or less tumefaction or thickening of rietes of the bowel. Chronic proctitis is requently a complicated, than a simple af- ; and, when associated with other dis- as with hæmorrhoids, with leucorrhœa in male, with spasmodic stricture, or with of the anus, it may be either the primary ndary affection. It is generally attended re or less tenesmus or pain and straining at by a sense of aching or pain under the ; by slight prolapsus of the inner coats lvine evacuations; sometimes by dysuria equent micturition, and often by the exu- of mucus from the anus — *Proctorrhœa*, of authors, — *Medorrhœa ani* of J. P. FRANK, cially when the irritation is kept up by the e of ascarides in the rectum, or when the s follicles are affected, or when the disorder iated with leucorrhœa.

The *Terminations* of chronic proctitis are, esolution; — 2d. Ulceration, generally ncing in the mucous follicles; — 3d. Fis- ulceration, with or without abscess or pu- collection in the vicinity of the anus; — issures of the anus, generally in connection emorrhoidal tumours, or spasmodic stric- the rectum, or with both; — 5th. Tume- , thickening, and ultimately induration and ction of the coats of the rectum; and 6th. tion, associated with thickening, or with ion and constriction, or with all these s.

D. Asthenic Acute Proctitis may com- with or without rigors; and, although it chiefly in delicate, exhausted and ca- persons, it may affect any temperament or tion when the contaminating or infecting ions which usually produce it are directed the exposed anus; as when persons fre- privies which contain accumulated fæces, it an abundant infecting vapour. — *a.* This f proctitis is attended by many symptoms thenic acute form; but the symptoms are evere, the suffering more acute, the spasm phincter is more severe, or occurs in more paroxysms, and the mucous discharge fol- the straining is more copious, watery, s or bloody, and more offensive than in nic form. The disease, moreover, is rarely to the rectum, unless the treatment be , energetic and judicious; but extends he colon, and assumes all the characters of dysentery, with the constitutional symp- d terminations described when treating of m of that malady (see Art. DYSENTERY, *t seq.*). Asthenic proctitis is generally attended by much fever; a quick, soft or weak pulse, by much heat of skin; a foul or loaded tongue; by tenesmus, dysuria, or frequent micturition; by retention of fæcal matters, and many of the phenomena of adynamic fever. Prolapsus of the inner coats of the bowel is frequent; and, if this be attended by violent or continued spasm of the sphincter ani, sphacelation, foul ulceration, exudations of an offensive sanies, implicating more especially the prolapsed parts, are common results.

31. *b.* The *terminations* of this form of proctitis depend upon the period at which treatment has been adopted, and the nature of the means employed. Beside the terminations already mentioned (§ 26.), the passage of the disease into dysentery, especially the asthenic form, contamination of the circulating fluids, vital exhaustion, extensive ulcerations, sphacelation, and the other consequences of dysentery, may supervene.

32. *c.* The *complications* of asthenic proctitis are often serious, and demand careful examination and treatment. The neck, and even the parietes of the urinary bladder, with the prostate and urethra, are not infrequently implicated in the male, causing frequent and painful micturition, or even retention of urine; and the vagina, os and cervix uteri, are even still more frequently affected in the female; occasioning severe paroxysmal pains, referred to the vagina and uterus; and sometimes also much disordering the urinary functions.

33. *E. Syphilitic* and *gonorrhœal proctitis* are occasionally observed, especially in females of a certain class; but these specific forms of disease require no further notice at this place, than that the practitioner should not mistake their nature. They are more frequent in females than males, chiefly owing to the readiness with which the infecting virus may be communicated, by proximity of parts and by position, from the vagina to the anus. Syphilitic proctitis often speedily passes into ulceration, &c. within and around the verge of the anus; whilst the gonorrhœal form of the disease is attended with much excoriation, swelling, and discharge at the orifice of the anus, and at the internal surface of the nates adjoining the anus.

34. *F. Inflammation*, often with extensive *excoriations of the anus*, is not infrequent *in infants* and *young children*. In some cases the inflammation seems to originate externally to the anus, or at its external margin; and is either symptomatic of disorder of the digestive canal, caused by the state of the mother's or nurse's milk, or by improper food, or by disordered secretions and excretions; or it is more directly produced by want of cleanliness, and the accumulation of irritating sordes in this situation. In plethoric, gross, or unhealthy children, the inflammation almost threatens the adhesion of the opposite surfaces of the nates. In those cases, the disorder is attended by much fever — by a hot, dry skin, and a full, excited pulse. In other instances, the inflammation extends to the anus from the rectum, and then the child has remarkable straining, with very scanty mucous evacuations tinged with blood; and often also dysuria. This state of the affection is not infrequent during weaning or dentition, and is often symptomatic of disorder of the digestive canal at these periods, or is caused by the nature or the excess of the ingesta In some cases, the

disease assumes a sub-acute asthenic form resembling aphthæ, upon which it not infrequently supervenes, or with which it is complicated; more or less disorder or marked lesion, apparently extending along the whole digestive canal, but becoming more developed and apparent at both the entrance and outlet — in the mouth and lips, and in the anus, where the vital action of the parts is modified by the copious accession of sensory and motory spinal nerves (see Art. Thrush).

35. ii. Causes. — (*a.*) The *predisposing causes* of proctitis are the irritable and sanguine temperaments; an irritable or susceptible state of the intestinal canal; the existence of worms in the intestines; a full habit of body in connection with hæmorrhoidal affections; venereal excesses and voluntary or involuntary pollutions; diseases of the prostate gland or neck of the bladder; and morbid or long retained alvine secretions and excretions. — (*b.*) The *exciting causes* are chiefly those which act through the medium of the intestinal canal; and those which act externally or locally. Of the former, the ingesta, medicinal and dietetic, are the most frequent and important. Calomel and other preparations of mercury in large or too frequent doses, or in prolonged courses; arsenic similarly prescribed; aloetic and resinous purgatives habitually or frequently taken; hypercatharsis, however produced; the prolonged or excessive use of emmenagogues; substances swallowed with the food, accidentally or otherwise, which irritate or penetrate the coats of the rectum, as fish-bones, or the spiculæ of other bones; the husks, seeds, or stones of fruit; and the very hot and least soluble spices, when taken in excess. Other substances accidentally swallowed, which irritate mechanically the rectum or anus; morbid or retained secretions and excretions, accumulated fæces, concretions formed in the bowels, hæmorrhoidal affections; and the irritation of worms, are also occasionally exciting causes of this complaint.

36. The external agents are chiefly injuries, accidents, wounds or operations, implicating the rectum or anus; the contingencies of parturition and the puerperal state; the administration of acrid or stimulating enemata, injections or suppositories; injury sustained by the bowel during the administration of enemata; abstracted animal heat by sitting on cold seats, on stones, or on the ground; currents of cold air; the application of gonorrhœal or syphilitic poisons, or other infecting agents; and frequenting foul privies where the fæcal accumulations are great, and where the foul exhalations rise against, and infect, the anus during defæcation. Of the influence of this last cause of proctitis I have observed several proofs in the course of practice. The inflammation which has resulted has generally assumed the form of asthenic dysentery (see Dysentery, §§ 20. *et seq.*); and when females have been exposed to this cause, not only has asthenic proctitis passing into dysentery been the occasional result, but also asthenic vaginitis, sometimes with asthenic hysteritis, attended by acute pain and by a copious or an offensive vaginal discharge, this complication appearing most frequently and remarkably in married females.

37. iii. Treatment should differ most remarkably with the activity and character of the inflammatory action, and the nature of the predisposing and exciting causes.—*A.* In *sthenic acute pro is,* local depletions, especially cupping over th a-crum, leeches to the perinæum and arounc he anus; cooling and demulcent aperients; the m bath, semicupium or hip-bath, followed y cooling diaphoretics, and fomentations, wit an antiphlogistic regimen, are the most efficacious nd generally remove the disorder in a few days If much pain and tenesmus continue after depl on, the compound ipecacuanha powder, or s ple ipecacuanha, with henbane, extract of hop of poppy, ought to be given in the form of pil he ipecacuanha in as large and frequent doses a he stomach will tolerate; and, having allayed t irritability, the bowels should be evacuated by castor or olive oil; or by sulphur and mag ia, aided by confection of senna, or by a gl of lemonade, taken soon after the magnesia, or a demulcent, laxative, or oleaginous enema.

38. *B.* The *sub-acute* and *chronic states* he complaint generally yield to the same mea as just advised; local depletions to a less amou being usually sufficient; but these should vary ith the habit of body and circumstances of the p nt. Ipecacuanha, cooling diaphoretics, warm hs, and emollient laxatives, with demulcent anc odyne enemata are generally beneficial. If ex nal irritation, heat, or excoriations are experien at the anus, a cooling and anodyne lotion, as a lution of the diacetate of lead, with vinum op nd acetic acid, will give much relief, and may b ept applied for a considerable time by me of pledgets of lint. The secretions and alvi excretions, especially the biliary, should be pro ted by means of hydrargyrum cum creta, or Plun er's pill, conjoined with ipecacuanha and soap, erposing a dose of castor or olive oil; or a dem ent and oleaginous enema.

39. *C. Asthenic proctitis* rarely admits e o local depletions, unless in plethoric persons As the chief danger in this form of the com int proceeds from the rapid extension of the c ase along the rectum to the colon, the princi indication is to prevent or limit the extensi by such means as experience has shown to b ost efficient in this mode of operation. I have nd the warm-bath, or hip-bath, followed by a rm terebinthinate embrocation applied over t sacrum or the hypogastrium, and the followin ills amongst the most efficacious means. As s as the more painful symptoms, especially the sm of the sphincter ani, were relieved, or even w out waiting for such relief, the subjoined draug was also administered.

No. 328. ℞ Pulv. Ipecacuanhæ; Quinæ D ph Camphoræ, āā, gr. j. Extr. Humuli, vel Extr entianæ, gr. iij.; Confect. Aromat. gr. ij.; M lag. Acaciæ, q. s. M. Fiant Pilulæ, ij. quarta vel intaquaque horâ sumendæ.

No. 329. ℞ Olei Terebinth., Olei Ricini, āā ss.; Aquæ Menthæ Virid. ℥vjss.; Tinct. Capsici, m. M. Fiat Haustus.

40. Demulcent and anodyne enemata always beneficial, if early employed; or bef ulceration or sphacelation of the internal c of the bowel has commenced; but the utmo are ought to be taken in administering an e na, lest the pipe of the instrument injure the sv en, softened, and tender parts along which it is ed. In every other respect the treatment sho be identical with that advised for *asthenic dys ry,* especially if the morbid action has advan to

lon and cæcum, or has continued any time.
rt. Dysentery, §§ 88. *et seq.*).

D. Inflammations and excoriations of the anus
ctum in infants and young children (§ 34.)
l be treated with a strict reference to
ause. The diet of the infant, and even of
rse, should be changed or corrected; the
ons and excretions improved and promoted;
fter the warm bath, emollients, &c., the
intment, or lead ointment, or cooling lo-
or other means which the peculiarities of the
equire, should be applied. In most of these
more or less constitutional disorder is as-
d with disease of the alimentary canal; and
tter is seldom confined to the rectum and
the colon, or the digestive organs generally
pating more especially in the existing de-
nent. In these circumstances, the hydrar-
cum creta, conjoined with ipecacuanha,
mall doses of rhubarb, and with absorbent
rs, or other ant-acids, will frequently prove
beneficial; and sometimes equal parts of
tated sulphur and carbonate of magnesia,
ch powdered liquorice root and cinnamon
ded, in quantity sufficient to render the
more pleasant, may be taken in milk or in

E. The specific—gonorrhœal and venereal—
of inflammation of the anus and rectum,
be treated conformably with the principles
guide the treatment of these maladies, in
ituations and circumstances. The local af-
will, however, require much of the sooth-
ans already advised for other inflammations
e parts: — the gonorrhœal especially, local
ons, saturnine or cooling and anodyne lo-
c.; and, internally, the balsams, especi-
paiba, powdered cubebs, or a decoction of
illea millefolium. Clysters are of doubtful
age in the specific states of the disease, as
ay favour the extension of the specific in-
from the anus to the rectum and lower
the colon.

v. Itching of the Anus.—*A.* This is gene-
symptom only of diseases of the digestive
or of the rectum and parts in the vicinity. It
, however, so distressing as to form the most
ent disorder; and is then a most obstinate
remove. It is most commonly caused, at
s, by ascarides in the rectum, by other in-
worms, and by chronic eruptions around
us. It sometimes follows recovery from
ry. It frequently precedes and accompa-
morrhoidal affections; and it often attends
lows the cessation of the menstrual dis-
It is often attended by more or less of
discharge from the rectum — or "*me-*
ı ani." Pathologically, it may be viewed
dication of either irritation of the intestinal
specially of the rectum, or congestion of
ı the rectum or anus, or cutaneous erup-
ar the verge of the anus. It is often pro-
y the accumulation of fæces in the rectum
on; by the abuse of calomel, or of aloes,
ther purgatives which act chiefly on the
; by various exciting emmenagogues; by
n or enlargement of the prostate gland,
self-pollution.

B. The *treatment* should be directed to the
gical and exciting causes, and to the com-
ns of the case. Local bleedings are sometimes required, and these are often advantageously followed by cooling lotions, as the acetate of lead, with acetic acid, and the tincture or wine of opium. The yellow wash, or weak solutions of the nitrate of silver, and the other means advised for the chronic cutaneous eruptions affecting this part, should be employed when any one of these is the cause of the itching. In the more obstinate cases, clysters containing turpentine will be found most efficacious; and lotions, or a wash, with a saturated solution of the bi-borate of soda, will also prove most beneficial, and appropriate to all the circumstances in which the symptom appears.

45. v. Mucous Discharge from the rectum.—*Medorrhœa ani*, J. P. Frank — is often caused by the same pathological states as produce itching of the anus (§ 43.). *A.* It may proceed also from a chronic state of inflammation of the lower portion of the rectum; and precede, accompany, or follow hæmorrhoidal attacks, the hæmorrhoidal flux being very frequently followed by this discharge. When caused by inflammatory irritation or congestion, it may prove a substitute for the sanguineous evacuations attending hæmorrhoids. It is distinguished from gonorrhœa affecting the anus, or "venereal blennorrhœa," by its tenacious state and transparent appearance, which it commonly retains.

46. *B.* The *treatment* of this discharge depends upon the cause. It is often produced by the abuse of calomel and aloes, and by resinous purgatives and emmenagogues, and is readily cured by relinquishing the use of these. It is a frequent consequence of the congestion, or local determination of blood produced by masturbation; and hence it should excite suspicion of this vice, the existence of which will render treatment inefficacious, but the relinquishment of which will alone remove the disorder. When it follows proctitis, or dysenteric attacks, or attends hæmorrhoidal tumours, or follows sanguineous evacuations from these tumours, the treatment advised for Hæmorrhoids will then be required; and when it is caused by intestinal worms, the treatment prescribed for these parasites is then necessary. In many cases, the means recommended for itching of the anus, or for chronic proctitis, will remove this affection.

47. vi. Abscess of the Rectum and Anus.—*A.* Abscesses may form in connection with the rectum or anus, or with both, either consecutively of some form of inflammation of these parts, or from the extension of disease from adjoining parts, or secondarily from phlebitis or from purulent absorption. — (*a.*) When either of the forms of inflammation terminate in abscess, the surrounding and connecting cellular tissue is the seat of the purulent formation. If the abscess form near the anus, it is formed in, and confined by, the surrounding adipose substance. The abscess may be *between* or *external* to, the coats of the rectum: if the former, it is generally very small, or several may exist; if the latter, it is much larger, and is generally single. In cachectic habits it may be very large, and spread to a dangerous extent.

48. Small abscesses, which form in the parietes of the rectum, or superficially near the anus, are generally consequent upon inflammatory irritation in the mucous membrane or its follicles; and in the more healthy subjects, and when the treatment is judicious, they generally terminate without pro-

ducing any of the consequences, to which the larger purulent formations often lead. When the mucous follicles of the rectum or anus are irritated, either by the nature of the excretions which pass over them, or by medicinal excitants, or by the morbid matters existing in the blood that they are partly concerned in eliminating, the irritation may, especially when occasioned by this last cause, rapidly pass into ulceration, which, if it extend to the connecting cellular tissue, may be followed either by purulent collections, or by fistula, or more commonly by both these in succession.

49. (*b.*) Abscesses seldom form externally to the coats of the rectum, or to the sphincter ani, independently of inflammatory irritation of the rectum or anus, or of the urinary and sexual passages. A small abscess, or boil, may however appear, independently of irritation of these parts, external to the sphincter, or near the anus, owing to want of cleanliness or to some other cause; and may, if opened early, and otherwise properly treated, in no way implicate the adjoining canals or their outlets; but, if neglected, or if suppressed externally, it may extend upwards or along the rectum, especially in cachectic habits, and ultimately perforate the parietes of the bowel above the sphincter, and be followed by fistula. Although an abscess may occasionally thus originate, and with an apparent independence of any irritation or disease of the adjoining canals or of their outlets, I believe that instances are rare in which these affections, either of the mucous surfaces, or of the follicles, are entirely absent, these affections proving the exciting cause of the inflammatory action and suppuration external to the rectum or anus.

50. (*c.*) Irritation or inflammation, passing into abscess in or near the rectum or anus, although commonly originating in those parts, and produced by the causes mentioned above (§§ 35, 36.), frequently proceeds from disease — from inordinate excitement, irritation, inflammation, or other lesions, of adjoining parts. In females the abscess may be a consequence of irritation in the sexual passages, and be seated in the anterior parietes of the bowel, or in the recto-vaginal partition, or in the perinæum, and may point or open into either canal or externally, according to its position. In males, inflammatory irritation or diseases of the urethra, of the prostate gland, or of the neck of the bladder, may extend to the adjoining cellular tissue, and endanger the integrity of the rectum by exciting inflammation of, and abscess in or extending to, this tissue. Even the means used to cure disease of the urinary and sexual organs, in both sexes, may excite inflammation or irritation, which will extend in this direction and terminate in purulent formation, which may open into the rectum. Abscess in the vicinity of the rectum or anus may, moreover, depend upon disease of some one of the pelvic viscera, or upon disease or caries of a portion of bone in the vicinity; but these are comparatively rare occurrences, or causes of abscess in this situation. It should not, however, be overlooked, that an abscess may appear near the anus, or may partially surround, or open into the rectum, owing to the extension of disease, and to purulent extension and infiltration, from the vertebræ — the abscess being, in such case, merely a variety of psoas abscess, proceeding from inflammation of the intervertebral spaces, or from caries or tubercular disease of the bodies of one or more of e vertebræ.

51. (*d.*) Abscess, or abscesses, may form i he rectum or anus, from inflammation of the vei of these parts, or of a hæmorrhoidal tumour, of a dilated or varicose vein, the purulent colle on being more frequently external to the vessel, in the surrounding cellular and adipose tissues an within, or involving the coats of the vein. is not improbable, that inflammation of the hæ or- rhoidal veins, when commencing in their in al or serous membrane, may sometimes extend re or less along them, and contaminate the bloc or cause coagulation of the fluid in them, or er lesions fully described in the article on the p o- logy of the VEINS, and be associated with pu nt collections in their course, either internal ex- ternal as respects their parietes; but these r lts are certainly not so frequent as may be exp ted from the exposure of these vessels to the s ral causes of irritation and inflammation, wh so often act upon the rectum and anus, and infl ce the circulation through the hæmorrhoidal ns, both in health and in disease. It still more ely happens, that secondary collections of matte rm near the rectum or anus in consequence of ru- lent absorption, the few instances of absc in these situations which have occurred in the er- peral state being those in which inflamma of the veins of the uterus or of the appendag has extended to the veins and cellular substan ad- joining, and has implicated those parts in near the rectum or anus.

52. B. *The symptoms of abscess* near to, im- plicating, the rectum or anus vary remarka y, in severity and character, with the causes of in- flammation of which this is the consequenc with the severity of the inflammation and the ex t of the abscess, in no small degree with the par ular situation of the abscess, and with the cons tion and habit of body of the patient. The sym oms are often, at first, those of proctitis; esp ially when the disease commences in the rectum anus itself. But, when the abscess proceeds fr in- flammation of the adjoining parts, passa , or outlets, or when it is so external to the rec n or anus as at first not to implicate these part little inconvenience is experienced there until t out- let is pressed upon, or consecutively ir med by the progress and distention of the p lent collection.

53. When the abscess is apparently, even really unconnected with the bowel, or se l or urinary passages, and is at some distance f the anus (§ 49.), it generally appears in th form of an ordinary boil, and proceeds with ntral hardness, swelling, redness of a dusky ti and throbbing, with symptomatic fever, var g in character and severity with the constitutio f the patient. If the abscess be of a sthenic nat , the attendant fever is more or less inflammato and the tendency to point externally is manife but, if it be asthenic, or the constitution cach , the local inflammation and the matter produc by it may be diffused, and isolate a portion the parietes of the rectum, or of the sphinct and disconnect it from the adjoining parts. these cases, the constitutional symptoms are ways adynamic; and, however frequent the pu , the vital powers are more or less depressed. some of these, the abscess will hardly point ext ally

or it thus point, it will do so imperfectly, or assu the character of carbuncle. When the abss forms near the side of the anus, and much ress or swelling and pain extend to the buttock, wi considerable fever, then the more painful sytoms subside upon the formation of matter, esially in the sounder constitutions; and throbbi chilliness, followed by a disposition to persptions, with external pointing of the abscess, are chly experienced. If, however, the matter is m diffused, if the disease is more asthenic, if the coitutional powers are weak or exhausted, if the suficial appearance of the abscess is more carbuular, and if more than one opening have apped on the surface, both the local and general sytoms may be aggravated, or at least not abd; and, with the diffusion of the local lesion, th dynamic fever seriously if not dangerously inased.

. The severity of the symptoms and the conseive evils are much increased when the abscess is nsequent upon changes of the coats of the rem, or upon ulceration of the mucous follicles of e rectum or anus, or upon inflammation of haorrhoidal tumours, or of the hæmorrhoidal ve; for, in these circumstances, not only are th local changes more complicated, but the coitutional affection is more severe, and the tency to terminate in fistula, if not in still more seus changes, much greater. Much, however, in spect of severity of local and general sympto, will depend upon the constitution and habit of dy of the patient, aud upon the exact seat of th ocal change. Integrity of vital power will prnt a dangerous extension of the mischief, wlt depressed or exhausted energy, and an impu state of the circulating fluids, and their seal concomitants, will increase the evil. The ex situation of the abscess will also remarkably aff the symptoms. If the matter form on one of e sides of the anus, the symptoms will be m less severe than in any other situation: they wi be severer if it forms posteriorly; and still m severe if it collects anteriorly; as in this last sition it implicates parts of greater sensibility th in the other situations; and, in the male espelly, it involves parts concerned in very impont functions — whether extending merely to, orginating in, these parts — and interrupts more or ss painfully, and even seriously, their offices. Tl abscess may in this situation involve the prate gland, or neck of the bladder, or the urra, or the vesiculæ seminales, either primarily or nsecutively, and thus interrupt the excretion of ine, or cause retention of it, with various assiated phenomena.

. In females, the symptoms are seldom so see as in the male, especially when the abscess is erior to the anus or points in the perinæum; an et I have seen, in two cases, of which strong fees of a sanguine temperament were the subje both the local and the constitutional symptoms m acute, the abscess having been seated high in th ecto-vaginal partition. In such cases, the abss will not point in the perinæum, but either in vagina or rectum, according as the parietes of her is primarily or chiefly affected, or as the irrtion or cause existed in the one canal or in the ot; but when pointing in either direction, peron of the parietes is generally the consequence, an the risk of fistula being the result is great, especially if the rectum be perforated, and the constitution be at all in fault.

56. vii. ULCERATION OF THE RECTUM.—*A.* Ulceration of the coats of the rectum is not infrequent, especially in the course, or as a consequence, of acute or chronic dysentery, of diarrhœa, especially of colliquative diarrœha, and of tenesmus. It may take place as a termination of one of the forms of proctitis described above, and it may be either the consequence or the cause of abscess of the rectum or anus. It is frequent in the course of tubercular formations in the lungs, and less so in the advanced progress of organic diseases of the liver. In the former, it is often productive of fistula, having previously occasioned more or less suppuration, or distinct abscess in some cases, or a less obvious collection of matter in others; and it generally commences in the mucous follicles, and is often caused by the state of the blood consequent upon softening of tubercles in the lungs, and the absorption of tubercular matter. Ulceration may also follow the opening of an abscess into the rectum, when the matter proceeds from inflammation of adjoining parts, especially of those already enumerated (§§ 49—51.). It may possess asthenic or reparative character, in which case a favourable issue soon takes place; or it may present an asthenic or spreading form; or it may even assume a sloughing or rapidly disorganising state. It may, moreover, be specific, or venereal.

57. *B.* Ulceration of the rectum or anus is more frequently a complication of other maladies, as of those of the lungs, liver, &c. than a primary and simple lesion. It is often associated with other changes in the rectum — with inflammation of the rectum, or of the colon, or of both; with prolapsus ani, with fissure of the anus, with stricture and thickening of the parietes of the bowel, with hæmorrhages from the rectum, of which it is often the cause, and with hæmorrhoidal tumours, internal or external. It is often complicated with, or consequent upon, thrush and excoriations of the anus in children (§ 34.); chronic dysentery and diarrhœa, at all ages, and in all climates; and disease of the mesenteric glands. It is not infrequently associated with lesions of the urinary and genital organs in both sexes; and with tubercular formations in different parts of the body, but more particularly in the lungs.

58. *C. The causes of ulceration* of the rectum are the same as those which occasion proctitis or abscess of the rectum and anus; more particularly the several diseases just mentioned as often associating with them these lesions, as tubercular formations in the lungs or in other parts; disease of the liver and digestive canal; hectic and other fevers; the several kinds of dysentery and diarrhœa; local irritants, and septic or contaminating vapours directed on the anus and rectum in foul privies; substances lodged in the rectum; operations and injuries implicating the rectum or its vicinity; certain kinds of ingesta, both medicinal and poisonous, taken too frequently, or in too large doses, as calomel, arsenic, &c.; scurvy and morbid states of the blood; and excessive sexual indulgencies. (See §§ 35, 36.)

59. *D.* The *symptoms* of ulcerations of the rectum are often those of chronic proctitis, especially tenesmus, the discharge of puriform, or a mixture of purulent, sanious, and mucous matters in the stools; more or less pain during the passage of

the fæces, often with partial prolapsus of the inner coats of the rectum, and with more or less blood, sometimes a little only, following the fæculent evacuation. If the ulceration exist near to the anus, it may be associated with some degree of fissure; and a sanious or puriform discharge may either exude constantly, or be discharged at intervals from the anus. When the ulcer is considerable and low in the rectum, it may be felt upon the examination; some degree of thickening, with slight induration of the edges, and irregularity of the surface, serving to distinguish it. When it is beyond the reach of the finger, or above the sphincter, its existence may be inferred from the history of the case, especially from the appearance of purulent, or sanious matter, or of blood in the stools, but unmixed with the fæces; from the circumstance of these discharges having followed symptoms of proctitis or of abscess, or attacks of dysentery or chronic or colliquative diarrhœa; from the pain under the sacrum or pubis just before or during evacuation of the bowels; and from the partial prolapsus often attending fæcal evacuations. But it is rather from the association of several of these, than from either singly, that this change is to be inferred. (See art. Hæmorrhage — *from the Intestines*, &c. § 197.)

60. *E. Syphilitic ulceration* of the rectum or anus is a general attendant as well as consequence of syphilitic proctitis. It occurs most frequently in females, owing chiefly to the proximity of the infecting and infected surfaces. The specific characters of the syphilitic ulcer are often, but not always, present. When these are absent, as well as in other circumstances, the history of the case, and the conduct of the patient, as far as that is known, will serve to guide the diagnosis. The existence of other syphilitic symptoms, primary and secondary, should also be ascertained.

61. viii. Fistula in Ano. — *Rectal fistula.* — Fistula is the consequence of *abscess* or *ulceration* of the rectum or anus, and hence it proceeds from the same remote causes — predisposing and exciting — as occasion either or both these lesions. It has usually been divided into *three varieties*, the last of which, however, is very doubtful: — 1st. *Complete fistula*, which has two openings, one in the rectum and the other externally, — 2d. *Incomplete internal*, or *external blind fistula*, which has an opening in the bowel, but none externally. — 3d. *The incomplete external or internal blind fistula*, which has an external opening, but no internal opening into the gut. The existence, however, of this third variety has been disputed with much reason. More than one fistula may exist in the same person, and they may be of the same, or of the first and second varieties. They may present various differences; the fistulous canal may extend far up, before opening into the gut, may have several external openings, may extend far beneath the external skin, may be attended by spasm of the sphincter, and by callosities, hardening, and disease of adjoining parts, as the vagina, bladder, urethra, prostate, or even of the pelvic bones.

62. The constitutional and pathological relations of fistula in ano — the frequent dependence of this lesion upon important visceral disease — have not sufficiently engaged the attention of surgeons in devising their intentions and means of cure. Hence the necessity of close investigation of the *causes* and *complications* of all cases of a fistula which come under medical or surgi treatment. The *causes* of rectal fistulæ are th already mentioned in connection with the disea already discussed, but more especially injurie f the internal coats of the rectum by foreign bod , or by retained matters in the bowel; and p suppuration or ulceration of bunches of hæm - rhoids, perforating or destroying the inner coat f the gut. Fistulæ, from this latter cause, gener y form slowly. The patient has itching at the a , and a knobby swelling forms near the anus, wh often merely empties itself by a small opening r which has little disposition to break externa , but rather spreads upwards, or it may be c- nected above, with a second opening into e rectum. In some cases the fistula is a conseque e of injury, or of the burrowing of pus from s e adjoining part, depriving the exterior pariete f the rectum more or less completely of their cell r connections. These fistulæ are often critical — r rather the abscesses in which they originate. t more frequently the fistulæ accompanying c- stitutional disease, especially *phthisis*, originat n ulceration, frequently affecting the mucous l- licles, in the manner already mentioned (§ 56

63. According to the researches of Sabat , Larrey, Ribes, and Chelius, the internal o e- ing of rectal fistula is most commonly immedia y above the part where the internal membran f the rectum joins the external skin, and ra y higher than five or six lines above this part. S h appeared to have been the result in seventy e cases examined by M. Ribes. The conditio f the fistula is partly shown by the nature o s origin and history of the case; by the circumsta s of the discharge being either purulent or fa d, and by the passage of intestinal gas throug t, especially after having been examined by e probe.

64. ix. Treatment of Abscess, Ulceration, d Fistulæ of the Rectum and Anus. — The ca s and the constitutional relations of these le s. should determine the indications and mean f cure that ought to be adopted. If either le n proceed from constitutional or general dis e, the treatment should be chiefly constitutional d dietetic. If either have arisen from acute or - acute proctitis, the means already mentione s appropriate for chronic proctitis (§ 38.) y be employed; but these should be varied with e diathesis, the complications, the duration o e obstinacy of the disease, and the habit of bo f the patient.

65. *A.* When the *abscess* is of a sthenic a- racter, is apparently only forming, then lee s, and soothing applications may be employed; t in all cases, whether sthenic, asthenic, carbunc r, spreading or burrowing, they ought to be op d as early as matter is formed, and a free external t- let to it be afforded. Afterwards, as well as n *ulceration* of the internal coats of the rectum e ascertained upon examination, the treatment, h local and general, should depend entirely upo e features and pathological associations of the e. If the abscess or ulceration has not advanc o the formation of either an incomplete or com te fistula, such means as are most likely to pro te the circulation through the portal vessels, an e- move obstructions from the liver, ought t e adopted, aided by soothing, stimulating, o s-

tri nt and tonic means, locally or constitution-all according to the peculiarities of the case. W these views, I have given PLUMMER's pill wit soap and inspissated ox-gall; or the pre-cip ted sulphur, with the bitartrate of potash, the onfection of senna, and confection of black-pep r, or with capsicum, according to the state of t case. If the rectum continue irritable, or if the ceration be attended by spasm of the sphincter, em ient injections, the local application of the ext t of belladonna, with either of the ointments adv d for anal fissure, and a recourse to the dec tion of the yarrow, or millefolium, which was rec mended to my attention by Mr. PERKINS, of Mo mer Street, will afford relief. If the ulcera-tio e obstinate, small injections of a solution of nit e of silver, or of mucilaginous mixtures con-tai g spirits of turpentine, or the balsams, espe-cia the Peruvian balsam; or pills with ipecacu-an capsicum, ox-gall, and one of the balsams, wil generally remove the disease, if the evacua-tio and the diet be duly regulated, and if the co tutional powers be duly preserved or in-cre d.

(*B.* If the ulceration present a foul, spreading, *ast ic*, or gangrenous character, the treatment bot ocal and general should be of an antiseptic an nic nature. Applications containing one of the lorides, or creasote, or spirits of turpentine, or e Peruvian balsam; small injections with the ; and the internal use of the decoction of cin na with alkaline carbonates, camphor, ser-pen ria, capsicum, aromatics, &c. are indicated in t se cases. When the ulceration is considered *syp itic*, then mercurials, especially the bichlo-rid in gradually increased doses, or calomel, blu ill, hydrargyrum cum creta, &c. may be pre ibed according to the peculiarities of the cas

(*C. Rectal* or *anal fistulæ* require the adoption of ilar principles and means to those espoused abo . These fistulæ often require an operation for eir cure; but such operations ought not to be dertaken inconsiderately for the following rea s: — 1st. The fistula may be symptomatic of ease of the lungs or liver — of the lungs esp ally, and the discharge from it may have a ben cial influence on the pulmonary malady. No tempts, therefore, should be made to close this afety-valve of the frame in these circum-sta s, until another has been established in some oth quarter; besides, an operation in these cases is o n followed by a recurrence of the fistula. — 2d. istulæ may occur in weak, irritable, nervous, and usceptible persons, even independently of tub ular formations, or of pulmonary disease; and et an operation by *incision* or *ligature* may be llowed by very painful or even dangerous con quences. The accidents which may thus occ are, severe or fatal hæmorrhage, inflamma-tio copious suppuration, colic, diarrhœa, perito-nit retention of urine, constipation, erysipelas, &c Although these ill effects of the operation are ost common in persons constituted as above, yet hey may appear also in the plethoric, the cac ctic, and even in those apparently the least lik to be thus endangered. — 3d. Fistulæ, in fav rable circumstances, especially during the adc ion of means to improve the general health, of uitable and regular diet, and of a treatment ide cal with, or similar to, that just advised (§§ 65, 66.), will heal up favourably, particularly when no visceral disease remains to perpetuate the symptomatic lesion. In all cases, the visceral disease should be investigated, and the treatment in great measure directed to it.

68. As to the performance of these operations I need only refer the reader to the able writings of A. COOPER, BRODIE, W. FERGUSSON, CHELIUS, SOUTH, and others referred to in the BIBLIOGRAPHY. But I may here add that they should not be attempted when the patient is the subject of any form of pulmonary or tubercular disease; or whenever the fistula becomes a vicariously secreting organ, by which other ailments are alleviated or removed; or if it be connected with disease of the pelvic bones, or of the prostate gland, or with incurable disease of the liver. In many of such cases, the patient may be relieved by enlarging the external opening of the fistula, and by strict cleanliness. The operation, moreover, will often fail in very old fistulæ, in those which have several openings, or which are connected with callosities or ruptures, or when the internal opening is out of reach. Even when no visceral disease exists, if the fistula have been of long standing, the operation should not be undertaken until an issue or seton has been prescribed.

69. V. FISSURE OF THE ANUS, SPASM OF THE SPHINCTER ANI, AND NEURALGIC PAIN OF THE RECTUM are more or less connected with each other. I very much doubt the existence of *spasm of the sphincter* independently of either *fissure* or *ulceration* within the verge of the anus; and the *pain*, which is often extremely acute in the rectum, especially after a stool, is generally dependent upon one or other, or upon both, these lesions, and is but rarely of a purely *neuralgic* or even *rheumatic* or *gouty* nature. Indeed the pain cannot be viewed as possessing those characters unless it be independent of spasm, fissure, and ulceration, and alternate, as the case may be, with neuralgia, rheumatism, or gout, in other parts.

70. i. FISSURES OF THE ANUS — *anal fissures* — have been well described by BOYER, DUPUYTREN, and BRODIE. — *A. Causes.* — Adults are exclusively subject to this disease. Children and young persons are exempt from it; and it is met with in persons between the ages of 25 and 60; most frequently from 30 to 45. It occurs in both sexes, but more frequently in females than males, and in those of nervous, hysterical, and irritable temperaments. The most common *exciting causes* are constipation and the irritation and spasm thereby sometimes produced. The passage of hard substances which abrade the mucous surface in the situation of the sphincter; injuries occasioned by the administration of clysters; the existence of hæmorrhoids or hæmorrhoidal tumours, and previous operations for these, and the venereal poison flowing from the female genitals and infecting the anus.

71. *B. Symptoms.* — The disease sometimes commences insensibly, in certain cases more rapidly or suddenly. The passage of stools is attended by heat and smarting, and, as the fissure increases, by violent pain, and a sense of spasmodic constriction at the anus. The pain often continues for hours after passing a stool; and in the worst cases it scarcely ceases. It is often increased by coughing, by micturition, or by exertion. It is generally lancinating or burning, and is attended

by restlessness, an anxious expression of countenance, increased nervous susceptibility, and loss of flesh and strength. M. Dupuytren states that the disease consists in a lengthy and superficial ulceration in the folds of the mucous membrane of the anus. On separating the orifice and directing the patient to strain, a narrow cleft is observed, with its bottom red, and its edges slightly swollen and callous. It often extends into the rectum; and is more frequently seen at the sides and back of the anus than at its fore part. It rarely extends through the whole thickness of the mucous coat. The most distressing part of the affection is the painful spasm of the sphincter. Sir B. Brodie remarks, that the construction of the sphincter at first appears merely spasmodic; but in proportion as this muscle is called into action it increases in bulk; and after the affection has continued for some time it becomes considerably larger. Dupuytren and other surgeons consider the fissure or ulceration to be produced by the spasm; but, without denying that the spasm may occasion ulceration, I believe — and I state this from the history of several cases, two of which occurred as early in my practice as 1825 — that the fissure or ulceration is commonly the cause of the spasm. The constriction of the anus is often so great as to render the introduction of any body, even the pipe of a syringe, both difficult and most painful.

72. Fissures present various differences according to their situation. When they are entirely *anal*, or are *below* the sphincter, and are external to the verge of the anus, they are much less painful; and the pains are not materially aggravated by the passage of fæces; but there is more or less pruritus; and in this situation the affection is often venereal, especially in females. Fissures may exist *above* or *within* the grasp of the sphincter, or in both situations, extending from the one to the other. When the fissure is above the sphincter it possesses more of the characters of an ulcer. It may be detected there either by means of the speculum or by introducing the finger, to which it feels hard, knotty, or rough; and it is very painful when pressed on by the finger, or when a hardened motion is passed; but the pain ceases soon after, and never continues so long and so violently as when the fissure is grasped by the sphincter. When a consistent stool is passed, the portion of the fæces which passes over the ulcer or fissure is often covered by a puriform mucus, sometimes coloured with a little blood. When the ulcer exists above the sphincter, it does not present the appearance of a fissure, and is not usually attended by spasm; nor by remarkable pain until a motion is passed; but possesses the characters, and, by extending, produces the results, already mentioned, especially copious hæmorrhages, abscess, fistula, &c.

73. *C. Treatment.* — Previously to 1825 this affection was generally treated by the operation first recommended by Boyer. At the commencement of that year I was called to a gentleman residing at Wisbeach who was advised by his surgeon to have this operation performed, conformably with the opinion then entertained by the most eminent authorities. He had been long subject to hæmorrhoids, was remarkably nervous and timid, and had the greatest aversion, notwithstanding the violence of his pains, to undergo an operation. He came to London, and placed himself under my care, having heard that I had expressed the opinion, that this affection may often be completely removed without any operation. Notwithstanding the severity and long duration of the case, I believed that it might be removed by medical treatment merely; and prescribed a light and antiphlogistic diet; demulcents with liquor ammoniæ acetatis; gentle and cooling laxatives; emollient enemata; and an ointment containing one part in seven of the extract of belladonna, which was applied after each stool, and with which the pipe of the enema syringe was directed to be covered when the enema was administered. Within three weeks he returned home quite well, and never had a return of the disease. In the summer of the same year (1825) I attended a lady residing near Russell Square for the same affection, and for which the same treatment was adopted with the like result. Since then I have not treated more than [illegible] cases, but these recovered without an operation, the means having been varied according to the peculiarities of each.

74. M. Dupuytren remarks, that fissures below and *above* the sphincter most commonly heal without an operation; the former with linen or lint spread with simple cerate, opiate cerate, poplar ointment, mercurial preparations; and the latter by soothing and narcotic lotions of decoctions of marsh-mallow, poppy-heads, nightshade, henbane, stramonium, &c. thrown up into the rectum. He says that spasmodic constriction is the true ailment, and that the fissure or crack is merely a secondary symptom. This, however, by no means agrees with my observation. The application of belladonna, when judiciously prescribed and aided by a proper general treatment, is commonly most successful in these cases. One part of the extract may be added to seven or eight of a suitable ointment, or the lead ointment or cerate; or one part by weight of the extract, and one part of the acetate of lead, to six parts of any ointment, and this pomade may be applied once or twice daily, or on the surface of a bougie. In cases where a lotion may be preferred to greasy applications, I have found a saturated solution of the bi-borate of soda, with the extract of belladonna, or vinum opii, used as a lotion, almost as efficacious as the foregoing; or a lotion with the diacetate of lead and an anodyne, for the more external fissures. Sir B. Brodie states that, though he formerly used a *suppository* with extract of belladonna with manifest advantage, yet he is not in the habit of frequently employing it. "Even used in the form of a suppository, the belladonna sometimes produces very serious symptoms by its influence on the brain." He therefore only gives purgative medicine to prevent hard stools, directs the introduction of a bougie before going to the water-closet, and prescribes an opium suppository at night. But the employment of belladonna in the form of a suppository is not required, and is always objectionable; and much of the success depends upon the selection of laxatives, rather than purgatives, or upon the means by which the bowels may be kept gently open, and the irritation in the rectum and anus at the same time soothed — intentions which the experienced physician will readily fulfil.

75. ii. Neuralgic, Rheumatic, or Gouty Pains of the Rectum or Anus are rare, and cannot be admitted to exist, unless they appear connected with neuralgia, rheumatism, or gout in some other part, either before or after the pain had

b n felt in the rectum. Pains in the gut or in t anus are generally caused by ulceration, or fi ure, or spasm of the sphincter, the existence of e er of which should be ascertained whenever p s in these situations are experienced; and if t can be referred to either of these causes, the t tment ought to be directed accordingly. If, h ever, no such source can be detected, or if they a referable to neuralgia, rheumatism, or gout, t means which have been recommended for t e maladies should then be prescribed, and a d by narcotic or anodyne suppositories, or ointn ts, as advised for spasm of the sphincter.

6. VI. **PROLAPSE OF THE RECTUM.**—*Prolapsus a* — *Vorfall des Mastdarmes*, Germ.; — *Chute d Rectum*, Fr.

CLASSIF. — IV. CLASS. I. ORDER (*Author*).

7. Prolapse of the rectum or anus appears u er different forms: — it may be *complete*, the p apsus consisting of all the coats of the bowel, t greater or less extent; or it may be *incomplete* o partial, and consist only of the inner coats. It n arise from *debility* only, as in children, and i hese cases it is generally complete; or from *h orrhoidal tumours*; or from *irritation* or *chronic i ammation* of the internal coats; and in these t classes of cases it is generally incomplete or p ial, consisting only or chiefly of the mucous a cellular coats. CHELIUS states that this dise appears under *three forms*: — it may be either t rectum with all its membranes, or simply the i rnal membrane, or an inverted upper portion of t bowel — *volvulus*, or intus-susception of the u er part.

8. i. *Prolapse from debility — prolapse of all t coats of the rectum* — has been doubted by a f surgeons who could have had no experience o he diseases of children, among whom this affecti is by no means infrequent. Mr. COPELAND s , that "in almost every case of prolapsus ani, it the internal membrane of the intestine only w ch descends through the sphincter." No doubt s is the case in the great majority of cases in a lts, especially when the prolapse is consequent u n hæmorrhoids and changes just mentioned; b in children, and even sometimes in old persons, e cially females, the prolapse is often that of all t coats, and not infrequently to a very great ext ; although in them also partial prolapse, or p rusion of the inner coat only, sometimes occurs. I epends upon imperfect tonic contraction of the s ncter, and relaxation of the connections of the b el with the surrounding parts. It proceeds f n the general debility observed in children r ed in unhealthy localities, in the ill-fed, and in t offspring of aged and debilitated parents. In s e cases both the sphincter and the muscular coats o he bowel seem more or less paralysed. The t our is usually of a large size; and if it be a wed to remain for some time unreduced, the c s become congested, livid, and thickened, and n ch difficulty is experienced in reducing it. M SYME considers that the prolapse, involving t whole parietes of the gut, is owing chiefly to i ation. This may be sometimes the case, espec ly as irritation is not infrequently associated w debility or want of tone of the parts, especially o he sphincter. The tumour is commonly round o oval, but sometimes cylindrical, varies in size f n that of a small egg to that of a large orange, e ibits the slimy surface of a mucous membrane, and affords a secretion similar to red currant jelly. This protrusion is the same as an invagination occurring higher up in the bowels, and differs only in its being so low down as to become external.

79. The *symptoms* of the prolapse vary with the extent of protrusion, and with the habit of body and strength of the patient. They are commonly very severe, and most urgent in young or robust subjects. There are straining and pain at the anus, with obstruction of the fæcal evacuations. If the protrusion continue, the pressure of the sphincter retards the return of blood from the protruded part, which then becomes engorged, livid, and swollen. Inflammation may follow, if the prolapse be not removed; and increased pain, fever, ulceration, sphacelation, or peritonitis, may supervene. Recovery may follow the sphacelation of the protruded part, or death, in consequence of peritoneal inflammation.

80. ii. *Prolapse from hæmorrhoids, or chronic inflammation of the internal coat*, is the most frequent form, and occurs to a much less extent.—(*a.*) When it is consequent upon chronic inflammation, or inflammatory irritation, there is generally more or less thickening, seated chiefly in the connecting cellular tissue. The frequent straining, often preceding and attending this protrusion, causes a relaxation and elongation of the internal coat, especially when hæmorrhoidal tumours complicate the affection. At first a little reddish swelling only appears, which gradually enlarges, becomes wider, is rounded below, but narrowed above by the sphincter; and, at its free extremity, has an opening by which the stools pass. The surface of the protrusion varies in appearance with the degree of constriction exercised by the sphincter, and with the duration of the displacement. It is red, or livid, soft or slightly tense, often divided into several lobes, and covered with bloody mucus. Dr. BUSHE justly states that, when this protrusion occurs in children, it presents the appearance of a small pyramidal, red, and coiled tumour; while in the adult it is less red, and generally takes the form, either of two lateral flaps, or of a circular fold. "In some of these cases, the portion of membrane protruded comes from the pouch of the rectum, while that within the sphincters remain in situ. When this is the case, the extremity of the little finger may be passed between that portion of the membrane which adheres to the internal sphincter and that which is protruded." (p. 204.)

81. (*b.*) Mr. COPELAND observes, that prolapsus ani has so many points of analogy with hæmorrhoids that it may be considered as the same disease in a more chronic and advanced state; and Mr. SYME thinks that the protrusion of the mucous membrane alone should be referred to the head of hæmorrhoids. Dr. BUSHE remarks, as to its *diagnosis* from hæmorrhoidal tumours, that the semilunar form of the flaps, the extent of their base, our ability to glide the folded membrane between the finger and thumb, as well as the absence of erection and hæmorrhage, are sufficient to distinguish this form of protrusion from hæmorrhoidal tumours. He adds, in respect of *intus-susception* of the rectum, that, in cases of *protrusion*, a probe, or the finger cannot pass higher than the border of the internal sphincter, owing to the doubling of the mucous membrane, while in intus-susception no resistance is offered to the passage of either the one or the other.

82. iii. The *prognosis* of prolapsus ani varies with the age and other circumstances of the patient. In *children* it is generally soon cured; or becomes less and less frequent as the child advances in age. In adults and old persons, it is a much more severe and obstinate complaint; and more readily and frequently recurs. In old prolapses considerable changes take place in the rectum and anus. A discharge of mucus is almost constant, the prolapsed mucous membrane becomes indurated, loses its villous surface, and sometimes ulcerates, especially when the sphincter is relaxed, and when the patient is subject to much straining at stool.

83. iv. The *causes* of prolapse of the rectum in *childhood*, amongst whom this complaint is most frequent, are the irritation of teething, or of ascarides in the rectum; diarrhœa occurring during or after weaning; insufficient or unwholesome nourishment; attempts to dispense with a healthy nurse; general or local debility and relaxation of the pelvic viscera; violent screaming and straining at stool, especially when produced by purgatives which irritate the rectum, as calomel, &c.; stone in the bladder; sitting on cold seats, and exposure of the loins to currents of cold air, occasioning a partial paralysis of the muscular coats of the rectum and sphincter.

84. The causes which most commonly produce this malady in *adults* and aged persons, are those which frequently occasion hæmorrhoids, or proctitis (§§ 35. 36.), and whatever weakens the tone of the sphincter ani and the attachments of the rectum to adjoining parts; the improper or frequent use of relaxing enemata or lavements; the neglect of the sub-acute or chronic forms of proctitis, especially when they are attended by much straining at stool; residence in hot and unhealthy climates; the several forms of diarrhœa and dysentery, especially the chronic; thickening, induration, and polypous excrescences of the inner coats of the bowels; hæmorrhoidal tumours, and other organic changes of the parts; stone in the bladder or disease of the prostate gland; prolonged costiveness; intestinal worms; protracted self-pollutions; sudden or violent muscular efforts; previous injuries and operations implicating the rectum or anus; and injuries or diseases affecting the dorsal or lumbar spine.

85. v. *The treatment* of prolapse of the rectum should be regulated according to the *cause*, and the *age*, and other circumstances of the patient. The *first* object is to return the protrusion; the *second* is to prevent the recurrence of the prolapse. — (*a*.) The *first* is generally accomplished with ease when the prolapsus is only partial; but when it is complete, or consists of the whole parietes of the bowel, the reduction of the protruded part is often difficult. But, by pressing up the parts nearest the opening of the bowel first, and directing the pressure upon and in the direction of the opening, much less difficulty will be experienced. If the swollen, reddened, and inflamed state of the prolapsed part, or spasm of the sphincter, or both, prevent the reduction, the application for a short time of a piece of muslin on the tumour wetted with equal parts of tinctura opii and sulphuric æther, and allowing a rapid evaporation so as to produce a quick transfer of heat, I have never known to fail in many cases in which I have advised it in cases of the complaint in children.

86. (*b*.) In order to prevent a return of complaint, the cause should be investigated, a the remote as well as the more immediate cau removed or counteracted. The numerous surgi writers who have entertained this subject, ha advised various operations, which are more or l painful, and not always devoid of risk; and th operations have not always been preceded b sufficient trial of those medical and rational mea upon the failure of which only they should be sorted to. Partial prolapse, or that form of complaint which is consequent upon neglected prolonged hæmorrhoidal affections, is often co plicated with chronic inflammation and thicken of the inner coats of the bowel, or with torpor obstruction of the liver, and obstinate congest of the hæmorrhoidal vessels; and unless these removed by appropriate means, the prolapse return frequently, and at last become almost c stant. In these, as well as in several other cumstances of the complaint, Plummer's pill, w soap, and taraxacum should be given at bed-tin and the bi-tartrate, tartrate or acetate of pota in the morning and mid-day, either in a decoct of Achillæa millefolium, or of the taraxacum, o the compound decoction of scoparium, in do sufficient to keep the bowels sufficiently op After these have been taken some time, and if excretions have then acquired a natural appe ance, cold injections into the rectum, each c taining about a drachm of the muriated tinctur iron, or two or three drachms of the spirits of t pentine to half a pint or twelve ounces of vehicle, will generally be of great service. Th injections may be repeated according to circu stances; but care should be taken to preserve secretions and excretions in a healthy and state.

87. (*c*). In *children* especially, and when the p lapse is complete, the treatment should be m constitutional than local, or the latter ought to b aid of the former. The means should be direc to the form of general disorder; and tonics, es cially those containing the preparations of ir cold salt-water, or sea-bathing, the douche of s water, or weak brine, on the loins, followed active exercise; the cold medicated injections mentioned; the muriated tincture of iron ta internally, preserving at the same time the bov gently open, or at least preventing costivene and attention to suitable, light, and nourishing d avoiding bulky innutritious vegetables, will ra fail in preventing a return of the protrusion. the complaint be associated with intestinal wor the treatment should be directed accordingly, injection containing the turpentine, or an oc sional draught with a moderate dose of this s stance, and an equal quantity of castor oil, produce a very decided benefit. In the m obstinate, or prolonged cases, after returning protruded bowel, and adopting the above treatm the patient should retain the horizontal posture some time; and after using cold-bathing or cold douche, he may cover the loins with emplastrum thuris comp., and have recourse such means, medicinal and dietetic, as will pron the general health. When the above measures unavailing, then the operations advised by surge may be adopted; for an account of which I n refer the reader to the works referred to in Bibliography, especially to those by Fergus

Bi ie, Dupuytren, Bushe, Chelius, and
So h.

. VII. Excrescences about the Anus and
Po pi of the Rectum are analogous affections.
— The former sprout from the skin and mu-
co membrane adjoining the anus; and assume
va us forms, to which different names, as sy-
co , ficus, mariscæ, cristæ, verrucæ, porrus,
co yloma, &c., have been given. These ex-
cr ences are *caused* by friction, erosion, the
irr tion produced by morbid secretions and by
ne ct of personal cleanliness, and by specific
po ns. They are prevented by avoiding these
ca s; and, when fully developed, they are best
tre d by the local application of strong solutions
of line, or nitrate of silver, or of hydrochlorate
of nmonia, or of bi-chloride of mercury, or
otl appropriate means. If these are inapplica-
ble r are inefficient, excision or ligature becomes
ne sary.

. B. *Polypi* are not infrequent in the rec-
tu and, like the same formations in other situ-
ati s, they present either a *mucous* or a *sarcoma-*
tou structure. — *a*. Dr. Bushe considers the mu-
co species to be most common; M. Sanson the
sa matous. M. Stoltz (*Gazette Médicale*
de *aris*, 1841, p. 253.) states that they are much
mo frequent in children than in adults; and
th while they occasion protrusion of the rec-
tu they are often confounded with that com-
pl t. Their intimate structure has not been
ex ly ascertained. In children, they present
mo of a mucous homogeneous structure; whilst
in lults they have more of a fleshy or spongy
str ture. In a case which was removed by my
di tions, the polypus had a serous-like cavity
co ining a little clear fluid, the walls being ap-
pa ntly amorphous. I have never observed any
po ssing a fibrous structure. Polypi of the
re m vary in their size, situation, and insertion.
Tl may vary from the size of a pea to that of
an gg: they may have a very broad, or a very
na w base or pedicle. They may be seated
ne the verge of the anus, or high in the rec-
tu These surfaces also vary; but they have
ge ally the mucous aspect, a pale reddish hue,
are ounded or oval, and are either smooth or
eq l, or more rarely lobulated. The mucous
me brane appears thickened at or around the
po of insertion. More than one may exist in
th ame case.

. *b*. The *symptoms* produced by rectal polypi
ar ifferent according to their seat and size. If
lo lown, the polypus will protrude with fæcal
ev uations, or even remain protruded. It may
be e cause of partial prolapse of the gut, and it
m be mistaken for prolapse, whether occurring
in endently of, or complicated with, that com-
pl t. When high in the rectum, it may not be
re gnised until an examination be made. When
it near the verge of the anus, it soon becomes
ex nal, and continues in this state. In rare in-
st es the bowel and sphincter contract so forci-
bl s to strangulate and detach it. When it is
se d high in the bowel, it may not be readily
di iguished from an invagination, although, in
th latter, the aperture of the invaginated part
m be felt, if the displacement be within reach.
T polypus rarely advances to a considerable
si without causing costiveness, and colicky pains
in e course of the colon, with tenesmus. The straining is often distressing, but is attended by much less pain than when it is caused by inflammation. The evacuations, when soft, are contracted, flattened, and generally smeared with mucus and blood, or pus, so as to lead to the supposition of stricture of the rectum; an examination, however, readily determining this point. When the polypus increases in size and malignancy, the patient becomes sallow, and loses his appetite; his tongue is coated, and his thirst constant. Emaciation, œdema of the lower extremities, and hectic fever supervene. Fæcal evacuations are procured with difficulty, are scanty, and commonly not without the aid of clysters. Tenesmus and weight in the rectum increase, and are attended by lancinating pains. There is much muco-purulent discharge, and often considerable hæmorrhage. If blood exudes from the surface of the polypus, and if it cannot be readily distinguished, on examination, from an invaginated portion of intestine, the diagnosis between them becomes difficult; but the symptoms of the latter are much more acute, and fæcal obstruction much more complete, than those of the former, whilst polypus in the rectum is a much more protracted malady.

91. *c*. The *treatment* of rectal and anal polypi is the same as that usually adopted for polypi in other situations. Surgeons are divided in opinion as to the propriety of removing them by excision or by ligature: much may depend upon their seats and attachments; and probably, in the majority of instances, they should be removed by both — by ligature and excision just below the ligature; but let the surgeons decide this point.

92. VIII. Contraction of the Anus. — (*a.*) This lesion is seldom observed; but it has occurred owing to the following local changes: — 1st. By the contractions of a cicatrix either just within, or just without, or implicating the verge of the anus; — 2d. By the deposition of lymph, which has become more or less organised in the submucous cellular tissue, thereby forming a ring around the anus; — 3d. By the production of lymph on the mucous surface of the lower portion of the rectum, which becomes somewhat organised, either forming filamentous bands, or narrowing the outlet both by its thickness, and subsequently by the contraction to which, like other false membranes, it is liable; — 4th. By the various changes consequent upon chronic inflammation of the internal membranes, or of hæmorrhoidal tumours, or of veins, especially irregular thickening, induration, and cartilaginous transformation. These changes nearly approach one of those next to be noticed, and differ from it only in implicating the anus, more or less, instead of being seated in the rectum entirely. The *symptoms* of this alteration are those of permanent stricture of the rectum, the nature and seat of lesion being readily ascertained by an examination.

93. (*b.*) The *treatment* should be adapted to the change occasioning the contraction; but in every circumstance the bowels ought to be kept gently open, inflammatory action should be subdued, and tumours, hæmorrhoids, or other associated lesions removed. Mechanical dilatation should be cautiously adopted, after these preliminaries have been effected.

94. IX. Strictures of the Rectum. — The rec-

tum is subject to two kinds of obstruction affecting its parietes, and narrowing its canal, — the one is *spasmodic*, and occasional ; the other is *organic*, and permanent until removed by treatment. — *A.* Mr. Mayo remarks, as to the part of the rectum which is the seat of *spasmodic stricture*, that no single point is more liable to this affection than another. The cases which he has met with have impressed him that the upper part of the rectum and the sigmoid flexure of the colon are most liable to irregular contractions of their muscular tunics. —(*a.*) This complaint, especially when seated thus high in the bowel, is independent of fissures or ulcers in or near the anus ; these lesions, however, frequently produce spasms of the sphincter and lower portion of the rectum, which are most severe or painful during and after the passage of a stool. Spasmodic stricture occurring thus independently of fissure or ulceration near the anus, is most common in debilitated constitutions, and in nervous and irritable temperaments, and as a sequela of dysentery. It is apparently *excited* by the vitiated state of the biliary and intestinal secretions and excretions. The frequent or habitual recourse to purgatives, especially to those which excite or irritate the lower bowels, cannot fail of predisposing to this form of stricture, when it does not produce chronic inflammation or hæmorrhoids.

95. (*b.*) The *treatment* of spasmodic stricture of the rectum ought to be chiefly dietetic and regimenal. The biliary and intestinal secretions and excretions, with the several digestive functions, should be improved and promoted by means suited to the existing disorder ; and the lodgment of vitiated secretions and fæcal matters prevented by means of emollient, anodyne, and antispasmodic clysters. I have found these, and pills consisting of ipecacuanha, Castile soap, inspissated ox-gall, and sometimes also the extract of henbane, or of hop, taken twice or thrice daily, with due attention to diet, and regular exercise in the open air, remove the disorder in a few days or weeks.

96. *B. Organic or permanent stricture of the rectum* results from chronic inflammation, which, however, may have been associated, at one time or other, with additional lesions.— *a.* It consists of a partial thickening of the sub-mucous coat of the bowel and of the connecting or adjacent cellular tissue ; through which means a smooth ring is formed, generally from a third to half an inch, more rarely to an inch in depth, which projects into and narrows the canal. Sometimes the thickening does not include the whole circle of the intestine, but a segment only. The ordinary seat of organic stricture is from two and a half to four inches from the orifice of the gut. But sometimes it occurs higher in the bowel — at six or seven inches from the anus ; and a contraction of the same nature is occasionally also met with in different parts of the colon. (Mayo.)

97. *b.* The *symptoms* of stricture of the rectum generally come on slowly, unless the complaint follow acute or sub-acute proctitis. In other circumstances, or when it is, as most frequently, the consequence of chronic irritation or inflammation, the more urgent symptoms are slowly and gradually increased ; and the obstruction is often very considerable before the patient has recourse to medical advice. There is always a sense of obstruction and weight in the lower bowel, which are not relieved effectually by attempts at ev ation ; uneasiness, distention, and occasional s modic or colicky pain in the abdomen ; pain the sacral region, often advancing to the loins extending down the limbs ; itching and heat at the anus ; frequent eructations and flatulent tention, with oppression at the præcordia ; ing down in females, and nervous irritabi headache, and dejection of spirits ; and a viti state of the alvine secretions and excretions. W the disease has continued for some time, the morrhoidal vessels often become congested, tumours form near the anus, produced by e vasated blood, which in old cases occasion t ening and elongation of the skin about the a Owing to the local irritation and determinatio of blood, inflammation, passing on to suppura sometimes attacks the cellular tissue near anus, forming abscesses, terminating in fist (Bushe.)

98. The calls to stool are sudden, ineffic and often amount to six, eight, or twelve in twenty-four hours — generally two, three or taking place within a very short time. They are attended by much straining, which sometim if the stricture is high in the gut, gives rise to trusion of the mucous membrane. Much fl and a small quantity of mucus, occasionally m with blood, are often all that is evacuated ; every two or three days fæcal matter, in s pellets of hard ; and in long, round, angula or flattened portions, of small diameter, if so is discharged. After each attempt, althoug pain is very moderate, a sensation continues the bowels had not been emptied ; and this actually the case, several successive atte with only slight effect, are usually made in succession. When a sufficient quantity of f lent matter and mucus is evacuated to a some relief, the patient desists with fatigue, a sense of fulness, weight, and tenesmus req es another effort. Occasionally the accumulati of fæces above the stricture, by irritating the m surface, causes an increased secretion from surface ; and the fæces, being thereby ren more fluid, pass more readily through the stric and the accumulation is thereby either par ly or altogether removed. If the stricture be very high in the rectum, it may be reache the finger, especially if the patient strains d the examination ; but if it cannot be reached bowel should be sounded by the instrumen commended by Sir C. Bell, which consis of an ivory ball, mounted on a stalk of w bone.

99. In some instances, many years may e without the patient's general health being m ally impaired, notwithstanding the fæcal rete and daily sufferings. Ultimately, however, he his appetite, and becomes pale, emaciated, hectic. At last purulent matter, so acrid excoriate the anus, is discharged in great a dance, and frequently it comes away whe coughs or stands erect. These symptoms inc until life is exhausted. (Bushe.) — Some pa die before the disease arrives at this stage, o to the obstruction and fæcal accumulation : become distended with flatus ; breathe with culty ; are distressed by singultus, and al symptoms of ileus. The pulse is very freq small, irregular, or intermittent ; the extre

old, are seized with cramps; and ultimately eatures, which were previously anxious, are psed, and cold perspiration, restlessness, &c., r in dissolution.

0. Dr. Bushe remarks that, in a few cases, tricture is partially destroyed by ulceration; the portion of rectum immediately above it ore frequently thus affected. In these the tine may communicate, by means of adhesion ulceration, with the bladder in the male, and the vagina in the female, thus forming a -vesical or recto-vaginal fistula, through h the fæces may pass. A much more com- consequence, however, of the ulceration, ially when the ulceration is low in the gut, passage of fæcal matters into the cellular , forming stercoraceous abscess, passing into æ, which may vary in number from one to a n, especially in females. The ulceration may, after causing adhesions to another portion of el, open into it; or, failing of producing ad- ns, open into the peritoneal cavity, and lly terminate by occasioning general peri- is.

)1. *c.* The *diagnosis* of organic stricture of the m is not without importance; for lesions of ining parts, as well as other lesions of the gut, be confounded with stricture. — (*a.*) *Retro- on*, or *enlargement of the uterus;* disease of rostate gland; and *tumours* in the vicinity of rectum, may simulate stricture by pressing and obstructing the canal of the viscus, by ering defæcation difficult, causing figured s, tenesmus, mucous discharge, and fulness eight in the sacral and perineal regions. In e, an examination will disclose the nature of complaint; and not the less readily, when ful chronic affections of the vagina occasion ptoms resembling stricture of the rectum, ig to the contiguity of situation and nervous munication. — (*b.*) *Ulceration* of the rectum, *ssure* of the anus, with *spasm* of the sphincter, hardly be mistaken for stricture, if the state he stools, and the remarkable pain attending lischarge of them, receive due attention; but e lesions may co-exist with stricture, and then reful examination can alone determine the ence of the complication. — (*c.*) Stricture of rectum may be mistaken for a *sarcomatous our* growing into the bowel, owing to the sure of the stricture downwards by the fæces imulated above it. A careful examination per m will generally lead to the detection of an ning admitting the point of the finger, and onstrating the nature of the lesion. — (*d.*) *malignant affections* of the rectum will be nguished from the organic stricture now being sidered, by the sallow or leaden and cachectic of the countenance and surface; by the lan- ting paroxysmal pains, and the rapidity of the rative process.

02. *d.* The *causes* of stricture of the rectum are y frequently only those which have been merated in connection with *proctitis* (§§ 35,), especially when these causes have been in uent or prolonged operation. The complaint ery rarely observed before the adult age, or r the 60th year; and it is nearly equally fre- nt in both sexes. Mr. Copeland thinks that nen are oftener affected than men. Dr. Bushe ted eight cases in females and seven in males. Stricture is obviously the consequence of previous disease — of chronic dysentery, diarrhœa, &c., — of slow inflammatory action, or of the frequently repeated irritation of purgatives on the lower bowels. In some cases, the cause can hardly be determined.

103. *e.* The *treatment* of organic stricture of the rectum is chiefly surgical — consisting in great measure of mechanical dilatation. I cannot, however, see wherefore a lesion commencing so frequently in chronic inflammation, consisting principally in thickening of the connecting cellular tissue from the deposition of coagulable lymph, and passing into ulceration, should be so entirely or even chiefly treated by mechanical means. Much certainly depends upon the amount of change existing in the bowel; but the effects obtained from these means are not always satisfactory; and, if due discretion as to their adoption, and caution in their employment be not exercised, increased pain and irritation, general distress with shiverings, sickness at stomach, colicky pains, and even peritonitis, may follow a recourse to them. In many instances, where bougies have been injuriously employed, the application of leeches to the anus, and mild laxatives and anodynes, would have afforded more or less relief; for I have no doubt that the constant state of emptiness in which the lower bowels are kept by purgatives, mercurials, and injections, in the usual treatment of those affections so generally ascribed to stricture, and the irritation produced by bougies are no mean agents in actually producing or aggravating the complaint which they are intended to remedy. The nimia diligentia is commonly too conspicuous, with whatever intention it may be dictated. There can be no question as to the impropriety of preventing the lower bowels from experiencing that state of healthy distention necessary to antagonise the contractions of their circular fibres. All hollow canals contract inordinately, even to the extent of obliteration, when they are deprived of the natural antagonism produced by their contents. I have generally found, that persons who were subject to stricture of the rectum, had been, for a long period previously, in the habit of taking purgatives, which kept the lower bowels almost constantly in an empty and irritated state. At an early stage of the complaint, more benefit will arise from the use of such means as will remove inflammatory irritation, and allow the fæces to become the natural and daily dilator of the incipient constriction, than from those measures which are commonly recommended, and often too officiously employed. Nevertheless those measures are frequently requisite, and are often successful in experienced and cautious hands.

104. In early stages of the complaint, after prescribing the treatment advised for the chronic states of proctitis (§ 38.), an evacuation from the bowels should be obtained every day, or every other day, by mild aperients taken by the mouth, or by enemata. The laxatives which I have preferred in these cases have been castor oil, olive oil, manna, magnesia with sulphur, the confection of senna, the bitartrate of potash with bi-borate of soda, or the compound infusions of senna and gentian. The injections should not be too frequently administered unless the obstruction be such as to occasion dangerous fæcal accumulation above the stricture, and they ought to

consist chiefly of emollients and laxatives, as soap with olive oil, the bi-borate of soda in the decoction of marsh-mallows, and similar relaxing and soothing substances.

105. When it is determined upon to have recourse to instruments for the removal of contraction of the rectum, the fact should not be overlooked, that these contractions generally result from chronic inflammation, and that the change thus produced, unless it has gone on to fibro-cartilaginous induration, disposes the part to laceration when even a slight dilating force is used; the sound adjoining parts readily yielding, whilst the contracted parts are as readily torn. Nor should it be forgotten that there is an intimate consent between the mucous canals of the pelvis and the peritoneum, injury of the former, especially mechanical injury, not infrequently exciting peritonitis, although the violence is sustained at a part of those canals which are not covered by peritoneum. A recourse, therefore, to bougies and other mechanical means of dilatation should be had with caution. As to this topic, and as to recourse to division of the stricture, I must refer the reader to the surgical authorities contained in the *Bibliography*.

106. X. INVAGINATION OF A PORTION OF THE UPPER PART OF THE RECTUM, WITH OR WITHOUT CONTRACTION, occurs in rare instances.—*a.* When stricture takes place at, or near to the junction of the rectum and sigmoid flexure of the colon, the pressure above may carry the obstructed part down into the relaxed and dilated portion below, and thus produce either an incomplete, or a complete invagination, although the stricture of the invaginated part be very slight. When the rectum is much dilated, or is in that relaxed or paralysed state described above (§§ 12. *et seq.*), the upper part, or a portion of the sigmoid flexure of the colon, or both, may thus be forced downwards, or invaginated, even although no actual stricture of these parts exists. This state of disease has been noticed by Mr. CHEVALIER, Mr. EARLE, and Mr. MAYO. The last of these writers remarks, "that it originates in great laxity and dilatation, which is liable to be produced by frequent large accumulations of fæcal matters in the rectum." When the bowel is in this condition, the upper part of it is liable to be invaginated, or to form a prolapsus within the lower. The prolapsed part, whether consisting merely of a fold of the internal membranes, or of the whole parietes of the bowel, soon becomes inflamed, thickened or indurated, and the opening through it contracted; so that the symptoms and distress are thereby greatly aggravated.

107. *b.* The *symptoms* of this lesion are often ambiguous. But imperfect action of the bowels, frequent and ineffectual efforts to void the fæces, discharges of puriform mucus, and aching pain, weight, and tenesmus in the sacral region, are most commonly complained of. As there is generally a capacious sac below the invaginated or contracted part, fæces may accumulate there, the watery portion being absorbed, and the fæcal part thereby rendered more consistent. The stools may thus be discharged nearly of their natural quantity and appearance, and the nature of the complaint may hence not be ascertained, unless an examination by the finger or speculum be properly made.

108. *c.* The *treatment* consists of the exhibition
of gently aperient medicines; or rather of t
combination of tonics with aperients, as of t
compound infusions of gentian and senna; or
rhubarb and inspissated ox-gall; and of olea
nous enemata. In this, as well as in other aff
tions of the rectum, the decoction of *Achill*
millefolium may be taken as follows, and m
even be administered as an enema, omitting t
tinctures and salts: —

No. 330. ℞ Achilleæ millefolii, ℥ij; Aquæ, ℥x
Coque per partem horæ quartam, et cola. Liq
colati adde Bitart. Potassæ, ʒiij; Sodæ Bi-boratis,
Tinct. Aurantii et Tinct. Cardamom. co. āā, ℥ss.
Fiat Mist.: cujus capiat coch. iij. vel iv. ampla,
terve in die.

Subsequently astringent injections, especia
those with the terebinthinates or balsams, may
prescribed; and such mechanical means as
case may require be resorted to, more especia
properly adapted bougies or tubes.

109. XI. CANCER OF THE RECTUM. —*Scirr*
contracted rectum. — *Carcinoma of the rectum.*
A. Malignant disease may attack the rectum or
or both it and the anus, or it may commence in
affect chiefly the anus. Dr. BUSHE states, tha
presents chiefly the cartilaginous, lardaceous,
encephaloid forms. The cartilaginous degene
tion may commence either as hard tubercle on
mucous coat, or in the muscular tunics of
bowel, this latter being the most common.
muscular fibres become pale and firm, and
connecting cellular tissue undergoes a sim
process of condensation, without alteration
colour. As the morbid process goes on,
tissue often becomes lardaceous; and the wall
the bowel increase in thickness, and the cellular
muscular coats are sooner or later softened and c
founded each with the other. Sometimes the muc
tunic is studded with lardaceous and encephal
vegetations, while the serous coat presents ca
laginous tubercles. The lardaceous degene
tion is thus superadded to the cartilaginous,
the one may occur without the other; and
muscular and cellular coats may be lardace
while the mucous tunic throws out encepha
growths. The encephaloid degeneration is so
times primary, commencing in the cellular tis
or mucous coat, but more commonly it is co
quent upon the cartilaginous or lardaceous.

110. Any portion of the rectum may be
attacked, but the junction of the rectum with
sigmoid flexure of the colon, that immedia
above the pouch, and the anus, are the p
most commonly affected. Adjoining organs
also frequently involved in the disease, especi
the recto-vaginal septum, the os and cervix u
and the urinary bladder. The malady, instea
being seated in the rectum, may attack the co
either in or near the sigmoid flexure, or consi
ably above that part, or in some other portio
the bowel. It may even co-exist in the rec
with malignant disease in some other situation
in the stomach or pylorus. The physical char
in the parts are, according to Mr. MAYO,
traction, a peculiar induration of the pariete
the bowel, thickening, and ulceration of the
cous surface. The induration results from
scirrhous degeneration of the muscular and ce
lar coats, the diseased parts assuming diffe
appearances, according to the quantity and
racter of the morbid formation. In one vari
"the thickening is inconsiderable, but the mu

brane is abraded, the muscular coat is hard, gristly, and the canal of the bowel is nar- d. The muscular fibre is partly converted partly contained in, firm, gristly, fibrous ance." This form of the disease does not ally extend to the anus, but commonly s from one inch to one inch and a half n this part, and occupies from four to five s of the bowel, terminating abruptly up- s, and more gradually towards the anus. her or fungoid variety is characterised by derable thickening, caused by a greater nt of scirrhous deposit than in the preced- The scirrhous stricture is grey, fibrous, not opaque, much looser, and more succulent ardaceous or fungous in parts, than in the r kind. Fungoid cancer, at its commence- , generally occupies a portion only of the mference of the bowel, and is felt as a hard ur situated about three inches within the gut, commonly upon its anterior surface, with the us membrane as yet unbroken. The morbid h extends in each direction, upwards to the e of the colon, and downwards so as to cate the anus, and to throw the anal integu- into hard knots. This form of the disease t which is most frequently found in parts of rge intestines above the rectum. In either the adipose tissue external to the rectum nes firmer and more crisp, as seen in the tissue around a cancerous mamma.

l. According to the view of this malady by M. CRUVEILHIER, cancer may com- e in any part of the rectum, and may assume orm of the cancerous degeneration, from the ous induration to the soft medullary fungus, cephaloid, or any, or even every form, may ended in the same case. In women, among it is most frequently seen, it is often a mere sion of cancer of the uterus, or rather of the a, the disease affecting the recto-vaginal n in such a manner as to render it difficult ermine in which canal it had commenced. ry rarely thus appears to commence simul- usly in the rectum and urinary bladder in M. CRUVEILHIER thinks that cancer of the n is mostly a local disease; but this is the only at its commencement, or at an early before the cancerous contamination of the and frame generally has taken place.

. *B. Symptoms.* — Malignant stricture of the n is more frequently met with than the thickening and induration already noticed . *et seq.*). Whatever may be its particular cters, — whether scirrhous, sarcomatous, lar- us, fungoid, or encephaloid, — it encroaches and narrows the canal of the rectum, so as or less to obstruct fæcal evacuation, and oc- great and constant distress. The patient ains of a dull, fixed, or aching pain at the part of the sacrum, with severe shootings, rp exacerbations, extending down the limbs, iolent tenesmus, and a sense of weight or g down in the part, especially after evacu- , or whatever may cause irritation of the Bloody purulent matter, or a puriform , is passed with the stools, which are thin equent. In the fungoid variety, discharges od may be large and often. Mr. SYME ks, that though in the early stage difficulty e experienced in passing the fæces, owing to the thickening of the coats of the gut, yet there is for the most part ultimately rather an inability of retention, from the action of the sphincter being impeded by the progress of the disease.

113. At an advanced stage, the countenance and general surface display more or less of the appearance of malignant cachexia, or a sallow, leaden, or greenish-yellow hue; and flesh and strength are lost; the blood also becoming deficient. On examination per anum, the bowel is found contracted, thickened, and irregular on the surface. The affected parietes are hard and unyielding, and morbid growths are felt projecting into the cavity; in some places in the form of rounded tubercles, in others with rough or ulcerated depressions. These changes may not feel very different to the touch from those which attend simple stricture, excepting in their greater degree; and hence more reliance is to be placed upon the symptoms indicative of malignancy, than upon the sensations furnished by the examination. The acute, lancinating, and paroxysmal pains, extending to the loins, pubis, and thighs; the sense of weight, aching, and numbness in the sacrum, loins, hips, &c.; the aggravation of these upon standing or walking; the irritability of the bladder, or incontinence or retention of urine; the more frequent and larger discharges of blood than in simple stricture; the bearing down sensation, especially in females; and the general cachexia and anæmia, as the disease advances, sufficiently indicate the malignant nature of the malady. Ultimately hectic, exhaustion, abdominal tenderness, hiccup, vomiting, &c., usher in dissolution.

114. *C. Causes.* — This disease may occur at almost every age. Mr. MAYO has seen it as early as twelve years of age. It is most frequently met with between the ages of thirty and sixty. The encephaloid is the variety which is met with early in life; the scirrhous and lardaceous at more advanced periods. Women are certainly more subject to the malady than males, and more especially after the cessation of menstruation. Some local injury, as a blow on or near the part, has sometimes appeared to excite the disease; but generally the particular cause has not been recognised; and it is not improbable, that the tendency to the complaint has arisen out of a constitutional vice or tendency.

115. *D.* The *treatment* of this malady is very unsatisfactory. But, although it admits not of cure, unless in those rare cases in which the anus only is affected, and even in these most rarely, and at an early stage, much may be done in palliating the symptoms, and even in prolonging life. The encephaloid or fungoid variety generally runs a rapid course, especially when it is attended by frequent discharges of blood; whilst the more cartilaginous, scirrhous, or lardaceous form may last for years. Diluent, emollient, and anodyne injections are generally requisite in this state of disease, in conjunction with those means, internal and constitutional, which I have advised for cancer in other parts. (See art. CANCER, § 29. *et seq.*) Sir B. BRODIE recommends opiate injections, and injections of linseed oil, either in a pure state or conjoined with limewater, with the view of allaying irritation; he gives alkalies internally, with balsam of copaiba; and he very justly considers the preparations of opium to be indispensable, notwithstanding the inconveniences attending the

use of them. Suppositories of conium or of henbane, or of both conjoined, or of opium with camphor, Peruvian balsam, or zinc ointment; mucilaginous injections, containing the chloride of zinc or creasote, with the solution of opium or syrup of poppies; and such laxative, emollient, and anodyne enemata as the state of the case may suggest, especially those with warm olive oil, with small quantities of camphor or balsam, will generally afford considerable relief. According to Mr. Calvert, much benefit is derived from "carefully introducing a hollow tube of elastic gum, through which the fæces are drawn off by injecting tepid water."

116. Of internal remedies, I can add nothing to those recommended for cancer in another place. (See art. Cancer, §§ 29. *et seq.*) The preparations of *iron* with narcotics, especially the mistura ferri comp., with liquor potassæ, tinctura conii, or tinctura opii, or tinctura camphoræ comp.; or the iodide of iron in syrup of sarza; or the pilula ferri composita with the pilula saponis cum opio, may be prescribed and varied according to circumstances. As to resorting to excision of the part when the disease is limited to the anus or lower portion of the rectum, the determination should depend upon the peculiarities and complications of the case. This subject is well discussed in the surgical works referred to, and in Mr. Cooper's Surgical Dictionary. — (*For other diseases connected with the rectum and anus, see articles* Digestive Canal, Intestines, Hæmorrhoids, Hæmorrhage *from the Bowels, and* Dysentery.)

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RHEUMATISM.

— Synon. — Ῥευμάτισμο
defluxion — from ῥευματίζω, to be affected
fluxion, from ῥεῦμα, a fluxion, and that f
ῥέω, I flow; — *Rheumatismus*, Pliny, Sydenh
Vogel, Juncker, Sauvages, Cullen, Pinel
Dolores Rheumatici, Hoffmann; — *Myo*
Sagar; — *Myitis*, Chrichton; — *Arthrody*
Cullen; — *Febris Rheumatica*, Auctor. Var.
Arthritis Rheumatica, Swediaur; — *A. Rheu*
tismus, Parr.; — *Cauma rheumatismus*, You
Arthrosia Acuta et Chronica, M. Good
Gliederfluss, flusskrankheit, Germ.; — *Rhu*
tisme, Fr.; — *Reumatismo*, Ital.; — *Rheumat*
Rheumatic fever, Rheumatic pains.

Classif. — *Class* 1st., Febrile diseases
Order 2d., Inflammations with fever (
len). — *Class* 3d., Diseases of the san
neous function; — *Order* 2d., Inflam
tions (M. Good); — III. Class; —
Order (*Author in Preface*).

1. Definit. — *Severe pains preventing, or*
markably aggravated by, motion of the affe
parts; apparently seated in the fibrous structu
chiefly of the large joints, the aponeurotic ex

and the fibro-serous surfaces; arising from ul or manifest causes, and assuming various and complications — being sometimes remark- icute, febrile, or inflammatory, and shifting tuations, often sub-acute, and oftener still less non-febrile, unattended by heat or swelling, onic duration, and accompanied with debility ness of the affected limb.

2. Although rheumatism is, owing to geogra- and social circumstances, one of the most ent diseases in the British Isles, yet is it specting the nature and treatment of which exist the greatest diversity of opinion, and st amount of undisputed knowledge. The able prevalence of the malady, this di- of doctrine, and the several very important ogical relations suggested to the thinking ian by every manifestation of rheumatic on, are sufficient to direct investigation to oject with greater energy than has hitherto estowed on it, and with more success than herto signalised it.

3. Rheumatism was not described, or even as a recognised malady, by the ancients, by this term, or by any other, to which the lage of symptoms thus denominated can be Yet the word is sometimes found in their s, although it does not altogether represent order to which the moderns have applied name having been given by the former ctions, to which they attached the idea humoral defluxion, conformably with its ion, especially to those characterised by s or pituitous discharges.* One of the writers amongst the moderns, who em- this term according to its modern accepta- eated of the subject in connection with , an affection to which rheumatism is closely and with which it is often complicated. VIGIER, *Tract. de Catarrho Rheumatismo,* eneva, 1620. In HALLER's *Biblioth. Méd.* t. ii. p. 376.) SYDENHAM, however, was t to treat fully of rheumatism, and to dis- it from gout, with which it had been tly, if not generally, confounded by former under the name of *Arthritis.* Subsequently AAVE, HOFFMANN, and JUNCKER, described ease with tolerable accuracy; but it was il the end of the last, and the commence- the present, century that the various me- and pathological relations of rheumatic as received even a partial notice.

4. DESCRIPTION.—Various *forms* of rheuma- ve been described by authors, or rather se- ates of disorder, more or less intimately al- each other, have been ranked as varieties of ease, although certain of them might have aced, with greater propriety, under a dif- category, — thus the pains in a limb or caused by organic disease of the nervous centres, and the sympathetic pain produced by hepatic congestion, &c., have been often mistaken for rheumatism, and described and treated as such. Since, or at least soon after, the first notice of rheumatism as a distinct disease, two remarkable forms of it have been admitted, — the *acute* and *chronic*. Recent observation has recognised the varieties of the complaint and the pathological distinction between certain of its states, with greater accuracy; but there has been a greater disposition also among observers to multiply distinctions than to point out alliances, and pathological relations. The *division* most generally adopted of the forms of rheumatism has been that founded upon the severity and duration of the attack. It is almost identical with the foregoing, the term *sub-acute* being employed to mark intermediate states of severity. If the division into *acute, sub-acute,* and *chronic* be not arbitrary, it is at least conventional; but it has this recommendation, that it is simple, and involves not theoretical or pathological doctrines, nor necessarily suggests ideas as to the seat and extent of morbid changes, which vary remarkably in their associations and concomitants, in different cases, and even in the same case at different periods.

5. More recently, a pathological division has been attempted, in which distinctions are based on conditions that are contingent, varying, and uncertain; and qualitative or adjective terms have been applied as distinctive of varieties, derived from the names of the tissues, which are assumed to be the seats of the particular forms of the malady; thus we have had rheumatism denominated *capsular, muscular, periosteal, neuralgic,* &c., the meaning implied being that the capsules of the joints, the muscles, the periosteum, &c. are the seat of disease in each of these varieties which are respectively thus designated — an assumption at the best, and requiring proof even as respects the partial affection of these tissues, as will appear in the sequel. Instead, however, of adopting a division which is more specious than real, I shall take the one already very generally employed, and which is the most convenient for practical purposes, namely, the *acute,* the *sub-acute,* and the *chronic forms of rheumatism.*

6. i. ACUTE RHEUMATISM. — *Febrile Rheumatism. — Rheumatic Fever. — Inflammatory Rheumatism.* — This form of the disease is generally ushered in with rigors, or shiverings, or chilliness, followed by increased heat, and the usual febrile symptoms of an apparently inflammatory or sthenic character. Co-ordinately, and often contemporaneously, with chills or rigors, severe pains, impeding or altogether preventing motion, are felt in the limbs, affecting chiefly the joints or aponeurotic expansions, or tendinous sheaths, and sometimes extending in the course of the muscles, &c. As febrile reaction is established, the tongue becomes furred or loaded; thirst urgent; the pulse quick, open, bounding, and full; the bowels confined; the skin hot, at first dry, but afterwards perspiring freely; the urine scanty, high-coloured, depositing no sediment, and very acid; the appetite impaired; and sleep prevented by the aggravation of the pain, during the nocturnal exacerbation of fever. The seat and character of the pain vary in different cases; and even in the same case in different periods. Generally, at first, the pain is confined to the large joints, as the knees, ankles, elbows, shoulders; or to the

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[*] " HIPPOCRATEM, GALENUM, ARETÆUM, PAU- ÆGINETAM Græcos, sive CELSUM, AURELIANUM- iptores Romanos accuratè evolveris, quod hunc indubitatè designat, nihil dilucidè enodatèque um invenies. PLINIUS (l. xxii. 47. 68., l. xxv. quidem Rheumatismum nominavit, morbum eo non omninò attigit. Sunt tamen apud eos loci, en invalitudinem quasi obiter indicant, quippe ρετον κοπωδεα et διαθεσιν ρευματικην, et alia hu- di nomina indidant. Quæ res quidem, hunce antiquioribus nec prorsùs ignotum fuisse, nec m frequenter, quàm hodie, ob oculos venisse, anè demonstrat." — (*J. Copland,* De Rheuma- 8vo. Edin. 1815.)

aponeurotic expansions covering the large muscles; or it extends to both the joints and these expansions, attacking them either simultaneously or in quick succession. Less frequently parts of the trunk of the body, as well as one or more limbs, are so severely affected as to render the patient helpless and almost motionless. The pain, according to its situation, is most acute, severe, plunging, tearing, burning, gnawing, girding, tense, or lancinating; it is more or less constant, but exacerbated at intervals, and during the night, and by the slightest movements of the affected parts, or even by touching or pressing them, so that the pressure of the bed-clothes is hardly endured. When the joints are chiefly affected, the acute pain is often followed by increased heat, and after a time sometimes by an erythematic blush of inflammation, but more generally by swelling, rendering the joint fuller, rounder, and more manifestly swollen. The swelling is owing either to serous effusion and capillary fulness of the cellular tissue external to the fibro-serous tissues of the joint—the chief cause of it in acute rheumatism; or more rarely to serous effusion within the cavity of the joint, which more frequently occurs in the sub-acute form of the complaint. Neither the redness nor the swelling is followed by suppuration, unless in cachectic or scrofulous habits of body; and even in those, not until erosion or ulceration of the cartilages of the affected joint takes place,—an event most probably produced by changes in the fluid effused into the cavity, during low grades of vital power or reaction.

7. In acute rheumatism, the fever is sthenic or inflammatory, more in appearance than in reality, and generally presents the usual concomitants of this fever, with remarkable severity of pain, which is always disposed to shift its place; this disposition even being the greatest, or occurring most frequently, when the exacerbation is the most severe. All the febrile symptoms, and even the pain itself, manifest more or less of a *remittent* character. This circumstance is of importance as respects both the nature and the treatment of the malady. The pulse is excited, broad, open, bounding, compressible, and sometimes full; varying commonly from 84 to 100 during the day; but rising generally to 96 or even up to 112 during the night. In some cases, slight chills usher in the evening exacerbation of fever; and occasionally the symptoms are more severe on alternate days, especially in some localities. The veins are generally full, and blood taken from them furnishes a firm coagulum covered by a firm, thick, buffy coat, which by its contraction from the circumference renders the upper surface of the coagulum more or less cupped. This state of the blood continues, notwithstanding the frequent repetition of bloodletting, the coagulum becoming smaller in relation to the amount of serum. (See §§ 60. *et seq.*)

8. The secretions are all impaired or changed at the commencement. The tongue is either loaded or furred, or both; the mouth is clammy and dry; and thirst is generally experienced and increased during the night. The bowels are confined, unless fæcal accumulations have formed from neglect, when they may become loose from the irritation thus produced. The urine continues scanty and high-coloured until the febrile action begins to subside, when it deposits a copious sediment, of a brownish-red colour, resembling brick-dust. he skin is dry at first; and generally continue ry during the day and early part of the night but as the nightly exacerbation of pain remits to rds morning, the skin becomes moist, and a p use perspiration breaks out; but without any re rkable or permanent alleviation of the pain. he perspiration is generally unctuous, emitt a peculiar acid odour; and continues profuse r a considerable time, especially if the pati is placed between blankets, or partakes free of warm diluents. In this case, the perspiratio ay throw out a miliary eruption on the skin.

9. These symptoms, if not affected by erturbating treatment, or if no internal met asis occur, generally continue about fourteen da or even longer; when some mitigation of the intensity occurs. Although the pains have sub ed, still the patient feels them when he moves t affected parts; and they generally return, bu n a less severe form than before, during the night he parts affected, even when the pain has disapp ed, continue very weak, and the patient is indi sed to use them, from a feeling of inability to ert them. The frequency of the pulse and the her symptoms subside: the urine is more abu ant, paler, and more turbid on cooling, and dep its a sediment; but the perspiration often still co ues unctuous and offensive, and more or less p use. If the fæcal evacuations and biliary sec ons now become copious and natural, the urine ore abundant, less acid, the sediment more co ous, and the sweats more free, less unctuous, an ave less of an acid and offensive odour, the tly exacerbations being more slight, or near disappearing, the disease subsides favourabl and debility chiefly characterises convalescence; hich is the more rapid and the less likely to be fo wed by the sub-acute or chronic states of the d ase, or by relapse, the more fully the several sec ons are restored; the cleaner and more natu the tongue, and the more completely the prima and secondary assimilating functions are disch ged. If, on the contrary, the amendment stops ha way —if it be arrested, the tongue continuing l ded, or furred; the urine acid or scanty, or uch loaded; the perspiration offensive, enfeebli and unsatisfactory; and the pulse still freque this state of the disease will generally pass in the *sub-acute* or *chronic*, or into both in succ ion, and in either these forms continue an ind nite period.*

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* The following description is more minute respects certain points, than the above:—

"Hicce morbus ab horroribus plerumque se que lassitudinis; interdum et a frigore incipit. . . . ntequam febris, aut ulla ejus indicia accesserint, roto plerumque per triduum quadriduumve, loca ce aliquantum dolent. Indicia tamen febris unum aut rum diem dolores constantes nonnunquam præveniun Dolor, qui alios alio pacto, nec eundem eâdem ione semper occupat, febre ingravescente excruciat. rtes tamen quibus nervi, vi movendi e voluntate præ suffunduntur, et cœli mutationibus objectas, poti ium infestat. Quapropter membrorum superioru inferiorumque, ut et dorsi et cervicis musculi arti que, maximè Rheumatismo laborant. . . . . . iculi majores plerumque dolent: dolor aliàs unum et um, aliàs plures quoque angit; nec in articulos solùm rum etiam in musculos aponeurosesque tendinosas ie sum exercet: movendo adaugetur: et partis dolentis litas sentitur. In hoc morbo dolor nunquam const nisi ubi nulla neu minima quidem febris calore tata adsit: nec eo tempore nisi quendam certum lo obtinet. Veruntamen, ut notæ febris augentur, illuc ex alio in alium per musculos locum transiliunt rea

ii. Sub-acute Rheumatism. — *Rheu-ius sub-acutus,* — *Semi-acute rheumatism, natismus semi-acutus,* Fowler. — This va- of the disease may be merely a sequence of ute; or it may occur primarily. In either it is a state of disease intermediate, as re- severity, duration, &c., between the acute bronic, the term sub-acute being used con- nally to mark the grades or phases between ore extreme forms of the complaint. When b-acute state appears primarily, it is very ushered in by either chills or rigors; nor is nded by well-marked fever, unless at night, more or less, often only a slight degree of fe- l heat of skin are experienced, generally com- ng in the evening and going off with perspi- in the morning; and during this febrile , the pains are generally most severe. The are felt in either the extremities, the trunk, d, — most frequently at first in one limb, en in another, or in two or more joints of ne limb; as the knee and the ankle, or the and wrist; more rarely both knees, or both , or elbows. In some instances the pain om one joint to another, affecting different ations, or aponeurotic expansions, in quick sion, as at an early stage of acute rheu- ; but in other cases it is stationary for ime, either in the joint or the limb, or the the trunk in which it is either at first or fterwards seated.

This form of the disease, although differing the acute, chiefly in the mildness of the oms generally, is not altogether without During the evening and night, the pulse lly rises from 70 to 80 or 90 beats, becom- so fuller and broader, and the heat of skin eased. During the night, thirst is often ined of, and the mouth is somewhat dry ammy. The tongue is white, or loaded, ed. The alvine excretions are scanty and morbid; the urine is scanty, dense, high-coloured, very acid, and deposits a pink or brick-dust sediment. When the patient falls asleep, or towards morning, the skin becomes covered with a warm unctuous perspiration; and he is remarkably susceptible at all times of cold, even when he is hot in bed; and if he be at all exposed to currents of air, the pain often is aggravated, or it shifts its seat, or the joints become more stiff and painful. Although the bowels may not be remarkably costive, the biliary secretion is seldom healthy, the liver evincing more or less torpor, with retention of the secretion in the ducts and gall-bladder. The appetite is somewhat impaired; and digestion slow or difficult, and attended by flatulence. Even when the patient is able to move about during the day, the aggravation of the pain, and the presence of fever, during the night, may be such as to deprive him of sleep, or to allow him only broken slumbers, especially towards morning, for a long or indefinite time — generally for a period prolonged beyond that of acute rheumatism, or for several weeks. At last, the disease is either subdued, or it lapses into the chronic, but it is rarely superseded by an acute attack.

12. Sub-acute rheumatism is seldom accompanied by redness of the affected part. More frequently there are heat and swelling; often swelling without marked heat of the part; and then the patient complains of stiffness, and even of coldness of the joint. It is not often that more than two parts are simultaneously affected with this form of the disease; and it is more fixed in a part than acute rheumatism; and is much less disposed to metastasis. It is often, however, remarkably obstinate; and seldom evinces any disposition to amendment until the excretions are improved and the tongue becomes clean. In this form of rheumatism, also, the blood taken from a vein is often more or less cupped or covered by a buffy coat.

13. The *sub-acute* is one of the most frequent forms in which rheumatism occurs in the *dark races*, whether in the eastern or in the western hemispheres, the disease rarely assuming in them the truly acute character. It is one of the most prevailing diseases among the natives of the various countries of the East, and among the native troops in the service of the East India Company. The symptoms and progress of this form of the complaint are the same in these races as they have been now described. Mr. Malcolmson, whose remarks on this disease as observed among the sepoys are very instructive, states, that "the pains are worse in bed; but whatever may be the case in Europe, it is not the heat of the bed-clothes that causes this, as they come on frequently when the sun gets low, and continue for the early part of the night." This remark confirms what has been stated above, that the exacerbations of the pain are intimately associated with the return or aggravation of the febrile symptoms; this connection admitting of a ready explanation when the *causes* of the disease come under consideration, especially those which are dependent upon locality and climate.

14. iii. Chronic Rheumatism.—*Rheumatismus Chronicus; R. Diuturnus; R. Longus*, Author. — This form of the disease may follow either the *acute* or the *sub-acute*, these gradually lapsing into the chronic state; or this last state may be the primary disease, proceeding directly from the

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x alio appetentes, et unde exorti, eodem recepti ium figunt suum.

ris ejusque habitus huncce morbum comitans, sub m ingravescit; dolor per noctem penè opprimit, men tempore sedem mutare assolet. Nec verò emper nec pyrexia se invicem ex æquo subse- r: signa enim febris, ut e plurimis exemplis nequaquam augeri videntur.

er ægrotandum sudores sæpè partes, rari quidem totum perfundunt corpus; nec sublevant angorem *σιν* proferunt; verum-enimverò dum cæterum multo perfunditur sudore, pars, quæ dolet, merò siccescit; sæpè tamen inter morbi disces- , articulus discruciatus sudoribus plurimis suf- r. Postquam dolor aliquamdiu duraverit, pars s parùm sincera tumescere, nec ita multò post, ere incipit. Plurimum tamen tumoris sub specie tosa sine ullo rubore, frequenter adest. Partes, Rheumatismus acutus imperium exercet, semper tactionemque refugiunt. Inflammatio tumorem, memini, subsecuta, haud exiguam doloris par- pè submovet. Sub hac forma statuque, hicce s in circiter decimum quartum diem durat: nec a desunt, in quibus modò in alteras aut etiam ampliùs extenditur, modò plures nundinas su-

rminatio. — De illa Rheumatismi acuti forma, licissimè decedit, nihil est, cur multùm more- autem observandum est febris indicia, plerumque em decimum quartum sensim decrescere: do- ipsum obtusiorem et constantiorem factum mordere: unum et alterum articulum tantum- afficere, et paucis post diebus ex toto quiescere: cto Rheumatismum nonnunquam, sæpè febrem desinere. Dolorem, nullâ medicorum ope adhi- riùs abire: in uno et altero etiam exemplo do- febremque sub idem tempus inveniri desinere; autem febris signa longè frequentiùs subsequi." *Copland*, De Rheumatismo, pp. 7—9.)

causes usually producing either of the forms of the complaint already described. I have remarked that the term sub-acute is merely conventional, and is intended to convey the idea of some intermediate state between the acute and chronic: hence, whilst it may be difficult to distinguish between the acute and sub-acute conditions, in many cases of the disease, it may be equally difficult to distinguish many instances of the chronic from the sub-acute. There cannot, owing to the nature of morbid actions, in relation to peculiarities of constitution, be any line of demarcation drawn between either. If it were possible to Daguerreotype disease, the likenesses even of the same malady taken in the numerous cases and phases in which we observe it, would hardly furnish two or three of them quite alike, however numerous might be the portraits obtained. How strenuous soever may be our endeavours to state the truth — to describe with accuracy phenomena which vary not only in different cases, but even also in the same case at different periods — we can only approach to the truth; and, even to make a tolerable approach, numerous circumstances, states, changes, and things must be mentioned, which, to the superficial and unthinking, may appear unnecessary or irrelevant. The terms *acute*, *sub-acute*, and *chronic*, in relation to rheumatism, must not be viewed as marking either *dynamic conditions*, or *peculiarity and limitation of seat*, or *duration of disorder*, local or constitutional, or certain *qualifying properties;* but these collectively, in connection also with *grades of severity*, between which grades, thus associated, and otherwise *variously complicated and characterised*, no line of demarcation can be drawn, however minute and conventional may be the subdivision; each state, condition, variety, or form insensibly passing into that which is the nearest to it in the scale of morbid action or structural change.

15. *A.* When chronic rheumatism *succeeds to the acute or sub-acute*, the febrile symptoms attending these forms have subsided, and with them the severity of the pain. The secretions and excretions, especially the alvine, have, however, not returned to a natural or healthy state; and the tongue and mouth are generally dry and clammy in the morning, the former being also more or less loaded. The pains[*] in the limb or joint assume more of an aching, gnawing or boring character; and sometimes, instead of b g aggravated at night, as is most frequently the e, they are often relieved by the warmth of d. They are commonly now more fixed and n- tinued, or less remittent; but much less se e, and are most frequently experienced in the sh l- der, elbow, knee, and ankle; in the occipit or cervical region, in the lumbar or dorsal re n, and in the ischio-gluteal region; in the wr s; and in various other parts, according as they y have been most affected previously, or exp d to external causes. Frequently, however, he pain remits in the morning or during the day nd returns with evening or night; but this in e measure depends upon the causes or circ n- stances of the case. If the part had previ ly been the seat of increased heat, redness, or s l- ing, these, especially heat and redness, ve entirely disappeared before the chronic state d supervened, although slight swelling may ill remain. As the disease continues, the generally abate, or intermit; exacerbation or returns of them occurring frequently from s- situdes of temperature, weather, or slight x- posures. The parts, however, still remai or some time stiff or weak, especially if the b ry and intestinal secretions be scanty or disorde

16. *B.* When chronic rheumatism ap rs *primarily*, and often also after acute or sub- te attacks, there is neither redness, nor incr ed heat, nor swelling of the affected part; some es there is even greater coldness than natural. he pain is dull, aching, or gnawing; often but s it, generally increased on motion, and attended a feeling of weakness of the part. Frequentl is described as gnawing, boring, or merely a e- ness, seated deeply, and affecting the bones. is often remittent or intermittent; but it is often so continued, or almost constant, for a time. en it presents the former states, it is generally ti- gated or removed by the warmth of bed, espe ly in the morning, and by a free perspiration. In some instances the pain is slight, rarely be n- ing severe; but although slight, it is atte ed by pain on motion, or a feeling of weakne or inability of motion, when first attempted; nd yet, when the attempt is made energetically nd continued so as to accelerate the circulatio nd promote a free perspiration, the pain is rel ed or altogether removed for a time. When ch nic rheumatism is thus primary, it is generally a vi- ated by pressure and by warmth; and it ost frequently attacks, unless in cases where cu nts of cold air, or other causes, have acted di tly on the affected parts, those joints or places ch had previously been the seats of dislocation, n- tusions, or other serious injuries.

17. *C. Chronic Rheumatism of Joints* — o- *nic Rheumatic Arthritis* — *Chronic Rheu* tic *Gout.* — *Arthrodynia*, CULLEN. — *Rheumati* o- *dosities of the Joints*, HAYGARTH. — The ses of rheumatism, when acting chiefly upon a int

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[*] “Dolor obtusè angit: movendo exardet: articuli ipsi obtusam et perpetuam molestiam sentiunt: frigent; neque cætero corpore sudoribus diffluente, sudant; sin sudent, sudoribus frigidis et tenacibus perfunduntur. Verùm in eodem loco dolor plerumque constat, frigore multùm adauctus, calore vel tepore quoque imminutus; præsertim si lecto æger recumbat. Rheumatismus longus premendo levatur, degravatur acutus.

“Longus plerumque maximos corporis articulos, humeros scilicet et coxas, nec dorsum rarò invadit: Quum his in corporis partibus aliquamdiu permansisset, in alias transiit. Pars, quæ doluerit, morbo amoto, imbecilla et rigida perdiu manebit, et in superiorem dolorem, cœli si intemperies quidquam moveatur, facilè incidet. Rheumatismus etiam longus, statas remissiones si excipias, aliquot menses, vel annos, immo et maximam vitæ partem, hoc pacto excruciabit.

“Partes dislocationibus, luxationibus et contusionibus anteà laborantes, vel prioribus ægrotationibus debilitatas, partibus anteà integris prætermissis, infirmare solet. Rheumatismus dorsi coxæque musculos aggressus, ne amoveatur, multùm renititur, et tunc quidem sexum masculinum quàm muliebre sæpiùs aggreditur.

“Dici non potest ut longus in acutum permutetur. Quidam, qui istuc sæpiùs inciderint, ibique diu laboraverint, ad articuli hydropem sæpè perveniunt. Manifesta quidem res est, membri imbecilitatem affecti, et remissionem exhalentium quæ in ligamenta capsularia ferant, necessariam inde exortam eam excitare. dy- *drarthrum* quoque in scrofulosorum articulis epè gignit. Rheumatismus prælongus prægravisqu ti- culi ἀγχυλωσιν nonnunquam afficit.

“In sectis horum cadaveribus, qui diu sæpiùsq oc morbo laboraverint, quique eodem (qui quidem pe ucl sunt) obierint, articulorum membranæ crassesc et adhærescunt; quasi glutinamentum tendinum cis infunditur.” —(*Op. cit.* pp. 10—13.)

r tremity, often occasion a chronic state of he sease remarkable for its obstinacy, and of- en rious as respects the consequences. After xp ure to cold and humidity, or to currents f d, humid, and miasmatous air, a joint, es- ec ly the knee-joint, the ankle, the hip-joint, lb , or shoulder, is attacked by a sense of na ng, aching, of soreness, fulness, stiffness, nd n incapacity of moving without acute pain, r increase of these feelings. The complaint en lly continues for weeks, and, if neglected ur this time, often for months, either without lle tion, or becoming much worse; the patient lti tely being unable to extend the affected m at least without extreme pain. The sore- es stiffness, and pain generally extend from ie nt, along the fibrous structures, to a greater r l extent, the limb thus becoming the seat of ev pain. This form of rheumatism may con- inu or months, and at last give rise to disease of ie rtilages of the joint, and its usual conse- ue es. One of these is absorption of the car- la , and the deposit of a smooth, ivory-like ub nce. Dr. Craigie observes, that although his rm of the disease commences in the apo- eu ic expansions, it is disposed to pass from hes to the periosteum, and to produce chronic 1o d action both in it and in the interior of the rti ations. This action occasions the removal f t synovial membrane and cartilages, and de- osi in their place a porcelain-like substance, oli ed, but devoid of the elasticity of cartilage nd secreting power.

1 This is one of the most common forms of be eumatic disease. It has been most ably rea l of by Dr. Todd. Mr. Adams has deno- in ed this affection "*Chronic Rheumatic Ar- hri*," and has given a minute description of he sions produced by it. Dr. Colles, Mr. Vi ot, Mr. Cusack, Mr. R. Smith, and M. Cr eilhier have also devoted much attention t s very important form of chronic rheuma- sm Dr. Todd justly remarks, that this affection f t joints, even when most severe, rarely causes nn liate destruction of the articular textures: up ration or ulceration seldom occurs; and he they do, he thinks that they proceed from v us inflammation coming on in the course of ie sease. The joints, however, do not always sc without serious change; for not only may ie sease run on, uninfluenced by any mode of ea ent, but exertions of the limb, and the pain- l e of the affected joint, may induce inflam- at n in its usual form, if it had not even pre- io y existed, and all the effects which commonly ll it.

1 The immediate effects of the rheumatic om aint are commonly confined to the ligament f joints, to the periosteum of the articular nd of the bones, and to the tendons of the u es inserted into them; but these effects om imes extend to the fibrous fasciæ. These ex es, as Dr. Todd very correctly observes, ec e thickened, lose more or less of their at l flexibility, and I may add that they are m red in their tonicity and vital cohesion. Th are also more opaque. The synovial mem- ra s are also thickened, evidently by an effusion f nph in the synovial areolar tissue. In some as the affection of the joints is followed by ffu n of fluid into the synovial cavities; the pain being aggravated by pressure, but more by motion. If the effusion be moderate, it may alleviate the pain; if it be very great, the pain is chiefly the result of distension, but is then rarely so severe as previously to the effusion. This affection is most common and most marked in the knee-joints; but although it sometimes is seated in both knees simultaneously, it is rarely equally severe in both. Dr. Todd very justly observes that these changes are seldom the result of a single paroxysm, but generally ensue from frequent attacks, or upon the long continuance of the rheumatic diathesis. In these respects, the analogy with gout he considers obvious. "And, although we have no evidence of such deposits in rheumatism as the chalk-stones of gout, there are abundant indications that rheumatic matter cannot be attracted to the joints in any quantity, or with frequency, without impairing to a material extent the nutrition of their textures." (p. 164.) Without, however, disputing at this place the existence of a "rheumatic matter," the alternative of a modified vital action — a morbid or altered condition of organic nervous influence and sensibility, and a consequent change of vascular action and of nutrition — ought not to be left entirely out of view.

20. The change of the articular cartilage, which I have briefly noticed above, is very fully described by Dr. Todd, who states that it consists of a process of absorption, taking place slowly, during the commencement of which this tissue appears to divide into a number of fibres, vertical to the surface of the bone. This change resembles that produced by long maceration of articular cartilages; and depressions or grooves may be seen which gradually enlarge, unite, and leave portions of the bone uncovered. As the articular surfaces of the bones are thus deprived of their cartilaginous coverings, the pressure and friction sustained by them cause them to assume a smooth and polished surface and appearance, resembling that of very dense polished ivory. Whilst the absorption of the cartilage, and the consequent change in the articular surface of the bones are proceeding, the bones themselves near the affected joint become enlarged, chiefly by an exuberant ossific deposit around and near to the articular extremity, causing both some deformity and a mechanical obstacle to the movements of the joint. These osseous deposits are seen irregularly about the joint, and vary in shape and size. The alterations in the synovial membrane are also remarkable. This membrane is thickened and prolonged at various points into fringes or villous processes, which are soft, and of a red colour, and dip into and completely occupy depressions around the neck of the bone. Small cartilaginous bodies, of an irregular shape and size, are sometimes found in rheumatic joints. They are either loose in the cavity of the joint, or attacked by pedicles formed by the synovial membrane to the inner surface of the ligaments, or to the articular surfaces. These changes cannot, I conceive, be ascribed to inflammation, but rather to a morbid nutrition, consequent upon altered organic nervous sensibility and influence in the joint, and upon the morbid state of the synovial secretion.

21. This disease of the joints, generally consequent upon prolonged and repeated attacks of

chronic rheumatism, is most prominently manifested in the hip joint; and, as occurring in this situation, it has been described by **Sandifort**, **Boyer**, **B. Bell**, and, more recently, by Mr. **Adams**, Mr. **R. Smith**, Mr. **Canton**, and Dr. **Todd**; but, as the last-named writer remarks, this disease does not spare any of the joints. It affects all the large joints; and it has been met with in the hands and feet; in the temporo-maxillary joints, and in some of the vertebral articulations. It may show itself in early life, as well as at more advanced periods; but it is most common after thirty years of age, and amongst the labouring poor who are much exposed to vicissitudes of season and weather.

22. This form of the disease may affect several joints, but whether one or more joints, it is more rarely even remotely consequent upon acute or sub-acute rheumatism, than upon repeated attacks, or it has followed several returns of the more chronic affection. The painful symptoms characterising this form are aggravated at night, and by vicissitudes of weather, especially by easterly winds, by cold and humid states of the air, and by derangement of the biliary and digestive organs; and they often extend to adjoining parts.

23. When the *hip-joint* is the seat of this disease, both the acetabulum and the head of the femur become altered in shape, the former being deeper and wider than natural, the latter being flattened and expanded, and assuming a turnip-like shape, or being lengthened into the form of a cone. "Both surfaces are deprived of cartilage; the fatty body, which in health occupies the non-articular portion of the acetabulum, and the ligamentum teres disappear; and the eburnation is apparent to a greater or less extent over both articular surfaces. There is more or less of the exuberant osseous growths around both the acetabulum and the head of the femur; but the most remarkable feature is, that the neck of the femur is shortened, so that the position of its head with respect to its shaft is sometimes considerably altered. So remarkable is the change in the general shape of the upper extremity of the femur, that a bone thus altered has been not infrequently mistaken for an example of united fracture of the neck of the femur." (**Todd**, p. 174.)

24. In this disease of the hip-joint, the affected limb is much shorter than the other, and the patient appears lame. Sometimes he merely rests the toes on the ground; and if he comes down on the sole, he appears the more lame. The foot is wasted, as in fracture of the neck of the femur. As rotation is so painful as to be almost impossible, walking is attended with circumduction of the pelvis with the affected limb, the muscles of this limb being more or less wasted, and the nates of the same side flattened. The weight of the body on the affected joint occasions much pain in it; whilst the reclining posture affords ease. Mr. **Adams** states that this disease, when fully established in the hip-joint, rarely or never extends to the other articulations, and doubts its rheumatic origin in some instances. Dr. **Todd** remarks, that in some of the cases traces of rheumatism have not been apparent in the previous history; but that he has not himself met with a case in which complaint has not been made of pains of a rheumatic character in some of the other joints, alth h further signs of disease of the articular tex s were wanting. Mr. **Adams** admits that this s- ease may have a rheumatic origin; but that ls on the great trochanter often give rise to the st symptoms. This, however, is no proof o ne independence of the disease of the rheur ic diathesis; for the fall may be only the exc ng cause or determining agent of the local affec n. This form of rheumatism of the hip-joint at ks much more frequently the male than the fe le sex; whilst chronic rheumatism of the hands ost frequently affects females.

25. Chronic rheumatism of *the hands* en produces much deformity of them. All the nts are liable to be affected, and the fingers are ne- rally most deformed. "Besides the wearing ay of the cartilages, the ossific growths, an he ivory-like surfaces, the joints become disloc ed, and the fingers are drawn more or less out of eir natural position; they are generally drawn ci- bly over towards the ulnar side of the nd, overlapping each other, the innermost f ers being in a state of flexion." The extremit of the metacarpal bones are often much enl ed, and the carpus preternaturally convex i the dorsal aspect, owing to thickening or dist ion of the synovial bursæ. Both hands are ger lly affected, and sometimes also other joints. Dr. **Haygarth** states that the disease is almo pe- culiar to women, and commonly appears out the period of the cessation of the menses. Out of thirty-three women in whom he observ it, only three had it during the period of r lar menstruation. It first appeared, in most the cases, between the ages of fifty-one and sixt he observed it only in one man. (See *Op.* on *Nodosity of the Joints*, p. 152.) I have, ho er, seen three instances of this affection of the nds in females between the ages of thirty and ty- five, and in all these the catamenia were irre lar, generally scanty and difficult.

26. iv. OF THE LOCAL AND STRUCTURAL S ES, OR THE SPECIAL SEATS OF ACUTE AND UB- ACUTE RHEUMATISM. — It has been ably on- tended by Dr. F. **Hawkins**, and more re ntly by Dr. **Macleod**, that rheumatism present er- tain differences, according as it is seated the *fibrous* or in the *synovial tissues*. Dr. Ha ins thus distinctly states this doctrine, and in sc cid a manner as to deserve especial notice. the *first class* of tissues, he ranks, 1st, those ich serve to connect parts together, as the tc ons and ligaments, and the aponeurotic expans s of tendons; and, 2dly, those which divide and ve- lope particular organs, as the muscular cia and enveloping aponeuroses; the periosteum the fibrous coats of the nerves; the membranes ich have on one side a serous lining, as the ura mater and pericardium; also the fibrous s ths of the tendons and capsules of those joints ich are provided with fibrous capsules, and th ga- ments surrounding other joints; and the em- branes which have a mucous covering ead over them, &c. In the *second class* he inc les, — 1st, the sub-cutaneous bursæ, to whi the epithet mucosæ has been improperly add . — 2dly, the synovial sheaths of the tendons; — nd, 3dly, the synovial capsules of the joints.

27. *A.* In the *first class* of structures, th ver and constitutional disturbance are much g ter

n portion to the degree of local inflammation ha in the other; and Dr. HAWKINS considers ha he heart and pericardium are chiefly prone o mpathise with the affection of the fibrous tru ures.

; B. Rheumatism of the *second*, or *syno-via lass* of textures, is indicated by the situation, he egree, the character, and the form of the swe ng, which is much greater, and occurs ear-ier han that which is caused by rheumatism of ibr s structures. The swelling in rheumatism affe ing chiefly the synovial membrane is that of a c umscribed fluctuating tumour, modified by he urrounding ligaments. There can be no dou of rheumatism being more acute, and more dis ed to associate with it disease of the heart, wh the fibrous tissues are its chief seat, than wh the synovial structures are chiefly attacked, n ich latter case the disease usually assumes a sul cute form.

; Dr. TODD remarks, that "some practical phy cians have endeavoured to make a distinction bet en what they call synovial or bursal rheu-ma m and fibrous rheumatism. The natural his y of the disease, however, does not warrant thi listinction; for in no instances of rheuma-tic ver are the synovial membranes free from irri ion — as evinced by the existence of effu-sio ; and the synovial membranes can scarcely be fected without involving the fibrous tissues wh surround, support, and convey the blood-ves ls to them." There is certainly much truth in s remark; yet the distinctions made by Dr. H KINS are not without some foundation; for, alt ugh there is generally an extension of the mo id action from one tissue to another, or even co-dinately to both, in some instances, never-the s there is often a predominance of it in the on over the other. Viewing the rheumatic dis-eas as altogether constitutional, although ex-pre ed more especially in particular structures, it nnot be denied that the disease assumes a mo acute form, and peculiar and even more ext sive associations, when predominating in non-sec ting fibrous tissues, where no portion of the *ma ies morbi*, admitting this to exist, is effused, tha when chiefly affecting a secreting surface all ing the effusion of a portion of the fluid, wh h fluid, when retained in the circulation, pr ably serves to aggravate, perpetuate, or ev to complicate the attack; but, when effused, ter chiefly to aggravate or perpetuate the local aff tion.

. That the fluid which is effused in the cavities of ints, during acute or sub-acute rheumatism, ab nds in materials of an injurious tendency if ey were retained in the blood, — that it con-tai more of a morbid material than in some other ci instances, is manifested by the sensible quali-tie f the secretions and excretions generally in th disease; and it is by no means improbable th the morbid effusion, especially when long re-ta d in the cavity of the joint, and thereby re ered still more morbid, exerts an injurious ef t upon the synovial membrane, upon the car-til es, and even upon the capsules and more ex rnal structures of the joints. One of the gr t errors of modern writers on rheumatism is th attempt to ascribe its several forms to a special af tion of certain tissues, — to view the several va eties of the disease as resulting from their respective local affections, — to consider a local and contingent manifestation of a constitutional malady as the malady itself — a local manifestation which is always various, constantly varying, differently associated, often singularly complicated, and which, however severe in any of its seats or complications, is the painful result of pre-existent morbid conditions of a much less sensible and obvious kind, — the local and more external expression of a constitutional malady to which our pathological investigations, as well as therapeutical indications, should be more particularly directed.

31. When the *synovial membrane* of the joints is the chief seat of acute or sub-acute rheumatism, the symptoms are not so acute, but more persistent than when the fibrous tissues are mainly affected. Although two, three, or more joints may be at first attacked, a more limited number, or only one, becomes the principal seat of the disease, and the effusion into the joint is often increased. It is extremely probable that the fluid then effused is not merely an increased quantity of synovia, but that this fluid is more or less altered from the healthy state, which alteration is increased by the retention of it in the affected joint. To this circumstance, and to the irritation thereby produced in the retaining and surrounding tissues, are to be imputed not merely the obstinacy and aggravation of the complaint, but also the structural changes in the capsule, in the cartilages, and even in the ends of the bones themselves, with the inflammation which either attends or follows those changes, especially in scrofulous, cachectic, or broken-down constitutions. When the effusion is within the capsule, there is more or less projection, owing to distention, of the more yielding parts, as shown when the knee-joint is affected, the swelling being more limited than when the more external parts, as the ligaments, tendons, and aponeuroses, are the chiet seat of the disease, and often fluctuating; this phenomenon never occurring unless the effusion is within the capsule.

32. I have seen this form of rheumatism most frequently in the knee-joint. In more recent and in the more sub-acute cases, the structural changes produced by the disease may not extend much beyond an increased quantity of synovia, and more or less vascular injection and thickening of the capsule, especially of the synovial membrane. In a case alluded to by Dr. MACLEOD, which terminated fatally from another disease whilst subject to a first attack of this form of rheumatism, the alterations in the joint were very similar to the above. When, however, the attacks have been frequent, or when the disease has been persistent, or the constitution in fault, or when the patient has aggravated the attack by exertion or exposure, the changes in the capsules, the ligaments, the cartilages and ends of the bones are much more serious, owing to superinduced inflammation and the contingent consequences, as respects not merely these parts, but also those more external to the capsule and in the vicinity. That suppurative disorganisation of the joint is sometimes met with during, or consequent upon, acute or sub-acute rheumatism, cannot be denied; but there is great reason to infer that the inflammation, of which the disorganisation is the effect, has been superinduced, as just stated; and that

that issue is not limited to rheumatism attacking the capsule or more internal tissues of the joint, but is occasionally extended to those cases in which it is difficult to determine whether or not the amount of the rheumatic affection was greater externally or internally to the capsule. In two cases, in private practice, attended by Mr. Fergusson and myself, suppuration of the knee-joint supervened; but this result was owing to the operation of the causes of inflammation subsequently to, or at least during the rheumatic attack, to unusual exertion of the affected limb, and to exposure. This *termination* of acute or sub-acute rheumatism of the joints should not be confounded with the *suppurative disease of the joints*, which is *secondary* of phlebitis, and which is not infrequent in females after delivery.

33. *C. Rheumatism affecting chiefly the Periosteum.* — *Periosteal Rheumatism.* — This state of the disease usually presents itself in a sub-acute or in a chronic form, more especially the latter; and is met with most commonly in impaired constitutions, in the cachectic and in the scrofulous. It affects those parts of the periosteum which is most exposed to the vicissitudes of temperature and weather, as those covering the tibia and ulna, the sternum, the cranium, and bridge of the nose. The disease is either attended by a slight degree of fever and aggravation of the pains at night, or is prolonged indefinitely in a chronic and non-febrile state. The pain is dull, constant, deep-seated, and referred to the bone. It is unattended by redness or evident swelling; but sometimes a slight fulness or thickening may be perceived upon a careful examination, and the pain is increased by firm pressure. The tongue, in these cases, is either loaded or furred, and the excretions are more or less disordered. The pulse is generally accelerated, often weak and compressible. That more or less thickening of the periosteum actually takes place, has been demonstrated on dissection of some of these cases. Dr. Hawkins remarks, that this form of rheumatism is often allied with deep-seated pains, which sometimes continue fixed in the shoulder, and occasionally affect the hip. They are aggravated by any motion in the joint in any direction; which renders it probable that the fibrous capsules with which these joints are provided are here the seat of pain, and these capsules are closely interlined with the periosteum.

34. It is often very difficult to distinguish rheumatism affecting the periosteum from pains occasioned by *syphilis* or by the abuse of *mercury*. The previous history of the case should guide the diagnosis; but it may be inferred that the affection is rheumatic when the pains and the periosteal affection are decidedly local, or are confined to a single limb, or to defined portions of one or more limbs. Whereas the pains from the other causes now assigned are more dispersed or wandering, affect a greater number of places, and are seldom confined to one part until nodes are being, or have already formed. The nocturnal exacerbations are also much more severe when the disease is syphilitic than when it is rheumatic; and they moreover are generally associated with other signs of secondary syphilis. If the pains have been produced by the abuse of mercury, the swellings or enlargements of the periosteum are more remarkable, more numerous, and more fined than when the disease is rheumatic.

35. *D. Rheumatism may affect chiefly Fibrous Envelopes of the Nerves.—Neuralgic r matism.—Rheumatism of the nerves.*—This for the disease is met with in the rheumatic diath from the same causes as produce rheumat and often in alliance with rheumatism of o fibrous structures. Yet, although pains follo the course of certain nerves, and produced by posure to cold, may be viewed as being closely allied to rheumatism, they should no viewed as being altogether identical with it; in many instances, as more intimately conne with neuralgia or with neuritis. Neverthe the connections of these pains with either obtain in different cases; the one affection pas into the other by insensible degrees. Neur rheumatism is observed chiefly in the *sciatic n* and its branches. The attack generally c mences in the loins, affecting one side chief solely, extending down the corresponding li and occasionally reaching the foot. It occu the posterior aspect of the limb, and follows course of the nerve. The suffering is gene very severe, and is commonly increased at ni but it is seldom so distinctly periodical as neur affections are; nor is the pain so sudden i invasion and cessation, nor so transient as th neuralgia. The symptoms often resemble t of incipient ulceration of the cartilages of the (See articles Neuralgia, § 35., and Ner *affections of.*)

36. Neuralgic rheumatism is sometimes se in the nerves of the face, usually in consequ of exposure to currents of air; is often associ with other rheumatic complaints, and somet even alternates with rheumatic affection of sciatic or other nerves. This form of rheuma is often attended, at its commencement, by a or furred tongue, by acceleration of pulse, disorder of the secretions and excretions, and biliary congestions or accumulations. It present a *sub-acute* character; but it is frequently *chronic*, and often very prolonged, ing of several months' *duration.*

37. *E. Rheumatism affecting chiefly the neuroses, Muscles, or fibrous Tissues of Loins and Back.* — *Lumbago.* — This for the disease may be either *primary*, or *consecu* or *simple*, or *associated.* When it is *primary* sometimes *sub-acute*, but it is more freque *chronic*, especially when it is *consecutive* of o forms of the complaint; and in this latter especially it is often complicated with some o form of rheumatism, as neuralgic or sciatic rh matism. Lumbago is often confounded with o complaints, these complaints, especially con tion of the venous sinuses of the lumbar verte and its consequences, congestions of the kidn &c., being mistaken for lumbago. This for rheumatism is sometimes but little painful un the muscles of the loins are called into action, n especially if the action be sudden. Owing to remarkable increase of pain on motion, the tient either remains at rest in his bed, or on a s or he walks bending forwards, and is unabl raise himself quite erect.

38. When the pains in the loins are truly rh matic, the lower limbs and joints are sel affected; but when they depend upon conges

of e venous sinuses of the lumbar vertebræ, or up congestion of the kidneys, there are, in addit n to more marked disorder of the urinary ex tion, symptomatic pains, numbness, cramps, or icking, or lancinating pains in the limbs, us lly in both limbs, when the venous sinuses of th pine are congested; and in one limb, if only on idney is thus affected.

. Rheumatism sometimes affects not only the lu ar region, but also the *dorsal portion*, in some ins ces, and in others it apparently extends to, or s advanced from, the *ischial* or the *gluteal* ap urosis to the *lumbar* or *dorso-lumbar aponeu* *sis*. It is doubtful, in these cases, whether th nuscles or the aponeuroses are the seat of pa I believe that the latter are chiefly affected, the ontractions of the muscles inducing pain by str hing the affected aponeurosis.

. *F.* There are various *other parts* of the bo in which rheumatism sometimes appears, inde ndently of those more *internal parts* which it so times attacks either contemporaneously with, or nsecutively upon, an affection of the externa ructures. (See § 47. *et seq.*) Of the manifes ions of rheumatism in these external parts, litt notice is required at this place, as the more im rtant topics connected with them are discu d under other heads. It is necessary only to ention what these localities are, and the us forms in which the disease affects them. — (*a* *Rheumatism of the head*, — *Cephalagia rheuma a*, — *Epicranial rheumatism.* — The rheuma affection may appear either primarily or co cutively in the head, in a chronic or subac , very rarely in an acute form. It may aff either side of, but very seldom the whole he ; and it may be seated in the frontal and te oral regions, or in the occiput. It appears to seated in the epicranial aponeuroses of these sit ions, and not in the periosteum. (See art. H ACH — *Rheumatic and Arthritic*, § 29. *et seq*

. (*b.*) *Rheumatism of the neck*, — *Cervical rh natism*, — *Torticollis*, — *Crick in the neck.* — Th as well as the preceding local form of the co laint, generally follows the action of curre of cold air, or other kinds of exposure to co or to cold and moisture. The pain affects ch ly either the back or one side of the neck; an in this latter case the head is held to one sid or held awry, and is always inclined so as to lieve the suffering part. The neck is sore, sti and incapable of motion, unless with great in ase of pain. This form of the complaint is oft complicated with the preceding, and is apa tly seated in the cervical aponeuroses.

. (*c.*) *Rheumatism of the face*, — *Facial rh natism*, — *Facio-temporal rheumatism.* — This f may be associated with either of the forego ; and especially with rheumatism of the he (§ 40.). The pains may commence in eit r the temples or in the face, on one side, or in th at the same time. It is liable to be confo led with tic douloureux, or *neuralgia facialis*, or ith toothach, with which latter it not infreq tly alternates, or even is associated; the sa exciting causes producing either or both. It sometimes, also, complicated with severe atta of catarrh, or with catarrhal fever; and, in ra instances, it either is seated chiefly in, or ex nds to, the sclerotic coat of the eye, forming *rheumatic ophthalmia*. (See EYE, *Diseases of*, § 96. *et seq.*)

43. (*d.*) Rheumatism may likewise be seated in, or extend to, the *aponeurotic investments* of the *intercostal muscles*, or these muscles themselves, according to the opinion of some writers. It has, in this situation, been usually denominated *pleurodynia*, or spurious pleurisy, under which head it has been considered. It may also affect the aponeurotic expansions, or fibrous tissues of any part of the *abdominal parietes*, although the disease is seldom observed in these parts. Its affection of, and metastasis to, *internal organs or structures* are considered in the sequel.

44. II. GONORRHŒAL RHEUMATISM; — *Specific rheumatism.* — Rheumatism affecting chiefly the capsules of joints and the synovial membranes not infrequently occurs in the course of other constitutional and cachectic diseases, especially *gonorrhœa*, the venereal or mercurial cachexy, or other states of general taint. It is, however, only in connection with gonorrhœa that I have to view the complaint at this place. — *a.* The rheumatic affection generally supervenes upon gonorrhœa, about ten days, or a fortnight, or three weeks, from the first appearance of the urethral discharge, which usually is very much diminished, or has entirely disappeared, when the former is developed; and the one affection may alternate with the other, and become remarkably obstinate, especially when neglected at first, or injudiciously treated. The *cause* of rheumatism thus supervening upon, and more or less superseding, the gonorrhœal discharge, is not very manifest. The operation of the usual causes of rheumatism upon a constitution affected by gonorrhœa, and previously exhausted by seminal discharges, seems the chief source of the malady; but, in some instances, the exciting causes are not evident, the gonorrhœal infection both predisposing to and determining the rheumatic disease. Probably diathesis is much concerned in producing the attack, the gonorrhœa imparting the peculiar conditions by which this form of the complaint is characterised.

45. *b.* The *symptoms* of gonorrhœal rheumatism generally appear before the urethral discharge has altogether ceased. A severe aching is complained of in one or more joints. Of four cases which were under my care, three had the knees affected; the other the ankles, and bursæ of the adjoining tendons; but the affection was severer on one side than on the other. The pain soon becomes acute and burning, and affusion rapidly appears within the capsules and bursæ, which become much distended. The external surface is rarely or never reddened or inflamed. Motion aggravates the pain, which is much exasperated during the night, causing watchfulness. The affected limb is usually kept in a semi-flexed position, and either stretching or bending it greatly aggravates the pain. This form of the disease assumes either an *acute*, *sub-acute*, or *chronic* character; the last generally following the first or second. The *acute* is always attended by fever: in a case which I lately attended, the pulse rose above 120; but more commonly the febrile symptoms are less severe than in the usual form of the complaint, and assume more of a sub-acute character, and a truly remittent form. The tongue is loaded, the bowels confined, but not so obstinately as in other states of rheumatism; and the

urine is loaded with lithates. The perspiration is copious, and somewhat offensive. Dr. MACLEOD states that the skin presents a pulverulent deposit, which may be scraped off in sufficient quantity to be tested, and which consists of the lithate of soda. I have not observed this. In no instance which I have seen has the urethral discharge entirely disappeared, a very scanty gleety fluid still exuding from the urethra. Several surgical writers have noticed the alternation, or the succession of gonorrhœal ophthalmia and gonorrhœal rheumatism. I have seen it only in one instance. I have not met with a case in which this form of rheumatism was complicated with, or succeeded by, cardiac or any other internal affection. In one instance there appeared a slight delirium during the acute stage.

46. The course of this complaint is very prolonged, according to the usual mode of treating it. M. RICORD states that it generally continues many months. Although the more acute symptoms may soon subside, the sub-acute and chronic stages are most obstinate. Even when it has apparently disappeared, the complaint is apt to recur, generally in a chronic form, the urethral discharge returning during the intervals. In this way it may continue a long time, and even induce serious organic changes in the affected joint.

47. III. OF THE COMPLICATIONS, EXTENSIONS, OR METASTASIS OF RHEUMATISM. — Rheumatism, especially in its acute and sub-acute forms, is a more or less *external* manifestation of a constitutional malady, during the existence of which *internal* determinations also of morbid action may appear in similar tissues and structures, — or, in other words, the constitution, being affected in an acute or sub-acute form, will throw the morbid action on the periphery of the frame, without any internal complication in persons of strong vital resistance or unimpaired power; but in those of diminished energy or vital resistance, a somewhat similar state of morbid action is apt to appear in internal fibrous and serous tissues and surfaces, either contemporaneously with, or consecutively upon, the external affection. In these latter, the vital energy is insufficient either to throw off the morbid action on distant or peripheral parts, or to protect more central structures from the invasion of this action.

48. *A.* Of the several *associations*, *complications*, and *metastases* of *rheumatism*, there are none of greater importance, and of more frequent occurrence, than those in which the heart and pericardium are concerned. The *endocardium*, in certain of its reflections especially, and the *pericardium*, are particularly liable to be affected, either contemporaneously with, or consecutively upon, acute and sub-acute attacks of rheumatism, — the acute more especially. Of this complication or metastasis I have fully treated, when considering the diseases of the HEART and PERICARDIUM (§§ 129. 132, 133.), and to that article I must now refer the reader. That many cases of this *complication* present the heart as the primary seat of the disease is by no means improbable, especially in young subjects, inasmuch as I have often observed a fully developed state of cardiac affection at an early period. Dr. TODD takes a similar view of this association of the internal and
external disease, and believes that it is less
quently a metastasis than is usually suppos
and states that the occurrence of the car
affection " is inexplicable by the doctrine of
tastasis, which supposes that the cardiac infl
mation has been transferred from the limbs to
heart. The truth is, that the cardiac inflamma
may be primary: it frequently exists at the s
time with the articular affection, and date
origin from the same period, as it derives it f
the same cause." (p. 116.) This remark is
firmatory of what I have stated at another p
(see art. HEART, § 129.), and agrees with wh
shall have to notice in the sequel.

49. Dr. GRAVES even believes that the r
matic disease may exist without its exte
manifestation, and that the cardiac affection
precede the articular swellings, or may exist
out any disease of the joints being mani
especially in persons who have been formerly
subjects of acute rheumatism. Such case
these are comparatively rare; but I have
with two cases, both in fishmongers, in which
symptoms were identical with acute rheuma
with many of the symptoms of endocarditis
without the external rheumatic affection. T
cases were viewed and treated as internal r
matism of the heart, and terminated favourab

50. *B.* The *head* is variously affected in r
matic cases. It may, as stated above (§
be the primary seat of sub-acute or chronic r
matism in either of the parts there designa
or it may be implicated consecutively, or in
course of either of the forms of the disease.
usual states of rheumatism of the head have
considered in the article on HEADACHS (§§ 2
seq. 50.). But the head may be differentl
fected from either of the modes there mentio
— *First*, head affection, delirium, or mental
order, in some form or other, may occur in
course of acute rheumatism, without any a
ment, or with slight abatement, either of
fever or of the local disease. In these cases
head affection is chiefly nervous, and conti
upon the febrile condition, in connection
depression of nervous or vital power. The a
tion of the nervous system may, however
produced by too large or repeated bleeding
by a rapidly induced anæmia, — or by colchi
or by antimony, or by narcotics, and other
pressing and perturbating agents. In all
cases the head affection is independent of
inflammatory action within the cranium.

51. *Secondly*, The symptoms referred to
head may appear at an advanced stage of acu
sub-acute rheumatism, most frequently of
acute and capsular rheumatism, attended
effusion into the cavity of the joint; a
generally followed by the subsidence of the
ease of the joint. In this class of cases, al
the most unfavourable, and generally occu
in persons of exhausted or depressed vital po
or of a cachectic habit of body, the head s
toms are more or less indicative of inflamm
irritation of the brain or its membranes,
passing into effusion of serum into the vent
or between the membranes. Although the
tion of the head is attended by the parti
entire subsidence of the disease of the joint
it cannot be conceded that the subsidence
produced the disease within the cranium.

sh ld rather be considered that, during the co se of the rheumatic disease, owing to the er ing states of the nervous and vascular syste s, influences acting on the brain or its membi es develope a morbid action in these parts w ch supersedes, or partially or entirely rem es, that which previously existed in the jc ts; and that this form of head-affection is su rinduced most frequently by causes acting on th mind, or on the brain and membranes, through th media of the senses, or still more directly ai locally during states of vital depression, conse ent either upon the duration or intensity of th disease, or upon an injudicious mode of treatm t.

2. C. *Disease of the membranes of the spinal* cl *d*, probably commencing in, or at least implica ng the theca of the chord, is occasionally obse ed either complicated with, or immediately ce ecutive of, an attack of acute or sub-acute rh matism. A case occurred to me in 1820, in w ch acute rheumatism of the joints, complic d with *pericarditis*, was followed by *chorea* a inflammation of the membranes of the spinal c d, soon passing into effusion of lymph, and te inating in complete general *palsy*. This case w not only demonstrative of this complication a succession of local affections, and of the a earances after death (see *London Med. Repos.* v xv.), but it also evinced the connection subsi ng between rheumatism and inflammation of ir rnal fibro-serous surfaces on the one hand, and b veen atonic spasmodic affections, chorea, and p lysis on the other.

3. When treating of the forms of parap ia and general paralysis (see art. PARALYs § 70. *et seq.*), I described certain states of that d ase which depended upon inflammation of, f owed by the effusion of lymph upon or bet en, the membranes of the spine; and which o n commence in a very slight form or degree o palsy, the movements of the limbs being at fi uncertain, tremulous, irregular, or spasmodic, i many respects resembling chorea, and gradua becoming still more imperfect, until they are a gether lost, sensation still remaining unimp ed. This affection, in rare cases, is conseq nt upon acute or sub-acute rheumatism, app ring as a transference of the morbid action f n the more external parts to the theca and m nbranes of the spinal chord. I have met with f cases of this description, two of them in c dren under twelve years of age; and in three o the cases I had an opportunity of examining t spine after death. In all three, coagulable l ph was effused within the theca, and pressed n the chord and origins of the nerves; and the ous sinuses of the vertebræ were remarkably gested. It ought not, however, to be overl ked, that inflammation of the membranes of t chord, occasioning effusion of lymph and palsy, i enerally attended by severe pain in the limbs, l a girding sensation around the abdomen, ich may be mistaken for rheumatism, but ich is owing to the irritation at the origins of nerves supplying the pained muscles, and y be quite independent of pre-existent rheutism, or of the rheumatic diathesis. (See art. INE, ITS CHORD AND MEMBRANES.)

54. D. *The pleura* may be affected either in course or consecutively of an attack of acute or sub-acute rheumatism; but not so frequently as may be expected. In one case, the pleura was implicated very soon after the complication of the rheumatism with pericarditis was ascertained, pleuritis with effusion rapidly supervening. The earliest writer who noticed the internal or visceral complications of rheumatism was probably BOERHAAVE (*Aphorisms*, § 1491.). He mentions the viscera in general terms; but particularises only the brain and lungs. VAN SWIETEN, in his excellent and practical commentaries, is more explicit; although even he fails in duly recognising the frequent complication of cardiac disease with rheumatism, if, indeed, this complication was as frequent in those days as in the present, which admits of some doubt *, although certain symptoms of this complication are not entirely overlooked by him; yet, in noticing these, we are surprised that more particular attention had not been directed to the state of the heart and pericardium. It is not improbable, although such cases are not frequently detected, or are often overlooked or mistaken, that rheumatism, affecting the intercostal muscles, or the fibrous tissues in the vicinity, may extend to the pleura, and be there followed by inflammation or effusion, in more numerous instances than generally supposed.

55. E. The *diaphragm* and the *peritoneum* are, as far as my experience permits the remark, more frequently affected in connection with, or consequent upon, rheumatism than the pleura. When rheumatic diaphragmitis is observed, either the pleural or the peritoneal surface presents the most evident indications of change, although the

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* " Verum quandoque contingit, ut materies rheumatica admodum vaga sit, et, mox externas, mox internas, partes occupet; unde tales ægri in majori versantur periculo. Aliquando enim dolor in membris disparet, oritur pectoris anxietas, cordis palpitatio, pulsus intermittens, et, redeunte ad membra dolore, hæc symptomata disparent, pulsusque, paulo ante tremulus et intermittens, denuo æqualis et liberrimus est. Alibi describuntur plures similes morbi, qui mense Novembri 1759, in *Nosocomio Pasmanniano* aderant, quorum initium fuit horror per totum corpus, dein languor; postea dolor rheumaticus, partim vagus, partim fixus, qui omnia membra obsedit, et subinde post unam alteramve, horam cessavit, tuncque pectus oppressum fuit, et ægri inceperunt tussitare. Caput etiam doluit vario modo. Quandoque post plures horas dolor rheumaticus de novo per omnia membra diffusus est; et tunc illico desiit dolor capitis, pectoris oppressio, et tussis evanuerunt. Illæ autem mutationes in eodem ægro sæpius contigerunt.

" Hæc materies rheumatica, quandoque adeo mobilis et vaga, nisi bona curatione, dissipari possit de corpore, vel expelli, in unum locum confluit aliquando, et ingentes tumores lymphaticos producit; de quibus eadem hac paragrapho dictum fuit, quomodo in externa corporis superficie appareant, et illis pertusis, exiverit semper serum flavum viscidum, quod leni calore potuit inspissari. Cum ergo pateat, eandem hanc materiam ex artubus derivari posse ad caput, ad pectus, si nec inde salutari metastasi redeat ad artus, nec curatione expellatur de corpore, poterunt tales tumores in interioribus colligi, et pessima mala producere, imo mortem, uti cadaverum hoc morbo defunctorum sectio docuit.

" Tres ægri, in quibus serum, per universum corporis superficiem antea dispersum, subito interiora occupavit, rheumatismo perierunt. In binis cadaveribus reperiebatur copiosissima flava gelatinosa materia inter membranam pulmones ambientem et ipsos pulmones; totaque pulmonum substantia in admodum parvam molem compressa erat. Talis materies valde copiosa quoque inter piam matrem et cerebrum atque cerebellum hæsit; anteriores cerebri ventriculi simili gelatina pleni erant. In tertio ægro disparuit tumor artuum, secuta fuit difficilis respiratio, et tussis convulsiva, quæ nullis remediis obedivit; unde miser intra quatuordecim dies, omnibus viribus exhaustus, periit. In medio pulmonis dextri detegebatur saccus, qui quinque libras seri flavi subacris reclusit. Cætera fuerant sana."—(VAN SWIETEN, *Commentaria in* H. BOERHAAVE *Aphorismos*, t. v. p. 654.)

crura, or the tendinous parts of the diaphragm, may be the chief seat of disease. When this viscus is implicated, the symptoms vary not materially from those mentioned in the article on its diseases, where, also, the connection sometimes existing between rheumatism and inflammation of the diaphragm is pointed out, conformably with the results of my observations, and with my subsequent experience. (See art. DIAPHRAGM, §§ 9. *et seq.*)

56. Although rheumatism may affect the *diaphragm* either alone, or in conjunction with one or other of its serous surfaces, or both, as a complication, extension, or metastasis of the disease, yet the *peritoneum* may be chiefly or even solely affected; the external disease either subsiding or entirely disappearing upon the development of the peritoneal affection. Rheumatic peritonitis is probably most apt to occur either during the puerperal states, or when rheumatism affects the aponeurotic expansions and fibrous structures of the abdominal muscles and parietes; but it is of comparatively rare occurrence. (See art. PERITONEUM, § 128.)

57. *F.* Rheumatism or rheumatic inflammation may attack the *ovaria*, or the *uterus*, generally upon the subsidence or disappearance of the disease from more external parts. Cases of this kind are rare. An instance of metastasis of rheumatism to the ovaria has been adduced by me at another place. (See OVARIA, § 7. *note.*) The *testes*, either one or both, may be also similarly affected; the pain being very severe, and the swelling considerable. Three instances of well-marked metastasis of rheumatism to the testes, of which I have preserved notes, have come under my care.

58. *G.* Of the more pure *complications of rheumatism*, there are none so frequent as those with *catarrhal fever*, or *simple catarrh*. I shall have to show hereafter that exposures to cold and humidity are more likely to produce attacks of rheumatism when malaria, even in slight grades, is superadded to these states of atmosphere, the catarrhal affection resulting equally with the rheumatism, which may assume either of its forms, but most commonly the sub-acute, slight, and chronic, from the combination of malaria with cold and humidity. Many writers, from BOERHAAVE to STOERCK, VAN SWIETEN, and others, have noticed the frequent association of rheumatism with *ague*, during some seasons, with *scurvy* in other seasons, and even with *dysentery* — complications manifestly depending upon the combination of atmospheric conditions, upon weather, season, &c.; and more especially upon exposure to cold, in conjunction with an impure or malarious atmosphere, or with exhalations of decayed vegetable and animal matter, and often with unwholesome or improper food.

59. *H.* Rheumatism is not infrequently complicated with *disorder of the catamenia*, or of the catamenial discharge. This subject has been recently noticed by Dr. TODD, who remarks that he "has been strongly impressed with the idea that the secretions of the uterus, if of an unhealthy character, and not duly thrown off, may be absorbed into the circulation, and contaminate the blood, producing symptoms of greater or less urgency;" and he adds, that he "cannot do more than propose as a query, whether, under certain circumstances, the uterus may not be regarded as a so e of rheumatic or arthritic matter?" (*Op.* t. p. 148.) I believe that in no circumstances is e uterus productive of such matter; but that s, as I have contended in various parts of this w k, a most influential agent in depurating the b d when it fully discharges its functions; and th it thus may prove, in the full exercise of these f tions, the means of preventing attacks of both r matism and gout; whilst the imperfect disch e of the catamenial function, and of the depura g process thereby produced, may favour the d lopment of either rheumatism or gout, the fo er especially before the forty-eighth or fiftieth r, especially in the rheumatic diathesis, or where e hereditary predisposition to either of these dis es exists. Hence interrupted, scanty, imperfec or otherwise disordered states of the catamenia, y be an efficient or a concurrent cause of rheu tism; and thus catamenial disorder may be plicated with either of the forms of this dis e. Hence, moreover, arises the frequency of ch ic arthritic affections in females when the catam ia become difficult, scanty, and altogether cease

60. IV. OF THE STATES OF THE BLOOD AN CRETIONS IN RHEUMATISM.—i. OF THE BLOO — It becomes a matter of some interest to con er the states of the blood in rheumatism, seeing at the disease is considered by several recent wr s, as it was by BOERHAAVE, BAYNARD, VAN SWI N, and many others, during the commencement d middle of the last century, to depend upon a teries morbi existing in the blood. I shall, t e-fore, give the results of observations and exa a-tions of the blood; and when I come to con er the nature of the disease, I shall then notic in how far the changes observed in the blood a he pathological conditions constituting the ma y, or are merely the results of the influence o e disordered organic nervous system on the blo — whether the alteration of the blood is the p mate *cause*, or is the *result*, of the disease.

61. BAYNARD had long since asserted, tha he saline and acid ingredients found in the bloo d urine, are present in the former in excess, o g to the non-elimination of them by the kidney d skin; and that the excessive accumulatio of them in the blood caused the rheumatic dis e. It is obvious to common observation, ev if not shown by NASSE, SIMON, and AND , that the blood contains more fibrine in te rheumatism, than in the normal state, and at the corpuscles decrease in proportion to th x-cess of fibrine. The fat is also increased. n proportion to the increase of the fibrine and fat d the decrease of the corpuscles, the whole soli e-sidue is diminished — this state constituting at SIMON has termed *hyperinosis*, for a principal rt of the science of German pathologists consis in the coining of terms. In rheumatism, especia in the febrile states of the disease, the physical n-ditions of the blood, rather than its chemical n-stitution, or its microscopic appearances, are st important to the practitioner, who cannot ry a chemical laboratory, nor even a modern m o-scope in his pocket, and who cannot shap is treatment according to the reports furnishe y those sources, however they may aid him in n-ing an hypothesis. In the acute states of the s-ease the clot is rather small, consistent, cu d, and covered by a strong buffy coat; the cu g

hickness o. the buffy coat depending much e deepness and shape of the vessel in which lood is received, and upon the rapidity and f the stream. NASSE states that the coagu- s firm; but that when the buffy coat is very , the consistence of the lower part of the s much less. JENNINGS, according to AN- maintains that the clot under the buffy coat oose as to fall to pieces on the slightest touch. are right in different cases and in different of the disease; at least such is the result y observations. The serum is always clear, f a deep yellow hue. With the frequency ood-letting the size of the clot diminishes in rtion to the amount of serum, and the cup- and buff either continue, or even increase, ver far depletion may be carried.*

According to SIMON, ANDRAL, and GA- ET, the quality of fibrine and of fat is always increased during the acute form of the dis- and that of hæmato-globulin much dimi- l; the proportion of blood-corpuscles dimi- g, and that of serum increasing with the ity or frequency of depletion. The *first* part e following table exhibits the maxima, mi- and mean of forty-three analyses of the of fourteen persons in this disease; the *se-* part, the analyses of the blood in four pe- r cases.

	Water.	Solid residue.	Fibrin.	Blood-corpuscles.	Residue of serum.
ima -	839·6	228·4	10·2	130·0	104·8
ima -	771·6	160·4	2 8	70·1	76·9
n -	805·4	194·6	6·7	101·0	86·0
lthy od }	790·0	210·0	3·0	127·0	80·0
e 1st.	826·8	173·2	4·8	79·0	89·4
e 2d.	818·3	181·7	4·6	89·1	88·0
e 3d.	815·4	184·6	4·0	82·6	98·0
e 4th.	741·1	259·9	2·6	154·3	102·0

63. The blood in the *first* of the cases (the second part of the table) was taken from a colour-mixer under the influence of lead, to which M. ANDRAL attributes the deficiency of the corpuscles. The blood was taken in the *second* from a person who had been bled six times, and had had 200 leeches applied. The *third* was the blood from a person with incipient chlorosis; and in the *fourth*, the blood was taken from a vigorous person twenty years of age.

64. The blood of ten persons suffering *chronic* and *sub-acute articular rheumatism*, furnished, according to the analysis of ANDRAL and GAVARRET, no striking results. The proportion of fibrine in no instance exceeded 5·0, and in two cases was as low as 2·9 and 2·6. The blood-corpuscles in one amounted as high as 154·3, and the solid constituents to 259·1. In the other cases, the corpuscles were below the healthy average. As rheumatism loses its acute, febrile, and severely painful character, so the fibrine diminishes and the blood approaches, or altogether returns to the healthy state. As these forms of rheumatism are more frequently aggravated than relieved by blood-letting, I have very rarely had an opportunity of observing the state of the blood in connection with them; but, in two cases, the chief change from the healthy state, observed in sub-acute rheumatism of the head, was an increase of the fat in both; the serum having been of a very white or milky hue in one case.

65. ii. THE URINE, in rheumatism, requires constant observation, as upon its varying states modifications of treatment are often indicated. — *A.* In *acute* rheumatism the colour of the urine is generally high, sometimes of a purple-red, or thin claret. Its acid re-action is very decidedly marked; and very bulky fawn-coloured, or lateritious sediments, consisting of urate of ammonia, and occasionally of crystallised uric acid, are deposited. Acetic and phosphoric acids have also been found in the urine in this form of the disease by HENRY and VAUQUELIN. In eighteen cases, in which the urine was examined by BECQUEREL, it always presented the characters usually observed in inflammation, as long as the fever continued. The deep colour and the acid re-action were always observed. The mean specific gravity was 1022·6. In cases which threw down a spontaneous sediment it was 1025·2 to 1027·0. He found, that after large bleedings the urine assumed the characters of that in cases of anæmia. Albumen was detected in seven of the eighteen cases. Oxalate of lime is of frequent occurrence. The other constituents vary somewhat; but, as the urine of persons in sound health varies in different indi-

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* any years ago a remarkable illustration of this fact red in a case, which was attended by a surgeon in orth, to which Dr. W. and I were called at advanced s of this disease. A man, aged about fifty, of a phlegmatic appearance and corpulent, had a severe of rheumatism of the lower extremities, for which ok, of his own accord, a large dose of croton oil. ent hypocatharsis was the consequence, and the in the limbs suddenly ceased; but he was as sud- seized with excruciating pain in the region of the , with extreme anxiety and palpitation. The sur- instantly saw him, and bled him largely about the le of the day. When he was seen again at night, as found in no way relieved; the blood which was was very much cupped and buffed; and this ap- ance, in connection with the continuance of the ess, induced the surgeon to bleed him again the night e same day — twice largely on the day of the oc- ence of metastasis. The following morning he was etter. The second quantity of blood taken was buffed than the first. Dr. W. was sent for, and as bled a third time largely on the second day. The ulum was now small, but still remarkably cupped buffed. On the third day he was no better, and tant jactitation had supervened. He was bled the th time. I was requested to see him on the evening at day: I saw the third and fourth quantities of d taken away, the clots of which were very small, remarkably cupped and buffed; the first and second tities were described in consultation. The anxiety, n of the heart, and jactitation were extreme. The gums, and surface were remarkably anæmied, and he presented all the appearances I have described, as indicating extreme losses of blood. (See art. BLOOD, § 53. *et seq.*) Having heard the history of the case, and observed his existing state, I expressed my belief that he could not live twelve hours. He died within that period. The surgeon and I opened the body about twenty hours after death. Adipose matter was very abundant in the usual situations; and all the tissues presented the most remarkable pallor, very much resembling the appearance of veal. There was no fluid effused in any of the cavities, and the large vessels and cavities of the heart contained very little blood, which was coagulated into fibrinous, stringy clots, which contained a very small proportion of red globules. The internal cavities, and the valves, and columnæ carneæ appeared deeply red. The pericardium was natural, but pale, and contained no fluid. The appearances generally were similar to those of an animal blooded to death. (See art. BLOOD, §§ 50 — 64.)

viduals, and in the same person at different times, no precise inference can be drawn respecting them.

66. *B. In chronic* rheumatism, and when the pains are not very acute, the urine often retains its normal characters. Of thirty seven cases, Becquerel found the urine unaffected in twenty: in seventeen it assumed the inflammatory character, and in nine of these it threw down a spontaneous sediment. If the complaint be very long continued, and much debility exist, the urine may, without being red or high-coloured, present a turbid, thick, or even fœtid appearance. I have generally found the urine to have an acid re-action in the chronic as well as in the sub-acute states of the disease. In some cases, and especially when the membranes and sheath of the spinal chord are implicated, the urine has contained the phosphates; and it has never been alkaline, unless much debility or vital exhaustion exists.

67. iii. The perspiration has not received due attention in the different forms of the disease, as respects either its chemical constitution, or its quantity and sensible characters. When the perspiration is profuse, in *acute* rheumatism, minute vesicles, or sudamina, are often observed on different parts of the surface, especially the breast or trunk. The perspiration has generally an acid or peculiar offensive odour, which is less remarkable, or becomes so, when any internal complication or metastasis supervenes. Lactic acid, the ordinary free acid in sweat, is usually increased; and Simon states that, when there is an acid odour, acetic acid is present. Persons subject to *chronic* rheumatism have these pains removed by a free or copious perspiration; and those thus subject, who do not take sufficient exercise, are generally liable to have a return of the complaint, if a sufficiently perspirable state of the skin be not preserved, the cessation or sudden suppression of this discharge often sufficing to reproduce the disorder, without any exposure or other exciting cause.

68. V. Diagnosis. — Rheumatism may be confounded with gout, with scurvy, and, in the form of lumbago, with nephritic affections, or with inflammation of the membranes or substance of the spinal chord. Various affections of the joints, of the periosteum, and of the nerves, especially neuralgic affections, may also be mistaken for rheumatism. — *A.* Rheumatism is often not easily distinguished from *Gout.** In general, however, the large joints are first attacked by rheumatis
and the small joints by gout, the former dise
appearing, after chills or rigors, in the ac
form, and at an earlier age than the latter; a
unless at a very early period of life, gout is m
disposed to affect internal organs than rheumatis
and it is generally preceded by, and sometin
associated with, more marked disorder of the s
mach, liver, and kidneys. It should not, ho
ever, be overlooked, that both diseases are
nearly allied, especially in certain of their for
as not to admit of diagnosis, the arthritic form
rheumatism, especially when affecting the sm
joints, and occasioning nodosities (§ 25.), nea
resembling chronic gout, and justifying the
pular appellation of "*rheumatic gout.*"

69. *B.* From simple or scrofulous *inflamn*
tions of the joints, rheumatism is often dist
guished with difficulty. Rheumatic inflammat
of the joints may, however, affect scrofula
persons; or inflammation of these parts m
attack either the rheumatic or the scrofulous d
thesis; and, although closely allied to rheur
tism, as respects the former diathesis, it cannot
viewed as an instance of rheumatism of the p
In acute or sub-acute rheumatism not one j
only is commonly affected, but several, and
affection moves from one to another, and along
aponeurotic expansions; or if it be permanent
one, or intra-capsular, the distention gives the j
the appearance noticed above (§§ 28. *et se*
When inflammation and its consequences su
vene upon the rheumatic affection, then the lo
disease presents the changes usually consecu
of simple inflammation of the joint, whilst
constitutional disturbance still preserves man
the rheumatic characters, and both one and
other often are influenced by atmospheric st
and changes.

70. *C.* Rheumatism may approach the c
racters of *neuralgia*, or be associated with it.
may even affect, as stated above (§ 35.),
fibrous sheath of a nervous trunk, as in *sciati*
or the *ischias nervosa* of Cotunnius. Wl
rheumatism is complicated with that form of n
ralgia which depends upon an affection of
sheath of the nerve, they may be both viewe
almost the same complaint, and differing only
implicating different seats or parts; and t
generally both arise from the same cause. T
neuralgia, or tic-douloureux, however, depe
more upon some change affecting the origin
roots of the nerve, than upon any alteration im
cating its trunk or branches, and occurs in v
violent paroxysms, between which there i
complete immunity from pain; whereas, wl
the sheath of a nerve is attacked, there is m
continued affection, more of the symptoms
neuritis, and often numbness of parts be

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* "In rheumatismo discernendo a podagra chiragrave, sæpiùs falluntur medici. Sunt tamen, quæ distinguant. Medicus igitur primùm omnium, utrum ægri corpus arthritidi proclivius sit, necne, animo diligenter perpendat. Deinde quæ indicia ante apparuerint, præsertim an ventriculus affectus sit, quod quidem in rheumatismo simplice perquàm raro fit: perturbatio autem ventriculi sive *dyspepsia*, arthritidis accessionem biduum triduumve antevenit. Qualis febris et rheumatismum et arthritidem comitatur, talis posteà animadvertenda est. Ille enim a frigore et horrore incipit, nec remissionem habet; hujus verò febris statis temporibus remittit, et interdum omnia febris symptomata ex toto cessant. Tum ex ratione, quâ dolor accedit, et ubi resideat facilè dignoscitur: Rheumatismus plerumque tardè advenit, et statim ab initio articulos majores occupat: si quando minores occupet, nunquam nisi in longinquioribus morbi exemplis fieri videmus. Contrà ea tamen Arthritis multò frequentius minores, quam majores torquet; qui quidem articuli eò magis rubescunt et tumescunt. Podagra denique ætate provectiores, juniores verò rheumatismus, victimas excruciat.

"A doloribus scorbuticorum facile discriminatur. Scorbuticorum arteriæ non nisi permodicè inequaliterque micant; interdum et subsiliunt. Scorbutus et
specie interdum lividâ, quam urina præ se fert; sp
et putrescendi, quæ per totum corpus hic illic con
citur, sese haud rarò prodit.

"A nephritide satis distinguunt 'dolor in regione re
sæpe ureteris iter sequens, vomitus, cruris stupor, t
culi ejusdem lateris retractio aut dolor,' et dolor re
ex statu pronâ nunquam adaugendus.

"Non est, cur hac in re, dolores, qui debilitate
lue venerea enatam consequantur, nos in rheumati
distinguendo fallant. Prior *syphilis*, et rerum
ortarum cognitio, satis discriminat." — (*J. Copl*
Op. cit. p. 20.)

the eat of pain, with a sense of burning heat in t part affected.

D. Although the pains experienced by per s suffering from secondary symptoms of *syp is* have been ascribed by some to that malad and by others to the mercury used for its cur yet there is reason to believe that these, or eith of them, may be only a chief cause, cold and her causes concurring with them to produce the stressing pains experienced during the night, gen ally in the periosteum of the more exposed bon . These pains, instead of affecting the joints, or e remities of the bones, as in rheumatism, are sea chiefly in the superficies of the bodies, or sha , of the bones, and depend on a specific form of i ammation of the periosteum with thickening and odes. The history of the case, the previous trea ent, the seat of pain, the elevation, and irregul ty of the part affected, the absence of fever, and e great severity of the pain during the night, gen ally indicate the nature of the complaint; esp ally when the flat surface of the tibia, or the utside of the ulna, or of the radius, or the ster m, or the frontal or parietal bones are affec ; or when eruptions, sore throat, &c. accom any the disease; or when large quantities of me ry have been prescribed.

VI. PROGNOSIS. — SYDENHAM places the pro osis of rheumatism in a too favourable point of w, when he says that it is rarely fatal; and VA SWIETEN very justly remarks, that this is onl he case when it is fixed in the joints; for, wh acute rheumatism changes its place, it is apt to ze upon some internal viscus, and place the pat t in the most imminent danger. The justnes f this remark will be readily acknowledged at present day, when the frequency of compli ed and metastatic rheumatism is considered, and he influence of age, and of various states of pre position, in favouring the complications and me tasis of the disease, is recollected. The risk of rdiac complication is especially great, — indee the existence of it may be inferred in the gre majority of cases, under the age of puberty; and both this and other complications and metas es, already noticed (§§ 47. *et seq.*), may occur at ages. VAN SWIETEN observes, that when an ternal affection commences after the subsid ce of external rheumatism, and terminates fat y at a more or less remote period, the result s t often considered as due to the internal diseas and not to the rheumatism, which is actually the use. Whilst, therefore, acute rheumatism is att ded by fever; if it occur very early in life; if t pulse be very rapid, open, and compressible; if patient have experienced a depletory or low ing treatment, and is the subject of mental an ty; or if the pain continue to change its pla , there still exists more or less contingent ris even although the sounds and impulse of the hea be found natural upon a careful examination, an he functions of the brain be undisturbed. If int al complication is detected, or metastasis occ s, then the patient should be considered in a sta of great danger; although recovery may take pla in such circumstances, or the changes which ha already supervened may only remotely tend to orten life.

. Even the *sub-acute* and *chronic forms* of th disease may be followed by prolonged suffering or, if seated in the joints, may be followed by irremediable, or partially remediable changes, as anchylosis, if neglected or improperly treated; and still more frequently by relapses, or by more or less suffering for months, or even years. In all cases of acute, sub-acute, or chronic rheumatism, an immunity from the disease, or from a relapse or return of it, should not be relied upon, until the tongue becomes clean, the biliary and intestinal secretions are natural, the alvine and urinary excretions are healthy, and until the perspiration is free and equable.

74. VII. REMOTE CAUSES. — i. *Predisposing Causes.* — *A. Temperament and diathesis* have some share in producing a state of predisposition to one or other of the forms of rheumatism. The disease may affect any constitution or temperament; but the bilious, melancholic, and bilio-irritable temperaments are apparently most liable to it. That there is a rheumatic diathesis — a *diathesis rheumatica* — has been asserted by most medical writers; this diathesis being hereditary. I have certainly observed numerous instances which seemed to support this opinion; but I shall give it a more particular attention in the sequel.

75. *B.* The most remarkable source of predisposition exists in the several *digestive, depurating*, or *eliminating organs*, especially the *stomach* and the *skin, kidneys* and *liver*, and even also the intestinal canal. In very few cases are the functions of the *stomach, duodenum*, and *liver* duly discharged, either for some time previously to, or during the attack. The stomach is weak, or the food unwholesome and insufficient; and the liver is torpid in function, or retentions of the secretion in the ducts and gall-bladder have taken place, until primary and secondary assimilation has been impeded or disordered, and excrementitious materials have accumulated in the blood. Whilst this state of the hepatic functions, especially when accompanied with biliary congestion or accumulation, occasions merely wandering or fixed symptomatic pains in some persons, it is often followed by attacks of either gout or of rheumatism, both in them and in others, when the predisposition to either is more fully developed, and the respective exciting causes come into operation. The functions of the other depurating organs, especially of the *kidneys, skin*, and *digestive mucous surface*, and even of the *uterus*, when imperfectly discharged, are also more or less concerned in predisposing to some form or other of this complaint; and even also in determining the particular states or complications in which it is often observed.

76. *C. Sex* has manifestly but little influence in predisposing to rheumatism; for so much depends upon exposure to the exciting causes, that those classes, whether males or females, which are thus most exposed, will present numerically the greatest predisposition. HOFFMANN is certainly not correct in considering females more predisposed than males. Rheumatism is, perhaps, more frequent in the former, in a chronic form, after the age of fifty; but, before that age, it is certainly more frequent in males. VAN SWIETEN justly remarks, that men being more exposed, by occupation, by irregularities, and by dissipation, and their numerous concomitants, are more liable than females to rheumatic affections. HAYGARTH states that he found the disease more frequent in males than in

females, in the proportion of 98 of the former to 73 of the latter.

77. *D. Age* has also no very marked influence after 15, or after puberty, if the proportion of persons living at certain ages be taken into the account. The greatest number of cases is met with between the ages of 15 and 30; but the proportion of those living at that age is greater than at a more advanced age. M. CHOMEL found that in seventy-three cases, thirty-five were first attacked between the ages of 15 and 30; twenty between 30 and 45; seven between 45 and 60; and 7 after 60. Two only were attacked before 15, one at 8, the other at 9 years. I have seen several cases between the ages of 5 and 15; but hardly one at that early age that was not complicated with either endocarditis or pericarditis, or with both, and even also with inflammation of the membranes of the spinal cord.

78. *E. Depressed, impaired,* or *exhausted organic nervous energy*, is most influential in predisposing the frame to the invasion of every form of rheumatism; and by whatever causes this energy may be weakened or exhausted, by none is this effect more manifestly induced than by premature or excessive venereal indulgences, and masturbation or self-pollution. By these, more perhaps than by other causes, is organic nervous power depressed, and the tone or healthy condition of the fibrous tissues subverted, thereby occasioning imperfect assimilation and excretion, and favouring the morbid influence and operation of causes which alter organic sensibility, and vital tone and contractility.*

79. ii. EXCITING CAUSES.—*A.* Of these, *cold* has been viewed as the most influential, in whatever way it may be directed on the frame. In many cases, however, it is not the mere abstraction of the animal caloric from the whole or part of the frame, but the combinations of this with other influences or agents. —(*a.*) Of these combinations the most common depend upon the modes of *warming and ventilating houses and chambers* in this country. Although these modes, viz., by open fire-places and coal fires, admit of a free and healthy ventilation, provided that the air thus supplied be pure, still the body is unequally heated by them; and whilst the parts opposite the fire are inordinately excited by the radiated heat, the other parts are exposed to, and depressed by, the currents of cold air proceeding from the doors and windows to the fire-place.† To this cause, more especially, may be imputed the prevalence of the several fo of rheumatism in this country. Still more inj ous are insufficient clothing, especially if it connected with unwholesome or insufficient ment; exposure to cold conjoined with humi and to currents of cold and moist air; ridin open carriages, especially at night, and wit sufficient protection, and more particularly if cold and humid air contain malaria, or exhalat from decayed vegetable matter; and livin tents, or lying and, still worse, sleeping on ground, or on cold, damp, or wet places. last cause is more especially injurious, inasm as it abstracts the animal heat, changes the tural electrical states of the body, and exposes frame more completely to terrestrial exhalat at a time when it is most predisposed to be fected by them. In addition to these, wet-clot the sudden suppression of perspiration, the li in cellars or on the ground floor, or where exhalations from the soil, or sources of vital pression are given out constantly, and even licited by fires and ventilation.

80. The *causes* now enumerated, both disposing and exciting, are such as depress organic nervous energy, and weaken the funct of these organs which are actuated by the org nervous system, — the digestive, the assimilat the secreting and the excreting functions; the changing the condition of the blood, as wel more directly affecting the circulating flu through the heart and vessels themselves, giving rise to morbid states of the secretions excretions, more especially of the cutaneous urinary excretions.

81. VIII. THE NATURE OF RHEUMAT has been much discussed during the last present centuries. It was formerly imputed, BAYNARD, BOERHAAVE, VAN SWIETEN others, to a *materies morbi* existing in the culation, which affected particular parts i prominent and painful manner, according to t predisposition or morbid tendency. More rece it was viewed by STOLL and LATHAM as an flammation of a peculiar form, or affectin particular series of vessels, namely, those admitting the colourless parts of the blood, though the existence of such vessels had not demonstrated. CULLEN, C. SMITH, and BICH considered acute rheumatism as an inflamma state of the muscular fibres, which assume peculiar form, owing to the cause and the na of the structure affected. BICHAT, however, sidered that this affection implicated more ticularly the fibrous tissues of the joints and aponeurotic expansions. These latter opinions generally received when I ventured to suggest view taken in the subjoined passage.‡ Since t

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* "Inter hodiernos et nostrates potissimùm ad luxuriam et incontinentiam nimiam referendus est; et ad artes operæ sedentariæ egentes, quæ corpus intra parietes retentum et occupatum infirmant. Eos certè, qui sedentarii victum quæritant, quique sub dio ferè nunquam morantur nec ibi ad sudores mediocres exercentur, citò infirmari; nimium admodum sentire, quique irritentur justò procliviores esse; idcircò e causis extra afficientibus faciliùs in valetudinem incidere, ex omnium experientiâ satis constat. Nec igitur latet, quamobrem nautas rheumatismo vacare, etiamsi præter ceteros homines, crebriores cœli mutationes, et causas omnes excitantes, subeunt. Ex hoc quoque liquet fœminas quàm mares, imbecillos quàm robustos, et antea affectos quàm immunes, sibi sæpiùs mancipare."

† "Inter causas ejuscemodi, quæ patria in nostra rheumatismum longum excitare soleant, enumerari debet ratio domiciliorum calefaciendorum, quà conclavia et cubilia nostra calore radiante temperantur. Nam adeò inæqualiter facit ignis, ut una ex parte corpus calefiat, ex altera frigeat. Huc forsitan adnumerandæ sunt crebræ vestium mutationes, vel potiùs ratio vestes induendi requenter mutata. Rheumatismum longum et excitant cœli intemperies, tempestatumque anni assidua mu litas. Ubi vel hiems vel æstas incipiat, et ubi desin sit, certissimè distinguere prorsùs nequimus. Hie in media æstate et æstum interdum haud medioc frigoribus in mediis non rarò vidimus: quin immo i diem unicum temperatura aëris XXX gradus sæpe currit. Cœlum nostrum humidum est, quippe qui sulam incolamus, cui Zephyrus et Caurus, e reg calidâ exorti, perque oceanum magnum perequita madidis incubat alis; et sudorem, qui corpus le perfundat, subitò reprimit: ideoque morbum sop resuscitat, aut in iis, qui anteà vacabant, progignit."

‡ "Quidam e scriptoribus antiquioribus de rheu tismo disserentes, quales hypotheses explicaturi su tales fingebant: fluidorum scilicet lentorem esse,

ir . **Scudamore**, **Hildenbrand**, and **Todd**, av dvanced different views as to the pathology f t s disease. The first of these writers has ega ed rheumatism as pain of a peculiar cha- act with or without inflammatory action, af- ect several tissues at the same time, but chiefly he ite fibrous tissues of the joints and muscles. In cute rheumatism, he conceives the morbid cti to be seated in the ligaments, the tendons, he oneurotic membranes, and the bursæ, but n t ligaments most frequently. In the sub- cu orm, though any of these textures, and even he rves, may be affected, the disease is most req ntly confined to the bursal, that is the yn al texture surrounding the tendons. In the hr c form, though the disease may occur in the ga nts and tendinous tissues, he represents it as nos common in the sheaths of the tendons and he oneurotic membranes."

8 **Hildenbrand** is more elaborate in his con- de ion of this subject than any recent writers. He ews it as a specific form of inflammation, ffe ng fibrous, or serous, or fibro-serous mem- ra , and differing from other specific inflamma- on roceeding from atmospheric conditions and ha es — from catarrhal inflammations which ffe mucous surfaces, from erysipelatous inflam- nat ns which attack the skin, and from phlegmo- ou nflammations which appear in any structure. Pai ne considers, to be the chief characteristic, r e nent *παθος* of the complaint, the other cha- act s of inflammation either being absent or on gently present. He considers that the im- on rable agents, light, heat, and electricity, are hi concerned in the causation of the disease; tat of the air, alterations of the temperature and on ions of the surface of the body, &c. sub- er g the equilibrium of the circulation, and cc oning efforts to recover the harmony subsisting et en the different systems. These efforts he eli es to be concerned in, or to constitute, the no immediate cause of rheumatism. I cannot efe to the numerous arguments by which he up rts his views, but many of them are fallacious, and are founded on postulata. (See *Institut. Medico-Practicæ*, t. iii. p. 360. *et seq.*)

83. Dr. **Todd**, one of the most recent writers, has adopted a similar theory to that contended for by early writers in the last century. He observes that, on reviewing the leading phenomena of the rheumatic paroxysm, it is impossible not to perceive a resemblance of the most marked kind to some of those diseases which are confessedly due to the introduction of a morbid material into the blood; and that, as in those diseases, the fever is not relieved "until the morbid element which gives rise to it has, as it were, spent its fury on the textures to which it is attracted." He next inquires into the nature of the morbid matter, which he considers "to be the cause of the rheumatic diathesis, as well as of rheumatic fever;" and he proceeds to observe that "the two most remarkable excretions in the rheumatic diathesis, or fever, are the urine and the sweat. Both these are distinguished by the presence of an unusual quantity of free acid. The urine contains a large proportion of lithic acid; and those highly coloured deposits take place in it, which Dr. **Prout** supposes to arise from the formation of purpurates. The lithic acid diathesis, however, is by no means so strongly marked in the rheumatic as in the gouty state; and these excessive deposits of lithates are more to be regarded, as belonging to the paroxysms, than as constant concomitants of the diathesis. The high colour of these deposits is more marked in rheumatism than in gout. The sweat of rheumatism is much more copious than that of gout; and is evidently much more acid. In the latter disease, indeed, sweating is generally absent. Lithate of soda is never found in the rheumatic paroxysm, nor in the diathesis, — and those derangements in the biliary system, which so often occur in gout, are not so apparent in rheumatism. If, with these considerations, we take into account the most frequent causes of the rheumatic diathesis and paroxysm, we shall obtain a further clue to the determination of the problem we have proposed. These causes must be admitted to be imperfect assimilation and vicissitudes of temperature, — and hence the ill-clad and badly-fed children of the poor are the most numerous victims of rheumatism. Hard work, exposure to cold and wet, bad food, are strongly contrasted as causes of the rheumatic diathesis, with the ease, comfort, and excess which give rise to the analogous one of gout. If now we remember that the skin is the great emunctory of lactic acid, and that bad food, or too little food, may give rise to its undue development, as well as too much food, it is no wonder that, as lactic acid is imperfectly excreted, through its natural channel, in consequence of the influence of cold in checking perspirations, and is too freely developed in the alimentary canal, it should accumulate in the blood and become eliminated at every point. Moreover, the long continuance of the causes which produce the defective cutaneous secretion, and the deranged gastric one, will give rise to the undue development of the lactic acid, in the secondary destructive assimilating processes; thus infecting the blood from every source, and tending to perpetuate the diathesis." (p. 142—4.)

84. There is much that is manifestly true in the above view taken of this disease; but the changes described are merely a part of the suc-

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par affectæ vascula obstruat; quidam verò, materiam noi lam in corpore generatam, et ibi per totum corpus irc ntem, donec maturuerit, ut medicatricibus naturæ iri s, per vascula emunctoria expellatur; et hujusce nat æ morbidæ expulsionem perquam necessariam ad egio vel sanationem proferendam conducere. Huncce no m in vasculis articuli dolentis *lymphaticis* sedem hab se, apud quosdam hodiernos hypothesis tenet. Fri tamen cui corpus, corporisve pars objicitur, vas- ulo m subter cutem dispositorum contentionem, h. e. pa um efficere, indeque partium interiorem et articu- oru et fibrarum musculorum et aponeuroseôn tendino- ar inflammationem necessariò oriri, opinio jam propè mi sa est. Hæ hypotheses jam memoratæ, eorum qua rheumatismo occurrant partem tantùm explicant, tac simul ac editæ sunt, obsolescunt.

" iis tamen, qui nihil nisi musculorum fibrarum et apo uroseôn tendinosarum statum inflammatum esse he atismum affirmant, quæri possit: Quarè inflam- ma nem gangræna aut suppuratio consequi nunquam rep atur? quæ res quidem in reliqui corporis affectio- nib quæ ex inflammatione oriuntur, sæpissimè accidit. Et eri potest: Cur dolor hujusce morbi a cæterarum nfl mationum cruciatibus tantùm differat?

" hil quidem, nostro judicio, obstat quò minùs rheu- ma num affectionem nervorum, præcipuè ad partem affe m pertinentium, singularem, hisque inseparabilem; et nihilo alio nisi adauctiore corporis, ut excitetur pro vitate (vel ut vulgò dicimus ex irritabilitate, vel sen tate adauctâ), nasci existimemus. Quarè inflam- ma nem, non rheumatismi causam; sed hujusce affec- tio singularis nervorum, sive systematis vel ad partem affe m pertinentium, effectum esse arbitremur." (*Op. sup it.* p. 17.)

cessive morbid conditions consequent upon the remote causes. They are, however, important changes, and have been always insisted upon by me in my lectures, and have furnished the basis for one of my chief indications of cure for many years, as shown in a work, published some time ago, in which the author states this doctrine and the treatment founded on it. He there remarks that, "in this species of fever the perspiration, urine, and saliva, will be found invariably acid, and the use of alkalies beneficial;" and he adds, that "this employment of alkalies, and the observation upon which it is founded, I derived a long time since from Dr. J. Copland." — (*The Simple Treatment of Disease*, by J. M. Gully, 8vo. Lond. 1842. p. 133.) But, as I shall have to state hereafter, these are not the only changes which either constitute or prove a *materies morbi* existing in the blood, and directly causing or perpetuating rheumatism; there are other alterations which are both antecedent to, and concomitants of, these changes, and some of which are the causes of those which are more prominently manifested in the blood and in the excretions. There is every reason to infer, from the nature of the predisposing and exciting causes, and from the more immediately resulting phenomena, that the earliest changes which take place in the œconomy are depression of the organic nervous or vital energy, imperfect assimilation and impaired excretion; and that the resulting retention of effete and excrementitious materials (see Art. Disease, §§ 99—102. *et pluries*) is followed by morbid excretions, chiefly from the kidneys and skin. But, perhaps, the most important of the consecutive changes — consecutive especially of the morbid condition of the organic nervous system — is the increase of the fibrine of the blood and diminution of the red-globules; states which, under the influence of this system, are manifestly concerned in producing the complications and metastases which so frequently occur in acute rheumatism, and especially in those cases in which these changes in the blood are the most remarkable. After the most attentive consideration I have been able to devote to the subject, I believe that the *pathology of rheumatism* may be stated as follows: —

85. *a*. The *remote causes* or occasions of rheumatism are principally of that kind which either directly or indirectly depress the organic nervous, or vital energy of a part or of the whole body, altering the sensibility and other vital conditions and functions thus partially or more generally; and these causes, whether intrinsic or extrinsic, as respects the œconomy, affect, through the medium of the organic nervous system, the vascular system, and the blood, and ultimately the secretions and excretions.

86. *b*. These causes, especially such as impair the power of the constitution to generate animal heat, or rapidly transfer this heat from the surface, and are connected with changes in the electrical conditions of the body in relation to those of the atmosphere, — more particularly insufficient nourishment and clothing; low, humid, and cold localities; living in cellars, or upon or near to the surface of cold, damp, or clayey soils; the proximity of marshes and other sources of malaria; seasons in which the quantity of rain has been excessive, and east or north-east winds prevalent, &c. — are such as produce the most remarkable effects upon the organic, nervous, and vascu systems, thereby developing, according to culiarity of constitution, and concurrence of cau the several forms of rheumatism and their c racteristic phenomena.

87. *c*. Owing to the greater prevalence of th causes in some districts, or countries, than others, rheumatism is so prevalent in these a be *endemic* as respects them; and owing to usually wet seasons, and the prevalence of eas r north-east winds, or to remarkable vicissitud f weather and temperature, this disease has b not merely prevalent in a single district, but o so very generally diffused as to have been *ep mic*; endemic and epidemic prevalences of the c plaint having been generally overlooked by wri s, and hence not referred to their respective cau .

88. *d*. The nature and operation of the re e causes — the effects produced by them on e organic, nervous, and vascular systems, and secutively upon the blood, the secretions, and cretions; and the nature of these effects, espec y in acute and sub-acute forms of the disease, e to explain the frequency of the complica ns and metastases of these forms; the constituti of the blood manifestly favouring the superventi of disease of internal serous or fibro-serous surf s, and the effusion of fibrinous lymph on the aff d surface.

89. *e*. There is no satisfactory proof of the l ic or acetic acids, found in the perspiration d g acute rheumatism, or of the uric acid found i e urine, having existed in the blood previous to their excretion from it, and there forming a *a- teries morbi*. It is, on the contrary, more a- sonable to infer, that the elements of these ds accumulate in the blood, owing to the operat of the predisposing and exciting causes upon ne organic, nervous, and vascular systems, and on the organs which these systems actuate; and at the accumulation or condition of these elem ts gives rise to these acids in the excretions as ll as to the other changes in them and in the o- nomy; and that these acids are probably the ct, rather than the cause, of the disease. The e ss of fibrine, and diminution of red-globules, i he blood, are most probably owing to the same de of operation of the remote causes. Even gra ng that these acids are in part formed in the dig ve canal, and in the blood during the disease is not unlikely that they are also partly formed he excreting organs, especially when their ge amount in some cases are considered.

90. *f*. The great importance of the pr ry effects produced in the organic nervous and as- cular systems, and of the consecutive chan in the blood and excretions, should direct a ore intimate reference to these effects, when de ing the indications and means of cure, than has hi rto been attempted. These effects, primary an on- secutive, are such as require the organic n ous energy to be duly supported and develope the exuberance of fibrine to be diminished, th en- dency to the exudation of fibrinous lym on serous surfaces to be counteracted, and the r bid conditions of the secretions and excretions be removed by means appropriate to the resp ive conditions.

91. *g*. The frequency of complication and metastases of rheumatism is owing — 1st. t pre- existing tendency, lesion, or disorder of so or-

part; — 2d. to exposure to some energetic
during the rheumatic disease, as violent
l emotions, causing affections of the heart
ain; — 3d. to depletory, depressing, or
sting means of cure, thereby lowering the
esistance, and favouring the extension or
asis of disease from the periphery to the
of the frame; — 4th. to the neglect of the
l states of the blood, especially of the ex-
ıce of fibrine; — 5th. to the neglect of the
al and chemical states of the secretions and
ions, and of the means which these states
suggest; — 6th. to measures which act
, and which, by suppressing the local ma-
tion of a general or constitutional disease,
the production of it in other parts, or in
l organs.

h. Rheumatism is attended by phenomena,
however nearly allied to gout in many
are different as respects — 1st. the seat and
ter of the pain; — 2d. the state of the
particularly in regard of the abundance of
and the diminution of red-globules, in the
disease; — 3d. the nature of the excreted
nd salts, and the state of the excretions from
n and kidneys (§§ 65—67.); — 4th. the
d nature of the consecutive local changes,
in arthritic rheumatism are chiefly within the
s and at the ends of the bones, but which,
, are external to the capsules, and are often
d, in chronic cases, by the peculiar gouty
ions; — 5th. the remote causes, predispos-
d exciting; those of rheumatism chiefly
a deficiency of red-globules and poorness
d, those of gout, an exuberance of globules,
hness of blood.

. The pain in rheumatism, whether affect-
fibrous tissues of joints, or of tendons and
rotic expansions, does not proceed from in-
tion of these parts, or of the muscular
nd the increased pain on motion, or the
y of motion, is not dependent on affection of
scles themselves; but are chiefly owing to
nge in the functions and sensibility of the
l or organic nerves supplying these struc-
When inflammation supervenes, it is owing
nfluence of these nerves upon the capillary
ion of these tissues, and to the irritation of
rbid fluid exuded from them, either inter-
r externally, to the capsules.

. That the disease actually originates, and
es mainly seated, in this part of the nervous
is shown — 1st. by the nature and opera-
the remote causes; — 2d. by the transition
morbid sensibility from one part of the pe-
of this system to another, — from one side
to that on the other, — from a superior to
rior extremity, &c., — and, in cases of ex-
n, from the periphery to more central parts,
in the course of the cerebro-spinal nerves.
anges in the vascular system, in the blood,
the secretions and excretions, are the con-
ces of the morbid condition and excited
ity of the ganglial nervous system. In-
tory irritation, or action, when it supervenes,
internally or externally, is owing to this
r to the irritating nature of the fluid effused
e affected tissues, or to a combination of
auses; and the augmented pain on motion
ffected joint or limb, is also owing to the
sensibility and tenderness of the affected fibrous or fibro-serous tissues, manifested more especially when these tissues are stretched, or brought to a state of increased tension.

95. *l.* The treatment of the several forms of rheumatism, especially the acute and sub-acute, has been conducted by me since the subject first engaged my mind, in 1814, upon the pathological basis now stated; and always with a successful issue, and without internal complications and metastases, if they were not present previously to the employment of the means which this view suggested.

96. IX. Treatment. — The *indications* and *means of cure* advised for the several forms of rheumatism have been as different, or even opposite, as the views which have been entertained of the causes and nature of the malady; and, even at the present time, very opposite doctrines respecting the pathology and treatment of the disease are promulgated by able authorities, each one appealing to facts — too often false facts — as demonstrative of success, without giving due consideration to the influence of vital resistance or constitutional power — the *vis medicatrix naturæ* — in withstanding injurious influences and agents, and to the manifest disposition of the œconomy to return to a normal condition, where injurious causes no longer continue to operate, and where no organic injury calculated to impede or interrupt the vital functions has been produced.*

97. i. Treatment of acute and sub-acute Rheumatism.—Having taken a view of the modes of treatment and means of cure which have been recommended for these forms of the disease, and having given my opinion respecting them, I shall next state the treatment which I have employed for these forms of rheumatism since the earliest period of my practice, and which I have found most beneficial in the simple forms of the disease, when no complication nor metastasis had supervened. It may, however, be remarked, that the treatment of the several forms of rheumatism must necessarily vary with the locality in which persons who are the subjects of them reside — according as the patient resides in the country, in a healthy and dry atmosphere, or in a humid and malarious air; or in a close, low, crowded, and large town, and as he has been well or ill fed and clothed. Neither should it be overlooked that a somewhat different treatment may have been required by our ancestors who drank malt-liquors, and not tea, and

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* "Apud antiquiores de rheumatismi curatione nihil certi repertum: quippe qui morbum, sicut suprà memoravimus, penè ignorare, et cum arthritide confundere, viderentur. Veruntamen, ut e scriptis Græcorum patet, sanguinem mittere, movere alvum, et tepidâ perfundere solebant. Romani de rheumatismo curando nihil meminerunt; neque dubium, quin podagræ chiragræve speciem duxerint.

"E Galeni temporibus usque ad seculum decimum sextum, de hoc morbo, deque curatione ejus, nihil prorsùs repertum; nec apud Arabes quidem, ubi, Europâ ignorantiæque barbariæque nebulis obumbratâ, omnes Æsculapii filii discipulique concesserant. Sub finem seculi decimi sexti, rheumatismum ab arthritide et catarrho, quibuscum tam sæpè confusus esset, discriminavit Ballonius, eique iterùm rheumatismi nomen, forsan parùm feliceter, indidit. Sydenhamius hunc morbum ex artis medicæ regulis submovere, et sub morbi accessionem ante omnia sanguinis missioni fisus videtur. Ferè nullus alius morbus est, cujus in curatione plura medicamentorum genera medici neoterici adhibuisse videntur. Nec mirum, quoniam unusquisque eorum, prout ipse de proximis morbi causis judicat, vel hæc remedia vel illa adhibet. Eventus felices quos a remediis quæ absolutoria existimaverint, affici sibi gratulentur, αὐτοκρατεια potiùs, sive viribus naturæ medicatricibus posse attribui, haud mediocris suspicio habenda est." — (*Op. cit.* p. 22.)

spirituous liquors, as in modern times. These latter, taken even in moderation, especially when taken habitually, impair more or less the primary and secondary processes of assimilation, impart more of a nervous character to diseases, and contra-indicate the employment of vascular depletions, unless with caution and in moderation.

98. *A. Blood-letting* was recommended by Sydenham at an early period of his practice, and certainly to an extent which could not fail of being injurious in many instances. Of this he appeared to have become afterwards convinced; for in a letter to Dr. Brady he admits that it impaired the strength, and favoured attacks of other diseases. He therefore trusted, at a later period of his practice, to a diet consisting chiefly of whey. Sydenham had probably been induced to adopt frequent bleedings for this disease at the commencement of his practice by the advice of de Baillou or Ballonius, and Riverius, who had advised this practice. Boerhaave also recommended large blood-letting early in the treatment; but his very able and learned commentator, van Swieten, and about the same time Stoerck, saw reason to be more cautious, and advised it only for the young and plethoric, and when the pulse is strong and full. Tissot, Pringle, D. Monro, and Stoll, also recommended free or repeated blood-letting, aided by diluents; and the practice was followed by Thilenius and Bang, and adopted by Cullen, with more reservation, he bringing to its aid local bleedings, diaphoretics, and purgatives. Heberden was still more cautious, and contended that venesection was not suited to the majority of cases, and ought to be prescribed only for robust persons. Dr. Fordyce had at first recourse to blood-letting; but his experience led him to infer that it favoured the occurrence of internal metastasis, and he therefore abandoned the practice. Dr. Fowler resorted to bleeding in 41 out of 87 cases, and found that only three were cured, seven much relieved, seven partially relieved, twenty very little relieved, and four not at all benefited. Dr. Latham regarded blood-letting as not required, although he did not object to local bleeding by leeches, as advised by Dr. Fowler, and trusted chiefly in diaphoretics, diluents, laxatives, and rest. Ultimately, Dr. Wells and Willan came nearly to the same conclusion, as respects the treatment of the disease in London and large towns, namely, that blood-letting is either unnecessary or injurious, by enfeebling the patient and favouring internal translations of the malady. More recently Mr. Bedingfield and Dr. Craigie have advocated early and large blood-letting. But the former wrote when venesection was a common remedy, and was certainly less prejudicial, as respected the prevailing epidemic constitutions (from 1810 to 1825), than it has been subsequently. Dr. Craigie, practising in Edinburgh, has declared in favour of blood-letting, aided by diaphoretics and cathartics, and contended that, "in order to be beneficial, it ought to be performed early in the disease, and carried to a considerable extent." He considers that the best time is within the first three or four days, or, at all events, within the first week. It should be carried, he adds, "to twenty, twenty-five, or thirty ounces at once, and within twenty-four hours to as much more;" and he attributes the want of success of Fowler and others to the smallness of the quantity taken. M. Bouill has advocated a somewhat similar practice to e foregoing; but, instead of abstracting at once e quantity advised by Dr. Craigie, he has ado the abandoned method of Sydenham, and s advised a smaller quantity on more freq t occasions to be drawn.

99. I believe that the treatment of any of rheumatism by blood-letting, as a ger principle of practice, however early in the dis , to be productive of injury in some cases of rheumatic inflammations of the internal and ternal membranes of the heart, of the periton , pleura, synovial membranes, &c.; of delir , prolonged convalescence, and of the degener n of the more acute into the chronic states. I ll not deny that the robust, or those in the pri of life, who live well and enjoy a wholesome air ll bear full or even copious depletion at an y period of the disease, generally without detri t, and possibly with advantage; but I am n-vinced, that in large cities or towns, in pe ns employed in warm, ill-ventilated factories, or se living in crowded rooms, low apartments, ce s, &c.; in the very young, and in the old especi ; wherever there is any indication of deficien or poorness of blood; and, *à fortiori*, in th ll-clothed and ill-fed, vascular depletion in any m is often most injurious, and always unnecessa — rarely required, even for the apparently ro t; unless it be conjoined with the method of re which I shall recommend in the sequel. (§§ 5, *et seq.*)

100. *B. Mercurials* alone, or *with opium*, ve been advised for the acute and sub-acute fo of rheumatism, since the benefit produced by em in inflammations of serous membranes was s wn by Dr. Hamilton. The practice was adopt by Niemann, and by many modern writers, wi the view of preventing the effusion or format of coagulable lymph, especially in the intern ex-tensions or metastases of the disease. But ere is every reason to believe, that mercurials re-scribed so as to produce their specific constitu nal effects, will exert but little influence eit in removing rheumatism, or in preventing the eo-tion of internal parts; although they, esp lly calomel, will be of service in removing l ary accumulations and congestions, in rousin the torpid functions of the liver, and when on-joined with opium, in promoting the exc ing functions of the skin — an intention always es-sary to be accomplished in rheumatism. But there is another preparation of mercury, ch, when conjoined with other medicines, is o of service in certain forms of rheumatism, vi the bichloride. This, when taken in minute ses with the compound decoction, or fluid extr , of sarsa, or with the decoction of cinchona o fu-sion of serpentaria, &c., is often of great ser e in some sub-acute and chronic states of rheu ism of the joints. Attempts to cure the more ute forms of rheumatism by salivation, as sug ted by some writers, whilst by no means prev ing, if not increasing, the risk of internal met ses, always render convalescence prolonged and favour the degeneration of the acute an ub-acute into the chronic forms.

101. *C. Emetics*, followed by cholagogu ur-*gatives*, or *eccoprotics*, were much prais by Lentin, Thilenius, and Stoll, at a ver arly

d of the disease, and more especially in that of acute rheumatism, which they denominated is, or in which biliary disorder was manifestly nt. Clossius recommended the repeated ition of emetics. There can be no doubt of ropriety of the practice, in the circumstances tated, and if the treatment be not otherwise ssing. Emetics have been rarely given in natic fever in recent times; but I have pre- ed them in a few cases at the commencement attack, conjoining them with warm cardiacs, matics, or stimulants, so as to produce not full vomiting, but also copious perspirations, rly in the disease as possible.

2. *Purgatives*, especially cholagogues, are ally required early in the disease, although have been but little insisted on by writers, ting Buchhave and a few others. But they d be prescribed only so as to procure a free evacuation, and discharge of bile, without oning severe catharsis; for a too violent ac- on the bowels, and more especially if it be ined with vomiting, will remarkably risk the ession of the local affection, and cause some al complication or metastasis of the disease, the very remarkable instance adduced above. e more acute states of the disease, I have y prescribed, as early as possible, a moderate dose of calomel, with ipecacuanha or James's er at bed-time, and a purgative draught, as mpound infusions of gentian and senna with lphate and carbonate of magnesia, in the ng; the satisfactory operation of these being uctory to other more efficient means. In instances, I have preferred half an ounce of spirits of turpentine and castor oil, taken surface of milk, or of some aromatic water; when the bowels do not act copiously, an , containing about an ounce of turpentine en grains of camphor, or half a drachm of tida, and some common salt, will always st serviceable. The evacuations ought to efully examined; and if, from their appear- , there is any reason to infer either the ion of disordered intestinal excretions, or ion or disorder of the biliary secretion, the tives now mentioned, or such other as the arities of the case may suggest, avoiding t measures, should be repeated occasionally, the motions present a more healthy cha- . This end is not always attained by pre- ng cold saline purgatives; but it will be more nly and speedily reached by conjoining chics and bitters with the purgatives.

3. D. *Diaphoretics* have been recommended ny for all forms of rheumatism, but they ot equally beneficial in all, nor are all dia- tics equally efficacious. The medicines of ass which are most serviceable are the pre- ons of *antimony*, either alone or with opium; 's *powder*, or *ipecacuanha* and *calomel* with ; the *liquor ammoniæ acetatis* with *sesquicar- of ammonia* in full doses, and with the *us ætheris nitrici*; *guaiacum*, in the form of tion or tincture, with *ammonia*; and *camphor nitre* and *opium*, or *camphor* with *James's* or *'s powder*, or with *antimony*, or with prepa- s of *ammonia*. Although the most acute of rheumatism are generally attended by lant sweats, which produce no relief, yet do not contra-indicate a recourse to diaphoretics. If this course of treatment be adopted, there are certain points which should receive due attention in connection with it.—1st. All retained, accumulated, or morbid biliary and intestinal excretions should be previously removed by the means already noticed; so that the patient may not be chilled, during the diaphoretic operation, by getting up to the night-stool.—2d. The patient should be enveloped in, or have next his skin, a long flannel night-gown; or, in default of this, a cotton one; and he should sleep in soft woollen or flannel blankets, or in cotton sheets. — 3d. A sufficient supply of warm antacid and saline diluents, and especially an abundance of fresh whey, or of very weak, but fresh mutton or veal tea, or barley water, should be always ready, which may be made the vehicle for diaphoretic or other medicines, and which, taken abundantly, may promote diaphoresis.

104. *a.* The *antimonial diaphoretics* are the tartar emetic in small doses; James's powder or antimonial powder, either alone or with other substances, as with alkalies, opium, camphor, &c. The alkalies and magnesia, in the state of carbonate, aid the effect of these, and neutralise the acids present in the prima via. Opium increases or insures a sudorific effect, and is generally of more or less service when thus conjoined, if biliary and intestinal accumulations and retentions have been removed, and when the symptoms are very acute, and when vital power and vascular fulness have not been too much reduced. When, however, the patient has been too freely depleted; or when there is much exhaustion; and especially if the urine indicate much free acid; or if the perspirations have an acid smell, &c., then other diaphoretics are indicated, and antimonials should be relinquished.

105. *b.* The preparations of *ammonia*, with or without *guaiacum*, or the *spiritus ætheris nitrici*, or *camphor*, or other medicines, are then, I believe, the most beneficial. If the *liquor ammoniæ acetatis* be prescribed, it should be conjoined with full doses of the sesquicarbonate of ammonia, and the spirits of nitric æther; or, if *guaiacum* be preferred, it may be given with ammonia or camphor. Guaiacum, either alone or with ammonia, was formerly much employed in rheumatism; and much praised by Dr. Fowler; and more recently by Dr. Seymour; the former preferring the simple tincture, the latter the mixture, of the pharmacopœia. I have prescribed either, but generally in conjunction with large doses of the carbonate of ammonia, or some other alkali, for reasons which will appear hereafter. The gentle operation which it often exerts on the bowels, when given in a sufficient dose, is also advantageous, but its free diaphoretic effect should always be aided by diluents, and by the regimen advised above (§§ 103.).

106. *c. Dover's powder* has been very generally employed in the several more acute states of rheumatism; but it should be prescribed either in its original form, the nitrate of potash being substituted for the sulphate, or the ipecacuanha should be given in larger doses in the form of pill. One grain of ipecacuanha, with one of opium and eight of nitre, should be given in the form of pill every two hours, until three or four doses are taken; and then this dose should not be given oftener than every tenth or twelfth hour, the ope-

ration upon the skin and urine being promoted by a copious use of diluents, containing nitre and the sub-carbonate of soda or potash, that may be rendered pleasant by the addition of the usual spices and aromatics. At the commencement of the attack, the ipecacuanha, in doses of two or three grains, may be given with an equal quantity, or somewhat more, of calomel, and a grain of opium; and be followed, after three or four doses, by a stomachic purgative, or by either of those already mentioned (§ 102.); and, after the bowels have been evacuated, the ipecacuanha, opium, and nitre, may be taken so as to procure a copious perspiration, which should be promoted by the regimen and medicated diluents already recommended. In some cases I have preferred a combination of ipecacuanha, camphor, and opium, the camphor in doses of three or five grains, with the same quantities of the ipecacuanha and opium as already advised; nitre and carbonate of soda or potass being taken freely, in large quantities of diluents or demulcents.

107. *d. Calomel* and *opium* have been recommended for their diaphoretic and alterative effect; but they should be given only at the commencement of the disease, and should then be combined, at first, with full doses of ipecacuanha, and afterwards with camphor; but after a few doses— not more than three or four — a purgative should be taken, and its operation promoted by an enema, (see § 102.)

108. *E.* The *nitrate of potass* was much employed for acute rheumatism by Brocklesby, Ranoë, and Thilenius, who gave from one ounce to an ounce and a half in the twenty-four hours, copiously diluted, and continued thus to exhibit it for five or six days, when the disease generally began to subside. I have prescribed it for many years, but not in so large doses, using it chiefly in the drink of the patient with the carbonate of potash or of soda, or prescribing it in the decoction of bark, either combined thus, or with the liquor ammoniæ acetatis, and spiritus ætheris nitrici. The intention of these writers was to excite the skin and kidneys to the due elimination of hurtful materials from the blood; my object being to rouse all the emunctories to increased action, to develope organic nervous energy, and to counteract the morbid disposition and condition of the blood.

109. *F.* The treatment of acute rheumatism has been confided chiefly to *opium*, by Brugnatelli, and more recently by Dr. Corrigan. It has been recommended also by other writers in large doses, but generally with antimony, ipecacuanha, calomel, &c. I have given as much as seven or eight grains in the twenty-four hours, in the form of the pilula saponis comp. of the pharmacopœia; but I have considered the free use of opium most advantageous in conjunction with ipecacuanha or with camphor. In the most acute states of the disease large doses of opium are easily tolerated, especially when conjoined with warm spices or aromatics, or with ipecacuanha and capsicum, and are often indispensable and most beneficial in conjunction with the alkaline and tonic treatment which I have long employed.

110 *G. Peruvian* or *Cinchona bark* was first recommended for acute rheumatism by Morton. It was, however, objected to by Cullen, whilst Pringle and Heberden gave only a somewhat favourable, but an undecided, opinion respecting
it. Hulse, Fothergill, and Saunders wr
more decidedly in favour of it, and Haygar
entered upon an elaborate defence of the use o
for this disease; and his inferences received
support of Fordyce and Willan, although
Parry offered certain objections to it, which
have no weight when duly examined by the p
sician who has had any experience of the opera
of this medicine in acute rheumatism. I h
always employed cinchona for this disease, in
rious states of combination, since 1819, and h
up to the present day, preferred the decoctio f
the cinchona cordifolia, in full doses, conjoi g
it with other remedies, which the stage and p
liarities of the case have suggested. But the k
should be prescribed as early in the attac s
possible; and if the alvine evacuations have t
been sufficient, or if biliary and intestinal coll s
still remain, it may be preceded by an em ,
and by a dose of calomel and James's powd it
night, and a purgative draught in the morr ;
or these means may be occasionally resorte o
without materially interfering with the due -
ployment of the bark. At an early stage o
more acute cases, I have generally presc d
the decoction of cinchona with the liquor -
moniæ acetatis and nitre, often also with ll
doses of the spiritus ætheris nitrici, the p nt
having been allowed a large supply of dil s,
consisting either of whey, or of water gru or
barley water containing nitre and the spi of
nitric æther. If the disease was not soon r-
wards mitigated, the decoction was taken wi he
liquor ammoniæ acetatis, with sesqui-carb te
of ammonia, in full doses, and sometimes al -
pecially if the disease had been of some dur n,
with the tincture of serpentaria. In cases re
the perspiration was copious, and the urine s ty,
the decoction was prescribed with the carb te
of potash or soda, to which the ammoni nd
spirits of nitric æther were often added. he
patient's drink generally contained an alka in-
stead of nitre; and the weak animal tea, en-
tioned above (§ 103.), was often given us
medicated, and rendered palatable by sp or
aromatics; and whilst it quenched thirst, ur-
nished all the nourishment required. In me
cases, the decoction of bark was given with re-
paration of colchicum, but very rarely, unle m-
monia, in full doses, was conjoined with it. See
§§ 105.)

111. Since the introduction of *sulphate of* ina
into practice, the other preparations of cir ona
have been much less employed. Yet in eu-
matism, as well as in several other dise , I
have preferred the decoction, or the com und
tincture, especially in the combinations jus en-
tioned. In some instances, however, of th ub-
acute and chronic disease, I have given the ina
with much benefit, especially in conjunctio ith
camphor, in the form of pill; and, where ere
has been much evidence of anæmia, the su ate
of iron has also been added. In some such ses,
or when certain peculiarities of the case sug ted
a combination of tonics and purgatives, th the
quina, either alone, or combined as now ted,
has been given, in the form of pill, with t pu-
rified extract of aloes, or with the con und
rhubarb pill, or the aloes and myrrh pill, or
three grains of either acting freely whe hus
combined.

2. *H. Colchicum* has been much employed in and sub-acute rheumatism since 1815 or ; but not always with sufficient caution. I rarely given it, even in the most acute states disease, unless in conjunction with cinchona n alkali; or in the evening and at night, other medicines having been taken in the ing and during the day. One or two grains powder of the cormus, or of the extract, been thus conjoined with an equal quantity powder of capsicum, and with three to six of the soap and opium pill; the smaller having been taken at six and ten P. M. or rge dose at nine P. M. only; the morning and e of the day, when the remission of fever is ally observed, having been devoted to the istration of the preparations of cinchona and alkalies. The following has been found erviceable.

331. ℞. Magnesiæ Carbon. gr. xij: Ammoniæ . gr. vj; Vini vel Tinct. Seminum Colchici ♏ xx : Tinct. Cinchonæ Comp. ʒjss. vel ʒij; Tinct. ♏ iij: Tinct. Opii. ♏ v: Aquæ Cinnam. vel et Aq. distil.: āā ʒvj. Misce. Fiat Haustus bis die sumendus.

. *I. Aconite*, in the form of expressed juice, t, alcoholic extract, or tincture, has been mended by many in rheumatism, since it irst employed by STOERCK, especially by NIUS, RANOË, GESNER, and LENTIN. I tried it in several cases, both simple and icated, having always preferred the extract ture prepared with rectified spirit; and according to the formula recommended by Dr. RA. Of the former, from one sixth to a or half a grain may be taken every sixth or h hour; or from three to five drops of the but either preparation should be given aution, and the effects duly watched. I usually prescribed the tincture in distilled only; and the extract in the form of pill tely mixed with liquorice powder and simple and directed whichever was prescribed aken in the intervals between the administration of the other medicines employed. I have ered the aconite, when cautiously used, as erful agent in removing the morbid sensibi- d excited vascular action in acute rheu- ; but I have employed it chiefly in aid of er means already mentioned, especially the ion of cinchona in the states of combina- oticed above (§ 110.). In the cardiac or rdiac complications of the disease it is a le auxiliary to other remedies, as will be ned hereafter.

. *K.* A method of cure, which Dr. TODD has "*the treatment by elimination*," has very ly been recommended by this physician. probable," he observes, "that the *materies* in rheumatic fever is lactic acid. We know he natural emunctory of this is the skin. chemists maintain that it will also escape kidneys; and if it ever does so, perhaps more likely during rheumatic fever than at her time." The indications he suggests, in mity with this view, are "to promote the of the skin, the kidneys, and the bowels; antacid remedies, and to give large quanti- fluid for the free dilution of the materies and in aid of the drainage by diaphoresis iuresis." — (*Lond. Med. Gaz.*, vol. XLII. .). To obtain these ends, he recommends Dover's powder, and the other means usually employed. But, I may remark, that this acid is not the only materies morbi: there is an increase of fibrine and colourless corpuscles in the blood, as shown above (§ 62.), and when treating of rheumatic inflammation of the surfaces of the HEART (§§ 20. 129—133.), with a disposition to their exudation on the serous surfaces, especially those of this organ, whilst the quantity of red globules is diminished. The predominance of acid has been long ago contended for; but whether the acid is formed in the stomach, as Dr. TODD supposes, or by the emunctories from the constituents of it existing in the blood or partly by both, has not been satisfactorily shown. However this may be, the treatment it suggests has been long employed in acute rheumatism, as already noticed (§ 84.). The means of cure, however, should not be limited to this single morbid material, but be extended so as to comprize other changes in the blood and nervous system; which, as Dr. TODD very judiciously argues, and as was shown above, and when describing the treatment of *rheumatic endocarditis and pericarditis* (see *Art.* HEART, (§ 144. *et seq.*), can never be removed by blood-letting alone. Indeed, in many cases of the disease, especially in those of some duration, and when there was a deficiency of red globules inferred, I have prescribed the preparations of iron, as the oxydes or carbonates, with the carbonate of some one of the alkalies.

115. ii. TREATMENT ADVISED BY THE AUTHOR.— This may be partly inferred from the remarks already made; but it depends much on the duration, seat, and form of the disease, and upon the means which have been already resorted to. The indications or intentions of cure should be directed to the removal of the morbid conditions which constitute the disease, as far as these are known, and as far as experience may have proved the efficiency of the means recommended for this purpose. We should more especially endeavour to develope organic nervous energy, so as to promote the assimilating, the depurating, and excreting functions, — to diminish morbid sensibility, — to counteract whatever disposition may exist to form acid in the prima via, — to remove from the blood, or to neutralize the materials from which acid is formed, as well as whatever acid may be present, — to increase the quantity of red globules in the blood, when these are deficient, — to correct the morbid condition of the liquor sanguinis,—and to prevent the exuberance of fibrine and the tendency of it to concrete, and to exude in the form of a fibrinous plasma or lymph, on serous surfaces. As a prelude, however, to the administration of such means as may seem most efficient in attaining these ends, disordered or accumulated secretions and excretions should be evacuated by appropriate agents, — by medicines which moderately evacuate without occasioning vital depression or exhaustion.

116. *A.* If the patient be seen by the physician early in the attack, and if the symptoms are *acute*, he should be placed in a long flannel night gown, or between flannel or soft woollen blankets; the other parts of the regimen specified above (§ 103.) being also observed. If there be no cardiac complication, if bilious colluvies be inferred to exist, if the tongue be loaded or covered by a yellowish fur, and if the alvine excretions

have not been hitherto natural or free, an *emetic*, consisting either of ipecacuanha or sulphate of zinc, with two or three grains of capsicum, should be given, and its operation promoted by drinking a warm infusion of chamomile flowers. Soon after the emetic action has ceased, especially towards evening or night, four or five grains of *calomel*, and one and a half or two of *ipecacuanha*, and an equal quantity of *opium* and *capsicum* should be taken, and be repeated in five or six hours, if a free perspiration, or some action on the bowels has not resulted from the first dose. If the bowels continue insufficiently open, four or five hours after the second dose, or the stools offensive or morbid, a *purgative* draught may be given; or an *enema*, containing an ounce of *turpentine* and two of *sweet oil*, with a scruple of *assafœtida*, ten grains of *camphor* and a little salt, may be administered. Fæcal and bilious accumulations having been evacuated by these means, the decoction of *cinchona* ought then to be given in such combinations as the existing state of the patient will suggest, — with liquor ammoniæ acetatis, spiritus ætheris nitrici, and nitras potassæ, if the febrile action is great and the urine scanty and high-coloured, and at an early stage; — with the carbonate of the alkalies, or with ammonia or magnesia and colchicum; — or with either of the alkalies and serpentaria, if the disease is further advanced. During the liberal use of cinchona, of alkalies, &c., the states of the bowels and of the urine and perspiration should be carefully watched. If the bowels are not sufficiently open, a dose of calomel, ipecacuanha and opium may be given at night, and a draught, with half an ounce each of turpentine and castor oil, in the morning. If the biliary and intestinal excretions are sufficiently free, two grains each of opium and of ipecacuanha, with five of nitre, or three of camphor, may be taken in the evening. If the excretions manifest much acidity, the alkalies should be given liberally, both in the patient's medicine and in his drinks; and if the pain continue severe, notwithstanding the liberal employment of them, either an increased dose of opium should be given at night, or ammonia and colchicum, as noticed above (§§ 110. 112.), ought to be added to the cinchona and the alkali. I have rarely found the above means fail of producing a very decided relief in the course of three or four days, when commenced early, and when no cardiac or other complication exists. But when a joint is attacked some external means, especially such as I shall hereafter suggest, may also be employed with advantage.

117. *B.* In more prolonged cases, and when the disease had not been seen during its early stage, instead of the colchicum I have prescribed the *aconite*, as noticed above, in the intervals between the taking of the cinchona and alkalies; and, in those cases where the patient has been reduced by the duration of the disease, or by vascular depletions, or where a deficiency of the red-globules of the blood was inferred, I have employed with marked advantage the *iodide of iron* in the syrup of sarza, and the compound decoction or fluid extract of sarza. This medicine was of the most remarkable and immediate service in the case of a medical officer from India which presented features of the greatest severity and obstinacy, no other substance, excepting an occasional purgative, having been required to effect a cure, which took place in a very s t time.

118. In the class of acute cases now l g considered, — in the prolonged, neglected, o njudiciously treated, where the red-globules ap ur to be deficient, but where no internal complic n or metastasis can be detected,—the preparatio of *iron* with the carbonates of the *alkalies*, espec y the mistura ferri composita, with the additi of the carbonate of potash or soda, will be fou of great service. The following pills will als be most beneficial. If the bowels be confined, m five to ten grains of the extr. aloes purificat. y be added to the mass.

No. 332. ℞. Ferri Sulphatis gr. xij: 'Quinæ hl. phatis gr. xviij: Camphoræ rasæ gr. xij: Pulv. C ci gr. vi. Pilulæ Galbani comp. ʒj: Syrupi Tolutan s. misce, et contunde bene. Divide massam in Pilulas v; e quibus sumantur binæ vel tres, ter in die.

119. *G.* When the disease attacks the ge joints in the *capsular* or *sub-acute* form, th pplication of leeches has been advised, espe ly if external redness or swelling is observed. he practice is of service in recent attacks, a in young or robust persons, more particularly he internal treatment be such as I have alrea es commended, or am about to suggest. The nu er of leeches* should depend upon the circumst es of the case; but the benefit derived from m will be only temporary, unless the internal ns used at the same time be appropriate, and ess the rest of the external treatment followin he application of leeches be suitable to the lo affection. After fæcal accumulations and diso ed secretions and excretions have been evac d, the means already prescribed (§§ 116, *et* q.) should be employed; and if the more acute ptoms lapse into the sub-acute, or if a joint be es especially affected, or, if effusion within th psule takes place, the decoction of cinchon ay be given with the *iodide of potassium*, and t solution, or the sub-carbonate, of potash. In ese cases, it is important to procure as speedy a rption of the effused fluid as possible, and t by to prevent the irritating effects of this fluid he membranes inclosing it. This end will b est obtained by subduing, by the internal mea al-

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* The mode in which *local blood-letting* is prac in the Shetland Isles is curious. I here adduce the d ption I have given of it in another place. I have n a similar mode adopted by the native Africans on the ain, Ivory, and Gold Coasts; the only difference bei nat, instead of a ram's horn; the chief instrument in t peration amongst the native Zetlanders, a small g l is employed by the Africans, as it was from the iest times in countries bordering on the Mediterra . — "Mentio hujus rei, quæ quidem in insulis Zet icis mihi contigit vidisse, ea mihi in mentem reducit. arificant et sanguinem ab ultimis usque temporib hoc modo eliciunt: — Quam partem volunt scarificar anc aquâ calidâ fovent. Qui medici partes agit, is tem sexies aut septies novaculâ perquam leviter pers git, et cornu arietinum modicè recurvum, quod cucu ulæ vice fungitur, apice perforato, et corio molli circ ato, partem leviter resectam applicat. Tunc forami bia admovet, et quantùm fieri poterit, aëra inclusum git. Quum cornu exinanisset, corio torquendo et in f nen linguâ protrudendo aëris irruentis impetum p bet. Postquam cornu partem scarificatam arripit, nde pannos ex aqua calida paulùm exsiccatos circ um cornu superimponit, qui sanguinem ad partem pr ent. Quum sanguinis semiplenum sit, cornu tum cu relinquit et decidit. Eadem res iterum et iteru petitur, donec satis sanguinis mittatur. Mulieres et es, scarificatione et cornu hujusmodi uti vidimus. I memoratu forsitan digna est, ut enim Romani ant res cucurbitis, sic Getæ (sive quis eos Gothos n are malit), et omnes eorum posteri, cornibus ad san em eliciendum uti videntur."

re y advised, the morbid action in the joint, by co ecting the altered state of the circulating fluid, ar by procuring a free discharge from the external su ce of the joint. After the operation of leeches, in ich cases as may appear to require them, or w out having recourse to them in other cases, wh e they are contra-indicated by the local or co titutional symptoms, — when there is little or no ocal redness, and no marked increase of heat, bu considerable intra-capsular swelling, — small or oderate-sized blisters may be placed near ea side of the joint, as when the knee is affected, an these may be repeated, or kept discharging, ac rding to the effects produced. In other resp s, the treatment of this form of the disease, as ell as of the other subacute states, may be co ucted conformably with the views already en tained. It may however be remarked, that th reparation of iodine, conjoined with cinchona, al ies, &c., or with iron, sarsaparilla, &c. when th is a deficiency of red globules, are more espe lly indicated in these forms of the complaint; an that colchicum, conjoined with the iodide of po ssium, the alkalies and cinchona, in these fo s, is often very beneficial, especially in the m active states. When the disease attacks the m superficial joints, leeches and blisters should no be placed immediately over the joint, but at a sh distance from it, so as to occasion a derivati of the morbid action from the affected parts.

20. In some cases of acute and sub-acute rh matism, I have employed the *oil of turpentine* di rently from the manner noticed above. After be ng evacuated disordered alvine secretions and ex etions, and given a few doses of the decoction of inchona, with an alkali and nitre, I have occa nally prescribed this oil in the following, or in similar manner; endeavouring, however, at th ame time, to preserve the bowels sufficiently op , and to prevent the irritating action of the oi n the kidneys, by a liberal use of demulcents co aining nitre and an alkaline carbonate: —

. 333. ℞. Olei Terebinthinæ, ʒj; Sodæ vel Potassæ B rbon. ℈j; Tinct. Cinchonæ Comp. ʒjss; Tinct. C ici, ♏ v; Aquæ Menthæ Piperitæ, ℥jss. Misce. F haustus bis terve in die sumendus.

21. iii. THE CHRONIC FORMS of rheumatism, w n they appear primarily, more especially in ar *ctive form*, or with nocturnal exacerbations, sh ld be treated very nearly on the principles no stated. — (*a*.) After evacuating morbid accu ulations and excretions, the decoction of *cinch a*, or the *guaiacum* mixture, may be given w *alkalies* and with *colchicum*. The preparations of *uaiacum*, especially when thus combined, and af the biliary and alvine secretions have been d evacuated and promoted, I have always fo d more or less beneficial in this state of the d ase, as well as in the sub-acute and in the m e *passive* conditions. The good effects of these a more certainly secured if free excretion by the se ral emunctories be promoted, by a liberal use o iluents, more especially those already menti ed (§ 103.).

22. (*b*.) In the states of the complaint now b g considered, as well as in the advanced stages o he acute, and in the sub-acute and arthritic fo ns, manifest advantage will accrue from the *i de of potassium* in such combinations as the e erience and tact of the physician will suggest, more particularly when given in the decoction of bark, or in the guaiacum mixture, with the solution of potash, or of carbonate of potash, or with colchicum, or aconite. Besides the forms of the disease just mentioned, both the active and passive states of chronic rheumatism will be remarkably ameliorated by these means, which may be aided by the external measures about to be noticed, and by a suitable diet and regimen. In these states of combination, I have found the iodide of potassium extremely beneficial, and whilst less than two grains, given thrice daily, were rarely prescribed, more than five grains were as rarely taken at one dose; a free use of diluents being always allowed.

123. *c. The cod-liver oil* once enjoyed a considerable reputation for the cure of the sub-acute and chronic forms of rheumatism; and was much employed in Manchester since 1766, when it was first introduced by Drs. KAY and PERCIVAL. Owing to the writings of this latter physician, and the reports of Dr. BARDSLEY, it came into use in Germany, where it is now one of the most commonly used medicines for the chronic forms of the disease. The work of Dr. HUGHES BENNETT on this oil has revived the credit of this remedy for rheumatism; and it is now very generally prescribed for some obstinate states of the complaint. It has from time immemorial been employed as a popular remedy for this and some other chronic disorders, both in Norway and in the Shetland Isles; the liver of the torsk — the *Gadus brosme*, being however preferred to that of the cod — the *Gadus morhua*. The oil prepared in the manner described by my friend Dr. EDMONDSTON of Shetland, in his communication to Dr. HUGHES BENNETT, is that which I believe to be the best. This latter physician has adduced the opinions of the earlier writers on this oil, and added his own, which are both discriminating and judicious. Dr. PERCIVAL remarks, that he had the fullest evidence of the successful exhibition of it in rheumatic complaints, and considered it superior to the preparations of guaiacum. Dr. BARDSLEY, much later, 1807, states that he is enabled to speak of it, from long experience, "as a medicine of efficacious but limited powers. In some instances, where every means has proved unsuccessful, it has operated in a manner so decidedly beneficial as to excite astonishment." The circumstances under which he found it most advantageous were, — 1st, in the chronic rheumatism of elderly persons, when the muscles and tendons have become rigid, and the joints nearly inflexible, owing to excessive labour, dampness, hard fare, and cold. — 2dly, In women whose constitutions have been worn out by repeated rheumatic attacks after parturition, and more especially in the decline of life. Dr. HUGHES BENNETT states that, judging from the mass of observations published in the German periodicals, and from what he has heard and seen connected with this subject, he considers this oil to be more especially indicated in three distinct forms of chronic rheumatism and gout, which may be denominated the general, erratic, and local.

124. I have prescribed the cod-liver oil in several cases of rheumatism since 1844, and chiefly in similar cases to those mentioned by Dr. BARDSLEY, and certainly with nearly similar results; the quantity having been from two to three or four table-spoonsfuls in the course of the day. It was commonly taken on the surface of milk, of cold

coffee, or mint-water, or of some aromatic water; and, in some cases, on the surface of the infusion of orange peel, to which a small quantity of the iodide of potassium was added. In two cases of sciatica in elderly persons it was quite successful; but in two cases of erratic chronic rheumatism, for which the patients had been, and still continued, in the habit of resorting to opium, the oil had no effect. Was this result to be ascribed to the influence of opium on the system? Much useful information on this subject will be obtained from Dr. H. Bennett's treatise referred to in the Bibliography to this article. (*Op. cit.* p. 70—92.)

125. (*d.*) The *compound decoction of sarza*, or the fluid extract of sarza, largely diluted, especially when conjoined with the solution of potash, or the sub-carbonate of potash, and the iodide of potassium, I have found one of the best medicines for the cure of the chronic and sub-acute forms of rheumatism. In order, however, to secure the good effects of this combination, the functions of the skin should be freely promoted by regular exercise in the open air; and the other secretions and excretions ought also to receive due attention. I have preferred the compound decoction of sarza to other preparations, in doses of about six ounces or half a pint, twice or thrice daily, as it produces a much more decided effect upon the skin, especially when taken in a tepid or warm state.

126. (*e.*) The *decoction of senega* is also often extremely beneficial, when conjoined with the iodide of potassium and potash, and with some aromatic water, which will enable the stomach to tolerate this decoction in full doses. In the complications of rheumatism with endocarditis or pericarditis, the combination of this decoction with the substances just mentioned is often most beneficial. It was found most efficacious in several cases of this complication which came under my care, two of these cases having occurred in medical men. Whilst this decoction, especially as thus combined, promotes the excretions, it also tranquillises the increased action of the heart. It may be given in the sub-acute, as well as in the several forms of the chronic disease.

127. (*f.*) The *Datura stramonium*, or thorn-apple, first employed for rheumatism by Stoerck, and subsequently by Wedenburg and Odhelius, and by Cooper and Bartram in America, has been found of service in the chronic and sub-acute forms of the complaint; and especially in sciatica, and other cases of nervous rheumatism. It may be given in the form of extract, thrice daily, commencing with a quarter or half a grain, and increasing the dose until dilatation of the pupil and giddiness are produced. I have prescribed this medicine in a few cases; but although it had considerable effect in alleviating the pain, the benefit derived from it was generally transitory. The *Rhododendron chrysanthum* has been recommended for the sub-acute and chronic forms of rheumatism by Pallas, Home, Koelpin, Loeffler, Willimet, and others. I have no experience of its use in this disease, but Dr. Craigie remarks, that two drachms of the dried leaves may be infused in ten ounces of boiling water all night; and the strained liquor may be taken either at once, or in divided doses during the day; and that a repetition of the remedy for three or four days in succession generally effects a cure in the forms of
the complaint just specified. Very probably t
infusion, as well as the extract of stramonium, m
prove much more beneficial when conjoined w
alkaline medicines, or with other substances
ready mentioned, than when given alone;
under any circumstances the effects should
carefully watched.

128. (*g.*) *Arsenical preparations* have been
commended for the more chronic states of rh
matism, by Jenkinson and others. Dr. Bards
considered them to be of essential service
these states of the disease when conjoined w
opium. I have recently given, in a very
instances, the combination of the iodide of arse
and mercury — the liquor iodidi arsenici et
drargyri as prepared in Donovan's solution, b
with and without opium; and in these this solu
appeared of service; but it requires a further t
before a decided opinion as to its merits in
disease can be given.

129. (*h.*) *Naphtha* was prescribed for chro
rheumatism by Thomann; and several forms
bitumen, *rock-oil*, or *Barbadoes tar*, or *petrole*
have also been employed, most frequently
popular remedies. The petroleum is used b
internally, as a sudorific, in doses of from
minims to half a drachm, three or four times da
and externally as a liniment or embrocation.
substance called *British oil*, procured by di
lation from the stone-coal of Shropshire and Wa
and the empyreumatic oil obtained during
formation of coal gas, are also popular reme
for this complaint. Of these I have had no
perience, but I have seen very decided ben
produced by the use of *tar-water*, and of the N
wegian *tar*, this latter being taken in the form of
with liquorice-root powder and magnesia.
exaggerated accounts of the virtues of tar and
water, which appeared at the commencemen
the last century, and the ridicule to which
use of it was soon afterwards subjected, have
to the disuse of a substance which is calculate
produce very salutary effects when judicio
employed, not only in chronic rheumatism,
also in several chronic and cachectic diseases.

130. (*i.*) Besides the cod-liver and em
reumatic oils just mentioned, several *vegetabl*
essential oils have been recommended by writ
both internally and externally, for rheumatism
need not here add to what I have already st
in favour of *turpentine*. It was many years
praised by Koeler and myself as an internal
external remedy for this disease; and the *caj*
oil, much used in the East, and brought to
notice of European physicians, is often a us
adjunct to turpentine, especially in the exte
use of this latter substance. It should not
overlooked that *olive oil* was recommended
internally and externally for chronic rheuma
by Brocklesbury; and, when taken frequen
or in sufficient quantity, and so as to preserv
regular state of the intestinal secretions and ex
tions, it is certainly of considerable service.

131. (*k.*) *Sulphur* has long been employe
a popular remedy in both the active and pas
states of chronic rheumatism, although it has
overlooked by writers with reference to this c
plaint. The precipitated sulphur may be ta
nightly, either alone, or with the carbonat
magnesia, this combination being preferred w
with a dry or harsh state of the skin, there is

tule e or acidity of the prima via. It exerts a ver ecided effect upon the functions of the skin, bot promoting and altering the excretions from this rface — an intention of the greatest import- and in the chronic and sub-acute forms of this con laint. I have usually prescribed the following very night, exhibiting occasionally, or once in 1 week, a purgative draught in the morning, con ting either of the compound decoction of alo or of equal parts of the compound infusion of senna and gentian with sulphate of magnes &c.

N 334. ℞. Sulphuris præcipit. ℥vj; Magnesiæ Carbon. ℥ss Pulv. Rad. Glycyrrh. ℥jss; Pulv. Zingiberis ʒj. Mis Capiat æger cochl. j vel ij minima, in aquæ vel lact pauxillo, omni nocte.

2. iv. OF VARIOUS OTHER MEDICINES WHICH HA BEEN ADVISED FOR THE SEVERAL FORMS OF RH MATISM. — Having noticed the plans and me s of cure most appropriate to the principal for of rheumatism respectively, I shall briefly me on some others which have been employed mo indiscriminately, especially by some writers; and emark upon their application to certain states of e complaint, *before I proceed to notice those ext al measures and regimenal means which have, at dry times and by numerous authors, been recon ended to the profession and the public.*

3. (*a.*) *Of purgatives*, little mention may be her made beyond what has been stated when tre ng of acute rheumatism (§ 102.). This cla of medicines was much employed in the sev al forms of the disease by RIVERIUS and BO HAVE, and in the bilious complications by ST L and others. They are certainly required in all rcumstances, especially early in an attack; bu nly to the extent of completely evacuating all ecal accumulations, and morbid secretions and xcretions, and of preserving and promoting a fre ischarge of these. If employed beyond this int ion, they may reduce vital power and resist ce, without producing any beneficial effect on e disease in any of its forms. The choice of pu tives and aperients in this complaint is alwa a matter of importance. I have already rema ed on this topic (§ 102.), but I may here add, tha the stomachic, warm, or cardiac, should be pre rred, and that these may be conjoined with alk ies or other deobstruents.

4. (*b.*) *Emetic tartar* was much employed in sm doses by BROCKLESBURY, and much more re tly by BALFOUR, in all the forms of the compla t; but it has most commonly been conjoined wi opium or with other diaphoretics. Unless Ja s's powder, it is the only preparation of an ony on which reliance should be placed in thi complaint. It is most appropriate in hot, dr or harsh states of the skin; when the pulse is tol bly strong and full, and when the cutaneous ex tion has been suddenly suppressed; but att pts at the restoration of this excretion should be ade by other diaphoretics, when constitutional po r is much depressed, and the pulse is very ra or compressible, more especially by the liq r ammoniæ acetatis, with excess of ammonia, wi camphor, and with the spiritus ætheris nitrici in ll doses.

5. (*c.*) Various *narcotics* and *sedatives*, besid those already noticed, have been advised for th several forms of rheumatism. Of the prepa ions of *opium*, *morphia*, &c., as well as those of *colchicum*, I may here remark, that they should rarely be confided in alone, or given, unless in such combinations as will promote their excreting operations — the former by the skin, the latter by the intestines and kidneys, — and at the same time prevent, especially as regards colchicum, their depressing influence on the nervous system, the combination with ammonia being one of the best which can be employed. In chronic forms of rheumatism, the preparations of colchicum are productive only of temporary benefit, and are often prejudicial, unless conjoined with cinchona, or quina, or with guaiacum, or with camphor or alkalies. *Aconite* is most appropriate to the more acute states of the disease, and to certain complications about to be noticed. *Conium*, which was praised by STOERCK, has comparatively little influence, unless continued in considerable doses. It is most serviceable in the forms of rheumatism which occur in females, and which are consequent upon suppression, interruption, or difficulty of the catamenia; and in these circumstances the *stramonium*, and even *digitalis*, are often of service, especially when conjoined with aloetic aperients, or with the iodide of iron, or with the biborate of soda, or with capsicum, according to the peculiarities of the case.

136. (*d.*) Several *stimulants* have been advised for the more chronic states of the disease. — *α. Phosphorus* was recommended by BUCHNER and HUFELAND; but it is a too hazardous medicine to deserve adoption unless with great caution. The phosphoric acid, which may be employed with safety, has not been hitherto prescribed for this complaint. Probably neither this acid, nor the mineral acids, may be appropriate in rheumatic cases, unless in as far as they may promote the digestive and primary assimilative functions, and may thereby prevent the generation of the lactic and uric acids. — *β. Assafœtida* was praised by THEDEN in the chronic states of the disease; and certainly both it and several other of the *gum-resins* and *balsams* are not devoid of efficacy in these states, especially when used as adjuncts to other appropriate means. I have prescribed the *Peruvian balsam* in some instances with very decided success.—*γ. Mezereon* has been employed by some writers; but it is in combination with *sarza* and *sassafras* and *guaiacum*, as in the compound decoction of sarza that it is most serviceable. — *δ.* The *geum urbanum* has been recommended by BUCHHAVE; the *solanum dulcamara* by LINNÆUS, PRESSAVIN, and VIEUSSEUX; and the bark of the *magnolia glauca*, which is tonic and aromatic, by BARTON. An infusion of either of these may be made the vehicle of other medicines, may promote the cutaneous functions, and, by this operation, as well as by their stimulant and tonic action on the organic nervous system, may remove attacks of the disease. — *ε.* The *trifolium fibrinum* was praised by AASKIEM and BROCKLESBY in the form of infusion, with the volatile tincture of guaiacum. — *ζ.* The *Phytolacca decandra* was prescribed by BARTON. My friend Professor DUNGLISON remarks, that it is celebrated as a remedy for chronic rheumatism, and is given in the form of tincture of the ripe berries. An infusion and an extract of the leaves of the *Taxus baccata*, or yew tree, have been given in this complaint, but I am not acquainted with the results. — *η.* The powder or extract of *nux vomica* has

been recommended by OBERTEUFFER in chronic rheumatism, and for the removal of the stiffness and partial palsy of the limbs often attending the complaint. I have tried the alcoholic extract in a few instances, in doses of a quarter of a grain increased to a grain, twice or thrice daily, preferring it to strychnine. It will be found of service in very chronic cases, when aided by other means; but it is apt to produce headache, which, however, may sometimes be prevented by conjoining it with aperients, as the purified extract of aloes, soap, and the ox-gall.—*Capsicum*, or Cayenne pepper, was praised by ADAIR. It is the common resource of many of the dark races, especially the Negro, in all the chronic and sub-acute states of rheumatism; and, whilst they use it abundantly internally, they apply it externally over the pained part. I have frequently had recourse to it; but chiefly as an adjunct to other means, and it has in this way always appeared to be of service.—*Mustard seed* has also been given by ADAIR. About 1825 it was an almost universal popular medicine, not only for rheumatism, but for all diseases. It soon, however, fell into disuse; most probably because it really possessed some claims to attention in chronic rheumatism.*—The *æthers* and *ætherial preparations* have been prescribed for the several forms of rheumatism, but chiefly as adjuncts to other means; and probably *chloroform* will soon be added to the list of means available in the more acute or neuralgic states of this complaint, and be exhibited either by the mouth or by inhalation, the former being obviously the safest method.

137. v. OF VARIOUS EXTERNAL MEANS RECOMMENDED BY WRITERS.— All external means of cure, unless employed as adjuvants of internal remedies, and judiciously prescribed, are attended, either immediately or remotely, by more or less risk. Rheumatism, in all its forms, is an external manifestation of a constitutional malady, in which the organic nervous and vascular systems and blood are chiefly affected; and if this manifestation be suppressed in one quarter, before the evil is removed in the systems more especially implicated, it will most assuredly appear in some other quarter, and not improbably in some important or vital organ. External means, excepting such as promote the depurating functions of the skin, ought therefore never to be resorted to unless in aid of, and contemporaneously with, or consecutively of, appropriate internal or constitutional treatment.

138. (*a.*) Of the numerous external means and applications which have been recommended for the different varieties of this disease, the *selection* is most difficult; and it should be guided entirely by the peculiarities and duration of the attack. The number of these means, although not so great as that of internal remedies, is almost sufficient to distract the inexperienced when an attemp made to employ them appropriately to the circ stances of the case. Yet will a due knowle and recognition of these circumstances and pe liarities prove the best guides to the selectio them, and to the periods of having recours them, this knowledge constituting the best kin experience; for without it experience is only g empiricism. The enumeration of this clas means may, in itself, appear somewhat formidal but it will furnish, with the remarks which I s append to each, an imperfect guide, upon w the reflecting practitioner will make the requ improvements when he comes to apply then practice.

139. (*b.*) *Acrid topical applications* of var kinds, and *irritating plasters*, have been empl empirically as domestic means, and prescr professionally. LENTIN and others have rec mended them; but BANG, the very practical w of Copenhagen, considers them not devoid of unless they are prescribed in aid of judiciou ternal remedies. Sinapisms, the moistened ba the mezereon, and various similar applications been resorted to, and often with benefit, *when energy is duly supported, and when the excre functions are promoted at the same time*—a ciple of cure which ought never to be overlo in the treatment of diseases caused by depres causes, and attended by pain and impaired po as well as by morbid states of the circul fluids.

140. (*c.*) *Acupuncture*, or the gradual i duction of a sharp and fine needle or met wire through the integuments down to the se the complaint, in very painful cases of mus or aponeurotic rheumatism, has been practise many ages in the far East, especially in Japan China. It was treated of, and the safety o practice shown, as well as the temporary effi of it, by Mr. CHURCHILL; and it was also quently employed in France. I have seen i sorted to in several instances with some suc but I am not aware of much permanent be having been produced by it. The practice fallen into its deserved disuse.

141. (*d.*) *Artificial eruptions* have been res to in rheumatism, more especially in chronic sub-acute cases, by THILENIUS, LENTIN, PIDI VICAT, ANTENRIETH, and JENNER; and er tartar, added to an ointment or plaster, has commonly used to produce these eruptions, wh however, especially when plasters have been ployed and allowed to remain too long, or the constitution has been cachectic, has somet been followed by foul, spreading, and obst ulcers. If resorted to at all, they shoul watched; and they ought not to be produce mediately over a joint, although they ma brought out in the vicinity, in obstinate case tried them many years ago in dispensary pra in several internal complications of rheuma with but little or doubtful advantage.

142. (*e.*) *Baths, warm, vapour*, and *medic* have been long recommended for the more ch cases of the disease. Of thermal mineral mention will be made hereafter, but conside advantage will often be derived from warm b which may be prepared at any place, under direction; and which may be general or local cording to the peculiarities of the case. T

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* A credulous disposition to believe in quackeries of some kind or other — religious, political, and medical — is inseparable from the English character; and the more absurd the doctrine, the more ridiculous the means, the more gross the humbug and imposture, the more credence such impositions acquire, and the more generally are they adopted, not by the ignorant only, but by the elevated in rank and social position more especially. The public resemble a flock of sheep, of which, when one breaks off in an eccentric direction, all run the same way. A facetious contemporary would be inclined to impute this tendency to the quantity of mutton annually devoured by our countrymen.

bat at a high temperature, or *vapour baths*, are gen ally most beneficial in chronic, passive, or col states of the complaint, and for these the ad- diti of salt or mustard, or both to the warm bath, wh her general or local, will be of service. Even wh *sea water* is used for a warm bath these ad- diti s are often of service, especially when the reg en and internal treatment is judicious. But bat are not confined to chronic cases only. Ev in the sub-acute and acute states benefit will be rived from warm baths of a somewhat lower ten rature, or tepid baths, containing an *alkali*, or *kaline sub-carbonate*. Indeed *warm alkaline bat* will be found useful in both states of the dis e, and more particularly when the skin is hot ry, and harsh, during the evening and early par f the night.—*Vapour-baths*, both general and loc have been much recommended by Du M LIN, BARDSLEY, and BLEGBOROUGH, and their effi y is undoubted in chronic cases, especially wh the joints are affected, and when aided by a torative treatment and regimen, and due exe ise in the open air.—*Sulphur baths* have been em yed with marked benefit in similar cases; and arm baths containing the sulphuret of potash ha also been resorted to. These baths, general or al, or in whatever way they may be *me- dic d*, should be employed chiefly in aid of jud ous internal treatment, and of a proper reg en.

3. (*f.*) The *warm douche* and *vapour applied loc y*, have been found of service in many cases; bu he remarks just offered are equally applicable to e use of these. To obtain advantage from the , they ought to be daily employed, to be fol ved by friction, exercise, and warm clothing, an accompanied by the internal treatment re- co nended above.

4. (*g.*) *Blisters* have been generally employed as ternal or local aids of constitutional means; bu nless these latter means are appropriate, the be it derived from blisters is only temporary. Fo ER, ROUPPE, and others, have advised them; bu HUFELAND, finding the advantage procured fro them by no means permanent, recommended th to be kept open by the substances usually em oyed for this purpose. Blisters are seldom of e early in acute attacks; they are most useful to rds the decline of the disease, and when the ac n of the several emunctories has been duly pr oted. They are more beneficial in sub-acute ca , and when the joints are affected; but they sh d not be employed immediately over super- fic joints, but only near to them. The repeated ap cation of blisters is generally preferable to ke ing them open.

5. (*h.*) *Embrocations*, *liniments*, and *rube- fa nts* of various kinds have been employed, bo empirically and with rational intentions, as ai in the cure of the several forms of rheumatism. Th y have been even resorted to as the only m ns, and often as popular remedies and without m cal advice. Several nostrums are employed in he form of embrocation or liniment; and, al ugh relief has often been procured by them, ye heir inappropriate use, and the application of th whilst the morbid conditions of the nervous ar vascular systems remained unabated, have be followed in some cases by dangerous and ev fatal consequences, — by internal complica- tic , or by the supervention of disease of internal surfaces or organs, with effusions or adhesions. A few instances of these results have come under my observation, and have demonstrated the danger of having recourse to means which may suppress the local manifestation of a constitutional evil, without having prescribed judicious internal remedies for that evil, and without having employed agents calculated to throw off or to resist the tendency to internal complications. It would be endless, and of doubtful advantage, to enumerate the various embrocations, liniments, and rubefacients which have been praised for the several forms of the complaint. Most of the *formulæ* comprised under the head *Linimenta*, in the APPENDIX (*Form.* 295—314.), may be used also as embrocations and rubefacients in this disease with great advantage, when a judicious internal treatment has preceded, or accompanies, the use of them. Under such circumstances warm *rubefacient poultices*, and *rubefacient plasters* will also be found of service, more especially in chronic cases.

146. (*i.*) *Frictions*, *shampooing*, *percussion*, and *flagellation*, have been much employed in the more chronic and obstinate states of the complaint; but these means, especially frictions and shampooing, are most serviceable after warm salt-water or medicated baths. The frictions may be only simple, as with the hand, or with sweet oil, or with variously prepared oils or liniments, or with the hard Indian glove, or with the hair brush, or with any of the liniments prescribed in the APPENDIX. *Percussion* not infrequently relieves for a time the chronic pains of muscular or aponeurotic parts; and *flagellation* may have a similar effect; but it has been little used since the practice of medicine was rescued from the hands of monks in the dark ages, although it was employed by the ancients.

147. (*k.*) *Galvanism* and *electricity* have had numerous advocates in the chronic forms of rheumatism; and they are sometimes of service, especially *electro-magnetism* in the more passive states of the chronic disease. Several recent writers have furnished evidence in favour of the use of magnetic electricity in these forms of the complaint; but I am unable to give an opinion respecting it from my own experience. I have, however, seen benefit derived, in a few instances, from Galvanic electricity.

148. (*l.*) *Insolation*, or exposure of parts affected with chronic rheumatism to the sun's rays, has been advised; and I have prescribed it with benefit in the passive or cold form of the complaint. The effect probably depends not merely upon the warmth thereby produced, but also upon the electrical agency of the sun's rays. Much of the benefit derived from migrating to a warm climate in cases of obstinate rheumatism arises from this cause; but the change should be made to a dry climate and a clear atmosphere; for if the situation abounds in humidity or malaria, however warm it may be, the rheumatism will still continue, or even be aggravated.

149. (*m.*) *Issues* and *setons* have been mentioned favourably by some of the writers who have recommended the production of artificial eruptions for this complaint. They are rarely required, or submitted to, in cases of simple chronic rheumatism; but I have prescribed them with marked advantage in certain of the complications, or internal extensions, of the disease, more especially during, or subsequent to, rheumatic endocarditis

or pericarditis; or when the spinal membranes have become affected. They are also of use in sciatica, and when the large joints are implicated, and in these cases they have been recommended by BARDSLEY; but they should be prescribed in a suitable situation, so as to produce a derivation from the part or joint itself, and yet not be far removed from it. Two or even three issues may be required in some cases.

150. (*n.*) *Moxas* have been recommended, from the most remote times in the far East, for chronic rheumatism, especially when seated in the joints; and they have been praised by THILENIUS, BESE, PASCAL, NAUDAU, and more recently by LARREY, DUNGLISON, and BOYLE. They are often of service when applied in the situations advised for issues, and when a puriform discharge from the parts cauterized by them is obtained. They, as well as issues and setons, are suitable to the more chronic cases, or rather to the effects of rheumatism, than to recent attacks.

151. (*o.*) *Mineral waters* and *mineral baths* are amongst the most beneficial and popular remedies for the several states of chronic rheumatism. Much of the benefit derived is, however, due to the change of climate, air, scene and occupation consequent upon visiting watering places. The natural thermal springs have been most generally recommended for the more chronic and obstinate states of chronic rheumatism, and for sciatica, especially those of Bath and Buxton in this country; of Wisbaden, Baden-Baden, Karlsbad, &c. in Germany; of Bareges, in France; and of several in Italy. The chemical composition and temperature of these several springs, will suggest the propriety of having recourse to them in the circumstances of each case; and it is chiefly with a strict reference of this composition to the peculiarities of individual cases, that a selection of both thermal springs and of other mineral waters should be made. Much information will, however, be obtained on this topic from the writings of FALCONER and BARLOW on the Bath waters; from those of ROBERTSON and SCUDAMORE on the waters of Buxton; from those of GRANVILLE, OSANN, LEE, and GAIRDNER, on the German thermal springs; and from CARMICHAEL's account of the water of Bareges and Bagneres de Bigorres. Not only may these waters be taken internally, but they are still more beneficial when used as general or local baths, or in the form of douche. The duration of these baths should depend upon the strength of the patient. It should be short at first, and prolonged with repetition; but benefit will seldom be derived until a number of baths have been taken. The circumstances of the case should, however, suggest both the duration and the frequency of them. The same remark applies to the use of the douche. Immediately after the bath or the douche, the surface should be rubbed with dry hot towels; and the patient wrapped up in flannel or in blankets, so as to promote, for several hours, a copious perspiration. The use of warm chalebeate baths in chronic states of the complaint was much insisted upon by BRANDIS; of the waters of Rehburgh by ALBERS; of sulphureons waters and baths by many writers; and of numerous mineral springs by authorities of every kind, some of which will be found in the *Bibliography.*

152. (*p.*) A form of *physical training* has lately come into vogue for chronic rheumatism and ot chronic ailments, more especially such as re from dissipation, excesses, irregularities, &c. various kinds; and this training, conjoined v change of air, occupation, scene, and mode living, forming part of the system, and with ba ing, the copious use of diluents and exercise, s to produce a very free cutaneous discharge often productive of marked benefit, which is more striking in those obstinate cases — wl have often become obstinate from the fault neglect of the patient, and from recourse hav been had to many physicians in succession w out allowing any one of them time or opportunit employ the salutary resources of science. W however, is denied the honest advice of a p sician, is readily accorded by the patient to confident humbug of the charlatan, especi when it is sought for at a distance, and acqu at an expence which is felt as a recommendat although the only one. Regular modes of liv active and regular exercise, temperance, an copious use of diluents, a free excretion from skin, procured by baths, diluents and exercise, change of air, of occupation and of scene, h been recommended by physicians in all age many chronic complaints; but they have nerally been imperfectly followed out, or tially adopted, or altogether neglected, by t for whom they were prescribed. When, howe they were ushered to the public, sane and ins as the results of inspiration; were surrounded appliances calculated to excite the senses of weak-minded, to attract the credulous, to al the idle, the frivolous, and the intriguing, an strike those whose consciousness reach but l further than their sensations, and who are inc ble of observing and of reasoning on facts occurrences; and when they were moulded a plan, and popularized under the name of "*w cure;*" and were thus recommended by e means of publicity to that largest class of community now specified as an universal rem beyond all remedies the most efficacious, were the results such as might have been ticipated by the philosophic observer of hu nature, and of the constitution of the human r as influenced by existing states of society. most remote of these results already appear more accurate estimation of this universal "cu and in the recognition of the fact, that of all "vanities under the sun," the greatest and shortest lived are those by which charlatans the public, and jeopardise not only the live the credulous, the thoughtless, and the w less, but also the most important interest families.

153. (*q.*) *Sulphur*, in the form of sulphu migation, the oil of sulphur of former times, the *carburet of sulphur*, have been locally o ternally employed for the more obstinate forn this disease. OTTO, of Copenhagen, recomme either alone or in conjunction with vapour b two drachms of carburet of sulphur in hal ounce of rectified spirit of wine, four drop which are to be taken internally every two or t hours, and the parts affected to be rubbed w liniment consisting of two drachms of this car and half an ounce of olive oil. This treatme most suitable to those cases in which the secre and excretions have been duly improved and

m ed by the appropriate means before it is entered up n.

54. (*r.*) *Urtication*, or stinging, or flagellation w nettles, has been advised for chronic rheumatis as well as for some forms of palsy, by many of e older writers; and it has in more recent ti s been prescribed by HUFELAND. It may be re ted to with advantage after warm or vapour ba s; or in similar circumstances to those in which ot r rubefacients and external derivatives have be recommended, as warm terebinthinate embr ations, &c.

55. vi. TREATMENT OF THE COMPLICATIONS OF R UMATISM. — *A.* It has been stated above that ac e rheumatism may extend to the *membranes of e brain*, the disease either continuing in its m e external seats, or subsiding in, or disappearin rom these (see §§ 50 and 51.). When head sy ptoms occur in the course of acute or subac e rheumatism, the chief object is first to as tain the cause and nature of this complicatic ; to determine in how far it may be caused by th reatment; and to observe the evidence for or ag ist the existence of inflammatory action in the m branes, or of simple nervous disturbance, or of combination of both. Delirium, if slight, w lering, and nocturnal, the external disease co nuing but little or not at all ameliorated, may ar from the narcotics prescribed, or from too lo ring or depressing agents, or from the exac bation of the fever (see § 50.); and in these ci mstances the indications are obvious. Violent or stracting pain in the head may also depend on th ame causes, and be removed by similar means to ose which these indications suggest, or by su as are prescribed for this form of headach at at other place. (See Art. HEADACHS, §§ 50, *et se* But when the head-affection appears to be de ndent chiefly upon inflammatory action in the m branes, then the subsidence of the external dis se, especially that of the joint, will indicate its ature and the danger of effusion. In these cir mstances, whilst active revulsion or derivation sh ld be attempted by sinapisms applied to the pa affected previously, local depletions should be rdered, and be followed by blisters on the na of the neck and occiput, or behind the ears. C mel and antimony, purgatives and terebinth te enemata ought also to be administered; an f somnolency or sopor, or coma be threatened, th ead should be shaved and surrounded by a cl which has been just soaked in spirit of turpe ne, or which is imbued with an embrocation co sting of equal parts of the terebinthinate and co ound camphor liniments.

6. *B. The complications with the several forms of rdiac and pericardiac inflammations and their co quences* are the most frequently met with in pr ice (§§ 48 and 49.). The nature and treatm of these complications have been so fully dis ssed when treating of diseases of the heart, th I have left nothing to add respecting them at th place. I may however remark, that further ex rience has proved the accuracy of the opinions I t n stated; and the propriety of employing the m s of cure there advised. Rheumatic endoca tis and pericarditis, so common in children an young subjects, especially in cold, humid, an variable climates, depend chiefly upon the fas ons in clothing; upon low, damp, and illve lated places of abode; upon modes of living; and more especially upon the unnatural practice of hardening children by exposure and by fashions in dress. Hence the necessity of avoiding these causes, and of pursuing a treatment calculated to diminish or remove morbid effusion or change of structure, and at the same time to improve the constitution of the blood, and to promote vital action and constitutional powers — objects which may be attained, when these complications occur in young subjects; although they may be only partially or contingently accomplished in older subjects. (See *Treatment of Rheumatic Endocarditis and Pericarditis, in* Art. HEART and PERICARDIUM, § 144. *et seq.*)

157. It is not unusual to meet with cases, in which this complication has occurred in early life, or has appeared at some previous period, the acute rheumatic attack having been entirely removed, but the cardiac or pericardiac affection continuing either with or without detection. In some cases which have come under my observations, for very many years after the rheumatic fever, complicated as now stated, had occurred, and even after every rheumatic symptom had disappeared, little or no ailment had been experienced, until shortness of breath on exertion, or dropsical effusion evinced the mischief produced in the heart. In other cases, however, attacks of acute or sub-acute, or chronic rheumatism, have followed at periods more or less remote from that attack in which this complication first appeared, generally aggravating the cardiac or pericardiac lesion, but not having always this effect; for I have met with instances, one of them in a medical man, in which an attack even of acute rheumatism has not increased the organic disease of the heart which had taken place during a previous seizure.

158. A reference to the histories of cases of this complication, which have come under my care in the course of a practice of thirty years, and of which I have preserved notes, suggests their classification as follows: — 1st. Cases in which rheumatic fever complicated with cardiac disease had been experienced in early life, but many years had passed without any ailment having been experienced until shortness of breathing on exertion and dropsy ultimately supervened, the patient dying of the cardiac disease, no second attack of rheumatism having occurred. In a case now under my care, twenty-three years elapsed between the rheumatic fever thus complicated and the present developed state of the organic disease of of the heart, no rheumatic disease or other ailment having been experienced during all these years, although the cardiac affection had been slowly progressing until it has reached its present state.—2d. Some years after the occurrence of this complication, the cardiac disease still existing, latent or detected, another attack of acute rheumatism has supervened, and has aggravated the cardiac complication, or even diminished the physical signs and symptoms of this complication, these different effects depending much upon the treatment and constitution of the patient. I have thus seen two attacks of rheumatic fever take place after intervals of years; the cardiac complication at last destroying the patient. In the case of a medical man, two such attacks, after intervals of some years, have left the cardiac disease, in respect of both the physical signs and the symptoms, much less extensive and severe than when I first saw him, fifteen years

ago. — 3d. Much more frequently the patient who has experienced an attack of cardiac disease in the course of, or consequent upon, rheumatic fever, has suffered recurrences of the rheumatic affection in a slight or chronic form, without any very manifest aggravation of the cardiac disease, which, however, has either slowly advanced, or has proceeded more or less rapidly according to his habits, modes of living, constitution, and treatment. — 4th. In several instances, rheumatic fever has occurred in early life, accompanied or followed by a cardiac complication, and no second attack of rheumatism has appeared, or merely slight or chronic rheumatic affection; but the cardiac symptoms, as well as the physical signs of cardiac disease, have gradually subsided until they have, after several years, nearly altogether disappeared, or have been attended by little inconvenience.

159. It is obvious that, in these several states of complication, the exact nature and extent and consequences of the cardiac and pericardiac lesions, demand the chief attention; and that the treatment of whatever rheumatic affection may be present should be a secondary object. Fortunately, however, the very means in which I have for many years confided in for the several forms of rheumatism, are also such as are most serviceable in the cardiac lesions most commonly associated with them. After what I have stated, when treating of diseases of the HEART and PERICARDIUM (see §§ 144. *et seq.*), I need only enumerate some of the most efficient means which may be prescribed in these complications, and which moderate powers of observation will enable the physician to apply to the peculiarities of particular cases. Upon the approach, or in the early stage of the cardiac complication, *calomel* with *opium*, or with *aconite;* or the tincture or extract of aconite with *biborate of soda* or with *alkalies;* spirits of *turpentine* given by the mouth; alkaline *aperients* with *colchicum; camphor* with *digitalis* and *henbane;* the *alkalies* in large doses with demulcents and diluents, and external revulsion, are most efficacious in preventing the deposition of lymph or fibrine, and the effusion of fluid. At an advanced stage, when either fibrinous lymph, or serous fluid, has been effused, or when hypertrophy has followed obstructive or other changes of the valves and orifices of the heart, then the *iodides* of mercury or potash; *borax* in camphor mixture; the *iodide of potassium* and the solution, or carbonate, of *potash*, with the compound decoction of *sarza*, or the decoction of *senega* and an aromatic water; *camphor* with *digitalis*, and with either of these decoctions, or with the infusion or tincture of hops; the *iodide of iron* in the syrup of sarza; and an issue or seton near the margin of the ribs, are the means in which I have most confided.

160. *C.* When *the membranes of the spinal chord* are affected (§§ 52, 53.), the treatment should depend much upon the duration of the disease in this situation. If the patient be seen early, local depletion, chiefly by cupping, followed by calomel and opium with colchicum; by purgatives and terebinthinate enemata; by terebinthinate embrocations in the course of the spine, and by blisters, are most serviceable. If the case come under treatment at a more advanced period, or if the above means have failed, partial palsy or paraplegia, or other symptoms of increasing
congestion, effusion of lymph or pressure on
chord appearing, issues or setons in the back
loins; the bichloride of mercury, or the iodide
potassium, in the decoction of sarza, and the otl
means advised in the articles on PALSY and SPIN
CHORD, will then be appropriate.

161. *D.* When the *diaphragm*, or either
pleural or peritoneal surfaces are implicated,
when the costal *pleura*, or the *peritoneum* (§§
55, 56.) reflected over the abdominal parietes
attacked, the lymph thrown out soon excites
flammatory action in the opposite parts of tl
membranes, and agglutination of the surfaces s
follows. This complication not infrequently ca
under my notice many years ago in public
stitutions, the affection of these surfaces hav
been an extension of disease from the adjoir
parts, the tenderness and pain of which o
masked the more internal mischief. When, h
ever, the diaphragm is implicated, the sympt
of diaphragmitis are generally present in a
manifest form (see Art. DIAPHRAGM, § 9. *et s*
In these associations of the disease, the m
already advised, especially local depletions,
lomel, colchicum, and opium; terebinthinate
brocations, blisters, issues, &c., and various o
means recommended in the articles on inf
mations of these surfaces and on their consequen
may be rèsorted to. In many instances, t
forms of disease are not brought before the
sician until they have arrived at advance
chronic states — until effusion, adhesion, &c.
taken place; and then a judicious and perseve
treatment will be required to produce any am
ration, aided by change of air, by suitable
and by whatever may promote the general h
and constitutional power. In many cases, how
the iodides already mentioned, taken in sui
vehicles; bichloride of mercury in small
with sarza; alkaline solutions with iodides; P
mer's pill, with soap and taraxacum; rep
applications of the terebinthinate embroca
repeated blisters, and issues, when aided by
per regimen, will be productive of some be
These external means are more efficacious
the application of the tartar-emetic ointr
which I have not found of much service in
cases.

162. *E.* The *association of affections of the s*
organs with rheumatism, or the supervention
former upon the latter (§ 57.), requires n
adapted to the states of sexual disorder, suc
orders being duly considered under their respe
heads. But, in respect of these, as of othe
sociations of internal disease with rheumatis
should not be overlooked, that it is not only
internal disease which requires appropriate
ment, but also the rheumatic diathesis — the
stitutional affection, whether depending up
seated in the organic nervous system, or i
blood, or in both, — and to this diathesis, and
conditions constituting and indicating it, our r
of cure should also be directed; using mean
culated to support the vital power of this sy
and to remove the morbid conditions of the
— objects which are more certainly attain
the remedies I have advised for the treatm
rheumatism, than by any other. Rheumati
females being so frequently connected with
pression, or irregularity, or difficulty, o
cessation of the catamenia, or with leucor

af tions, due attention in the treatment should th fore be devoted to these disorders.

63. *F. Gonorrhœal Rheumatism*, or the states of eumatism consequent upon gonorrhœa (§ 44. *et q.*), is one of the most difficult to remove. A se re case of it occurred in my practice very la y, and presented the mixed form of capsular an aponeurotic rheumatism, the knees, and limbs ge rally, having been severely affected. The io e of potassium and solution of potash, in the de ction of bark, or in the guaiacum mixture, an requently with colchicum, were the medicines ch ly prescribed. The case proceeded favourabl and after a few weeks the patient was able to ha change of air, and to take regular walking ex ise. In more obstinate cases, I have given th pirit of turpentine internally until the urinary or s were affected with success; or bark with alk ies and the iodide of potassium, whilst terebir inate epithems, or blisters, were applied on or ne to the affected joints. In this form of the dis se, a full dose of calomel, colchicum, and op n, taken at night, and a draught with castor oil d spirit of turpentine the following morning, in dition to these means, and repeated at inter ls of one, two, or three days, will generally be great service. I have seen the tinctura lyttæ, an capsicum, given with the medicines now me ioned, until some degree of irritation was pr uced in the urinary organs by the former, an until heat or smarting at the anus followed the tter, prove most beneficial in this form of the co laint. If the affection of the joints become ch ic, the internal use of the iodides, and the rep ted application of blisters, or the formation of ues near the joints, and recourse to thermal spr gs, are amongst the most efficacious means of cu If this form of the disease be neglected at an rly stage and becomes chronic, it is not only ren ved with the greatest difficulty, but organic lesi of the joint is very apt to supervene.

4. *G. Rheumatism is often associated with influ a or catarrhal fever*, or *with ague*, or *with a ren ent form of fever*, and I have already shown tha e complication is due chiefly to the presence of laria in the humid and cold air to which the pat t has been exposed, or to his having previo y been the subject of ague (§ 58.). In cas of either of these associations, the treatme which I have recommended for the rheuma affection is equally appropriate to the assoc ed disorder, the lowering means too frequ ly prescribed for the former aggravating not onl t, but also the complication, and favouring the upervention of still more serious internal dis e, especially of the fibro-serous, or serous sur es.

5. *H.* If *Pneumonia* or *pleuro-pneumonia* sup vene in the course of acute rheumatism, a mo rate general or local vascular depletion will be escribed with advantage, if the patient be str or plethoric; and calomel or antimonials wit opium, and saline diaphoretics, will generally be quired. Blisters will also be of service. In a e, which was under my care, caused by ren val in an unfavourable state of weather and sea n, into a damp house, rheumatism, in a subacu form, disappeared from the arm after two do of the wine of colchicum of ten drops each ha een taken, and was immediately followed by ast nic pneumonia with rusty expectoration. A small cupping on the chest (seven ounces), and camphor with ammonia, small doses of the decoction of senega and terebinthinate rubefacients, and due attention to the several secretions and excretions, especially to those from the skin and kidneys, were soon followed by recovery. Pneumonia and pleuro-pneumonia associated with, or consequent upon rheumatism, have but rarely come under my observation; and the association of *scurvy* with rheumatism is not more frequent, although these complications appear to have been of more common occurrence during the early part of the last century, according to the best practical writers on medicine in that period. More recently *lemon-juice*, which has been found so beneficial for the prevention and cure of scurvy, has been said to have been serviceable in rheumatism, but I have had no experience of it in this latter complaint.

166. vii. REGIMEN, DIET, AND CHANGE OF AIR. — There are few diseases which require greater attention to these than rheumatism. During an attack of the acute form of the disease, the *regimen* and *diet* should be antiphlogistic. Such articles as are the least likely to occasion acidity should alone be taken. Saccharine substances ought to be avoided. As soon as convalescence has proceeded sufficiently far to admit of removal, *change of air* should be recommended,—more particularly to a mild or warm and dry air, or to a place where warm salt-water baths may be procured, or thermal springs may be used, especially to Bath or Buxton. If the attack has not been complicated with, or followed by, any affection of the heart, regular and active exercise in the open air ought to be taken, as soon as the patient is able, so as to preserve a free excretion from the skin. If any cardiac affection is present, an issue should be kept freely discharging near the margins of the ribs. In more chronic or mild cases, the regimen and diet ought to be regulated according to the peculiarities of individual cases; but, in every instance, change of air, active exercise in the open air, when it can be taken without detriment to the affected part; flannel clothing nearest to the skin; a diet regulated conformably with the state of the complaint; and due regulation and promotion of the several secretions and excretions, are most important aids to a permanent recovery, and to the prevention of a future attack.

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RICKETS. — SYNON. — *Rhachitis* (from ῥαχις, he spine, or ῥαχιτης, spinal), Glisson; — *achitis*, Sauvages, Vogel, Boerhaave, Cullen; — *Tabes Pituitosa, Morbus Anglicus, Osteo-alacia, Mollities ossium, Osteosarcosis*, Auct.; — *nutritio ossium*, Darwin; — *Osteomalakia*, wediaur; — *Scrofula rhachitis*, Young; — *yrtosis rhachia*, Good; — *Tabes pectorea, Spina dosa, Rachitismus*; — *Rachite, Rachitisme, iquets*, Fr.; — *Englische krankheit*, Germ.; — *achitide*, Ital.; — *Rickets, softening of the nes.*

CLASSIF. — *Class* 3d. Cachectic diseases; — *Order* 2d. Swellings (Cullen). — *Class* 5th. Diseases of the Excernent Function. — *Order* 1st. Affecting the Parenchyma (Good). IV. CLASS. IV. ORDER. (*Author.*)

DEFIN. — *Softening and curvature especially e long bones, and swelling of their extremities; ead being large, the spine bent, the abdomen en-d, and the flesh emaciated and flabby, with all igns of general debility and impaired assimila-*

This disease was first described by Dr. DAVID STLER, in his inaugural dissertation (*De bo Puerili Anglorum dicto "the Rickets."* lun. Batav. 1645.) GLISSON, who soon af-ards wrote on this complaint, states that he induced to give it the name of Rhachitis, be-e the spine was so often affected in its course, because the term nearly resembled *rickets*, name by which it was commonly known in land before the time at which he wrote. Dr. MIN remarks that the works of WHISTLER, SON, BATE, and others, procured a currency heir opinion that the disease made its first arance in the western parts of England to-s the middle of the seventeenth century, and it hence was called the *English malady*. The first of these writers published in 1645; the second edition of GLISSON's treatise appeared in 1650; and hence it may be inferred that the complaint had first appeared at a much earlier period. FLOYER, indeed, states that "Rickets first appeared in England about the year 1620." These, as well as other contemporary writers, contend that the disease was considered of recent date; that it first appeared in the southern and western parts of the island, and that it had spread to the eastern and northern counties by the time when GLISSON wrote. Softening of the bones, although most frequently observed in the young of the human species, is not confined to the species; for it has been observed in monkeys, in the several domestic animals, in the ox, the horse, and in pigs; and even in poultry, especially when exposed to cold, humidity, unwholesome air, and to improper diet. Viewing rickets as consisting chiefly of an imperfect assimilation, in which the bones suffer more especially, and evince more or less softening, I shall *first* and chiefly consider it as it appears in *children* — as common or true rickets; and *next*, very briefly as it occurs in *adults*, or as the *mollities ossium* of writers.

3. I. RICKETS AS AFFECTING INFANTS AND CHILDREN. — Rickets has been observed in the fœtus by several writers; but it is doubtful whether or not the imperfect ossification, and consequently softened state of the bones, observed congenitally, should be viewed as rickets, as, in this disease, there is, as will be shown hereafter, a change in the state of the affected bones different from a mere delay or simple imperfection of osseous formation. The complaint has been met with from the earliest months until approaching puberty; but it is most commonly observed to commence during the first dentition, or from six or seven months to three years of age. M. GUERIN states that, of 346 cases, 209 were affected from the age of one to three years. Three cases only were congenital, and 34 only occurred from four to twelve years. Of the 346 cases, 148 were males, and 198 females.

4. i. DESCRIPTION. — The course of the disease has been divided by MM. GUÉRIN and GUERSENT into *three stages*, 1st, that of incubation; 2d, that of deformity; and 3d, that of restoration or of irremediable atrophy, as the termination may be. From considerable experience of the complaint, I believe the division to be useful, and to be based on sound observation. — *A.* The *precursory*, or *incubative* period, does not constitute the complaint; but consists chiefly of that impaired state of the organic nervous or vital functions which occasions those changes constituting the malady; and that state may be associated with a variety of ailments of the digestive and assimilating organs. The transition from apparent health to the incipient state of the disease is always gradual, and consequently more or less slow; but it may be masked by some other disorder, and hence not be recognised until this period has made considerable progress. The impairment of vital power originating the malady is most frequently associated with indigestion, or with chronic irritation of the gastro-intestinal mucous surface, or with bronchitis, or with hooping-cough, or even with lobular pneumonia, and with more or less change of the urine, which, however, has generally been imperfectly examined. Nevertheless, cases

occur in which but little or no ailment, or merely slight debility of the digestive and assimilating functions, has been remarked up to the time of the manifest appearance of the complaint.

5. With the approach of rickets, the child is dull, or sad, or peevish; is averse from play or any action; prefers to sit or lie, appears feeble or indolent, or complains of inability to use exertion, and of pains in the joints and along the bones; the appetite is impaired or is capricious; the bowels are irregular or relaxed, and the stools morbid, or pale, or deficient in healthy bile; the face is pale, and the flesh becomes soft and flabby; perspiration is free on slight exertion, and is weakening and colliquative during sleep, and the skin often moist during the day. The pulse is quick, soft and broad or open, the external veins are large, and the jugular veins much dilated. Thirst is generally present; emaciation becomes evident, and the abdomen tumid. With all these symptoms, however, no evidence of rickets may exist; for they may accompany or usher in other maladies; but, when with these, the urine is more abundant than in health, and when it deposits a copious calcareous sediment, or abounds in the phosphates, then the early or precursory stage of the complaint may be considered as already present; and it is in this stage especially that the salts are most abundant in the urine (§ 16.).

6. The *duration* of this period necessarily varies with the number and severity of the symptoms now enumerated, with the age and constitution of the patient, and more particularly with the quantity of phosphates contained in the urine. It may thus vary from one or two months to six or seven; but, when the head is very large, and the bones of the head imperfectly developed, or the sutures not closed when the abdomen is very tumid, the bowels lax, the stools pale and deficient in bile, and the urine abundant, the second, or developed state of the complaint appears early. The continued operation of the causes, neglect or injudicious treatment, and the occurrence of some local intercurrent affection, may shorten this period; whilst a proper treatment and regimen may remove all the symptoms, and prevent the developement of the disease. In some cases, also, the precursory stage may be hardly apparent; the first indication of the complaint being the actual deformity of the limbs constituting the second stage; the child may have appeared, up to the detection of the flexure of the long bones, in good health; although closer observation and an examination of the urine would have detected more or less evidence of disorder.

7. *B.* The *second period* is that which is characterised by more or less deformity of the bones. The extremities of the long bones, especially those of the ankles and wrists, and the sternal ends of the ribs, are the parts which first evince this stage, by their swollen or knobby appearance; and the lower portions of these bones now begin to yield, especially those of the lower limbs, when the child is so old as to attempt to walk. The increasing softness and yielding of the bones are now apparent in the gradual change of their forms. The lower extremities are usually curved by the weight of the body, whilst their bones yield more or less to the action of the most powerful of the muscles. They generally present the convexity of the curvature outwards, and the concavity inwards. e femurs are sometimes curved forwards, but m e frequently outwards, as are the tibiæ. The kn s are sometimes bent inwards, and the feet thro n outwards, so that the knees press against e h other, and the patient rests on the inside of e foot; and as often the knees are separated to n unnatural distance by the continued curvat e outwards of both the thighs and legs, the whol f the lower extremities forming irregular curvatu s, with the convexities outwards and greatest a r near the knees. In some cases the angle for d between the neck and shaft of the femur is chan d from an obtuse to a right or an acute an e. Much of the deformity which takes place in is stage is owing either to the manner of carryin r placing the child, or to the weight of the body d head upon the lower extremities when atte s are made to stand or walk, and upon the u r extremities also, when the child crawls abou n its knees and hands.

8. The head of the rickety child is gene y unusually large. The vertex is often flatte ; the forehead is prominent and broad; and e centres of the parietal bones expanded. e fontanelle is wide and unclosed; and, if the d be very young, the sutures expand or re n open. The bones of the face are imperf y developed, or are partially arrested in r growth; and the under-jaw is often elong d. The process of dentition is arrested or dela ; or if they have been formed they soon de y, owing to softening of the fangs, and of the alv ar processes. The clavicles are, after the bon of the lower extremities, the most frequently e- formed. The long bones of the upper extren es are much less frequently curved than those o e lower. The spine is generally also curved, o g as much to yielding of the ligaments as to so n- ing of the bodies of the vertebræ. The curv re is commonly outwards, but it is sometimes so lateral-outwards in the back or between e shoulders, where the curvature is also to one e, and to the opposite side in the lumbar re n, where also there is sometimes a curvature inw s. The curvatures of the spine, especially outw s, are generally connected with a flattening o e ribs laterally. The ribs are turned inwards, d their sternal extremities, at their connections th their cartilages, are swollen into knobs. W st the sides of the chest are thus compressed e dorsal spine is pushed outwards, and the ste m also outwards, the diameter of the chest, m right to left, being thus much diminished, an e "pigeon breast" formed. (See art. CHEST e-*formities of.*) The flat bones, as those o e shoulder and pelvis, are also sometimes affe d. The shoulder-blade is, in a few instance so deformed as to embarrass more or less the n e-ments of the shoulder; but when the bon of the pelvis are softened, the deformity is o e utmost importance, especially to the femal in after life. The change of form in the pel is often remarkable, and is extremely various e sacrum and pubis being carried either back ls or forwards, the ilia directed inwards or othe se altered, the lower part of the sacrum pushe p-wards, and the outlet of the pelvis vari ly altered in form and diminished in diameter. e progress of deformity is generally from the x-tremities to the centre of the frame, and re

e cially from below upwards, particularly after tl first year.

. The relative proportion of the alteration of tl different bones in rickety patients has been st d by M. Guérin. But it should not be o looked that, as the bones nearest the centre o he frame are the last affected, or are liable to d rmity only at an advanced stage, and in n ected or ill-treated cases, the statistics he has fu ished are open to the objections which may b rged against the statistics of other diseases — w ther the relative proportion, or numerical calc tions, be applied to symptoms, or to organic cl ges, or to remedial results,—objections based o the differences of disease owing to varying c binations of predisposing and exciting causes; t ndemic and epidemic influences; to seasons a weather, to modes and manners of life, and t umerous circumstances, to which it is needless h to advert. M. Guérin states that, of 496 c s of rickets, eleven only had swellings of the e emities of the bones without curvature; and o he 485 with curvatures, 59 had at the same ti deformity of the thorax, 48 deformity of the sp e, 17 enlargement at the same time of the c ium, and 14 only deformity of the upper extr ities simultaneously with these alterations.

). During this stage, the deformity of the b s is not the only change. The alterations m tioned in connection with the first stage conti e during this. The abdomen continues tumid, o ncreases in size, and is more tympanitic, the li s more emaciated and flabby; the child more la uid and weak; the perspiration free and re ily increased; the thirst increased; the pulse q k, small, and weak, with slight hectic sympto ; and pains are complained of in the bones a joints. The bowels are irregular, or loose, a the stools pale or almost devoid of healthy bi The general emaciation and change in the b s allow the head to appear larger than usual, w st it is often only large in proportion to the re of the body; and whilst all other parts of the fr e, the bones especially, cease to grow, during th stage, the head appears even to enlarge, and th aculties of the brain to be developed, someti s precociously.* The cessation of growth, p cularly of the bones, during this period is most re rkable in the lower extremities, and less so fr below upwards. M. Guérin states, that hi omparisons of the skeletons of rickety subjects, w those of the same age and sex who had not b rickety, gave the following per centage of re ction in the different bones: — in the fibula, 2 er cent.; in the tibia, 25; in the femur, 22; in e cubitus, 19; in the humerus, 15; in the clavicle, 9; in the sternum, 8; in the spine, 5; and in the pelvis, 17 per cent.

11. The *duration* of this stage necessarily varies with the persistence or removal of the causes during treatment, with an early or delayed recourse to judicious means, with the diet and regimen, and with the local affections which may complicate the disease. In the more rapid states of the complaint this stage may not continue longer than two or three months, whilst in more chronic forms, and when the complaint has been long neglected, and unfavourable circumstances continue their influences, this period may extend even to several years, the deformity and its attendant symptoms either very slowly increasing or remaining nearly stationary.

12. *C.* The *third stage*, or *period of restoration*, or that attended by either a favourable or unfavourable change, is marked by no very sudden alteration from the state above described; it appears gradually, but rarely rapidly, unless some intercurrent disease, or local affection supervene; and this is not infrequent. — (*a.*) If the disease does *not tend towards recovery*, the emaciation increases, the abdomen is more distended, and the bowels more disordered, whilst the secretions and excretions are still more morbid than before. The deformity of the bones continue or increase; and ultimately the child is carried off by disease of the lungs or of the abdominal viscera, or several lesions of the thoracic and abdominal organs may co-exist in the same case and terminate life, as congestion of the lungs with effusion into the pleura; general bronchitis with gastro-intestinal irritation; lesions in the digestive canal with enlargement of the mesenteric glands; crude tubercular formations in the lungs, with tubercles in the membranes of the brain, and effusion in the ventricles or between the membranes, &c. If the child is not carried off by one or more of these, and continues deformed, without any amendment of the symptoms, the softness of the bones is much diminished, their flexibility is lost, they are more atrophied, and they are more readily broken; the deformity often still increasing. Recovery then rarely takes place; a complication of internal disorders, consequent upon structural changes, and upon a morbid state of the blood, ultimately terminating life.

13. (*b.*) A *favourable change* from the second stage is evinced at first by the states of the secretions and excretions. The urine assumes a more natural appearance and composition (§ 16.); the stools are more healthy, and coloured more deeply by bile; the abdomen appears less tumid and less tympanitic; the pulse is less frequent, and pains in the limbs are not so much complained of. The countenance presents more animation; and the hectic or remittent febrile symptoms and thirst subside gradually. The appetite is less capricious and more natural; and, with the continuance of these changes, the flesh becomes firmer, and voluntary motion is made with greater activity. The growth of the limbs, which had been suspended until now, proceeds with remarkable vigour; the bones are gradually restored, and, if the deformity is not very great, it disappears by degrees; the curvatures are either diminished or altogether removed; the swellings of the epiphyses of the bones subside, and ossification proceeds with great rapidity, the affected bones ac-

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Mental precocity is not, however, always seen; for so times the child continues dull, taciturn, or stupid, or ev idiotic. These opposite states have been explained by pposing that the openness of the sutures has allowed th irculation and developement of the brain to advance at increased rate, and the faculties of the mind to ex nd; whilst the closure of the sutures, and the conse nt unyielding state of the cranial bones, have confi and embarrassed the functions of the brain, and oc ioned the opposite state of the mental powers. But, as as I have observed, precocity has not always existed in nnection with openness of the sutures; nor stupidity w their closure. Perhaps the chemical pathologists, w attempt to explain all by chemical changes, will acc t for the different phenomena by ascribing them to th tate of the blood and to the excess of phosphates in it, ring their passage from the bones to the kidneys, by w h they are eliminated.

quiring greater density and strength than usual. The muscles also acquire a more powerful developement, so that persons who have been rickety in childhood have afterwards become remarkable for strength.

14. (*c.*) During *recovery* an excessive ossific action often occurs, more especially in the parts which had been swollen and softened during the stage of deformity. Not only are the sound bones more dense, but, in some intances, a state of hyperostosis or extoses more or less numerous, especially near the epiphyses and sutures, is observed. I have seen this occur most remarkably at the terminations of the ribs and commencement of the cartilages, the whole being more or less soldered together, and also with the sternum. Occasionally slight accessions of fever are observed during recovery, and either advance the process of restoration, or are the mere concomitants of the change taking place in the bones and system generally. If the complaint occur in children about the second year of age, or later, although it may be of considerable duration, amendment is generally rapid when it commences; and even when the growth is stunted, and the deformity is still considerable, still the period of puberty may remarkably develope growth and diminish the deformity, especially when the advantages of a favourable change of air and out-doors exercise are enjoyed.

15. When the disease is attended by an outwards or lateral curvature of the *spine*, or with flattening of the ribs and protuberance of the sternum (see art. CHEST, *deformities of*), recovery is imperfect and protracted, and the more so the greater the deformity arising from the curvatures of the spine and the flattening or bending inwards of the ribs. In these cases the functions of the lungs are impaired, and the more advanced parts of the assimilative processes are impeded. In many of these cases, especially in those which are the most deformed, and when the spinal curvature is so extreme as to form a dorsal hump, the deformity continues through life, the duration of which it may considerably abridge, by favouring the supervention of congestion of the lungs, or bronchitis or pneumonia, or even asphyxia, by pressure on the origins of the spinal nerves. In some, the curvature diminishes with the restoration of health, aided by suitable treatment and regimen; but, in others, it increases, sometimes after having been long stationary, owing to some change in the general health, or to debility, or to disease, when ultimately a fatal termination takes place in the way now stated.

16. *D. The urine in rhachitis* presents more or less change from the healthy state. Generally it is much more abundant than might be expected, considering the free transpiration from the skin. It is commonly pale, but it is sometimes of natural colour. The urea, and uric acid are diminished, whilst the salts are increased. A free acid is sometimes observed, which has been said to be the phosphoric, but this requires further investigation. The phosphates are more abundant than in health, and more especially than in healthy children; and a considerable sediment of oxalate of lime is not infrequent; and it has been observed that urinary calculi are frequent in rhachitic children. As far as my own observation enables me to state, the increase in the fixed salts is most considerable during the advance of the first st e, and when the deformity begins to appear in e bones: it is less remarkable when the disease i ar advanced, and the softening and flexures e greatest. The phosphate of soda and the ea y phosphates are most abundant. In a case x- amined by MARCHAND (*Lehrb. der Phys. Ch c.* p. 338.), the urine contained much lactic d and lactates, and a great excess of the ea y phosphates. In a case by Mr. SOLLY (*Tran t. of Roy. Med. and Chirurg. Soc. &c.*, vol x. p. 448.), three or four times the usual amou of phosphate of lime existed in the urine. m exact composition of the urine during the d stage, especially during a return to the hea y state, has not been shown.

17. *E. Various complications* often occur i e course of this complaint. These may be eith of an acute or chronic nature. Rickety chil n may be the subjects of the usual disease of c l- hood, as hooping-cough, measles, scarlet f r, small-pox, &c., or of bronchitis, pneumonia n- flammatory irritation of the digestive canal, n- largement of the spleen, scrofulous enlargeme of the glands, tubercular productions in the l gs and other organs, cutaneous eruptions, &c. st of these are accidents by no means necess ly consequent upon the rickety constitution; t, when the disease is far advanced, or is attende by deformity of the spine or chest, then the affec ns of the lungs, pulmonary congestion, effusions to the shut cavities, and disorders of the dige ve organs, may be favoured by such deformity. he complications now mentioned, which are not e- cific, and which result not from infection, are en produced by certain of the causes which con e to produce this malady, or by influences to w ch children in this state are often exposed, re especially to various endemic influences, a close, cold, and humid air, and injudicious t. M. GUERSENT remarks, that he has seldom f d rickety children the subjects of tubercles, alth gh he has observed two-thirds of children who ve died of other diseases present tubercular forma ns in some of their organs. M. RUFZ also st s, that in twenty rickety subjects he found tube es only in six. There can be no doubt of these n- plications having the effect of aggravating d accelerating the unfavourable progress of the s- ease in most cases; the only exceptions l ng when the eruptive fevers occur in a mild f n, and then, in a few cases, they have appe d to impart a new and favourable state of vas ar action to the frame. In the most severe an l- vanced cases, other complications than thos l- ready mentioned often occur, and, in the weak d state of constitution, frequently terminate e. These are chiefly colliquative diarrhœa; h ic with colliquative sweats; congestion of the b n, with or without effusion, and attended eithe y coma or convulsions, fractures of the long b es on sudden motion, retension of urine, comple or incomplete palsy chiefly in the form of parapl a, and loss of one or more of the functions of se

18. *F. The appearances after death* posses n- terest, not merely as respects the state of e internal organs and the lesions in them to w h death is more directly owing, but as regard e changes observed in the bones themselves. T e latter changes can be observed in the early pe ds of the disease, only when the patient is carrie ff

by some complication or intercurrent disease. M Guérin has observed the alterations which ta place in the *bones* during the three periods of th disease, and from his researches I am enabled to ve the following account: — (*a*.) When death is used by some acute disease affecting a rickety su ct during the *first stage*, as sometimes happens, th ong bones, when quite fresh and not previ ly exposed to the air, are congested with a la quantity of dark blood, which exudes from al arts when the bone is divided either longitudi ly or transversely. This blood appears not to contained in blood-vessels, but to be effused on ch side, in the medullary canal between the m llary membrane and bone, in all the areolæ of e spongy structure of the diaphyses, of the ep yses, and in the intermediate tissue which un s these two portions of bone, and under the pe steum, which is evidently injected and thi ened. Blood is also interposed between the la llæ of the compact structure of the bones, th admitting of an easy separation, and allowin his fluid to exude in numerous minute points. Tl blood is at first very fluid, and is readily re ved from the surfaces on which it exudes; bu at a more advanced stage, it loses its dark co r, becomes gelatinous and semi-transparent, an adheres firmly to the surface of the osseous tis . It then presents the rudiments of minute ca lary vessels. During these changes in the bl l the vessels of the bones acquire an increased de lopement; the openings through which the ve ls pass to and from the interiors of the bones ar much dilated, and the osseous system is the se of a remarkable sanguineous congestion, in wl h the small and flat bones also participate m or less.

. (*b*.) In the *second stage*, the osseous tissue is anifestly more or less softened, admitting of fle res according as the weight, pressure, position, or uscular actions of the body may direct them. O examining closely the structure of the long bo s, the swellings of the diaphyses and epiphyses ar found to be owing to the developement of a ve fine spongy tissue, of a new formation, which M Guérin has named the "*spongoid tissue*," to di nguish it from the ordinary spongy structure. Tl tissue consists of very fine irregular areolæ, wl h replaces the sanguinolent fluid charging the bo s in the first stage, and is found spread out ur rneath the periosteum, forming a coat from on to two lines in thickness. It is found also be een the lamellæ of the bones, where it may be etected by its darker colour; and between the bc and the medullary membrane; but it is ab dant around the epiphyses. It is also abunda , and more dense at the concavities of the fle res than at the convexities; and it is found in th the long and flat bones. The periosteum s ore or less vascular and thickened.

. (*c*.) The *third stage* presents changes in the bc s very different from each other, according to th ermination it assumes. When recovery and co equent re-ossification take place, the *spongoid tis* of the new formation is nearly altogether tr formed into a compact structure, especially in th concavity of the curvatures; and it is so al ndant towards that part where the medullary ca l is most contracted, as to invade the greater p of the canal by osseous lamellæ. Whilst the c pact structure acquires a very great density, it becomes the whiter the longer the duration of the consolidation, until it assumes the hardness and appearance of ivory. Disseminated through this structure in the diaphyses, and in the epiphyses as well, irregular open spaces are sometimes observed, apparently resulting from a partial resorption or from a retraction of the solid parts. When re-ossification does not take place, the compact structure is thin, fragile, dry, or compressible, especially around the epiphyses. The areolar tissue found within this thin osseous shell consists of large unequal or irregular cells, which extend throughout the whole of the medullary canal, which is filled with very fine osseous lamellæ surrounded by an oleaginous fluid. This alteration, which is found also in the epiphyses, M. Guérin has named "*Rickety consumption of the bones.*"

21. (*d*.) It must be evident from these alterations that the bones will present important chemical results upon analysis; and that the chemical changes will vary with the amount of softening, and of the alterations just described; and as these latter vary in different cases, in the same case at different periods, and in different bones in the same subject. According to Bostock and Becquerel, the earthy constituents of the bones are remarkably diminished during the early stages of the complaint. In two children who died of pneumonia during the early period of rickets, the bones of the cranium presented but a slight diminution of the earthy phosphates, whilst the femur, the tibia, and the sternum, contained only from a fourth to a twelfth part of the proportion usually observed in health.

22. (*e*.) The complications of the disease above enumerated, will suggest many of the visceral lesions observed in fatal cases of rickets; for to these death is generally more immediately owing. The brain is found more or less large relatively to the rest of the body; and fluid is often effused within the ventricles and between the membranes, which in a few cases have presented small or crude tubercular formations. Effusion of serous fluid is sometimes found in the pleural cavities; and the lungs often are pushed downwards by the lateral pressure of the ribs. The bronchi are often inflamed or congested, the lungs are congested, or in parts resemble the structure of the spleen, or contain, in some instances, tubercles in various stages of developement. The heart is often paler than natural, and, in a few instances, has presented incipient organic lesions, especially when the complaint has been of long duration, and the deformity of the chest has been considerable. The liver and spleen are often pressed downwards by the thoracic deformity; and both organs are sometimes found more or less enlarged—the liver frequently paler than natural. The alimentary canal is generally very much distended by flatus, and the mesenteric glands are more or less enlarged, and occasionally contain crude tubercles. The different series of glands contained in the digestive villous surface are either enlarged or ulcerated, particularly when the disease has been complicated with intestinal disorder. The muscles are generally very flabby, pale, and wasted; the adipose tissue is wasted by absorption; and what remains appears soft and almost fluid. The whole of the structures, visceral and external, present a state of flabbiness or softness.

23. ii. Diagnosis and Prognosis. — *A*. The

Diagnosis of this complaint is sufficiently easy, excepting in the precursory stage; and then it is often as difficult as it is important to detect the approaching mischief. In this stage the complaint may be mistaken for several incipient diseases, especially for tubercles in the lungs, for tubercular peritonitis, for tubercular disease of the brain or of the cerebral membranes, or of the spine. A short time and an attentive observation of the symptoms, will soon show whether or not they agree with those described as characterising the first stage (§§ 4, *et seq.*); and when enlargement of the ends of the long bones, and especially when these become at all deformed, the diagnosis will be manifest. If any mistake should be made, or any difficulty of diagnosis between the incipient states of these maladies should arise, but little evil need result, as the treatment would not be inappropriate to either of them. It is evident from the changes observed in the bones, especially those evincing reossification, that the softening of the bones of children, or *true rickets*, is, in very essential points, a distinct disease from the *softening of the bones* sometimes observed in adults, especially in females, although I have considered it at this place as a species of rickets, from the softening and deformity attending it. This latter, the true osteomalacia, or mollities ossium, is never followed by reossification, especially when it is consequent upon chronic or malignant diseases, or the puerperal state. Curvatures of the spine supervening in the course of rickets, should not be confounded with those curvatures caused by tubercular or scrofulous disease of the vertebræ on the one hand, or by relaxation of the ligaments, &c. on the other. (See Art. Spine). Nor should it be overlooked, that the curvatures of the spine, so frequently observed connected with deformity of the chest, may exist in children as well as in adults, or young persons about the age of puberty, without the least degree of rickety change in the bones; that this curvature, as well as the deformity of the chest and sternum (described in article Chest, *deformities of*), may exist, on the one hand, either separately or together, both in children and in adults, no other deformity of the bones being present; that either or both deformities may, on the other hand, supervene in the progress of true rickets, and of mollities ossium, or the rickets of adults; and that, when curvatures of the spine are thus associated with true rickets, or with mollities ossium, the bones of the pelvis are generally also deformed or contracted in various directions, more especially when the lower extremities continue much bent and shortened by true rickets, and when the softening occurs in adult age. It is worth noticing, also, that the extremities, especially the lower, not only cease to grow during the disease, but also continue much shorter during life, although they have acquired remarkable strength.

24. *B.* The *prognosis* depends not only upon the progress and severity of the complaint, but also upon the combination, or persistence of the causes, and upon the effects produced by treatment. If the child be not remarkably debilitated, if the disease be not far advanced, and if the deformity have not invaded the spine, or pelvis, or parietes of the chest, a favourable result may be expected from treatment; but when vital power is much reduced, when the deformity is great, and has extended to the spine, or to the chest, or tc he pelvic bones; still more especially when it is nplicated with serious visceral disease or lesion nd when the deformity is such as to impede th espiratory functions, or when the head is affe d, and sopor, coma, or convulsions supervene or when the urinary functions are disordered, en complete recovery should not be expected; d, although life may in many cases be indefi ly prolonged, yet it may be very rapidly termin d, particularly in the latter circumstances. A nfavourable issue is the more likely to occu he earlier in infancy the complaint appears, the re serious the disorders which usher it in, and he more manifest and marked the predisposing c es existing in the parents.

25. iii. Causes.—A due recognition of th emote causes of rickets is of the utmost impor ce in preventing and in curing the disease.—*A.* he *predisposing causes* are not merely those whic ct externally on the child, but those also, and en especially, which are derived from the parent nd the nurse—these latter sources, which have bee oo much overlooked at the present day, but to w ch Boerhaave and his commentator have dir ed attention.—" Maxime autem infestus ha ur proli, cujus parentes laxa et debili cond ne corporis, otiosi, molles, opipara mensa, cibis nguibus, saccharatis, pauca pane, vinis dulcis is, et aqua multa calida, usi, morbis chronicis, ve e, ætate, exhausti, tabi inprimis venereæ, et it tis gonorrhœis, multum obnoxii, effœtam ferm enituram impenderunt generandis liberis." (§ 1).—There is much truth in this enumeration the predisposing causes derived from the parents In respect of the influence to be ascribed t he exhaustion produced in the parents by ch nic diseases, venereal excesses, and age, Van Sw en remarks:—" Tales parentes, debiles, mor os, languidos, infantes gignere, nemo dubitat. de inter signa sanitatis optimæ numeratur, si his natus sit parentibus sanis, vegetis, plenæ a is, rara sed fervida venere utentibus. *Lyc* us qui validis exercitiis firmabat virginum cor a, antequam viris jungerentur, voluit, ut r ns nupti non cohabitarent, sed clam et furtiva asi venere uterentur tantum, adeoque rara et fe da. Talem curam gessit robustæ et bellicosæ pc ritatis. Facile patet, qualis proles expectanda t a decrepitis, uti et ab illis, qui, in ipso ætatis v re, libidine ac perditissimo vivendi genere exh sti, conjugia ambiunt, dum, ante trigesimum a m jam imbelles senes, lectissimas virgines tu ter decipiunt." (Vol. v. p. 587.).

26. There can be no doubt that these caus so strongly insisted upon by Boerhaave and an Swieten, predispose to this disease in th ffspring, by imparting an innate or congenit debility to the infant constitution, although ey cannot be viewed as imparting a more es ial tendency to it than to scrofula, or to other di es of debility to which this is more or less c ly allied. The children of parents who have m ed at a premature age, or who have indulge in sexual excesses, or who have been guilty o lfpollution, or who have become debilitated by er causes of exhaustion, as by living in unhe hy localities, or in the foul air of crowded fact es, or by sleeping in close or crowded sleeping c mbers, are predisposed to this, amongst other aladies, which are allied more or less to each er,

as spects their causes, rather than as regards their fo s or seats. Certain of the predisposing causes e ing in the parents, to which Boerhaave imp d a considerable influence, and which prob y did, at the time he wrote, and still more so w n rickets first became a frequent disease, possess th influence, namely, the taint or constitutional d lity consequent upon venereal or gonorrhœal a tions, may not, in the present day, produce th effect upon the offspring in so remarkable a anner as in those times; still I am convinced th they are not without some effect, although I b ve that they are more influential in developing a crofulous diathesis than in predisposing to ri ets.

7. The effect of *leucorrhœa* upon the offspring, m e particularly as predisposing to rickets, may a it also of doubt; still some of the best medical a orities have insisted upon the influence of this c plaint in the parent. Stoerck contends that fe les who are subject to leucorrhœa, are liable to uffer abortion, or to have rickety children. — Monebat, tales mulieres, nisi integre curentur a quam nubant, facile abortiri, si conceperint. I n felici arte cavebatur abortus ita, ut fœtus ad m uritatem perveniret, notavit sequentia. *Tales a m fœminæ pariunt plerumque infantes crassos, p ues, robustos, et hi tales manent per plures m ses: postea vero emaciuntur, lassi fiunt et m bra pendula gerunt; tandem subsequitur pessi rachitis, quæ raro huc usque sanari potuit.*"

3. The *predispositions* referable to the children th nselves have not been sufficiently investigated. R kets have been observed in all constitutions: in he dark, the fair, the delicate, and the app ntly robust; but most frequently in the deli e, in the sickly, in the soft and flabby, and in in nts with large heads, whose fontanelles remain o n, and whose dentition is delayed. Insufficient n ishment, unhealthy milk, early weaning, or " inging up by hand," a watery farinaceous di after weaning, a too exclusive use of veg bles, and the want of animal diet in cold and d p localities, and the periods of the first and se nd dentition, favour the occurrence of the c plaint, especially in the constitutionally or h ditarily predisposed. Indeed whatever debili es the frame not only predisposes to rickets, b also sometimes more directly developes it.

9. *B.* No particular *exciting cause* can be a uced in some cases to account for the appeara e of the disease, besides those which I have e merated as being occasionally predisposing i uences. But when these act in combination, a when other fortuitous circumstances aid their o ration, they produce a more direct and exciting e t. Probably, however, residence in a cold a damp locality has a still more direct influence i developing rickets, even than those causes a ady mentioned, although without their aid th cause may not produce this effect. Indeed th disease is even *endemic* in those places which a cold and damp, and where the poor are insuffi ntly fed and clothed. I believe that the abuse o piritous liquors by either parent is not only a p disposing, but also an exciting cause of the c plaint, and that it is more especially such when th vice is indulged in by the mother during the p od of lactation. The murderous practice of g ng narcotics to infants, so notoriously prevalent a ngst many of the physically and morally degraded of the manufacturing population, may produce a similar effect where it fails of causing a more rapid extinction of life.

30. *C.* The *proximate cause* of the change in the bones, of which rickets is the result, is still unascertained. No satisfactory explanation of the changes which take place in this part of the frame has hitherto been adduced. It has been suggested, that a superabundance of acid in the blood may cause the removal of the phosphates from the bones; but there has been no analysis of the blood in this disease, and the existence of an acid, and still less the kind of acid, in the blood have not been shown.* If the change were owing to the state of the blood entirely, it might be expected that the bones would undergo the same amount of softening and of chemical alteration throughout the frame. But this is found not to be the case, for the bones of the lower extremities experience these alterations in a much more marked degree and much earlier than those of the head or trunk. It may therefore be inferred, that whatever agency the blood may exert must be directed or influenced by the vital or the organic nervous influence, to which the nutrition of the several structures is chiefly to be imputed. We only know that the disease results from many depressing causes, acting in various combinations, but always producing a constitutional debility, depressed organic nervous energy, imperfect assimilation and nutrition, and consequently a morbid state of the blood, with all the consecutive changes observed first in the softer structures, and ultimately in the bones; but our knowledge has advanced no further than this, either in amount or in precision.

31. iv. Treatment.—*A.* The *prophylactic treatment* of rickets consists chiefly of the avoidance of the causes which occasion it, and of the adoption of those hygienic means which are requisite at all periods of early life, and more especially during the epochs of infancy and childhood. A healthy nurse, a warm and dry atmosphere, change of air, due ventilation, the animal warmth communicated by a healthy mother or nurse, suitable food—suitable as respects the periods of lactation, of weaning, and of dentition; attention to cleanliness, to dryness of the clothes, and to the warmth of the lower extremities, are the most efficacious measures, as far as concerns the child itself, that can be adopted for the prevention of this malady.

32. *B.* The treatment of the *successive stages* of the complaint depends much upon the visceral and constitutional disorders attending them. These disorders, especially when neglected or improperly treated in the first stage, tend to develope the rickets; and, in the second, either to retard recovery or to endanger the patient. — (*a.*) When any of the affections, which have been mentioned

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* Although the existence of lactic acid in the blood has not been demonstrated, it may probably exist; for it is not unlikely that this acid is formed in excessive quantity in the digestive canal during the early stages of the disease, owing to the nature of the ingesta and the state of the primary assimilation, and that, being carried into the circulation, it there affects the functions of nutrition, and impairs organic nervous energy, although its accumulation in the blood, in a large or very sensible quantity, will be prevented by the depurative actions of the skin and kidneys. It may also be remarked, that the formation of lactic acid in the digestive canal, and its excessive excretion by the emunctories, are phenomena of familiar occurrence in rheumatism, in the puerperal state, and in several diseases, during which softening or other changes in the bones have sometimes taken place.]

as complicating the *first stage*, appear in conjunction with those symptoms or indications of incipient rickets — more particularly with an excess of the phosphates in the urine, the treatment of them should be conducted with much caution; for they have been too frequently viewed and treated as inflammatory, when they have been only the results of irritation, or consequences of the presence of irritating materials circulating in the blood, and of an asthenic state of organic nervous power. When, therefore, any of the disorders noticed above (§ 17.) are observed to complicate this stage of the complaint, they should then be removed by means directed more especially to the improvement of the secretions and excretions, to the mitigation of both local and constitutional irritation, and to the promotion of vital power. In order that these intentions should be fulfilled with due success, the states of the perspiration, of the urine, and of the intestinal discharges should be carefully and almost daily examined. The urine particularly ought to be tested and chemically investigated; and, upon the states of these excretions, the choice of medicinal agents, as well as of diet and regimen, should mainly depend. The primary processes of assimilation especially require attention; and these are generally most efficiently promoted by a suitable diet, and by a warm and dry atmosphere.

33. When the *urine*, although abounding in phosphates, nevertheless presents an acid re-action, and when it does not become rapidly offensive, then alkalies may be given with tonics, sedatives, or alteratives. The irritative fever and quickness of the pulse, frequently attending the first stage of the disease, have often induced the physician to prescribe lowering means, when a restorative treatment was actually required. But the attendant fever being characterised by nervous asthenia, by copious or colliquative perspirations, by pale phosphatic urine, by general palor, and by the softness of the pulse, these furnish sufficient indications for restorative remedies. The alkalies most serviceable in these circumstances are, the carbonate of potash, the liquor potassæ, or Brandish's alkaline solution, or magnesia, with infusion or decoction of cinchona, or infusion of cascarilla, with aromatics. If the carbonates be prescribed, small doses of the dilute hydrocyanic acid, or of the extract or tincture of conium, will be of use. If the urine present only a slightly acid re-action, or if it be already, or soon become alkaline, the mineral acids, especially the hydrochloric and the nitric, or the combination of both, may be given with aromatics, or with small doses of the hydrocyanic acid, or of opium, or of conium.

34. If the *bowels* be confined, they should be sufficiently opened, and all fæcal accumulations and morbid secretions evacuated by means of stomachic aperients, especially the compound decoction of aloes, or equal parts of the compound infusions of gentian and senna, or rhubarb with aromatics. When the stools are devoid of bile, it will be preferable to attempt to procure an increased secretion by means of the nitro-muriatic acids, given internally, or used externally at a warm or tepid temperature, than to administer mercurials, which tend to depress still further the already impaired organic nervous power. Occasionally, however, the hydrargyrum cum creta will be given with benefit in conjunction with rhubarb, and cinnamon or ginger. If the tient be so old as to swallow a pill, these ll be most advantageously combined with the spissated or purified ox-gall. If the bowels b laxed, or the stools yeasty, and the patient m h griped, or pained generally, the alkaline m cines (§ 33.) may be given in lime-water d milk, with minute doses of tinctura opii, o of tinctura camphoræ composita, or of tinctura puli; and an enema, containing the same gredients, may be occasionally administered. n these latter circumstances, liniments or embr tions containing either of the balsams or turpent s, or camphor, applied over the abdomen, ar of essential service. The terebinthinates and bal is are severally of use, when given internally, t they ought to be prescribed only occasionally, d in small doses, so as not to irritate the uri y organs. Emetics have been advised, but the re of service only when this stage is complicated h hooping-cough or bronchitis, and even then ch y with the view of procuring a discharge of a mulated secretion from the bronchi, when t re is difficulty in expectorating it. During this pe d, as well as in the second, when there are ma d palor of the surface, and frequent sweats, e mistura ferri composita, made agreeable h liquorice powder, is eminently beneficial; a if any pulmonary symptom exist, conium sh d be added. If the bowels are torpid, this mi re may be conjoined with the decoctum aloes positum.

35. In this stage, as well as in the next, sp ing the back, loins, and thighs, with a d solution of bay-salt, or with tepid sea-wate is generally of service, especially when followe or preceded by active friction of the surface. e complaint in this stage is often quickly arreste y change of air, especially to a warm and dry s tion, and more particularly to such a situ n near the sea-coast. In the cases of infants a e breast, due attention should be paid to the s s of health and of the milk of the nurses; and e treatment of the infant should be partly cond d by directing such means to the mother or nur s will correct or improve this secretion. If is object cannot, or is not likely to be attain a healthy nurse should be procured. If the plaint appear about or after the period of wea , a sufficient quantity of ass's milk should be g n daily; or the farinaceous articles of diet ma e allowed with mutton, veal, or beef broth or ; or warm gellies, or the yolk of an egg, ma e taken once or twice daily.

36. C. In the *second or deformed stage*, e treatment should be in many respects the sa s now described. The febrile irritation somet s observed is still more remarkably the resul of debility conjoined with a morbid state of the b d than in the first stage; and hence it ought n o interfere with the adoption of tonic and resto e medicines, which, when duly selected, will b e most efficient means of improving the va s secretions and excretions. As in the former st , so in this, a particular attention should be dire d to the urine; and according to the states of s excretion, as well as of that from the skin, e decoction or infusion of cinchona may be g n with the nitric or muriatic acid, or with both r with the solution of potash, or with Brand s alkaline solution, or with a preparation of

mo a, and some warm aromatic. The sulphate of iina with sulphuric acid may be substitut for the above, especially when the skin is fla y and covered with perspiration, and if the be obvious anæmia, or even in other circu tances, the compound steel mixture may be iven as above (§ 34.), or the muriated tin ure of iron in the infusion of calumba or qu ia, or the iodide of iron in the syrup of sarza. Th is the best preparation of iodine for this dis se; although the iodide of potassium, taken in onic decoction or infusion, is often of service. In is stage, and not less so in the first, the cod-liv oil will be found very remarkably beneficial. I ve prescribed it for every case of this compla t which I have seen since 1844. This oil is no prepared by the principal chemists in the me polis from the fresh livers; and, thus prepa l, it is a much less unpleasant medicine than in e state in which it was formerly procured. Bu of the several fish-oils which may be prescri ed — those of the cod, of the ling, of the skate, &c -the oil from the liver of the torsk is certainly to preferred, according to my observation; and it ay be readily procured from the Shetland Isl the only place in this kingdom where this fish is undant.

. In this stage more particularly several earthy pre rations have been recommended with the vie of furnishing the materials for the reossificatio f the bones. But, as the disease is not so mu the result of any deficiency of the elements of one in the nutriment, as in the failure of org ic nervous or vital energy, whereby these ele ents form and unite in the tissues during the pro sses of assimilation and nutrition, so it may be ferred, that much less importance may be attri ed to the administration of substances contai g the constituents of bone, than has been att hed to it by some writers. Nevertheless, as sev al of these substances are useful in controlling ce in of the symptoms, or in exciting the actions of similating organs, or in rousing organic nervou power, they may be given with advantage, esp ially lime-water charged with fixed air, ma esia similarly charged, or effervescing, or eit of these conjoined with other means; the mu ates or chlorides of lime, or of baryta in mi te doses, and the phosphoric acid and certain of phosphates; but it is doubtful whether these lat are beneficial or injurious in any stage of ric ts. I have prescribed the chlorate of potash wi other tonics in several instances with benefit; an when the liver is torpid, small doses of me ury with chalk and rhubarb; or, when the sto are frequent, acid, and yeasty, with the co pound cretaceous powder, or with this powder an minute doses of opium. In these latter circu tances, the treatment above recommended wh colliquative diarrhœa is present (§ 34.) ma be adopted, or powders may be given co aining small doses of powdered cascarilla ba , cinnamon, and the carbonate or sulphate of iro Most of the preparations of iron are bene ial in this stage, more especially those already me ioned, and the citrate of iron, the tartrate of iro and ammonia, and the vinum ferri, either of wh h are readily taken by children.

. In this stage, the same *external means*, *diet*, an *regimen* as was prescribed for the first should be bserved, varying each, according to the effect and the peculiarities of the case. Boerhaave, Van Swieten, and others, have advised, and I am confident that the advice is judicious, that the utmost care should be taken to preserve the beds and bed-clothes clean, fresh, and perfectly dry; and to dust the surface of the body with tonic, astringent, and aromatic powders, especially when the perspirations are colliquative or weakening, and after warm salt-water bathing or sponging, or after the tepid salt-water douche on the back, loins, or limbs. In this state of the complaint, tepid chalybeate baths, variously medicated baths, and the thermal springs, recommended for chronic Rheumatism (§ 142.), may be employed, as well as the Tunbridge waters, and the natural or factitious mineral waters recommended for that disease (§ 151.). The child should be kept as much in the open air as the temperature and weather will permit, and in the sun-shine. The utmost care ought to be taken that the position, either when lying, or when being lifted or held up, should be such as not to bend the bones from their natural direction. As the weight of the trunk and head is apt to bend the long bones when the patient is allowed to stand or walk, either too early or in this stage; and, as the weight of the head is liable to produce curvatures of the spine, when the patient is allowed to sit too long, or too much, a recumbent or reclining position should be adopted at intervals, or for a considerable period during the day. A properly constructed couch or bed, on which the patient may lie either on the back or on the abdomen, and use his arms and hands without difficulty, will prove of great benefit; and a recourse to frictions of the surface, especially over the back and abdomen, will at the same time be of service. Galvanic or magnetic electricity will be productive of much advantage in this disease, especially if aided by judicious treatment, regimen and diet. When the legs are chiefly or only affected, standing or walking should not be allowed. In these cases, particularly when the curvatures are outwards, I have often directed the legs to be tied together, or confined by a broad band, bandage, or handkerchief, so as to prevent walking, and to resist the curvatures, or press the flexures in a proper direction. For this, and other kinds of curvature, various mechanical modes of treatment have been employed; and iron, or steel, or metal supports, or implements of different kinds and shapes, have been adopted. But these means, although sometimes of service in diminishing superincumbent pressure, or in resisting the disposition to flexure, are often injurious by preventing the muscular actions, and by embarrassing the circulation of the parts or limbs. Moreover, all metal supports are injurious, however carefully they may be covered, by conducting the animal heat, and the electricity always circulating through the frame and favouring the passage of both into the surrounding air. When the complaint is either so severe or so extensive as to implicate the vertebral column, or the parietes of the chest, or both the one and the other, the remarks I have offered on deformities of the Chest, as well as of those of the Spine, are altogether applicable to those more extensive forms of rickets. (See Chest and Spine).

39. II. Rickets in Adults. — Synon. — *Mollities ossium*; *Osteomalacia*; *Malacosteon*, *softening of the bones in adults*, &c. — This com-

plaint, although resembling in many respects the rickets of children, is in others a different disease; more especially as respects the changes which take place in the texture and fibrous membranes of the bones. It is more frequently observed in females than in males, and it oftener affects the pelvis and spine than other bones; but it may extend to nearly all the bones, such cases, however, being very rare. I can add nothing at this place to what I have adduced respecting the *causes*, *nature*, and *treatment* of *mollities ossium*, or the *softening of bones in adults*, in the article Osseous System (§ 27. *et seq.*).

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ROSE-RASH. — Synon.—*Roseola* (from *ro a* rose; or from the Italian *Rosso*, red), Wi), Bateman, &c.; *Rossalia*, *Rossania*, Aucto —*Exanthisma roseola*, Young; — *Exanthesi ro seola*, Good;— *Rubeola spuria*, Frank; — s *sellina*, Auct.; — *Roseole*, *Eruption ros e*, *Fausse rougeole*, Fr.; — *Rothlen*, *Rother h d*, Germ.;—*Red-rash*, *False Measles*.

Classif. — 3d. *Order*, Exanthemata; ı. *Genus*, Roseola; Rose-coloured effl scence (Willan). III. Class. III. Or r. (*Author*).

1. Definit. — *An eruption of small rose-col d patches, of irregular forms, very slightly elev d, not papular, transient, and passing into a d er roseate hue as they slowly disappear; the pa es being either limited to a part, or to the lim or dispersed over the body, preceded and attende y slight fever, and non-infectious.*

2. Under the term of *roseola*, modern w rs have described several forms of eruption, w h are chiefly symptomatic, and which, in ap r-ance, are intermediate between erythema nd urticaria; but more closely allied to the fe er than to any other eruption. Indeed R a doubts as to the propriety of considering ro la as a distinct genus, and of not viewing it a variety of erythema. Although approachin he appearances of the milder forms of measles nd scarlatina, yet the severer, the specific an n-fectious characters of these, can suggest ne er resemblance to, nor alliance with this erupti

3. I. Description. — This eruption is gene ly preceded by slight fever and disorder of th di-gestive organs, for two, three, or even four s, rose-coloured patches then appearing eithe on parts or over the body. The patches are la er, paler, and less uniform than the spots of me es. They are also more distinct, and are sepa ed from each other by intervals of healthy skin. ey are attended by itching and tingling, and re-quently disappear in twenty-four or thir ix hours; but they sometimes subside, and r rn alternately for seven or eight days. The *va ies* of this eruption have been divided into the *io-pathic* and *symptomatic* — the latter accompa ng or complicating other diseases; the forme de-pending upon less obvious changes, althoug re-quently proceeding from disorder of the sec ng and excreting functions.

4. i. *Roseola æstiva* is the most severe he more idiopathic varieties. It is preceded nd attended by constitutional disorder, and gen ly appears first on the arms, face, and neck, sp d-ing in the course of a day or two to the rest he body, and causing itching and tingling. he patches present the appearances just desc d, and are at first of a lively red, but soon ac re a deeper tint. The pharynx often present he same hue, and a roughness or dryness is fe on swallowing. The eruption continues fully o on the second day, but immediately afterwards b ns to decline; slight patches of a dull red often n-

tinue to the fourth day, and disappear entirely on the fifth, with the constitutional disturbance. Sometimes the efflorescence is limited to parts of the face or neck, or breast or shoulders; and is very slightly elevated. The patches itch very much; but are without the prickings or stinging of urticaria. They last at most a week; but they occasionally appear and disappear again and again, either owing to violent moral affections, or to iced food or heating beverages, or to no very manifest cause. The recession of the eruption is often attended by disorder of the digestive organs, or by headach, or by lassitude, which are relieved by the return of the efflorescence. This variety is met with in summer, most frequently in females of irritable temperament, and in delicate persons with an irritable state of the skin. It is often connected with disorder of the digestive canal; and in its external characters, is intermediate between erythema and urticaria.

ii. *Roseola autumnalis* attacks children in the autumn. It appears in the shape of distinct circular or oval spots, of a dusky red colour, that gradually increase until they reach the size of a sixpence or shilling, and are observed chiefly on the arms and legs. The patches sometimes end in desquamation; are not attended by itching or tingling, and rarely continue longer than a week. This variety is evidently very closely allied to, if not a form of, erythema.

iii. *Roseola annulata* is attended in some cases by febrile symptoms, and is then of short duration; but in others, there is little or no constitutional disturbance, and the eruption continues much longer. It appears nearly on every part of the body in the form of rose-coloured rings, of various sizes, the centres of which are of the natural hue of the skin. The rings at first are only a line or two in diameter; but they gradually enlarge to half an inch, or even more. They are less vivid in the morning; but they revive towards evening or night, and are attended with itchiness and tingling. As they vanish or fade, the stomach is disordered; and languor, pains in the limbs, and vertigo, are complained of. In the chronic state of the eruption, the rings have a sallow or discoloured hue, and often recede and recur alternately, thus enduring for weeks, or even months. I agree in the opinion of M. Rayer that this is merely a modification of *erythema annulatum.*

iv. *Roseola infantilis* presents spots of small size and more closely grouped together; so that, looking only at the eruption, and without reference to other, especially the catarrhal symptoms, it may be mistaken for *measles*; but there is less roughness of the surface than in this latter. This mistake has, however, been often made. This variety of roseola attacks children during dentition, or during febrile affections or disorders of the digestive canal. It may occur only for a single night, or it may come and go alternately for several days. It may also appear in succession in different parts of the body. It is accompanied with febrile symptoms, and more or less disorder of the digestive organs. As respects the extent of eruption, and the sensations experienced, this variety closely resembles roseola æstiva.

v. *Roseola variolosa* is symptomatic of the natural and inoculated small-pox. M. Rayer states that it precedes the former more rarely than the latter, in which it is calculated to appear about once in fifteen cases, in the course of the second day of the eruptive fever, which corresponds with the ninth or tenth day after the inoculation. The efflorescence is first perceived on the arms, the breast and face, and on the following day extends to the trunk and extremities. The long, irregular and diffused patches leave numerous intervals between them. This variety of roseola is, in a few cases, characterised by an almost generally diffused efflorescence, slightly prominent in some points. It lasts about three days; on the second and third, the variolous pustules may be distinguished amid the roseola efflorescence, by their roundness, prominence, and hardness, and the whiteness of their summits. As soon as the pustules appear, the roseola declines. This variety has been regarded as indicative of an eruption of distinct small-pox; but this is generally not the case; more especially when the roseola is of a deep or dusky tint, and the eruptive fever severe, the small-pox eruption becoming then confluent. The earlier writers mistook this variety of roseola for measles, and concluded that measles were sometimes converted into small-pox. This variety occurs chiefly in persons having a delicate and irritable skin, and is very closely allied to erythema.

9. vi. *Roseola vaccina* is sometimes observed in children from the eighth to the tenth day after the insertion of the vaccine virus. It appears as small confluent spots or patches, or is diffused like variolous roseola, commencing when the areola is formed around the vaccine vesicle, from whence it extends irregularly over the surface of the body. It is accompanied with frequency of the pulse, anxiety and general disturbance; but it occurs less frequently than the variolous variety. It rarely continues longer than two or three days; affects chiefly those of a delicate and irritable skin; and, like the preceding, is intimately allied to erythema.

10. vii. *Roseola febrilis* and *R. miliaris* are merely modifications of erythema, and are, in rare instances only, observed in the course of fevers or accompanying miliary vesicles, especially when those are attended by much perspiration. The patches are of a bright rose-colour, of an oval shape, slightly prominent and smooth, and occur chiefly on the chest and insides of the arms. There is seldom itching. The patches usually disappear after two or three days.

11. viii. *Roseola arthritica* is the appearance of a rose-coloured rash in connection with attacks of *gout* or *rheumatism.* This, however, is only a rare occurrence in this country, the efflorescence either preceding or attending the arthritic disease. Dr. Schönlein has described this variety under the term *Pelliosis rheumatica;* and Dr. Fuchs states, that the rheumatism which is thus complicated is endemic in Würzburg; that it attacks adult males most frequently during winter and spring, when the air is cold and moist; and that the eruption is then oftenest met with. The pains are usually experienced in the articulations and extremities; remit, change their place, are increased by cold, and diminished by the warmth of bed. Gastric symptoms, shiverings followed by febrile reaction, dry and hot skin, loss of appetite, and furred tongue, usher in the eruption, which appears on the second, third, or fourth day after the commencement of these symptoms,

usually at first on the legs, and sometimes going no further, but more frequently coming out on the arms and shoulders at the same time, very rarely on the trunk, and never on the face. The eruption consists of small, distinct spots, varying from the size of a millet seed to that of a lentil, rounded, and of a deep red, or violet red hue. The spots are not so numerous as the vesicles of miliaria, or as the spots of measles. Upon the occurrence of the eruption the fever ceases, and the rheumatic symptoms abate. The spots, whose numbers may be increased by successive crops, grow pale, and terminate by a slight furfuraceous desquamation. The arthritic roseola described by **Petzold** and **Hemming**, is similar to that just noticed; but the exanthematous rheumatic fever, which was epidemic in the West Indies in 1827 and 1828, and which was described by **Stedman**, **Nicholson**, and **Cock**, and supposed by **Rayer** to have been this variety of roseola, was more nearly allied, as regards the eruption, to scarlatina than to roseola; and it moreover appeared to have been, in the opinion of, and according to evidence by these and other writers, an infectious malady.

12. ix. *Rubeola cholerica* is one of the forms of eruption which occasionally appears on the surface of the body during the consecutive fever of the *choleric pestilence*. This variety was first noticed by Dr. **Keir** at Moscow, and more fully described by Dr. **Babington** and MM. **Duplay** and **Rayer**. But the eruption observed in some cases of this pestilence does not always present the rubeolar characters; for I have observed it to possess, in different cases, more of the appearances of scarlatina, of measles, of nettle-rash, of erythema, and even of erysipelas, with the attendant tumefaction, than of roseola. M. **Rayer** describes the eruption as occurring most frequently in women, appearing first on the hands and arms, and extending to the neck, breast, abdomen, and lower extremities. At its commencement the spots were of an irregularly circular form, of a bright red colour, elevated above the surface, and but slightly itchy. They were most numerous on the hands, arms, and chest; and in some places they were crowded, or almost confluent, more especially on the chest, where they sometimes formed, by their confluence, patches as large as the hand, somewhat raised, and well defined. The eruption then presented a dirty pink, or rose colour. About the sixth or seventh day, the epidermis cracked, and was thrown off in large scales, where the eruption had existed. M. **Rayer** has seen this eruption complicated with inflammatory affection of the fauces and tonsils, and its disappearance followed by an aggravation of the symptoms, and sometimes even by death.

13. II. **Diagnosis.**—*a.* Roseola, especially the varieties autumnalis and annulata, is distinguished with difficulty from *erythema*. In both kinds of eruption, the patches are irregular and uniform in tint; but are generally smaller in roseola than in erythema. When the febrile disturbance of the former is well marked, and the patches of eruption dispersed over the body, then the diagnosis between it and the latter will not be difficult. — *b.* Roseola æstiva, and R. infantilis, most closely resemble the eruption of *measles*, for which they have been often mistaken; but the absence of catarrhal symptoms, the less degree of fever, the larger size and more irregular form of the patches, the progressive advance of the patches from the extremities t he trunk, and their uniform redness, distinguish se varieties from the punctiform appearance o he eruption of measles. The infectious and often i-demic nature of the latter should also be taken to account. **Sydenham** considered roseola to a variety of measles, and several other writers believed that the former was only a spurious va y of the latter. **Hoffmann**, **Borsieri**, and **Se e**, pointed out the difference, and contended tha o-seola was an exanthem sui generis, and dis ct from the other exanthemata. — *c.* Roseola y be distinguished from *scarlatina* by some o e circumstances just adduced; but more espec ly by the severity of the constitutional sympt s, and the state of the throat and tongue. — *d.* e light-coloured and raised spots and wheals o r-*ticaria* can hardly be mistaken for the more i-formly red patches of roseola. The itchings, g-lings, prickings, and stingings, are much e severe and generally experienced in the fo er than in the latter.

14. III. **Causes.** — Roseola occurs chiefl n children, in females, and persons of a delicate n-stitution, or irritable temperament. It is gene ly occasioned in infants and children by teething d irritation of the digestive canal. In adults is most frequently caused by errors of die r regimen, especially during summer and autu , by hot spices; by overheating the body b x-ercise or exertion; by drinking cold fluid r exposure to cold air when the body is perspi ; by eating shell-fish, or other indigestible -stances; by acid fruits, pickles, preserves, ; by heating or exciting beverages; and by v t-ever irritates the stomach or bowels. It ma e symptomatic of a morbid state of the blood n-sequent upon impaired or interrupted secr n and excretion, especially from the skin, live r, kidneys; and in females from the uterus.

15. IV. **Treatment.** — This eruption req s but little treatment beyond the removal of e causes, remote and pathological, as far as they y be manifest, and the due promotion of the secre s and excretions. When the eruption occurs i e course of acute or constitutional disease it sh d be viewed as critical, and be interfered wit s little as possible. When it affects children, s ll doses of hydrargyrum cum creta, soda, and -barb; or simply the grey powder and magn a; followed after two or three doses, by a little c r oil, will generally be sufficient to remove it; d if the gums be hot or swollen, and the stat r period of dentition suggest the operation, scari g the gums will be of service. In some cases, e liquor ammoniæ acetatis with spiritus æt s nitrici, in camphor water, or in any other suit e vehicle, will be of further benefit. In ad , after duly evacuating the bowels, and prom g the alvine secretions, tonic infusions or decocti , with nitre and alkaline sub-carbonates, wil e taken with immediate advantage. When the s much itching and tingling of the skin, a tepi r warm bath will give relief. When any of the -cretions are disordered — whether the biliary, e intestinal or the urinary, — the treatment sh d be directed accordingly; and, if menstruatio s difficult, painful, or scanty, the biborate of s a may be given with an aloetic preparation and e compound galbanum pill, and when the erup n has disappeared, the mistura ferri composita

oth preparations of iron, may be taken in such con nations as the peculiarities of the case will sug st. The more obviously symptomatic variet of roseola should be treated according to the ature of the disease, of which it is merely a sym thetic, and generally a not very important ma estation, unless when it assumes a deep or dar ue, and then there is a manifest indication for e employment of tonic and restorative means. Th *iet* should be light, chiefly farinaceous, and mo ate; and the regimen in other respects antiphl stic.

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RU EOLA.

— SYNON. — *Morbilli scarlatinosi, S rlatina morbillosa, Scarlatina hybrida*; — *rbilli, Scarlatina, Roseola, Rossania*, Auct. r.; — *Rougeole, fausse rougeole*, Fr.; — *Röt n, Feuermasern*, Germ.; — *Rosalia*, Ital.; — *tard measles, Bastard scarlatina, hybrid sles or scarlet fever.*

CLASSIF. — III. CLASS. III. ORDER. (*Author*).

1 DEFIN. — *Fever attended by coryza, redness ind tering of the eyes, redness and soreness of the pains in the head, back, and limbs, attended third or fourth day by the sudden and gene ption of a red efflorescence, which terminates the tenth day in desquamation; the disease ing the characters of measles and scarlet fever ed.*

2 It is doubtful whether or not this should be vie l as a distinct or specific form of disease, or mer a variety of either measles or of scarlet feve in which many of the characters of either the e or of the other predominate. I have, as will lready appear, considered it as a hybrid, com ning the chief characteristics of both these exa emata. Since the days of the Arabian writ s, until recent times, certain of the exanthenat s fevers were considered as being merely mod cations of the same disease; and it was only as l as the close of the last century that the disti tions between scarlet fever and measles were fully etermined and generally recognised. More rece ly still the differences have been more absolu y believed in, than an extended and divers d experience warrants; for the medical writ gs of the 17th and 18th centuries contain the tories of epidemics, which, according to the desc tions they furnish, present characters which belo both to measles and to scarlet fever. The exp ence of physicians, also, that has been prolong through a number of years, or been extend to different countries, has furnished instan s of either sporadic cases, or of prevailing and alignant epidemics, in which some, if not the jority, of the cases have presented the mixed feat s of measles and scarlatina. Even the noti s of measles contained in the works of RHASES and other Arabian physicians, furnish indications that this form of disease, to which the term rubeola has been applied by myself and others, was actually known to them, they viewing it as a variety of measles; although they afford no distinct proofs of an acquaintance with scarlatina.

3. From the description which J. FRANK has given, it is evident that he misapplies the term rubeola to the more general and severe forms of roseola; and M. RAYER appears to entertain a similar opinion. Indeed the French writers use the word rubeola either with reference to measles or to roseola, to the former especially, and have not recognised this hybrid malady, which has engaged the attention of so many German writers since the commencement of the present century, and whose existence clears up many of the difficulties which present themselves on reading the accounts of epidemics that have possessed the mixed characters of this malady. — RICHTER and HILDENBRAND have defined Rubeola to be a species between measles and scarlet fever. The latter writer states "that *Rubeola* holds a place between measles and scarlet fever, the name being derived from its deep red colour. Authors differ much as to its nature, and have applied the term indiscriminately to measles and to other species of exanthem. Neither in France, nor in Italy, are these names appropriate to measles and to rubeola individually; *rougeole*, in the former country, and *rosolia*, in the latter, being applied indiscriminately to both." The Arabian writers viewed the eruption to which recent German writers have applied the name *rubeola* as a variety or modification of measles; and at a much later period INGRASSIAS, FORESTUS, BALLONIUS, SENNERTUS, and others, have so confounded rubeola with scarlet fever, as that the accounts they have given are equally applicable to either species of disease, owing both to their short and imperfect descriptions, and to their arbitrary or indiscriminating use of the terms rubeola and scarlatina. Towards the close of the last century, SELLE described measles (morbilli) and rubeola as distinct affections, and during the commencement of the present century, several German writers, especially ZIEGLER, REIL, FIELITZ, JAHN, HUFELAND, SCHÆFFER, FORMEY, FLEISCH, and HEIM, have given correct descriptions of epidemic rubeola.

4. I. DESCRIPTION. — (*a.*) During the *febrile stage*, rubeola furnishes most of the catarrhal and febrile symptoms observed at the commencement of measles and scarlet fever: a defluxion from the nostrils, redness of the eyes, frontal headach, cough, watering of the eyes, great heat and dryness of the skin. Sometimes rheumatic pains, retchings, somnolence, dull headach, itching of the eyes, are observed to precede the eruption. Inflammatory redness of the fauces, tonsils, and pendulous velum of the palate, is never absent unless in the slightest cases. According to HEIM patients emit a similar odour to that exhaled by those affected by scarlet fever.

5. (*b.*) On the third or fourth day an *eruption* or exanthem breaks out over the whole body, as if at a single effort. It is however more scanty on the face; and it presents two forms, the one consisting of red spots, with irregular margins, varying from a line to a line and a half in diameter, and remaining distinct throughout their course; the other of red spots, of the size of millet seeds,

possessing no distinct margins, and becoming paler from the centre to the circumference. In mild cases, the efflorescence is discrete; but in the severer cases, it is much more abundant, and the spots larger, being about two lines in diameter; so that, on the second day of the eruption, it imparts to the whole surface a deep and almost equal red colour. Rubeola may now be readily mistaken for scarlatina; but it may be distinguished by the circumstance of the red spots being different from the scarlatinous exanthem, those pressed on by the finger becoming pale, but very quickly regaining their red hue from their centres to their circumferences. The general redness of rubeola, which equals that of scarlatina, fades after two days, the spots still remaining, and small miliary phlyctenæ appear and impart a roughness to the skin, and become filled with a little whitish and thick fluid. During the eruption the constitutional symptoms of the first stage are increased, and others often supervene, as hoarseness, or loss of voice, severe cough, oppression in the chest, vomiting, delirium, or convulsions in young subjects. After the eruption has come fully out, which takes place within twenty-four hours, it continues from six to ten days, retaining its assigned form, and the anginous and febrile symptoms undergo a marked diminution, unless when the affection of the throat becomes aggravated, which sometimes occurs.

6. (*c.*) About the tenth day from the commencement of the disease, the eruption becomes pale and disappears, *desquamation* supervening in proportion as this change proceeds, the anginous and febrile symptoms equally subsiding with the progress of desquamation. This change is often connected with a critical evacuation, as sweats, hypostatic urine, epistaxis, &c. Desquamation proceeds from the centre of each spot, the scales presenting a round or stellated appearance, and without any unpleasant sense of itching.

7. (*d.*) In the most unfavourable cases, rubeola either *terminates* in death, owing to the same circumstances and changes as are observed in measles or scarlet fever, or occasions those visceral affections and their consequences, which are described in connection with these maladies, and which often render the ultimate issue doubtful. Of these consecutive affections, the most frequent are those of the respiratory passages and lungs; of the glands, and of the digestive and urinary organs; and dropsy, especially anarsaca. Rubeola, although frequently a mild, is sometimes a most severe or even dangerous malady, especially when it is epidemic. The epidemics described by Selle presented a malignant character, and were fatal to many; and that noticed by Formey was of a putro-adymic kind, and was very fatal in Berlin.

8. II. Nature.—Several authors believe rubeola to be a specific contagious disease, and therefore belonging to the class of pestilential fevers. Some, however, consider it a variety of one or other of the diseases which it so closely resembles—of either measles or scarlatina. Hildenbrand states "that some consider it with Hufeland, Shäffer, Formäy, and Heim, as a variety of scarlatina; and that Kapp, Wichmann, and Reil view it rather as allied to measles; whilst Ueberlacher, Jahn, and Fleisch believe that no essential difference exists between measles, rubeola, and scarlet fever." According to this last opinion, rubeola should be
viewed as the connecting link between me
and scarlet fever. That rubeola, on the one
is very nearly allied to scarlatina, is shown b
affection of the throat, by the intense redne
the skin, by the mode of desquamation, b
peculiar odour proceeding from the patient
the contemporary existence of both forms o
anthem in different persons in the same loc
and by the consecutive appearance of drop
some instances; but that rubeola, on the
hand, is equally allied to measles is shown, b
catarrhal symptoms—by the coryza, cough,
ing of the eyes, andhoarseness; by the form
segregated spots, forming a part of the eru
and by the occasional prevalence of it at the
times and places as measles, as Hildenbrand
that he had himself observed. Many writer
ther allege, as proofs that rubeola is mer
variety of measles, the belief in scarlatina be
comparatively recent disease, whilst notices
beola are found in connection with measles i
writings of the Arabian physicians. I believ
rubeola is not a disease, *sui generis*, nor
modification merely of either measles or of s
fever, but a hybrid of these two fevers, prese
sometimes a predominance of the symptom
racteristic of the one, at other times of thos
tinguishing the other, and not infrequent
equal combination of the features of both
this opinion I differ little from that held by
denbrand. Reil believed rubeola to be a s
of exanthem between measles and scarlet
whilst Marcus considered it to hold the sam
tion to both these exanthems as exists betwee
and spurious small-pox. But it may be ask
what cause can this hybrid state of disease
puted? Can the copulation of measles and
fever be assigned to epidemic states of the air,
demic constitution, or to the conditions of sea
weather? Or may it be considered an acci
combination, or a coincident appearance o
maladies, in an epidemic form, at the same tim
amongst the same population, the characterist
tures of either malady predominating accord
the predisposition, constitution, &c. of the i
duals affected? This latter view appears
means unreasonable, although the dogma of
Hunter, so long believed in, but now disp
that two diseases cannot exist in the human
nomy at one time, may still appear to som
without sufficient reason, to militate agai
(See Measles, § 48.)

9. III. Treatment. — The treatment
beola must entirely depend upon the ty
character it assumes, either sporadically
demically; and hence the principles of tre
assigned to such types of the diseases of w
is the hybrid — of measles and of scarlet fe
should guide the physician in his treatment
mixed malady. When the disease is mild, th
means should also be mild, and be directed
to the promotion of the secretions and exc
—and consist chiefly of cooling diaphoreti
aperients, and of diuretics; avoiding at th
time all causes, both intrinsic and extrinsi
may favour the supervention of internal con
tions, or of unfavourable sequelæ, and re
and promoting the functions of the skin
ternal warmth and other means which c
stances may require. When the type of t
ease is truly inflammatory, then antiph

me ures should be prescribed, but with the recol tion that however inflammatory it may app r, that it is generally characterised by more or s asthenia, and by an obviously morbid state of e blood, pathological conditions requiring mu circumspection as well as decision in the cho and administration of our means of cure. If, the other hand, the disease assumes adyan , nervous, septic or putrid characters — fea ures of more or less malignity, — as observed in som of the epidemics which have appeared on the Con ent, remedies of a tonic, restorative, as rin t, stimulant, antiseptic, or alterative nature, sho be prescribed; combining, varying, or ada ng each and several of these to the patho ogi conditions of individual cases, as I have atte ted to illustrate when discussing the treatmen of Measles, and of Scarlet-fever.

Bi og. and Refer. — See the works of *Rhases*, *In ass*, *Sennert*, *Baillou*, &c. — *Orlow*, Programma de Rub arum et Morbillorum Discrimine, Königsb. 1758. — *G. A. Ziegler*, Beobachtungen aus der Arzneywis ens ft, &c. Leips. 1788. p. 81. — *Selle*, Medicina Clinica, d e p. 171. — *Jahn*, Neues System d. Kinderkrankh, 44 — *Fleisch*, Handb. ueb. d. Krankh. der Kinder, b. ii. 20 — *D. A. G. Richter*, Die Specielle Therapie, &c. ii. 517. — *Formey*, Topographie von Berlin, 1796. — *eil* emorab. Clinica, vol. ii. p. 12. — *Strohmayer*, Dis ert. Rubeolarum et Morbillorum Differentia, Götting. 306. *Hufeland*, Ueb. die Rötheln, in S. Journ. 1811. 6. 15. — *Fielitz*, Beobacht. einer Rötheln-epidemie, ib b. iv. st. 2. p. 199. — *Heim*, Bemerk. über die Vers iedenheit des Scharlachs, der Rötheln u. Masern, orz ich in diagnostischer Hinsicht, in ibid. 1812, vii t. 3. p. 60. — *P. Ab Hagen*, Dissert. de Rubeolis, Gött . 1812. — *J. J. Schneider*, Beobacht. einer Rötheln pide e, in Adversaria, &c. b. i. pp. 180—203. — *V. N. b H enbrand*, Institutiones Practico-Medicæ, &c. t. iv. 411 — *Gallisch*, Tractat. de Rubeola, Wien. 1823. — *W pner*, Dissert. de Rubeola, Rostock, 1827. — *F. rae*, Dissert. de Rubeolis, Berl. 1828. — *Wagner*, ie theln als für sich bestekende Krankheit, in *eck* , Litterar. Annalen. 1829. Hft. 4. p. 420. — *M. E. N nann*, Handbuch der Medicinischen Klinik. b. iii. th. p. 818.

U NATION. — Synon. — *Ruminatio huma*; *Human rumination*; *Merycismus* (*μηρυ μὸς, ruminatio*); *Mérycisme*, Fr.; — *das W ierkäuen*, Germ: —

Classif. — I. Class. — I. Order. (*Author.*)

1. Defin. — *The regurgitation of food, which* *d ssed into the stomach, and which is remasti ted nd again swallowed.*

2. his affection is of rare occurrence, especially a mple and *complete form.* It is much less re an *occasional, incomplete,* and *associated oc rre e*; and in alliance with some form or other dy epsia.

3. History of. — It is difficult to determine het r or not this affection, — for it may not be call a d ase, seeing that it is attended by considerable njoy ent, — was known to the ancients. When e co ider the habits and luxurious indulgences of e c lized and wealthy amongst the Greeks and om s, and the means which the most notorious urm nds, in their respective eras of luxury, emoye to unload the stomach in order that a con gratification of the palate should be entered on t may be inferred that this affection would ave een viewed as a source of supreme gratiati ; and as one to be indulged in or cultivate and not one to be got rid of. And pro ably he enjoyment would not have been marred en a similar opinion had been entertained by eir hysicians to that promulgated by honest **Fabricius ab Aquapendente**, who believed that the human subjects of this affection are endowed with a double stomach, and that other bestial endowments might, in process of time, appear in them or in their descendants.

b. **Galen** must have had ample opportunities of observation amongst the cases of indigestion he could not fail of having met with in the luxurious but peaceful court of the **Antonines**, yet he does not furnish us with a single instance of rumination; and amid the various stomach-aches and affections of **Marcus Aurelius**, which both puzzled the brain and caused the anxiety of this immortal physician to such a degree as to make him afraid that a glass of spiced wine might be too hazardous a remedy for the good emperor, the faculty of regurgitating his food for a second mastication appears not to have entered into the number; unless we suppose that, this not being considered a disease, the interference of **Galen** was not required, upon the ground that matters of taste, in the animal as well as in the mental application of the word, give a heightened enjoyment by their deliberate rumination.

5. **Fabricius** has furnished two of the earliest instances of human rumination on record. The first was that of a nobleman, in whom it generally took place an hour after his meals; which, whether solid or fluid, were always returned to undergo a second and more deliberate mastication. **Fabricius** has thought it just to mention, that the father of this person had a horn growing from his forehead; and with great good faith has added, "ex quo forte datur nobis intelligi, parentis semen aliquam habuisse cum cornugeris animalibus, neque mirum fuisse genitum filium simile, quid a parente contraxisse," — that, although the son did not inherit his father's horns, yet he possessed the accompanying faculty of rumination.

6. The second instance, with which honest **Fabricius** has favoured us, was in a monk, who, although possessed of a most ravenous appetite, died of marasmus. This monk combined the bestial attributes of both the father and son just mentioned; for, in addition to his faculty of rumination, he had his forehead adorned with two horns, which, in a monk, he avers was the more singular. **John Burgower**, who visited this monk, in the company of **Joseph Prevot** and **Thomas Minadous**, wrote a volume on this very illustrious person, and furnished **Fabricius** with the particulars which are inserted in his works. **Burgower** also adds that the brother of this monk was also adorned with two budding horns, — "duorum cornuum vestigia gestasse," as a striking feature of family likeness; or, as this author will have it, "quod enim fratris erat, id monacho ruminanti simul gratis impertiunt." But this interesting individual did not ruminate, unhappily for the argument of **Thomas Bartholin**, who, from these two instances, has hastened to the conclusion, with true medical logic, and with faithful dependence upon the obvious analogy of the "cornugeræ pecudes," that all human ruminants are adorned with horns; and has also averred, with equal truth, that they will be found, on dissection, to be possessed of a double stomach. This interesting doctrine cost the laborious **Conrad Pyer** no small trouble to refute: and he has concluded in his turn, taking his honour to witness (for he has treated the subject with great gravity)

that this did not agree with his experience, for there are many horned individuals who do not ruminate.

7. DANIEL SENNERT has furnished an account of a man of forty who possessed the ruminating faculty from a child. He found no difficulty in accounting for the existence of this affection in that instance, when he learnt that this individual, when an infant, had lost his mother, and been fed during his nonage with the milk warm from a cow. SENNERT accordingly, more soberly than legitimately, concludes, that he sucked it in with his nurse's milk:—"Quamobrem deficiente educatione, cum orbus infans, et institutionis humanæ inops nutricem vaccam observaverit tuereturque attentius, ipse ruminationi paullatim assuevit, sodalitii familiaritate degenerans, &c.!"—PHILIP SALMUTH has adduced a case of human rumination which he observed, and stated a fact illustrative of its cause, that is met with in most human ruminants. The subject of the affection ate ravenously, swallowed his food after very imperfect mastication, and ruminated about a quarter of an hour after leaving table.

8. JOSEPH FABER LYNCEUS has immortalized the highly respectable ANTHONY RECCHI, who, dinner being concluded, and seated over his cups with his friends, was always obliged to retire, about half an hour after the meal, into a remote corner of the apartment, and then ruminated the ingesta, undisturbedly, and as quickly as possible; which having done, he enjoyed uninterruptedly the society of his friends. "Having been asked how he became obliged to indulge this propensity, he answered that, from a boy he had been subject to acid eructations; and that, after having reached his thirtieth year, he found it impossible to resist admitting into his mouth the food that constantly regurgitated from his stomach. Being further interrogated whether the second mastication of his food afforded him any gratification, 'Indeed,' he replied, 'it is sweeter than honey, and accompanied with a more delightful relish.' This affection might be said to have been in the family of the distinguished RECCHI; for he was blessed with two grown sons, the elder of whom was also endowed with this delightful faculty, but had it more under control than the father, as he could prevent it altogether when in company. The younger son had not then come to its possession.

9. G. H. VELSCH has recorded the case of an inhabitant of London, who, in the fortieth year of his age, and of sound health, always returned his food to undergo a more deliberate mastication. Rumination always took place in this person from one to two hours after a meal; and even at the second hour it still preserved a pleasant taste, and was without any degree of acidity. This, however, was not the case with a young woman seen by DANIEL LUDOVIC, for she returned her food with insufficient pleasure; and the regurgitated matters were often possessed of a disagreeable taste. He states that bitters and stomachic purgatives did not remove this affection, which, however, was not always regular in its occurrence; and although emetics and cathartics prevented it for a short time, it soon returned. With all due respect for DANIEL LUDOVIC I consider this affection more allied to apepsia, than to rumination, or as a state intermediate between them.

10. JOSEPH CONRAD PYER has recorded three cases of this affection, one of the subjects of wh was idiotic, one was a female, and the three w rustics; and he sagely endeavours to prove, f the circumstance of these persons having b rustics and cowherds, that the frequent sigh the ruminating process had impressed their br with a similar propensity, which, althoug first imperceptible, had nevertheless ripened maturity. SLARE has recorded, in the *Philos cal Transactions,* at a time when the Royal Soc was less fastidious as to the publication of pa the case of a Bristol man who ruminated not the more solid ingesta, but also fluids, as and soups. But, amid such imperfect inform as philosophers in those days were quite sati with, I find it stated that his victuals al seemed to descend imperfectly into the stom and to lie in the lower part of the throat. I ever, the portion first taken was the first minated. Nevertheless, I suspect that this was one of sacculated œsophagus simila those which have been more recently publ by my friend WORTHINGTON and others.

11. More recently several cases of huma mination have been recorded by MM. TA PERCY, LAURENT, CULLERIER, and still recently by M. RICHE, SCHMIDTMANN, and self. The first case which came under m servation was treated in 1819 and 1820, an history of it fully detailed in the forty-fifth v of the *London Medical and Physical Journal.* subject of it is still (1848) alive and in health. Since the publication of that cas others, one of them in a medical man, have treated by me; and I have had reason to belie instances of partial or occasional ruminati not so rare in the human subject as is gen supposed.

12. II. SYMPTOMS.—The cases of this aff which I have seen, were of several years' du before they came under my care. The aff was stated to have been partial or occasio first, and had become more constant and co by neglect and indulgence, and by the ha quick or voracious eating. The *symptoms* fully developed case, which continued for time under my care, were as follows:—Th tient was a married man of about twenty-se twenty-eight years of age. Rumination took after all his principal meals. His appeti always good, and his food was taken in mouthfuls, was masticated hastily and impe and swallowed eagerly, chiefly in order to his avocations. There was no thirst. His were habitually costive. His sleep was so

13. Usually rumination commenced quarter of an hour to an hour after a mea its commencement, a sense of fulness was the cardia, followed by a fuller inspiratio usual. As soon as inspiration was comp bolus of the unchanged food rose rapidly fr stomach, during the expiratory act, or pr this act; and so rapidly did expiration suc regurgitation of the alimentary bolus, th latter appeared as part of the expiratory a ruminating process was never accompa any time, with any degree of nausea, n pain or disagreeable sensation. The r alimentary bolus was attended by no un flavour, was in no degree acidulous, was agreeable, and was masticated with great

, and much more deliberately, than when first n.

. The whole of the food taken at any one was not thus returned for remastication, only part which had undergone this process in- iently, and which often constituted the greater of the aliment. That taken at the commence- of a meal was generally first disgorged; but order was sometimes not observed, much de- ing upon the articles partaken of and their arative degrees of comminution and digesti- . The more fluid portions of a meal were lways returned unless along with the more or imperfectly masticated parts; and it was then observed, if a considerable time had ed from their deglutition, that the former was or less acid, whilst the latter possessed the taste and flavour as when first swallowed. n the stomach was distended suddenly by a meal, the fluid as well as the more solid con- were generally regurgitated and again swal- after more or less mastication.

In this case, as well as in the others, this on appeared to have been partially under ontrol of the will; for, although it some- took place when the mind was merely un- ous of the process, yet it never occurred the individual was sound asleep. If sleep ened soon after a meal, either it was broken occurrence of the ruminating process, or ented this process, particularly if it con- for some time. In this latter case, acrid tions, flatulence, &c. took place, owing to stric juices being insufficient for the imper- masticated ingesta. Sometimes, when the ating process was thus prevented, or volun- suppressed, the ingesta were not returned fter some hours; but were then acid, often and bitter, and were occasionally regurgi- in so large a quantity as to fill, or even as han to fill, the mouth. This, however, was nded by cardialgia, or gastrodynia, or by eling of nausea; and even these disgorged s were attempted to be remasticated, al- more generally thrown out on account of isagreeable taste. In a case related by M. rier, the subject of it ruminated only he was urgently pressed by his occupations te his meals in a few minutes, with little ation. On becoming more at leisure, and able to pass an hour at table, he ceased to ate. Human rumination is to a certain de- n involuntary act, and yet the individual rtainly the power of hastening or suspend- o a certain extent.

Dissections have not thrown any light on ection. Nor can it be expected that, even event of sudden death taking place in a ting subject, any very manifest alteration of re would be found. Fabricius and Bar- us were confident of finding two stomachs t in ruminating persons, from the analogy cornuted animals! Pyer and Morgagni ridiculed the idea, and argued that there nimals which ruminated without a double h. The first instance, in which inspection eath was made was in the case of the monk alluded to. It was made by Francis oni, and is related by Rhodius and Bonet, mer of whom states,—"Monachus cum ate cibum ruminavit. Medici brutorum more genuino ventriculo præditum putabant. Ipso defuncto, F. Plazzonus œsophagum reperit undiquaque carnosum instar musculi, reliquis universi corporis partibus se recte habentibus." The physicians of the seventeenth century were not much enlightened by the opening of this monk, but their dreams of the existence of two stomachs were henceforth dissipated. J. P. Frank mentions the case of an old hypochondriacal pharmaceutist who ruminated for forty years. He died greatly emaciated, and on dissection the pancreas was found scirrhous. In a case noticed by Bonet, the only change observed after death was the very great size of the stomach and the rough or corrugated state of its villous surface.

17. III. Causes. — The *predisposing causes* of this affection in man are manifestly debility of the stomach with increased organic sensibility, and an insufficient secretion of the gastric juices for the quantity and state of the ingesta. The *exciting cause* is manifestly an imperfectly divided, and insufficiently masticated and insalivated condition of the more solid food, together with a too rapid distension of the stomach. Probably the former would be insufficient to excite the affection without the latter, otherwise the numerous persons who are incapable sufficiently to masticate their food, owing to the state or the want of their teeth, would be much more liable to this disorder than we find to be the case. It is not unlikely that more depends upon the state of the organic sensibility and contractility of the stomach, especially at its cardiac opening, than upon the other conditions singly now mentioned. It is most probable that, as the more digested and digestible matters are propelled towards the pylorus, the least divided or masticated aliments irritate the cardia, and thus, by a reflex action, originating in the stomach, or rather in this region of the stomach only, regurgitate or propel a portion of the unmasticated contents upwards and along the œsophagus to the mouth for their better preparation. As digestion commences and proceeds and the stomach contracts, the chyme or more altered parts are propelled to the pylorus, and the least prepared or least soluble parts are thereby placed nearer the cardia, whence they are simply regurgitated and remasticated, or where they occasion, according to the states of the organ, or the states of their preparation in the mouth, or their nature, if not rumination, partial or complete, acrid eructations or cardialgia, or any other form of indigestion.

18. IV. Treatment.—This affection should be treated simply as a form of indigestion, due attention being paid to the state of the biliary secretions, and indeed to all the secretions and excretions. But the means of cure will frequently fail if the patient neglect to take his meals deliberately, and masticate his food sufficiently, or if he take more than his digestive powers can duly dispose of. In the cases which occurred in my practice, a grain of ipecacuanha with a sufficient quantity of the pilula aloës cum myrrhâ, or of the extractum aloës purif. to preserve the bowels open, was given twice daily, and a tonic draught about an hour before dinner; or only the pills prescribed in the Appendix (*Form* 558.). These were aided by warm salt-water bathing, followed by frictions of the surface; by cold sea-bathing, or the cold shower-bath; by attention to diet, by eating in moderation, and by masticating deliberately. In other re-

spects, and according to the associations which this affection may present in practice, the treatment is altogether the same as is recommended in the article Indigestion.*

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RUPIA. — Synon. — *Ulcus atonicum, Ecphlysis Rhypia* (Good); — *Rhyparia; Rupia* (from ῥύπος, filth); — *Phlyzacia*, Alibert; — *Atonic ulcer.*

Classif. — *Order* 6th. Vesicular eruptions. *Genus* 4th. Offensive vesicular eruption (Willan and Bateman). IV. Class. IV. Order. (*Author*).

1. Defin. — *An eruption of small, flattened, and distinct bullæ, surrounded by inflamed areolæ, filled with a serous, puriform, sanious, or dark bloody fluid, and followed by thick, prominent, dark-coloured scabs, covering unhealthy ulcers.*

2. I. Description. — This eruption is observed chiefly in delicate, debilitated, or cachectic constitutions. It is so closely allied to *Pemphigus* as to justify the arrangement of both as species of the same genus. Most of the recent writers on diseases of the skin have described three varieties of rupia, namely, *Rupia simplex, R. prominens,* and *I charotica.*

3. i. *Rupia simplex* commonly appears or he legs, sometimes on the loins or thighs, and se om on other parts. It commences with one or re flattened, isolated bullæ, varying from the si of a sixpence to that of a shilling, that contain a rst a transparent serous fluid, which soon bec ies turbid and purulent. This fluid grows consi nt, and is finally changed into scabs of a choc ate colour, thicker in their centres than in thei ircumferences, the outer layer being continuous ith the epidermis, which appears detached a he margins by the fluid underneath. Unde he scabs, which are detached within a few days he skin is found excoriated or ulcerated superfic ly. The sore, if left to itself, either heals up, or is re frequently covered by another scab, whi is thrown off at a later period; and thus the p ess may be repeated for several times. Whe he ulcer heals, the part retains, for a very long ne, a livid or deep red hue.

4. ii. *Rupia prominens* presents larger læ than the preceding, and the scabs are thicke nd the ulceration underneath is deeper. Each lla is preceded by a circular red spot, over whi the cuticle is detached and slowly raised by a ark thick fluid, which soon concretes into a scal the thickness and size of which increase for som ays afterwards. The circumference of the scab urrounded by a reddish border, a few lines in br th, the epidermis of which is raised by a serous id, which forms a new incrustation, adding the extent of that already produced. The areol lso increases in breadth, around the base of the ab, which itself increases in breadth and thic ess, during three or four, or even during seven o ght days. When the diameter of the scale is larg resembles the outer surface of the convex shel an oyster; but in this variety, the incrustation p ects in the same degree as it spreads, becomes c cal, and resembles the shell of a limpet. The sc adheres firmly, and generally requires emollie applications to facilitate its removal. When i removed, the surface underneath the scab a ears ulcerated more or less in extent and depth. the part remain exposed to the air, either a nev rust or scab is formed, or ulceration extends ore deeply and spreads until it approaches the b dth of a half-crown, or crown-piece. The ulc ted surface is pale and readily bleeds. The onic ulcers thus produced heal very slowly; a the cicatrices which they leave retain for a long e a brownish livid hue, and are liable to brea pen afresh.

5. iii. *Rupia escharotica* occurs chiefly cachectic children and infants, and occasion in aged persons, or in adults who have s ered severely from chronic rheumatism, or constit onal syphilis. It commonly appears on the le the thighs, the scrotum, the abdomen, the upp part of the chest and neck; but it rarely i een on the upper extremities. This variety, infants, is almost, if not altogether, identic with *pemphigus infantilis* (see Pemphigus, § 9 It begins by one or two red and livid spot ver which the cuticle is soon raised, by the e ion underneath it, of a serous or sero-sanguinolen uid. The bullæ thus formed go on increasing in irregular manner; the serum they contain b mes turbid, and of a blackish hue; they afte rds

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* Sauvages adduces an interesting case of human rumination which occurred in a rustic, who accelerated and promoted the ruminating process, or rather the regurgitation of his food for remastication, by pressure over the stomach. After thus promoting at will this process, and resorting to it for several years, without any detriment to his health, his Confessor admonished him against it. But rumination continuing, notwithstanding the means employed to promote it were laid aside, he was told to reject the regurgitated food. He did so for a fortnight, but he became so debilitated that he had recourse to medical aid. His physician advised him to instantly re-swallow the substances which were regurgitated, without submitting them to a second mastication, and prescribed for him tonics, stomachics and aperients; and after a few days he was freed from his rumination and all his ailments.

reak, and the dermis, left exposed, appears ulce-
ated, softened or gangrenous, in different points.
bloody and an offensive sanies bathes the surface
the sore, the edges of which are livid, but not
ery painful. In infants the bullæ do not gene-
lly reach so large a size as those in adults, but
ey follow each other in greater numbers; the
res becoming painful, causing fever and sleep-
ssness, and even fatal exhaustion in the course of
o or three weeks. In adults, this variety some-
nes acquire the dimensions of rupia prominens,
d small portions of skin and cellular substance
ten sphacelate, and are detached slowly from the
cerated surfaces. In every instance cicatrization
tardy, restoration being often arrested or sta-
nary for a time. This variety is always attended
marked constitutional disturbance.

6. Rupia is sometimes *complicated*. *R. simplex*
frequently associated with *ecthyma*, or with
bies. The other varieties are occasionally com-
cated with *purpura*, or with the cachexia pro-
ced by very chronic rheumatism, by con-
tutional syphilis, and by long-neglected dis-
der of the digestive, assimilating, and excreting
ans.

7. II. DIAGNOSIS. — Rupia can be confounded
y with ecthyma and pemphigus. — (*a.*) *Ecthyma*
fers from rupia in being a pustular eruption
m its first appearance. The highly inflamed
ola surrounding the pustules, and the hardness,
all size, the embedded position, and the closer
erence of the scabs, further distinguish ec-
ma. — (*b.*) Rupia is distinguished from *pem-*
gus by the smaller size and flatness of the bullæ;
the turbid and sanguinolent contents, as con-
sted with the usually limpid and transparent
d of pemphigus; by the thick, rugous, and
bricated scabs; and by the ulcerations of va-
s extent and depth.

. III. CAUSES. — Scrofulous children; the off-
ng of debilitated, drunken or dissipated parents;
persons who have been weakened or exhausted
depressing causes, by sickness and unwhole-
e food, are the most frequently the subjects of
eruption. It appears, especially during the
ter, amongst the insufficiently clothed and fed,
among those who neglect personal cleanliness,
who live in low cellars, or in close, crowded,
ill-ventilated places or apartments. It is also
le to occur during convalescence from small-
, scarlatina, measles, &c.; and in both young
aged, who are the subjects of some degree of
mia in connection with impaired excretion.
association with cachexia, especially as an
ct of this state of the frame, and of consti-
onal syphilis, in some other instances, is a
umstance of great importance in forming our
ntions, and in selecting our means of cure.

. IV. PROGNOSIS. — Rupia is not in itself a
gerous, although often an obstinate, and, when
eruption is abundant, a serious disease. When
ppears on the legs, the ulcers are always
ctable. The duration of rupia cannot be
d with precision; but it is always chronic,
often very protracted; much, however, de-
ls upon the age and constitution of the patient;
number, the size, and the situation of the
æ; on the states of the consequent sores;
the character and amount of the consti-
onal disorder; or of the cachectic taint, or of
ing visceral disease when this is present.

10. V. TREATMENT. — The intentions of cure are *first* to improve the state of constitutional power, by suitable diet, regimen and medicines; and *next* to improve the state of the ulcerated parts. — (*a.*) The various remote causes should be removed; and the excreting functions of the skin and the assimilating actions promoted by means of warm, or warm salt-water, or alkaline baths; by a generous, nutritious and digestible diet; by a fresh, dry air; by tonic decoctions or infusions, as those of cinchona, cascarilla, gentian, absinthium, &c., with alkalies, or with the nitro-muriatic acids; and by the preparations of iron, when indications of anæmia are observed. But, whilst these objects are pursued, the alvine secretions and excretions ought to be promoted by stomachic aperients; or by a combination of mild purgatives with tonics, or vegetable bitters, or other restoratives. If these means should fail, a course of the cod-liver oil should be prescribed, as I have lately found it successful in two obstinate cases. When this eruption appears in children, the health, and state of the milk, of the nurse require attention. A healthy nurse should be selected for the child, and change of air recommended if this may be accomplished. When rupia occurs during or after weaning, a nutritious and wholesome diet should be prescribed, and asses' milk, diluted, or fresh whey allowed for drink; but change of air, especially to a dry and open situation, or to the sea-coast, ought to be most strenuously insisted upon.

11. (*b.*) The local treatment of rupia consists chiefly of puncturing the bullæ early, and allowing the morbid secretion to escape, and of having recourse to such applications as will exclude the air and restore the healthy action and tone of the vessels of the part. When the scab is formed over the sore, with the natural intention of protecting diseased surface from the action of the air, then the morbid secretion thereby confined underneath or around the scab perpetuates the irritation, and the healing process is prevented. Hence the necessity of having recourse to such applications as will at the same time exclude the air and restore the healthy state of the parts. The water dressing, by excluding the air, is beneficial, as well as by allowing the immediate escape of the irritating secretion from the surface of the sore; but it does not restore the tone of the affected vessels. Strappings, isinglass plasters, and similar means, do not allow the escape of the irritating secretion, and hence, if not often renewed, they fail of being of service. But when frequently renewed, after the parts are stimulated by suitable application, they are then very beneficial. Lotions containing the nitrate of silver, or nitric acid, or the bichloride of mercury, or tincture of iodine, or the sulphate of zinc, or alum; or sponging the surface with spirits of turpentine; or ointments containing either of the balsams, especially the balsam of Peru, or one of the turpentines, are generally of service. BIETT recommends an ointment containing the proto-ioduret of mercury (ʒj to an ounce), or deuto-ioduret (gs. xii. to ℥j). RAYER, advises the surface of the ulcers to be dusted with cream of tartar. A cretaceous powder, containing the oxide of zinc, is preferable to this. An ointment consisting of one-third or a half-part of the unguent. hydrarg. oxido-nitricum is often of service.

Bibliog. and Refer. — *Lorry*, De Morbis Cut. p. 76. *S. Plumbe*, A Pract. Treatise on Diseases of the Skin, 8vo. Lond. 1824. p. 156. — *A. Cazenave*, in Dict. de Méd. 2d edit. art. *Rupia*. See the *Bibliography and References* to the article Pemphigus.

SALIVATION. — See *Mercurial Salivation, and other forms of Salivation* in art. Poisons, § 580. *et seq*.

SCABIES.—See Itch.

SCARLATINA RHEUMATICA.

— Synon. — *Febris Exanthematica articularis; Exanthesis Arthrosia; Plantaria; Dengue; Demga; Febris peculiaris epidemica;—Giraffe, Bouquet,* Fr.; — *Dandy;* — *Eruptive articular fever; Epidemic eruptive rheumatism,* Cock; — *Epidemic anamolous disease,* Stedman; — *Peculiar epidemic fever.*

Classif. — III. Class. III. Order. (*Author*).

1. Defin. — *Severe pain commencing suddenly in the small joints, followed by local swellings and chilliness, or shiverings; to these succeed heat of skin, intense pain in the head and eye-balls, which soon become general; and on the third or fourth day a scarlet efflorescence appears on the palms of the hands, spreads rapidly over the body, and continues two or three days, after which the symptoms subside; the malady being infectious and epidemic.*

2. The epidemic fever, which has been variously named, but which may be justly called an *eruptive articular fever*, or *eruptive arthritic fever*, has been somewhat differently described, and probably it has presented modifications with the climate, season, locality, and circumstances in which it appeared, and with the treatment prescribed for it. But wherever it has occurred it has prevailed almost universally, few persons having been exempt from it. It has, in every place, however, presented distinct characters which constitute it a disease *sui generis* — different from others in combining an exanthematous eruption, ushered in by fever, with most severe rheumatic or neuralgic symptoms, — the course of the malady being so divided by intervals or remissions, as often to give rise to the idea of relapses having been a common feature in its progress. The first account of its existence was brought from Rangoon in the East Indies, in May 1824; and it appeared in Calcutta in June. It extended in various directions to the different presidencies. Dr. Mouat states, that it prevailed not only in Berhampore, but in many other places in the vicinity, in March, April, and May 1825. The secretary of the Medical and Physical Society in Calcutta says, that it was particularly severe in the populous towns of Patna, Benares, Chunarghur, and numerous other places. Dr. Mouat describes it as "an epidemic fever," which was characterised by "the suddenness of its attack, the redness and watering of the eyes, the acute pain in all the joints, rendered excruciating on the slightest touch, the scarlet or crimson efflorescence on the surface, and its sparing neither age, sex, nor habit of body." The accounts furnished by the East Indian physicians of the symptoms and treatment of this epidemic fever, agree in the essential characters, but are desultory, and very imperfect in many respects, and are mixed up with speculations, as usual, as to the influence of too much rain, or of too little rain, of electrical conditions, of terrestrial emanations, and of other supposititious c use in producing it, whilst the most obvious an ru cause is entirely overlooked. The physician wh have written from their experience of the epi mi in the West Indies and North America, two ar after the prevalence of it in the East, have ve the fullest account of its symptoms and treat en but without being acquainted with its previo appearance in the East Indies.

3. This disease made its appearance i th Island of St. Thomas, in the West Indies, i eptember 1827, and soon extended to the r t these islands and to the southern states of An ica It advanced westward among the islands rin the winter, and spread to the ports on the G f Mexico. Thence it travelled northwards an reached New Orleans in the ensuing ing During the summer Savannah and Cha sto were severely visited by it. A few case f appeared in Philadelphia and New York; t did not extend farther north. It has be described by the several writers referred to her fte but with much difference in many particular an it does not clearly appear whether or no t difference was owing to the influence of clim an locality, or to the treatment adopted by the ter Dr. Stedman, who practised in the Island S Thomas, where it first appeared, and Dr. D so of Charleston, have given good descriptior f i The former states, that of a population of ,00 in the principal town of St. Thomas, scarc on escaped. It appeared so suddenly, and sp d s rapidly, as to have caused great alarm; but soo was discovered that although a most painful wa not a dangerous malady; yet it often lef uc suffering, and even disease, after the declin f th more severe symptoms.

4. I. Description. — Dr. Stedman divi s th course of the disease into *three stages*. —) I the *first*, the invasion was somewhat diffe t i different cases. Usually a person in perfec eal was suddenly affected with stiffness and n i one finger, commonly the little finger. T stiffness and pain increased and extended up th and along the arm to the shoulder. The fingers both hands became swollen, stiff, and very pain an incapable of being bent. Sometimes the a ction commenced in the lower extremities, al ys i the small joints, and extending to the lar an to the trunk. These symptoms were follow in short time by restlessness, depression of sp s, b nausea, in some cases by vomiting, and b hilliness or shivering. But Dr. Dickson stat tha shivering was either slight or wanting in disease, as it prevailed in Charleston. To th succeeded fever, with great heat of skin, tense headach, acute pain in the back, knees, kles and in every joint, with violent pain in t eyeballs, which felt to the patient as too large the sockets. In some cases, whilst the ext itie were cold at first, the rest of the body s intensely hot. As the fever and heat of sk were developed, the whole body, particularly th ead, eyes, back, and joints were racked with pa . In some, the features were swollen and d rted, especially the eye-lids; in others, with sw ng o the face and distortion of the fingers, so ss o the mouth or ptyalism occurred. Patien often complained in this stage, as well as in thos which followed, of a feeling of great cold, eve when the skin was very hot to the touch. W Dr.

EDMAN had the disease, he covered himself with ee blankets, although the weather was sultry at time. The severe pains, restlessness, and usea, rendered this stage the most distressing of y form of fever, excepting rheumatic fever. ese symptoms generally continued with more or s severity for twenty-four or thirty-six hours. e fever then abated, and with it also the pains. e patient, however, continued in a state of guor, irritability, and restlessness for three days, t without fever; and generally without hunger, rst, and altogether without taste, the tongue ng loaded, and the mouth presenting small thous sores. The pulse was in this stage much celerated, the urine high-coloured, and the wels confined.

5. (*b.*) The *second* or *eruptive stage* commenced third or fourth day after the primary fever, erally the third, with a return of fever; and h an efflorescence which appeared on the hands l feet, and rapidly spread over the body. This ption is differently described, both as to its racters and time of appearance; and probably vas modified in different cases; but in this, as other respects, the descriptions are loose, devoid scientific precision, and by no means creditable he writers. Dr. STEDMAN describes the erup- as that of "a *blotch* or *wheal* of red-coloured n, between that of scarlet fever and that of asles." Others state the eruption to resemble t of scarlet fever; others that of measles, some t of roseola or erythema, and some the nettle- n. It was attended, "in the severer cases, by s lling of the feet, hands and face, particularly t eyelids, and by a distressing tingling, which, as t eruption disappeared, became an intense itch- i. The efflorescence generally began to fade c the second day, and was entirely gone before t third morning of its existence. This was fol- l ed in almost every case by some degree of des- q mation," which, in a few instances, gave rise troublesome consequences. After this eruptive s e, many patients began to recover their spirits a strength, a complete want of taste often re- n ning for some days; but many patients also b ame subject to the next stage.

. (*c.*) The *third*, or *rheumatic stage*, sometimes i ediately followed the eruptive stage, but often n until one, two, three or four weeks, or more h elapsed; and however early or late it appeared, i as generally of considerable duration, the pains a paralysis being greater than at first. "These p s were not accompanied with fever; and they g erally fixed themselves in one or two joints, a continued to excruciate the patient for weeks." T y were always severest in the morning, and w e off in some degree towards evening. Some w e tormented in addition by most distressing it ing of the skin; and in others the joints, par- ti larly those of the fingers, were painful, stiff, a swollen, so as to produce deformity. The se ndary pains were chiefly in the fingers, toes, w ts, ankles, and knees; confined persons to th beds, and were so aggravated on motion as t all forth groans and shrieks from those who s ered this stage severely. Except these pains, a the irritation they occasioned, "no other s ptom of disease remained. The appetite was g l, although the sense of taste was blunted."— " a period varying from three to four, or six d s, the pains began gradually to subside, deserting one joint after another until they remained fixed for some time in one. This process occupied several weeks, and was often attended by relapses." This description, however, applies only to the severest form of the malady; endless grades of severity, as well as differences in the stages having been observed; "for while some, who underwent the primary fever with the utmost mildness, had the eruptive attack with great violence; others who had passed gently through both, and were congratulating themselves on their escape, were suddenly crippled by the secondary pains." It was remarked, that those whose unavoidable occupations forced them to exertion, or who had resolution enough to exert themselves, got sooner rid of the pains than those who gave way to them.

7. (*d.*) The *differences* or *modifications* mentioned by those who have described the disease were numerous. Dr. STEDMAN remarks that the negroes were much less severely attacked than the white inhabitants; and yet the only three fatal cases which occurred in the island were negroes. Dr. DICKSON, of Charleston, states that excessive determination of blood to the head was frequent, and that delirium was present in several instances; but that it went off with the fever of the first stage, which did not remit, but subsided in a short time — on an average, in about thirty-six hours. The skin at this stage was at first hot and dry; but an abundant perspiration was thrown out, attended occasionally by a rash or miliary eruption. This eruption appearing in the first stage (not the characteristic eruption) was very various, and not the regular or true one. Children were often thus affected by it, and in several adults a thick crop of pimples was the first token of disorder. On the third or fourth day, little or no fever being present, the tongue became coated with a yellowish fur; the stomach uneasy or distressed; the patient low-spirited, impatient, fretful and restless at night. Frequently there were great lassitude and debility, nausea, vomiting, and a distressing feeling of oppression. About the sixth day of the disease "these symptoms were more or less relieved by the coming out of an abundant eruption, which must be regarded as an essential or characteristic part of the malady. It consisted of irregularly shaped patches, red and elevated; the feet and hands swelling with thickening and numbness. There were much itching and burning of the skin, and at this period a second febrile paroxysm often came on; and the pains of the joints were in many aggravated to their former severity." In some cases, the first stage of the disease had passed over with very little notice or complaint, and yet in them this eruptive or second stage was very violent. "Many became sensible on the third or fourth day of an inflammation and enlargement of the glands in the groin, axilla, neck, &c. and these glands continued swollen and painful a long time after convalescence was established."

8. Very young *children* were liable to the disease, even from a few days after birth: some were supposed to be born with it. In these the skin was of a scarlet red, and the tongue and lips smooth and fiery The infant could not bear to be disturbed; it screamed violently when lifted or when any of its limbs were moved. Below five years of age convulsions very commonly attended

the invasion, and sometimes continued with great frequency throughout the whole of the attack. *Pregnant women* were very liable to abortion, instances of miscarriage having been numerous. They were usually seized at the very commencement with violent pains in the back and loins, extending into the thighs, occasioning the expulsion of the fœtus. In old persons, the disease occasioned excessive prostration of strength; and in several of these, it left behind it an erysipelatous inflammation of one or both legs. There was often soreness of the mouth; looseness, lividness, and sponginess of the gums, with slight salivation. Ulcers sometimes formed in the mouth, which were occasionally painful, irritable, and difficult to heal. Very few died in Charleston; but the aged, the intemperate and corpulent were severely shaken by the malady, and remained long debilitated and emaciated; few persons above the age of sixty had absolutely recovered from it after two or three months from the attack.

9. II. CAUSES. — Nearly all who observed this epidemic in the western hemisphere have considered it infectious. Drs. STEDMAN and DICKSON, who have given the fullest account of it, concur in this opinion. The introduction of the disease from one island to another, and the propagation of it from persons and places to others, were so frequently and so incontrovertibly proved, that no doubt as to the fact of its infectious nature was entertained. But how did it originate? for there was nothing in the medical topography, the season, the weather, or the climate of St. Thomas, where it first appeared, in the West Indies, to account for the occurrence. Dr. STEDMAN states, in his very disjointed, although tolerably full account of the epidemic, that it was supposed to have been brought to the island by a vessel from the coast of Africa; but that this fact was not satisfactorily ascertained. Nor, indeed, does it appear, that any trouble was taken to determine the matter. Dr. DICKSON states that the disease was imported into Charleston by the captain of a ship who brought it from the Havanna and communicated it to his family; and that the transmission of the disease was traced from one subject to another. Dr. D. considered it a contagious eruptive fever; and remarked, that, in a few cases, in which the eruption in the second stage did not take place, the patient was liable to a second, third, and an indefinite number of returns of the disease, whilst those "*who were properly covered with the eruption about the sixth day were protected from any future attack.*" He states this to have been a rule to which there was no exception in his practice, and that this protection had particularly attracted his attention.

10. III. NATURE. — The descriptions which have been given of this disease show it to have been an infectious eruptive fever, *sui generis*, attended by severe arthritic, or rheumatic, or neuralgic pains, to which all were predisposed who were not protected by a previous attack. In this it agreed with scarlet fever, measles, small-pox, &c.; and with these diseases it also agreed in its specific eruption appearing at a definite stage of its progress. The eruption itself has not been described with precision; but it appeared to have more closely resembled that of scarlet fever than any other, or to have been intermediate between it and measles. It appeared to have consisted of large scarlet blotches, which were smoot and slightly elevated, owing to the congestion the minute sub-cuticular vessels, and which term ated in desquamation. The violent articular ins, swelling, and stiffness were evidently result f a remarkable alteration of the organic sensi ity, with a consequent change ot the capillary ci ulation in the synovial and other tissues of the nts, as well as in the vascular rete of the skin. ilst the cutaneous eruption, occurring at a c tain period, and continuing only a short time, e tles the disease to rank amongst the exanthemat the painful state of the joints imparts to it the eumatic character. That it was not a fo of scarlet fever is shown by the severity of the eumatic or neuralgic symptoms; by its havi attacked persons who had previously had s rlet fever; by the absence of the nephritic diseas and dropsy so often consequent upon scarlet fev , as well as of the internal affection so freq ntly complicating this fever. That it was not a eumatic fever was shown by the undoubted ropagation of it by infection, by the characte and time of the appearance of the eruption, l the course of the disease, by the absence of any c iac or other internal complication, and by the p ection which a full evolution of the eruption af ded from a second attack. Dr. DICKSON doub hat this was a new disease, and believes it to ave resembled a form of remittent fever observe and described by Dr. RUSH in 1780; but th differences between them are too remarka to admit of any resemblance, and he was acquainted with the accounts of the prevale of the epidemic in the East, contained in the Tr actions of the Medical and Physical Society of alcutta. According to these accounts, as wel s to those given of it in America, the disease appe s to have possessed an asthenic character; as ose who were bled, especially in large quantity, ere long in recovery, although a moderate ble ing was beneficial in the plethoric or those ely arrived from Europe; and it seemed to hav ursued the usual course, particularly as resp ted the first and second stages, whatever means ere used — to have been incapable, like the her exanthemata, of being cut short by any treat nt, however much its violence was mitigated — mitigation which was best accomplished l an emetic, followed by mild purgatives and dia retics. The very few deaths which occurred d ing this epidemic appeared to have arisen either om pre-existent organic lesion, or from some incident or intercurrent disease produced by its ual causes, and presenting no necessary conn ion with this malady.

11. IV. TREATMENT. — Dr. STEDMAN tes that the first cases which appeared at St. Th as were so mild that he prescribed only purga es, the warm bath, pediluvium and diapho cs. When the pains were severe patients refused urgatives, owing to the distress occasioned b he least motion. As the cases became more sev in the course of the epidemic he had recou to bloodletting, during the establishment of the f ile excitement of the first stage taking away fro 12 to 20 ounces, but never more, nor ever rep ng the operation. After bleeding and purgi he gave Dover's powder at bed-time. Durin he eruption he gave cooling aperients and c ng beverages, and prescribed the usual washes f he

oreness of the mouth. Dr. Cock adopted a si- ilar plan of treatment to that of Dr. Stedman. r. Dickson states, that he, as well as others, at rst prescribed bleeding, purgatives, and warm iaphoretics; but the great severity of the pains duced him to give large doses of opium, and the lief and success following the practice induced m to persist in it and to relinquish bloodletting, he believed that not only was the vital fluid thus usbanded, but the subsequent sufferings were ssened in severity and duration. He considered at, beyond the preservation of an open state of e bowels, cathartics effected very little benefit; d that an emetic was less objectionable, but was most instances unnecessary. In addition to a e recourse to opium he employed camphor, her, and sinapisms externally. Restoratives peared to have been required at an advanced ge of the disease, especially in aged and delicate rsons.

12. In the East Indies, the softness of the pulse d the general depression deterred many medical en from bleeding from a vein; but some had course to the application of leeches, and others nsidered that bleeding in any form was pre- dicial. The most successful practice appears to ve consisted of the administration of an active etic, followed by purgatives so as to freely acuate the bowels; and these by opiates or odynes with diaphoretics; restoratives and tonics ving been given after the subsidence of the ption of the second stage.

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ARLET FEVER. — Synon. — *Scarlatina* from the Italian, *Scarlatto*, scarlet, a deep ed), Sauvages, Vogel, Juncker, Cullen, J. P. rank; — *Morbilli confluentes, M. ignei; Ru- eola confluens; Febris purpurata; Rosalia, ossalia, R. squamosa*, Auct.; — *Morbus scar- tinosus; Febris scarlatinosa; Febris scarlatina*, ydenham; — *Purpura scarlatina*, Burserius; — *Gutteris morbus epidemicus Foresti; Febris ubra*, Heberden; —*Typhus scarlatinus*, Crich- on; —*Typhus scarlatina*, Young; —*Exanthesis salia*, Good; — *Febris scarlatino-miliaris an- inosa; Porphyrismus*; —*Porphyrisma*, Plouc- uet; — *Fièvre rouge, F. pourprée*, Fr.; — *charlach, Scharlachfieber, Scharlachkrankheit, Scharlachausschlag*, Germ.; —*Scarlattina*, Ital.; — *Scarlet fever, Rash fever.*

Classif. — 1st Class, Febrile Diseases; — 3d *Order*, Eruptive Fevers (*Cullen*): — 3d Class, Diseases of the sanguineous Function; — 3d *Order*, Eruptive Fevers (Good).—III. Class. III. Order (*Author in Preface*).

1. Defin. — *An infectious continued fever; on the second day of which, or sometimes later, a scarlet efflorescence generally appears on the fauces and pharynx, and on the face and neck, spreads over the body, and commonly terminates in desquamation from the fifth to the seventh day; the fever being accompanied with affection of the kidneys, often with severe disease of the throat, or of some internal organ, and sometimes followed by dropsy, and occurring only once during life.*

2. There is reason to doubt that the Greeks and Romans were acquainted with this disease, and the doubt applies equally to the Arabians, although a few passages in Rhazes might support the idea that scarlatina was confounded by the Arabian writers with measles. The first writer who distinguished the disease is stated by Hildenbrand and J. Frank to have been Ingrassias, who remarks that before the period at which he wrote it was called *Rossalia* or *Rossania*, from *rosso*, red; and that, although it was generally considered as the same malady as measles, yet he was convinced, by his own observations, that the one was different from the other. J. Coyttar, a physician of Poïtiers, published an account of an epidemic which prevailed in 1557, having the characters of this malady; and Forestus states, that the epidemic at Amsterdam in 1517, described by Tyengius, was this malady. According to Wierius and Schenk, this fever appears to have been prevalent in Lower Germany in 1564 and 1565; and Ballonius states that it was epidemic in Paris in 1581. De Heredia describes it by the appellation of "*Angina maligna*." The disease which was epidemic in Naples in 1620, and of which accounts were published by Carnevala, Nola, and Sgambarti, was probably scarlatina anginosa, which was then variously denominated, but most frequently as "epidemic phlegmonous angina," "a pestilential affection of the fauces," &c., although Hildenbrand entertains a different opinion. From this period accounts of several epidemics of scarlatina were furnished by writers, the symptoms and characters of which appear to have varied then as in more recent times. D. Sennert was the first to give a true description of scarlatina, in 1619. Subsequently Winkler, in 1642, Welsch of Leipsic, and Schulze in Poland, observed severe epidemics of this malady, and described it by the name of "malignant purpura," by which it was then known. The epidemic described by Sydenham, from 1667–73, appears to have been comparatively mild; whilst that observed by Morton, from 1672 to 1686, seems to have been much more severe; but he has noticed it as differing from measles, chiefly as respects the character of the eruption. During the eighteenth century this malady became more and more frequent, and the general prevalence and the great fatality of its epidemic visitations roused medical attention to its nature and treatment. Storch, Huxham, Stoerk, Fothergill, Heberden, De Haen, Bicker, Blackburne, Grant, Sachse,

Kreysig, Withering, Reuss, and many others, have described these visitations. During the early part and middle of that century, scarlet fever was variously named, and not only distinguished from other diseases attended by efflorescence, but more especially from measles and roseola. The writings of Heberden and Fothergill in this country were the first to show the distinct nature of this malady; and those of Withering placed this fact beyond dispute. At the present day scarlet fever is never absent, either in a sporadic or epidemic form, from any country in Europe, although in different degrees of severity and of prevalence. In warmer countries it appears chiefly as an epidemic, and generally after considerable intervals of immunity from its devastation.

3. I. Description of Regular or Normal Scarlatina. — The *course* of scarlatina has been divided into *three periods*, or stages, by some writers, and into *four* by others; these latter dividing the second stage into two. 1st, That of invasion, or that preceding the eruption; — 2d, That of the eruption (comprising the periods of eruption and of efflorescence); — and, 3d, The stage of desquamation. When scarlet fever proceeds in its more regular or usual course, these periods are generally very distinct; but when it assumes certain varieties, forms, or complications hereafter to be noticed, they are often indistinct, or even not altogether observed.

4. *A.* The *first stage* of *regular or normal scarlatina — stadium invasionis, s. irritationis* — is attended by general uneasiness, lassitude, headach, or giddiness; by a sense of depression, and loss of strength. The patient dislikes food, nauseates animal food, and complains of chills, horripilations, shiverings, or rigors. These are succeeded by heat of skin; great acceleration of pulse; by urgent thirst; by increased headach; by pain and redness in the throat, with difficulty of swallowing. The eyes are often red, and intolerant of light. These symptoms are the most constantly observed; but in severer cases nausea, vomiting, violent pain in the head, with aching of the back and limbs; augmented sensibility, sleeplessness, occasionally delirium, or even convulsions, in very young subjects, are also observed. Fever is always present, although often slight; and either exists alone, or precedes or accompanies the angina. It is often severe, the pulse being very rapid and full, the skin dry and burning, and the face congested, tumid, or slightly suffused. The redness of the fauces and pharynx is frequently great on the first day, sometimes in the course of a few hours, and the tonsils are swollen. The redness and congestion sometimes extends to the posterior nares, causing a stuffing sensation in the nostrils, and occasionally there is hoarseness. The tongue is covered at its base with a whitish or yellowish coating, is red at its edges and point, and its papillæ are erect or excited. The bowels are costive, or irregular; and the urine is scanty, high-coloured, voided frequently, and is sometimes albuminous, or soon afterwards presents these characters. In most cases these precursory symptoms continue but one day; in others they are prolonged, the eruption not appearing until the third or even the fourth day: in some the febrile symptoms are either so slight as not to attract attention, or are so instantaneous and brief as to appear as if merely ushering in the angina or efflorescence. The perspiration possesses a pec ar odour, which has been variously described y Heim and others.

5. *B.* The *second stage* commences with he eruption, which appears generally about he second day, — sometimes on the evening or ht of the first day, and occasionally not until he third, or even fourth day. The effloresc ce appears first on the neck and face, especiall he cheeks, the tint of which is commonly de er than that of other parts of the countena e. Sometimes the chest or trunk, or the extrem es, or even the hands and feet, first exhibit the e ption, which extends more or less over the b ly. The eruption consists of an infinite numb of minute red points, which appear in a rose-colo ed ground, and are not visibly or sensibly elev ed. These points, which are finer, redder, more ular, and more confluent than those of measles re transformed into patches, which are not elev ed, and appear smooth or continuous with the rrounding surface. The patches, at first dis ct, enlarge, and thus coalesce; ultimately impa ng a scarlet tint to the skin, which disappears omentarily from the pressure of the finger. he skin is now very hot, dry, and somewhat rou to the touch. It is sometimes diffusely tum ed, from the cutaneous and sub-cutaneous conge on, especially in the neck, face, feet, hands, nd flexures of the joints; and is often the seat a disagreeable stinging or pruritus.

6. The redness of the fauces and pharynx nd the swelling of the tonsils and adjoining gl ds, are now considerable, often occasioning occl on of the throat, and, externally, more or less efaction. The swollen tonsils are covered a thin, soft, and whitish exudation of lymph. he tongue sometimes retains its coating, but a requently it is gradually deprived of it from he edges to the middle, and it then presents a ep red hue, and appears so smooth as if varnis d; occasionally the elevation of the papillæ gi it a strawberry appearance. About the thi or fourth day the eruption has reached its h ht. It is usually most vivid about the groins, th nsides of the thighs and lower parts of the domen, and on the inner flexures of the joints; nd it continues the longest in these situations. is redder during any excitement, or when the ild cries; and is paler in the morning, and deep in the evening and night, when the fever is hig st. The redness of the skin, at its greatest pitch as been likened by P. Frank and others to that a boiled lobster, and by others to scarlet cloth It is the most continuous, general, and deep i he most severe cases, and when the febrile symp ns are the most acute. The skin is remarkably t, varying from 104° to 108° of Farenheit's s ; but not so hot as reckoned by Currie.

7. During the eruption, the countenance xpresses anxiety and suffering when the disea is thus severe. The eyes are animated and brill t; delirium and restlessness often occur at ni t; and a sleeplessness, which resists the usual m ns of procuring rest, is caused by the heat and s ging of the surface, and the affection of the th t. This affection is sometimes so severe, the swe g of the subjacent cellular tissue, and the ex ation of soft lymph from the inflamed surfac of the tonsils, fauces, and pharynx so consider e, and the secretion from the salivary glands so v id

d scanty, as to materially increase the distress the patient. Thirst is now urgent; respiration accelerated, somewhat difficult and laboured, d the breath is hot. The pulse is very rapid, ll, broad, and compressible. In some cases ght sopor is observed; in others a sense of sink- is felt. The bowels are generally costive; but slight diarrhœa occasionally supervenes, with licky pains. The urine is scanty, frequently ided, and high-coloured, sometimes albumi- us. The patient exhales the peculiar odour eady noticed, which is difficult to be de- ibed, although readily recognised by the ex- rienced observer. After five, six, or eight days' ration — generally after a longer period than in asles — the efflorescence fades; at first assum- a violent tint, and afterwards a pale rose or ppery hue. Generally the mucous membrane the mouth and throat continues still red; and en it is not until now that the tongue is deprived its coating, and shows its characteristic redness d prominent papillæ. The swelling about the k and throat now diminishes, and the next ge supervenes.

8. *C.* The *third stage*, or that of *desquamation*, mmences at various periods, in the different ms and complications of the disease; and even the more regular type it varies remarkably as the time of its occurrence. If the fever and ption are slight, desquamation may follow the rth or fifth day. If both the fever and the ption are intense, it generally is not observed il after the seventh day, or not until the eighth ninth. With the subsidence of the fever and he redness of the surface, the furfuraceous des- mation commences. Occasionally this change shered in by a slight perturbation or exacer- ion of the various febrile symptoms, followed slight diarrhœa, or by epistaxis, or by the amenia in adult females, or by a copious dis- rge of turbid urine, depositing a whitish or -coloured sediment; or by a free perspiration, ing a strong and peculiar odour. The affec- of the throat in this regular type of the ma- y becomes less severe; although, in some es, it is not ameliorated until a later period; the external swelling continues somewhat ger, the internal exudations still remaining, or ceeding for a short time. The pulse evinces irritative excitement; is less full, less quick, still accelerated, and soft or weak. The gue is clean, but red and flabby; and it s not regain its natural hue until after the ural affection is removed. As desquamation ceeds, the surface becomes paler; the epider- exfoliating in small furfuraceous whitish scales the trunk of the body, and in large scales or ellæ where the epidermis is thicker, as in the emities, and in the hands and feet. With the uamation the function of cutaneous transpira- is gradually restored, and convalescence mences. But the pulse often continues ac- rated or weak, or very compressible; the e sometimes albuminous, or the bowels dis- red; and convalescence becomes interrupted, yed, or entirely arrested by some serious con- tive affection hereafter to be mentioned, and ch should be anticipated and guarded against. some instances, the desquamation does not r for several days after the redness of the has disappeared, or not until a fortnight or three weeks have elapsed; but it usually follows the same order as that observed by the progress of the eruption.

9. II. OF THE TYPES AND IRREGULAR FORMS AND COMPLICATIONS OF SCARLET FEVER. — The *types, forms,* or *varieties of scarlatina* vary remarkably, not only in individual sporadic cases, but even in different persons of the same family in the same epidemic. The forms are remarkably modified as respects — 1st, The characters and duration of the eruption; — 2d, The type or character of the constitutional affection — the nature of the fever; — 3d, The seat and nature of the complication; — and, 4th, The nature and prevalence of the sequelæ, reliquiæ, or consecutive diseases. The irregularities, or anomalous forms (as they have been usually termed) of this malady require a much more serious attention than the more regular states; for these latter are not more frequently met with than the former, and are seldom attended with danger, unless they are neglected or mismanaged; whilst the former are for many years the most prevalent forms of the disease, and are much more frequently attended by danger—sometimes the most imminent danger—as regards either their invasion and progress, or their sequelæ. Like measles, but still more remarkably than that malady, scarlet fever presents the utmost diversity of form, severity and complication — a diversity depending upon epidemic constitution, upon local or endemic causes, upon the accumulation of morbific exhalations, and upon undue crowding and the absence of sufficient ventilation.

10. Of these several circumstances tending to modify the nature and form, or to extend or limit the prevalence, or to complicate the character of scarlet fever, there is none more influential than the prevailing *epidemic constitution*—the "*Constitutio morborum stationaria,*" first insisted upon by SYDENHAM, and recently by AUTENREITH, and by one of our best and most practical writers, Dr. GRAVES. There is no kind of fever which displays a greater diversity in its nature and complications, according to the prevailing epidemic constitution, than scarlet fever, or which manifests the character of such constitution more remarkably than it. Upon whatever cause this stationary epidemic constitution may depend — whether or not it may be connected with the long prevalence of dry, or of wet, or of cold, or of hot seasons, either of which has been observed to occur for several years in succession, giving rise accordingly to either inflammatory, or adynamic, or gastric, or other forms of the malady, — or whether or not it may be aided by prevailing states of the electricities influenced by these conditions of the seasons, — there can be no doubt of its influence, — an influence which has been duly recognised by those whose experience has been of sufficient duration to have observed the changes of those epidemic constitutions, or whose learning has made them acquainted with the experience of other observers. The *forms* and *complications* of the disease, therefore, which will require an especial notice at this place, are, 1st, those which respect more particularly the appearances of the eruption; — 2d, those which consist chiefly of the state of vascular action and vital power; — and 3d, those predominant affections which arise either in the course of the disease, or as a consequence or consequela of it.

11. i. THE APPEARANCES OF THE ERUPTION OR

efflorescence are always deserving of attention, for the purpose not only of diagnosis, but also of furnishing indication of the state of vital power.— *A.* The eruption may be *partial;* in this case it is observed chiefly in the neck or chest, or on the trunk, or on the flexures of the joints, or on other parts, in the form of red patches, of variable extension. Sometimes the redness is excessive, deep, and extensive, or general; at other times it is slight or pale. Frequently redness is uniform throughout. Occasionally a number of small violet-coloured points are dispersed through the reddened ground; these points differing, however, from the punctuated form of eruption. In some cases a miliary eruption — or miliary vesicles — the *scarlatina miliformis* of P. Frank — more or less abundant, appear at the commencement, more frequently than at the decline of the efflorescence, and are found most frequently on the neck and chest, and on the insides of the thighs and arms. These vesicles are sometimes interspersed with sudamina, or with papulæ, but very rarely with true pustules. Owing to the existence of these secondary or intercurrent eruptions, scarlatina has been termed *miliformis,* or *papulosa,* or *phlyctenosa.* These irregularities are not indications of any departure from the usual course of the disease, nor of an unfavourable result.

12. Reuss, Raimann, and Hildenbrand have observed, in rare instances, the eruption on the second day of the efflorescence, of *bullæ* of a dark red colour, above the size of a nut, containing a yellowish serum, and resembling that produced by a blistering plaster. The cuticle breaks, and, the fluid being discharged, a sore remains, which follows the course of the constitutional malady — *scarlatina pemphigodes,* Hildenbrand. The few cases in which this state of eruption has been observed, have been characterised by a remarkable degree of heat of skin, with a disposition to a septic or putrid condition. The only instance in which I observed this appearance of the eruption was that of a man of middle age, referred to hereafter, who accidentally allowed the discharge from the throat of his child shortly before death from malignant scarlatina, to remain on parts with which it had come in contact for some time. In the more malignant or dangerous states of this fever, the eruption assumes a deep, or dark, or livid appearance, or an almost violet tint; the darkness of the hue being great generally in proportion to the malignancy or putro-adynamia characterising the malady — to the depression of vital power, and to the change in the blood. In some of these cases, petechiæ or ecchymoses are found more or less abundantly interspersed in the deep red, or livid surface. In rarer instances the skin exhibits, in patches, altered dark blood effused between its layers — *Scarlatinal purpura.* This hæmorrhagic tendency, arising from extreme deficiency of vital power in connection with a poisoned or altered state of the blood, in which the fibrine has lost its power of vital cohesion, is remarkable in some epidemics, especially in those of a malignant or putro-adynamic character.

13. *B.* Besides irregularities in the form and appearances, the eruption may be abnormal in its *course* and *duration.* It may be long in appearing, the fever continuing three, four, or five days before any eruption breaks out. This not infrequently occurs in the more dangerous and complicated cases. On other occasions the er ion is remarkably early, especially in very favou ble cases, when it sometimes almost immediate fol- lows the fever, the symptoms of which may slight as to escape detection, or may be mask by some antecedent or existing affection. The ef res- cence, having made its distinct or early appea ce, may either disappear prematurely or sudden or it may continue an unusually long time. The *retrocession* of the eruption may be occasion by cold or by an internal complication, or interc ent affection. Occasionally the eruption disap ars on the first or second day, and reappears ain, after two, three, or more days. In rare ca , I have observed it continue nearly its usual ne, and reappear after seven or eight days, and en proceed the usual course. In other cases the efflorescence comes out freely, then fades nd soon afterwards is again abundant, thus assu ing a remittent form, the remissions appearing c fly on alternate days, the eruption being most un- dant when the febrile action is highest. The up- tion may, moreover, be of unusually long du ion —may be prolonged to the ninth or tenth ay. This is most apt to occur when it is genera nd intense; the persistence being longest in th ex- tremities.

14. *C.* The *absence of eruption* in true s let fever has been doubted; but has been admitt by Huxham, Fothergill, Aaskow, Stoll, I sg, Ranoë, Rumsey, Dance, Guersant, Trous au, Berton, and others. The circumstance in- dividuals having the constitutional affection, ner with or without sore-throat, during the epi nic prevalence of the disease, and the existence it amongst the other members of the same fami in its more usual forms, are proofs of this affe on being actually scarlet fever, although unac m- panied with eruption; and the propagation o he malady from cases of non-eruptive scarl na, further confirms this opinion. Some epid ics are remarkable for the number of cases in ich the eruption is not observed, the disease ing characterised by the other usual symptoms, pe- cially by the sore throat, by the appearanc of the mouth and tongue, occasionally by the es- quamation of the cuticle, especially in ad s; and by consecutive dropsy, these cases com u- nicating the eruptive disease. Sometimes, w- ever, the eruption appears in so slight, parti or evanescent a form as to escape observation. In these cases, the state of the mouth, fauces, nd throat, and the constitutional affection, are e chief proofs of the presence of this malady s- pecially when viewed in connection with the e- valence of it in the vicinity, or in the same h se or family. It should not, however, be overlo d, that sore-throat with fever, both the local d constitutional affections being characterise y remarkable asthenia, amounting even to p o- adynamia, may occur sporadically or endemic y, or even epidemically, independently of any n- nection with scarlatina, and amongst persons d families who have already been the subjec of scarlatina. Of these occurrences I have met h several instances, the greater part of a famil ll of which had previously had scarlet fever, ha g been thus attacked. (See art. Throat.)

15. But a child in the same house or fami n which scarlet fever is unequivocally present, y have the constitutional affection, not only wit at

characteristic eruption, but even without the e-throat also; both these essential features of malady being either entirely wanting, or so ght, or so evanescent as to escape detection. Is fever which is alone present — without the al local affection — truly scarlet fever in these es; and is it, admitting the affirmative, capable propagating the true and characteristic form of t disease? — That the fever — the constitutional ection — is scarlet fever, notwithstanding the ence of the eruption and of the sore-throat, I ieve for the following reasons, namely — 1st, occurrence in individual members of a family, rest of which are about or near the same time subjects of scarlatina; — 2d, its occasional nplication with the internal affections, somees complicating scarlatina; — and 3d, the very quent appearance, in these cases, of renal afion, of albuminous urine and consecutive dropsy nflammation. This form of the disease may be ly called *latent scarlet fever*.

6. ii. THE FORMS OF SCARLET FEVER DEDING UPON THE STATES OF VITAL POWER AND SCULAR ACTION. — *Upon the type or character he constitutional affection.*—It is of the utmost ortance to estimate, with tolerable accuracy, t states of constitutional disturbance existing in ividual cases, and constituting in the aggregate o ases the prevailing epidemic character. In n isease is more discrimination requisite than in th in determining both its type or diathesis, and th nature of its existing complications; and, as to one besides has more misconception existed, o as more false and mischievous doctrines been pulgated. "The blind have too often attepted to lead the blind;" and the credulous a docile many have submitted to the guidance o hose who formed and promulgated their opinis from insufficient experience, or from an acqntance with a single epidemic only, and who, esating with as little modesty as accuracy their o opinions, denounced or ridiculed the greater exrience and the juster views of their enlightened precessors and contemporaries.

. The *constitutional character* of scarlet fever is pendent upon several circumstances which arully stated hereafter; and which combine to pruce the pathological condition observed even in oradic and mild, although most remarkably in exsive and fatal prevalences of the malady. Th states of season, weather, and stationary and priling epidemic constitutions; animal exhalats, putrid effluvia, and every form of malaria, espially when aided by warmth, humidity, and imfect ventilation; and crowded, low, or close haations, are the chief causes of the several daerous constitutional forms and complications wh the disease assumes — causes, however, exing in intimate connection with the concentran or dose of the poisonous emanation — of the speic animal poison, and with the states of vital pow, or resistance of the infected. The combinats, conditions, and operations of these causes, are pecially concerned in the epidemic occurrens of the more malignant types or states of the dise which are to be particularised in the sequel.

A. SCARLATINA MITIS. — *S. simplex.* — *Mild or ple scarlet fever* may prevail either in a parular district, or season, or still more extensive, and for several seasons. It may even be the ost general form of an epidemic during successive seasons. It is met with in all circumstances, and seasons, and even in some of the members of the same family, in which malignant and complicated cases exist; and in the regular form above described; the disease being characterised chiefly by the mild or moderate degree of fever; by the efflorescence which generally appears early, or on the second and third day, and disappears with desquamation of the cuticle, from the fifth to the seventh; and by the slight affection of the mouth and throat, which, in many cases, is but little complained of, although, on inspection, the edges of the tongue, the fauces, pharynx, and Schneiderian membrane and internal surface of the eyelids present more or less redness. However mild the constitutional affection, or slight the affection of the throat, and however free from internal complication the complaint may be during its course, nevertheless the sequela may be serious, but chiefly as respects the disorder of the kidneys and the consecutive dropsy. Indeed, when very slight or mild attacks occur during the more severe or malignant prevalences of the malady, then these mild cases are the most apt to be followed by dropsy, unless the treatment during convalescence be most judicious, and even although the requisite care be taken.

19. *B.* SCARLATINA ANGINOSA. — *S. inflammatoria*, HILDENBRAND and NAUMANN. — This variety presents every phase from the mild to the malignant, and the most varied and serious complications. In this the fever is generally severe or intense, even before the eruption appears, and is ushered in by rigors, stiffness, and soreness of the throat, by intense redness of the fauces and pharynx, and painful deglutition. The tonsils are swollen, and a viscid secretion from the salivary glands, and mucous follicles, adhere to the inflamed surface, with patches of lymph of a greyish or whitish-grey hue, which cover the tonsils and pharynx, and often also the fauces, but very rarely the larynx. The papillæ of the tongue are enlarged and rise through the whitish or yellowish-white fur or mucus. The eruption is generally delayed to the third or fourth day; but it occasionally appears earlier, or even as early as the first day; then subsides prematurely, and not returns; or it re-appears in various grades; or continues with great and general intensity even beyond the usual period. These irregularities of the eruption depend much upon the nature and severity of the internal complication when this exists, and upon the violence of the fever, which is often greatest on the second or third day. The heat of the skin is then very remarkable, varying generally from 104 to 108. Thirst is urgent; the pulse is very much accelerated, full, and strong, but not hard or constricted. The affection of the throat is now severe, and the swelling so great as to impede or even prevent deglutition. The inflammation frequently extends along the Eustachian tube to the ears. The fever is aggravated towards evening and night, and delirium then supervenes. During the third or fourth day, especially if the eruption fades or suddenly disappears, some internal complication of an inflammatory nature frequently occurs; or an internal affection of an inflammatory or actively congestive kind may have commenced with the appearance of the sore throat, or with the febrile action, and have entirely prevented or delayed, or rendered irregular, the

eruption. In some of these a dark efflorescence continues for three or four days, or even longer, on the backs of the hands, and on the legs and feet. In this state of the disease, internal complications are frequent; the gastro-enteric mucous surface, or the membranes of the brain, or the lungs, or pleura, or even the pericardium, or the peritoneum, evincing a predominance of morbid action; the kidneys being also more or less implicated, although not so manifestly as during convalescence. The patient has complained of, and still experiences pain or aching of the loins and limbs; and the urine is very high coloured, turbid, or even bloody in some cases, and generally scanty, and voided frequently. The inflammatory action in all these complications is modified more or less from the sthenic condition characterising the primary inflammations occurring in persons whose vital influence and circulating fluids are not contaminated by an animal poison or infectious agent. The poisonous emanation which has infected the frame, and is multiplying itself to an indefinite extent, so as to propagate the malady to all who are predisposed to it, reinforced by obstruction of the several emunctories, so changes the states of vital power, of vascular action, and of the circulating fluids, from the healthy sthenic conditions, as very materially to modify the local complications, as respects both the state of vascular action and the morbid products or consequences of that action; so that these complications, although inflammatory in their nature, or as regards the disordered vascular action of the part affected, are imbued by a certain vice or diathesis appertaining to, and imparted by, the specific poison contaminating the frame, and are further affected by the interrupted functions of the kidneys and skin, so as to modify them remarkably from primary, sthenic, or pure inflammations; and the modification is great in proportion to the depressing and contaminating action of the poison, and to the accumulation of excrementitious matters in the blood, — to the adynamic, putro-adynamic or septic character of the fever, — the same relations subsisting between the constitutional and local morbid conditions in this disease as were shown to subsist in other fevers. (See art. FEVER, §§ 109, 110.) Although this type or form of the disease is often complicated, and irregular as respects the eruption, yet it frequently assumes the regular form described above (§ 4.), the febrile action being generally more intense.

20. *C.* SCARLATINA MALIGNA; *Pestilens faucium affectus* of SCAMBATI; *Angina puerorum epidemica* of BARTHOLIN; the *Garotillo* of ZACUCTUS LUSITANUS, — the *Pædanchone loimodes* of SEVERINUS; — the *Angina maligna* of DE HEREDIA; the *Malignant ulcerous sore throat* of HUXHAM; the *Purpura epidemica maligna* of SCHULTZ; the *Malignant sore throat* of JOHNSTONE; the *Cynanche maligna* of CULLEN; the *Putrid sore throat* of various authors. — The type of the disease which has been last described passes into this by insensible gradations, not only as respects different cases occurring during the same season, in the same locality, but even in the same family. Sometimes even the attack may present an inflammatory character at its outset, and soon afterwards assume an adynamic, typhoid, or malignant form. But it usually commences in an adynamic or asthenic form, especially in autumn and winter, and in
delicate, relaxed, or exhausted subjects, in tho
debilitated by other diseases, and in weak fema
children, or those living in low, damp, and clo
situations. The patient is first affected with la
guor, lassitude, weakness, and vague pains throug
the body. These are succeeded by giddines
chilliness, or shivering, followed by great hea
These latter alternate for several hours, until
last the heat becomes more constant and intens
The patient then complains of faintness, great pa
in the head, and of violent sickness with vomitin
or purging, or both, especially in children, mo
rarely in adults. Heat and soreness are felt in t
throat, and stiffness and tenderness in the nec
The face soon appears red or flushed, swollen
bloated, occasionally pale and sunk; the eyes a
red, watery, heavy, or suffused. There are gre
fretfulness, restlessness, anxiety, leipothymia
faintness, and remarkable dejection of spirits.

21. The pulse from the first is quick, small, a
fluttering; in some soft and full, but weak and
regular, but always without that firmness a
strength observed in inflammatory diseases. I
JOHNSTONE remarks, that if blood be taken fron
vein soon after the attack, instead of forming
firm crassamentum, "it continues in the state
a gelatinous texture." The urine at first appe
crude like whey; as the disease advances it l
comes yellower, as if bile were diluted with
or turbid, scanty, high-coloured, and sometime
contains dissolved or decomposed blood-globul
At the same time as, or soon after the attack,
fauces, uvula, tonsils, and pharynx become red a
swollen; and soon afterwards covered in parts
ash-coloured or dark exudations, which appear
sloughs. The tongue is now deep red or brown,
and glazed, and sometimes so tender and chap
as to readily bleed. The throat soon acquire
dusky-red, brown or livid hue, and the exudati
on the fauces and tonsils are darker, and of
cover gangrenous ulcers. The febrile or consti
tional disturbance presents an extremely typhoi
asthenic character, or putro-adynamia. The s
is hot; but there is little thirst, although the mo
is dry; and the teeth and lips are covered
sordes, or by an acrid fluid from the excoriated
ulcerated throat. The breath is remarkably fo
and contaminating.

22. The efflorescence often appears on
second or third day of the disease, and the ha
seem as if they were stained by the juice of ra
berries. It frequently soon recedes and recu
and is generally irregular. When it is abunda
it is often dark, dusky, or even livid; and i
often accompanied with petechiæ, more ra
with œdema. The breaking out of the erupt
sometimes relieves the vomiting and purging o
ushering in the disease. The parotid and s
maxillary glands swell and become painful.
neck and throat are œdematous, the swelling so
times extending to the breast. In this case
focation is threatened, the breathing being ratt
as if the patient were being strangled. A vi
secretion, scanty and adhesive, is produced by
salivary glands; and an acrid thin disch
exudes from the nostrils and from the angle
the mouth, the lips and cheeks exhibiting
aphthous appearance. The affection of the th
often extends along the tubes to the ear; and
only does gangrenous ulceration affect portio
the velum or fauces, but the tympanum and b

the ears are destroyed, and an offensive acrid charge flows from these parts. When the pant swallows the excoriating fluid exuded by the ected throat, diarrhœa, with excoriations of and out the anus, is of frequent occurrence. In se cases the pharynx occasionally is remarkably ected, and is covered by deep sloughing ulcers, tending in some instances to the cellular, muslar and ligamentous structures anterior to the rvical vertebræ and intervertebral substance. e larynx and trachea, the former especially, are t infrequently implicated, occasioning sudden ffocation and death. The lesion of the throat en extends further than the pharynx, and even plicates the upper part of the œsophagus, deglu ion being difficult or painful, or the fluids being jected forcibly through the nostrils.

23. The febrile action is often in young children tended by coma, and generally in older subjects delirium, which often lapses into coma. The lirium is commonly low or muttering; but it is metimes violent or frenzied. If it ceases in the orning, it generally recurs in the evening, or is en constant. In the more violent cases, the efrescence either suddenly disappears or becomes id; the fauces are black, and the breath most fensive; the eyes lose their lustre, and the swellg of the neck increases. The stools and urine e evacuated involuntarily, the former being equent, watery, and most offensive, sometimes oody; the latter, turbid, brownish, or supessed. The surface becomes cool; the countence bloated, cadaverous or œdematous; the rts pressed upon excoriated or sphacelated; the ngue brown, hard, or dry; the breathing laoured or interrupted by singultus; and death llows, with insensibility, congestion of the lungs, d great alteration of the state of the blood, and all the circulating and secreted fluids. This sult may appear very early — on the second, ird, or fourth day. I have seen it occur on the cond day, owing, in some instances, to the exnsion of the affection of the throat to the larynx, e patient dying asphyxied; in others, to a sudden ma, caused probably by serous effusion and alration of the blood; and, in some, to congestion the lungs, the depression of organic nervous inuence produced by the poison, and the morbid ate of the blood, occasioning or increasing these cal changes, and consecutively abolishing the tal functions, especially those of the brain, lungs d heart.

24. *D.* Scarlatina sine Exanthemate. — . *eruptione*, R. Williams. — Scarlet fever may ccur without any eruption, cases of this kind apearing chiefly during severe or fatal prevalences f the malady, and often in the same family in hich it pursues a regular course. In this variety e nature of the disease is indicated by the morbid ffection of the mouth, fauces, and throat, and by e febrile action, which is generally of an asthenic r low character. Dr. Johnstone remarks repecting the malignant angina, prevalent shortly efore the time at which he wrote, that "in some ases people have been seized with a severe angina f this kind without any eruption at all; yet even n these cases a great itching and desquamation of e skin have come on. This, however, has always appened among adults, not at all in children." p. 33.) — This variety is not always so limited, or I have observed it on several occasions in children, but in them the absence of the eruption appeared to be owing to the internal complication so frequently attending it in them. Dr. Willan observes, that "it is evidently a species of scarlatina, because it affects some individuals of large families, while the rest are labouring under some form of scarlatina, and because it is capable of communicating by infection all the varieties of that disease." Dr. Sims, Ranoë, Eichel, Hagstroem, and Struve, on the Continent, noticed this variety; and Filter, Speun, and others, remarked that desquamation of the cuticle frequently occurred during convalescence nevertheless. Dr. Heberden says, that he has seen the eruption so partial as to be limited to the back of the left wrist. J. Frank, that both he and others have seen many cases of scarlatina without any eruption at all. Mr. Murray mentions the occurrence of twenty cases without any eruption when the disease prevailed at Aford, in Aberdeenshire. Mr. Wood adduces sixteen cases which he observed during the occurrence of the disease in 1832 and 1833 at Edinburgh, in which no eruption was observed, and he considers these cases to have been those of scarlet fever, because none of these patients became afterwards affected with the fever and eruption, though very freely exposed to contagion in the sick rooms and convalescent wards. Dr. R. Williams remarks, that "there is seldom a year in which scarlatina has been in any degree epidemic, that cases have not occurred in which patients, not having previously had the scarlet fever, are seized with severe fever and sore throat, unaccompanied by any eruption; and on subsequent exposure to the contagion of scarlatina, they have been found insusceptible of the action of that poison; and hence it is fairly inferred that the disease they have passed through must have been a variety of scarlet fever." During the many opportunities I have had of observing scarlatina, cases of this variety have come before me; but on no occasion have they been so numerous as in 1848. But it should not be overlooked, that cases of most severe fever and sore throat, with all the indications of malignity, or putro-adynamia, may occur, as I have observed in several cases, in persons who have already had scarlet fever; and they may thus appear in several members of the same family, probably owing to the existence of endemic contaminating causes, to which I have had occasion to impute them. It may appear singular, as indeed Dr. Willan has observed, that the slightest and the most violent cases of eruptive fevers — cases which vary as much in fatality as a flea-bite and the plague — should be associated together and spring from the same origin. Experience has, however, proved that scarlatina simplex, the anginosa, the maligna, and the scarlet sore throat, without the efflorescence on the skin, are merely varieties of the same disease; and that all of them proceed from, and communicate the same infection.

25. There are certain points respecting this variety of the disease which have not been sufficiently investigated; namely, — 1st. Is the non-appearance of the eruption owing to the idiosyncrasy? — 2d. Is this occurrence owing to the existence or severity of some internal complication? —3d. Is it more frequently followed by affections of the kidneys or other sequelæ than the forms of scarlatina already considered. —(*a.*) It is difficult

to determine the degree of influence exerted by *idiosyncrasy* in this or in other maladies, as the reference of an anomaly to this cause is merely an attempt to escape from a difficulty, and even when the most confidently asserted, it is often no more than an unsubstantiated opinion. — (*b.*) As to the *second* point, my experience induces me to conclude, that this variety of the disease is frequently complicated, or followed by dangerous sequelæ; but I am unable to state the exact frequency or the numerical amount of these morbid associations, more particularly in comparison with the other varieties of the malady. I may add, that the fever characterising this variety is most frequently of an asthenic or adynamic kind, even although the affection of the throat may not be very severe or malignant, which, however, it often is, especially in some epidemics; and that complications are frequently found at an early period, upon close examination, but that they are often more or less latent, or masked, until they have reached a formidable height, or they often escape observation, until they are seriously advanced, or are displayed by a *post mortem* inspection. — (*c.*) As to the *third* question, I believe that affections of the kidneys are not merely occasional sequelæ, but are either concomitants or early complications of some cases of this form of scarlatina; for I have observed that the urine has been more or less albuminous in most cases, and even during, as well as after the disease, although dropsy has not supervened. It may be further remarked that obstruction of the functions of the kidneys in the course of the malady, and the consequent accumulation of morbid matters in the blood — the deficient depuration of the blood,—are the causes not only of the consecutive dropsy, but also of the more immediate complications, or inflammatory congestions and sequelæ observed in the course of this and other forms of scarlet fever.

26. *E.* SCARLATINA LATENS.—*Latent scarlatina.* —*Suppressed scarlatina.*—*Masked scarlet fever.* — *Scarlatina without eruption and without sore-throat.* Both in public and private practice, chiefly the former, rare instances of dropsy, especially anasarca, have for many years back come before me, commonly in children, and in families or localities where scarlatina prevailed; and I have been told by the parents that neither eruption nor sore-throat had been complained of previously to the appearance of the dropsy. I generally disbelieved the report, knowing that the mildest forms of scarlatina are most frequently followed by anasarca; and inferred that either sore-throat or efflorescence had existed, but in so slight and evanescent a form as to escape detection. It was not until early in this year (1848) that I became fully convinced of the actual existence of this variety — of a latent scarlatina; and that the constitutional affection may be produced by this specific poison without developing its two principal or characteristic features — the eruption and the sore-throat; the infection causing, nevertheless, lesion of the kidneys, with other concomitant sequelæ of a most dangerous kind. To one of these very serious and complicated cases of latent scarlatina, I was called in this year by my friend, Mr. JOSEPH HOULTON, who had also recognised the scarlatinous nature of the disease, the case having occurred in a house where this malady existed. During 1848, other cases of the same kind came under my notice; all of those, which
then saw having been of a complicated natur
and I have heard of several similar instances fro
other practitioners. Judging from the cases whi
I have seen, the dropsy consequent upon this l
tent form of scarlatina is more severe, complicat
and fatal, than when it follows the more regul
or usual forms of the disease. Is this owing to
early or premature affection of the kidneys resu
ing from the scarlatinal poison having prevent
the manifestation of the disease in the skin a
throat — the predominant lesions in this varie
occurring in the urinary organs and serous me
branes, and not in the usual situations? A
is a certain amount of vascular action, with affe
tion of either the throat or skin, or both, requis
to prevent the consecutive obstruction or lesion
the kidneys, productive not merely of dropsy b
also of other concomitant or consecutive lesion
If it be admitted that the morbid effects of t
scarlatinal infection or poison are exerted primar
and chiefly on the kidneys and serous membra
or other internal parts in these cases, it may
reasonably inferred that the usual manifestation
the infection on the skin and throat will be there
prevented and suppressed; and that the danger
the disease will be greater, when these import
organs and parts are attacked, than when the s
and throat are moderately and not malignan
affected. Upon referring to authors respecting t
variety of the disease, I can find no notice o
excepting in the clinical lectures of Dr. GRAV
where he states, that some years ago scarlat
attacked all the children in the family of a medi
practitioner, with the exception of one young la
who, when the children were convalescent, w
attacked by anasarca. Her father was mu
struck with the occurrence, and felt convinc
that it was the result of latent scarlatina. C
topic as to this variety is worth consideration, w
the relation subsisting between the infection,
fever caused by it, and the renal and other co
secutive affections, — as to whether the disease
the kidneys and the often associated affections
serous surfaces, and of other parts, are the im
diate effects of the poison in these cases,
eruptive fever, either with or without its us
concomitants of sore throat and efflorescence h
ing existed; or whether this fever and these c
comitants actually preceded the renal and ot
affections, but in such a slight and evanescen
manner as entirely to have escaped observati
From what I have myself observed, especia
during 1848, I conclude that scarlatina may
prevented from being developed on external pa
owing either to the state of the constitution of
person affected, or to the primary operation of
scarlatinal poison on the urinary organs and ser
or other structures. That the state of the
cipient has something to do with this irregulari
or latent form of the disease, is indicated by
circumstance that most of the patients in whon
have seen it were cachectic or anæmied, their v
energies appearing insufficient for the devel
ment of the characteristic local and external m
nifestations of this malady. It is not unlike
however, that the primary fever, consequent up
the infection, may have been so slight in all
phenomena as to have escaped detection; and y
as in the slight but more obvious cases of erupti
to be followed by severe consecutive disease, th

lat cases being admitted to be the most liable to ch consequences.

. iii. Complications of Scarlatina.—The co plications, or predominant affections of vital or ns or parts, constitute the most important to s in the history and pathology of scarlet fe . It may be remarked generally as regards th , that their nature and tendency depend ch ly on the character of the constitutional distu nce—on the states of vital or nervous power, an f vascular action, in connection with the condi n of the blood ; and that they may be inflamm ry, or actively or passively congestive, or ei r of these associated with so remarkable a lo f vital power and cohesion, as to be rapidly fol wed by disorganization. In all complications oc rring in the course of scarlatina, or of other sp fic infectious maladies, the local affections sh d be viewed as prominent lesions only, the wh e frame being more or less infected or po ned by the animal miasm, rather than as in pendent morbid conditions requiring a special tre ment. However inflammatory, or however co estive the complication or prominent disorder m seem in these maladies, it should never be vi ed, either pathologically or therapeutically, in e same light as inflammation or congestion oc rring primarily or independently of a specific in tion. The former has a peculiar character im rted to it by the specific poison, lowering and m fying organic nervous power and contaminatin he fluids, whilst the latter is devoid of these po nous influences and changes, and of their pr essive consequences. Accordingly we find th the same means as are successfully employed to move inflammation, or congestion or effusion, ta g place primarily or independently of a sp fic infection, would be either quite inefficient or ven injurious, if employed against these, wh supervening as complications or prominent di ders in the course of scarlet fever or other in tious maladies. These latter are imbued with th constitutional characters of these diseases— an partake of the type and diathesis which they m fest.—The most important of the *complicati or prominent affections* observed in the course of is malady, are — 1st, Congestion or other lesi of the urinary organs ; — 2d, diffusive or asth c inflammation extending from the throat to p in the more immediate vicinity ; — 3d, diffusi or asthenic inflammation of the gastro-intesti villous surface ;—4th, affection of the membr es or substance of the brain ; — 5th, asthenic pl ritis or pericarditis, or both ; — 6th, asth c pneumonia, or congestions of the lungs ;— 7t affection of the synovial membranes with effu n into the joints. Other organs or parts may be eriously affected, or even disorganised in the co se of, or during convalescence from, scarla a ; but certain of these will be comprised u r the head of sequelæ ; and two or more of th ffections now enumerated may even exist in th same case either coëtaneously, or in rapid su ession.

. *A.* The *kidneys* may become affected in a ve prominent manner early in the course of the di se : indeed I believe them to be always more or ss affected at an early period, although this af tion has been overlooked at this period, and re gnised only during the processes of desquamati and recovery. It is chiefly at certain seasons and during certain prevalences of the distemper that this early obstruction of these organs is most remarkable. I have met with it on many occasions; very few authors have mentioned the occurrence even of its usual consequences at this period. Johnstone, however, observes that "in some the face is much bloated and very sallow, the whole neck much swelled, and has a cadaverous look, and the whole body œdematous to such a degree that an impression made with the finger will remain fixed. The breath, towards the fourth or fifth day, becomes more and more fœtid, and the patient spits up a large quantity of stinking purulent mucus, sometimes tinged with blood and of a livid colour." (p. 38.) In the cases attended by more or less œdema, or anasarca, during the period of the eruption, or associated with a deep or dark coloured eruption, the patient, if not delirious or comatose, generally complains of much aching in the loins and pains in the limbs ; and the urine either is very scanty, very high-coloured, of a muddy brown, or dark-red colour from the mixture of blood globules, sometimes albuminous ; or it is more or less or altogether suppressed. The importance of ascertaining the existence of this complication during the early stages of the disease is extremely great, inasmuch as the issue will depend much upon the treatment adopted for it. I cannot hesitate to state my conviction that, in many cases which terminate fatally at an early period of the disease, whether the eruption be abundant or scanty, or altogether suppressed, this issue is in great measure owing to the early implication of the kidneys having been overlooked ; for I have remarked, in many instances, as respects both the symptoms during life, and the appearances of the kidneys after death, sufficient evidence to convince me *that these organs are remarkably congested, and their secreting and tubular surfaces are the seats of a similar vascular injection or efflorescence to that existing in the vascular rete of the skin ; and that this efflorescence on the surfaces of the uriniferous tubes, &c., and the associated swelling and congestion of these organs, during the early stages of the malady, either impede, or interrupt, or altogether suppress the function of urinary excretion, and thereby occasion an accumulation of excrementitial and contaminating materials in the blood, and consecutively an increase of the poisonous action of the infected blood upon the nervous system and on vital organs and parts, thereby producing further complications, more especially those about to be described.*

29. In this early period of the disease, the interrupted functions of the kidneys, produced in the manner now stated, has the effect not merely of preventing the discharge by these emunctories of the usual excremental matters in the blood, but also of arresting the evacuation of those morbid materials evolved in the blood from the action of the infectious miasm upon the nervous and vascular systems. The obstruction of the kidneys, arising as just explained during the early stage of the disease, produces a more immediate and a more intense or acute effect, than the obstruction so frequently caused subsequently, and during or after the process of desquamation, by the accumulation and infarction of the epithelium scales thrown off from the uriniferous tubes. The obstruction in the uriniferous tubes, caused by the accumulation of epithelium scales in them during

this latter period, is entirely the result of a species of desquamation, as respects these tubes, consequent upon the vascular action, congestion, and tumefaction of which they, with other parts of the kidneys, are the seat in the eruptive or early stage, and which, in this stage, frequently becomes, as just stated, the source of the most acute and fatal complications. The obstruction of the kidneys in the early stage, arising, as now shown, is often more complete and rapid in its accession, than that which follows in the last stage as a process of desquamation, and hence the consequences are generally not so severe nor so fatal in this last stage, especially when due precautions are used during the period of desquamation.

30. *B. Inflammation* of a more or less *asthenic* or *diffusive kind* may extend in more than one direction from the throat, especially in the more malignant states of scarlet fever; and this complication may be more frequent in certain seasons and epidemics than in others. — (*a.*) The most dangerous and rapidly fatal of these extensions of the local affection are *laryngitis* and *tracheitis*. When the angina attending scarlatina is not of a malignant kind, and when the pulse and affection of the throat do not indicate much vital depression or malignancy, the epiglottis and larynx very rarely betray any disorder. But in malignant cases, and in adults, especially those who have been addicted to the use of spirituous liquors, or whose constitutions are broken down, this extension of inflammation to the larynx and trachea, and consequent asphyxia, are not rare. In most of these cases the larynx is only or mainly affected; but in others, especially in children, the trachea is also implicated. In the more malignant cases, death may occur in little more than twenty-four hours from the commencement of the attack, owing to this complication. Of this I have met with two or three instances, in adults, one in a man aged between 50 and 60. In the cases of this kind which I have had an opportunity of examining after death, there was much firm lymph exuded over the tonsils and pharynx extending into the larynx, the tissues underneath being swollen, injected, and œdematous.

31. (*b.*) *Pharyngitis* is generally present in a greater or less degree in most of the severe cases of the anginous form of scarlet fever, and more especially, and in a most asthenic form, in the malignant variety. In many of these, especially in certain epidemics or seasons, the morbid action extends to the posterior nares, the nostrils and fauces, on the one hand, and to the upper portion of the œsophagus on the other, and is accompanied with the exudation of greyish lymph which coagulates on portions of the affected surface, and imparts the appearance of sloughs. In some cases, instead of this exudation, an acrid or sanious discharge of an excoriating nature is observed with sloughing ulcers, but these latter are more frequently found in some epidemics of this malignant malady than in others. In most of these cases attempts at deglutition are either very painful and difficult, or altogether abortive, matters being thrown out through the nostrils on attempting to swallow them. Sloughing ulceration is most frequently observed in the tonsils, and is more rare in the fauces, pharynx, or its vicinity; but this and other changes in the throat vary much in different epidemics. They are observed chiefly in the most malignant cases; and even in more rare instances of this kind which recover, the morbid action has extended posteriorly to the tissues and parts between the pharynx and bodies of the cervical vertebræ, until these latter, and the intervertebral substances and ligaments, have become implicated, and dangerous, if not fatal, sequelæ have followed the pharyngeal complication. Of this I have met with several instances in the course of practice (§ 47.).

32. (*c.*) The extension of the anginous affection along the *Eustachian tubes to one or both ears*, a frequent and most distressing complication of the more severe states of this fever, and is not unfrequently attended by destruction of portions of the soft palate, and of the small bones and membrana tympani of the ears. In some instances, caries of a portion of the temporal bones, and the extension of irritation and inflammation to the membranes, and even to the substance, of the brain, have followed, either immediately or remotely, upon the occurrence of an *asthenic* disease in the course of malignant or severe scarlatina. In these cases, a discharge more or less copious, and always offensive, takes place from the ears, and in rare instances even *hæmorrhage* from the ears occurs. I have not observed any instance where the hæmorrhage from the ear has been excessive; but Dr. Graves has adduced a case in which it was so great as to prove fatal; and it has also been noticed by Fothergill.

33. (*d.*) *Epistaxis* may occur in the course of scarlatina from very different pathological sources. It may attend, or appear early in, the stage of eruption, especially in plethoric children, in those accustomed to epistaxis, or in those of a sanguine temperament and hæmorrhagic diathesis. If it be moderate, or even considerable, it may alleviate the cerebral symptoms, and be even critical or beneficial. This, however, occurs chiefly in the more inflammatory states of the disease. But when it is excessive, or when it accompanies the malignant form, it may be only one of the means in which a fatal issue takes place. Even in the more inflammatory or sthenic forms of scarlatinal angina, an intercurrent epistaxis may be so excessive as to lower the power of vital resistance, and the patient may sink either from exhaustion, and from the want of correspondence between the capacity of the vascular system and the amount of blood contained in this system; or he may suffer another complication, favoured if not more directly caused by the hæmorrhage, namely the extension of inflammation, in an asthenic diffusive form, to the cellular tissue and glands of the neck. When epistaxis occurs in the course of malignant scarlatina, and is preceded by an offensive discharge from the mouth, nostrils or ears, it may be viewed as a consequence of gangrenous or sloughing ulceration of the fauces, pharynx or posterior nares, and generally it then hastens or causes dissolution. Epistaxis and bleeding from the throat, in these circumstances, are not rare, and have been noticed as more frequent occurrences in some epidemics than in others. These complications have been mentioned by Huxham, Fothergill, Graves, and others. Fothergill remarks that "the sick sometimes bleed at the nose towards the beginning of the disease; and the menses very often appear in those of the female sex who are of an age to have them."

(W ks, vol. i. p. 375.). And at another place he stat that, "it has happened in this distemper that hæ rrhages from the nose and mouth have sud-der carried off the patient. I have heard of the like cident from bleeding at the ear. But these fata discharges most commonly happen after the pat t has been ill several days; and it seems mo probable that they proceed from the separa-tion f a slough, rather than from a fulness of the ves s, or an effort of nature to relieve herself by a s tary crisis." (p. 376.)

(*e.*) *Diffusive* or *asthenic inflammation of the llular tissue* of the neck is one of the most dan rous complications of scarlatina, and is apt to cur when the throat is most malignantly affe ed. Dr. Johnstone has remarked upon the fre ency of this complication in the epidemic sca tina of 1778. "The parotids also swell," he tes, "grow hard and painful to the touch, and vhen the disease is violent, a large œdematous tu ır surrounds the neck, extends to the breast, and reatly increases the danger. The breathing the becomes more difficult, with a kind of rat-tlin noise as if the patient was suffocating." This ext sion of the disease to the glands and cellular tiss of the neck is frequent during the preva-len of malignant scarlatina. I have often ob-ser d it, and it has been duly remarked upon by Di ennedy, Graves, Osbrey, Charlton, and oth s. This diffusive state of inflammation may be eatest on one side, or it may surround the wh neck and throat and descend to the pectoral mu les. It may accelerate or cause death before pas g into gangrene or suppuration, into either of ich it may rapidly lapse; and it may exist wi the eruption or without it, or the parts af-fec l only may present a dark or dusky ery-sip tous hue. It is evidently the result of local co mination, spreading from the ulcerated and inf ed throat; and it may supervene either as a co lication or sequela of the distemper; but ho ver it may appear it requires the inten-tio and means of cure described in the article on iffusive inflammation of the Cellular Ti e.

. C. *Asthenic or diffusive gastro-enteric dis-or* is a very frequent complication or prominent aff ion in the more malignant cases of this ma dy. It may occur either with, or without vo ting, or it may only commence with this sy tom; and it may be attended by an eruption of more or less deep tint; or it may cause the su n suppression, or the non-appearance, of the er ion. It may be caused by the passage of th xcoriating discharge from the throat into the sto ch, especially in children who seldom spit ou he discharge, the gastro-enteric surface being irr ted or excoriated by this morbid matter; or it y arise primarily as a prominent phenomenon of is fever, and by its increase, or general dif-fu n over the digestive mucous surface, prevent th volution of the efflorescence on the cutaneous su ce. Dr. Johnstone remarks, that the acrid m er passing from the throat into the stomachs of ildren is "one reason why they are attacked w these violent gripings, dysentery, and exco-ri ns of the anus and buttocks which sometimes at d the distemper, and show that the sanies re ns its virulence throughout the alimentary ca l." (p. 39.)—The same statement had, how-ev been made by Dr. Fothergill thirty years previously, and nearly in the same words (*see his Works*, vol. i. p. 374.). Huxham also remarks that a sudden stoppage of the discharge from "the mouth and nostrils actually choked several children; and some swallowed such quantities of it as occasioned excoriations of the intestines, violent gripings, dysentery, &c., nay, even excoriations of the anus and buttocks." (*On Fevers*, p. 280.) Dr. Graves adduces a case in which these excoriations were observed around the anus, but in it the cutaneous eruption was intense. In most of the cases in which I have observed irritability of stomach and diarrhœa, with or without excoriations of the anus, in the course of scarlatina, the eruption was either suppressed, or partial and scanty, or prevented from appearing, the throat, however, being more or less affected. In the first two cases of this complication which came under my care, and which I attended with Dr. Clutterbuck in 1821, the eruption disappeared, diarrhœa occurred, and profound coma, with unconscious evacuations, supervened and further complicated the disease. Nevertheless both cases recovered. When diarrhœa complicates this distemper, especially in children, coma, or convulsions, or insensibility from vital exhaustion, not infrequently supervenes. When the diarrhœa is moderate and not attended by vomiting, and when the evacuations are bilious or feculent, then it may be salutary, or at least not injurious; but when it is consequent upon severe affection of the throat, or is attended by œdematous swelling of the neck, or is severe, the stools being watery or slimy, muddy, and very offensive, it is liable to be followed by coma or fatal exhaustion.

36. *D. Convulsions, coma*, and *tremors*, are frequently observed in the course of the more severe cases of scarlatina, and in the more nervous form of the disease; or in children of a nervous and susceptible temperament, convulsions, delirium, coma and tremors may occur in succession. These complications, like many others, may appear either when the eruption is very full and general, or when it suddenly or prematurely fades, or when it becomes partial or recurrent; but generally the skin continues hot and dry.—(*a.*) In very young children, *convulsions* may take place at or during the commencement of the distemper; and in this case they generally usher in a malignant or severe attack; and they may not appear afterwards. But they may occur at any period, or not until near the fatal termination of the disease. They are seldom attended by squinting, and the pupils of the eyes are rarely dilated — generally they are contracted.—(*b.*) Coma may supervene very early; but in children above five or six years of age it is generally preceded by delirium, and, in children under this age especially, it is often attended by partial convulsions. When coma takes place early in the disease, it cannot be imputed to serous effusion between the membranes or in the ventricles of the brain; but rather to congestion or to a loss of cerebral power; and, even when it supervenes at a more advanced period, it is to be attributed rather to these states than to effusion, although vital exhaustion and the morbid state of the blood may also be concerned in causing it. In most instances, and in whatever stage of the disease in which it occurs, the pupils are generally contracted. Although a dangerous, it is not a fatal complication, for I have seen several patients re-

cover from it.* When, however, it is attended by disappearance of the eruption, by a glassy state of the eyes, pallor and sinking of the features, tremors or startings of the tendons, and other signs of sinking of the powers of life, a fatal issue soon follows. Coma, convulsions, and other nervous symptoms, may occur also as *sequelæ* of scarlet fever, but generally in connection with renal obstruction and anasarca (§§ 41 *et seq.*).

37. *E. Congestion of the lungs, bronchitis, congestion,* or *asthenic pneumonia,* and even combinations of these, with or without *pleuritis,* are frequently prominent affections in the course of the more severe forms of scarlet fever. In most instances both lungs are affected, and bronchitis and lobular pneumonia are not infrequently associated, or are rapidly consecutive of each other. In the most severe cases, the general diffusion of disease through both lungs, added to other existing morbid conditions, has terminated life in from thirty to forty hours, or even in a shorter time, after the first appearance of the pulmonary complication. In these cases the substance of the lungs soon become solidified, especially in parts, and infiltrated with a bloody serum; the state of congestion insensibly passing into asthenic solidification, or splenization, especially in the posterior or depending parts. The complications now mentioned may also occur in the milder or less malignant states of the disease; but generally either in an advanced stage or as sequelæ; and in these circumstances they approach nearer to the usual character which these affections present, although more or less modified, and requiring, owing to the state and nature of the constitutional disturbance and contamination, a peculiar mode of treatment.

38. *F. Pleuritis* and *pericarditis* may take place either separately or in combination, or in connection also with affection of the lungs. The occurrence or association of these varies much in different epidemics and seasons, whether appearing as complications or as sequelæ of scarlatina. As *complications* they are met with chiefly in severe or irregular cases, in which the eruption either is suppressed or does not appear; and, as *sequelæ,* they most frequently follow mild cases, and in connection with anasarca and disorder of the urinary excretion; and, in these circumstances, they are soon followed by effusion, especially into the pleural cavities. These prominent lesions may exist and escape detection, either until they are far advanced, or until disclosed by a post mortem examination. This is particularly the case with respect to pericarditis, and even as regards pleuritis. A very careful and frequent examination is required to determine its presence in young children during the severer states of the malady.

39. *G. Peritonitis* may appear as a complication of scarlatina, either consecutively of diarrhœa and vomiting, or independently of these. I have, however, rarely met with it during the stages of eruption; but more frequently as a sequela the malady, and in connection with obstruction the kidneys and anasarca. It may generally b recognised, at whatever period it occurs, b the tenderness, fulness, and tension of the abdo en; by vomiting, and the heat and dryness o the surface of the trunk; and most frequently b the disappearance of the eruption. It usually oon terminates in effusion and in death, if not rly detected and treated by means which will rest the morbid action without depressing the ital energies, an intention which on a few occ ons may be accomplished.

40. *H. Affections of the joints, erysipelas, angrene,* &c. may occur during an advanced age of the more malignant states of the distemp or even as sequelæ, during the period of desq nation, and, with the rest of the complications al ady noticed, are to be attributed chiefly to the fo wing pre-existing changes: — 1st. To the c nge produced by the infectious miasm upon the or nic nervous influence and vascular system. — 2 To the alteration of the blood arising from thi primary change, and from the action of the ism on the constitution of the blood itself. — 3 To the active congestion, obstruction, and conse tive changes taking place in the kidneys at an rly stage as well as during the periods of desq nation and convalescence, whereby the blc is further changed by the accumulation of crementitial elements or materials in it, owin not only to the obstruction of the kidneys, but a to suppression of the functions of the skin, — t of the chief emunctories, by means of which fete and hurtful materials are carried out of the culation, — these two chief organs of depu ion being more or less interrupted or obstruct in their functions, during this disease. Owi to these consecutive series of changes, serous eff ons take place not only in the larger shut ca ies, with more or less irritation or asthenic i mmation of serous membranes, but also int the cavities of the joints, irritating the synovial embranes, and eroding the cartilages. Owi to these changes also, the internal surface o the blood-vessels, in predisposed parts, becom inflamed or obstructed, and eliminating su ces irritated or diffusively inflamed; the affected rts, owing to the depressed state of organic ne ous power, and to the morbid condition of the ood circulating in it, soon losing their vital coh on, and passing into sphacelation, — changes re ily accelerated and increased by pressure an the contact of morbid secretions or excretions.

41. III. THE SEQUELÆ OF SCARLATI — Having given the *complications* or prominent cal affections of scarlet fever that amount of onsideration which their importance demands nd which has not been accorded to them by pre ous writers, and having pointed out the sour or causes of their origin, of their severity, and o eir fatality; and having stated that an attenti examination of the early as well as of advanced henomena of scarlatina, and the lesions obs ed after death, *show these sources or causes to be c ly, or in great measure, the changes which take ice in the kidneys at a much more early period the distemper than has hitherto been believed,* I ow proceed to consider the more important *sequ* of the malady, and with due reference to their so es. If the inferences at which I have arrived fr an

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* Hildenbrand observes: — "Insignem vero, et quasi innatam, febris scarlatinæ miasma ad membranas serosas, et in primis ad membranam arachnoideam encephali habet proclivitatem, ita quidem, ut non solum exanthemate derepente represso vicariæ in cerebro libentissime subnascantur reactiones, verum etiam lætissime florente manifesta evolvantur congestionis cephalicæ, aut veræ encephalitidis, indicia. Quod autem arachnoidea, et non alia patiatur meninx, effusiones serosæ in peremptorum cadaveribus conspicuæ evincunt." — (*Institut. Pract. Med.* t. iv. p. 383.)

lentive observation of the phenomena of scarlet
ver be received, the sequelæ as well as the com-
ications of the disease may be assigned to nearly
e same sources. The *primary* obstruction of the
lneys is chiefly concerned, as shown above
§ 28, 29.), in rapidly developing or increasing
complications, aided, however, by obstruction
the functions of the skin; and the *secondary* or
nsecutive obstruction of the same organs is equal-
concerned in producing the *sequelæ*, as already
ted (§ 29.), and with the same aid. The
y same organs, surfaces, or parts which are the
ts of the complications or prominent affections,
y also be seats of those lesions which consti-
e the sequelæ. Indeed the local changes de-
ibed above as complications may appear so late
the disease as to be considered with propriety as
uelæ, whilst those usually denominated and
wed as sequelæ, may supervene so early as to
erve the former appellation.

42. It has been stated above, that the complica-
ns are most apt to occur in the more severe
tes of the distemper, whether inflammatory or
lignant; and that the early affection of the
neys — as early probably as the occurrence of
ripilations, faintness, vomiting, pains in the back
limbs, &c. ushering in the attack, or soon after
period, — by obstructing the functions of these
ans, and thereby augmenting the contamina-
of the blood, increases, in the first place, the
ensity and malignancy of the febrile action —
the constitutional disturbance; and, with such
ease, next developes local lesions of a severe or
l character. The state of the skin probably
also in producing these effects. If this be
itted in respect of the more severe cases, it
ows, that the milder cases of the malady are
nded by a much more slight affection of the
neys, and that the urinary secretion does not
nifest so much disorder or obstruction in these
er cases as in the former. Now this is exactly
t is usually observed. But it has been very
erally stated, that these milder cases are most
ly to be followed by renal disease and dropsy.
s is partly true; and is observed to obtain in
e seasons more than in others, and more espe-
ly in certain epidemic prevalences of the dis-
per. It may be inferred, from what I have
ed, that the sequelæ should be the most severe
r the most malignant cases; but the obstruc-
of the urine in many of these is such as fatally
ncrease the malignancy; and those who recover
frequently experience a general and profuse
piration, or copious discharges from the ali-
tary canal or other parts, which are some-
t vicarious of the obstruction of the kidneys,
which derive from these organs and diminish
consecutive affection. Besides, the amount of
consecutive obstruction may not be always
t in proportion to that of the primary affection;
his may be rapid in its accession, and great in
mount, in respect both of the secreting struc-
and of the uriniferous tubes, and yet the
ruction caused by the desquamation of the
helium, or the accumulation or infarction of the
uamated epithelium in the tubes, may not be
reat as to cause any serious change either in
blood, or, through it, in other parts. When
functions of the skin are restored, and deter-
tions of blood towards the kidneys, and con-
on of these organs, by exposures to cold and other causes, are prevented, the desquamation of the uriniferous tubes may take place gradually and without obstructing the urinary excretion, whilst such obstruction would very probably occur if the kidneys were the seats of vascular determination or congestion, caused by constriction of the cutaneous surface, and by the arrest of the cutaneous excretion.

43. The frequency of sequelæ arising out of the obstruction of the kidneys, and the severity of these sequelæ, often are greatest after very mild cases, and in the latent states of the disease (§ 26.). So very remarkably is this the case, as respects the latent form, and so dangerous are the associated affections sometimes attending this form, that I have had reasons to doubt whether the obstruction of the kidneys was, in this form, actually consecutive of an antecedent febrile attack, unattended by eruption or sore throat, or whether it was the primary change produced by the infectious miasm, which, instead of developing either a cutaneous eruption, or a sore throat, had affected the kidneys in so severe a manner as to prevent the more external evolution of the disease, and to obstruct the urinary excretion, thereby increasing the contamination of the blood, and the amount of its watery constituents, and occasioning other dangerous consequences, more especially the several forms of dropsy, with or without irritation or inflammation of vital organs or of serous membranes. However the renal obstruction may arise,— whether *secondarily*, as usually admitted, or both *primarily* and *secondarily*, as now first contended for, or sometimes *primarily only*, as just suggested —the consequences of its existence upon the state of the blood must be most serious. The blood necessarily becomes altered, both as respects an increase of its watery constituents and of its saline and solid ingredients, and, as regards the formation of injurious materials from the elements furnished by the processes of ultimate assimilation, of absorption, and of imbibition or endosmose, even independently of, and in addition to, the more special changes produced by the poisonous miasm, or infectious ferment, in the progress of the development of its effects and of the multiplication and dissemination of its kind. The more manifest consequences as regards the blood are an increase of the serous portion, and a diminution of the vital crasis, of the fluid and of the cohesion of the crassamentum. The globules or molecules which concrete into fibrine, either partially or altogether cease to cohere in such a manner as to form this substance, causing an apparent deficiency of fibrine, although these globules or materials which form it are actually not deficient, or are even in excess. The depression of organic nervous or vital influence, and the primary and secondary changes of the blood, diminish or otherwise affect the fibrine by depriving the globules, or the material principle constituting this substance, either partially or completely, of the power of cohering so firmly as to produce it, with its characteristic properties, more especially in the advanced stages of the distemper.

44. The consequences of an excess of the watery portions of the blood, and of the other excrementitial matters, and of the existence of other injurious products, which may be reasonably inferred to be present, although not admitting of demonstration, may be briefly stated as follows:

— 1st, The development of irritative fever, the pulse becoming very rapid, vital power depressed, and the skin burning, &c.;—2d, Over-distension, oppression, or congestion, of the vascular system, more particularly of the veins and capillary vessels, in predisposed and weakened organs: — 3d, With the continuance or progress of these states, asthenic irritation or inflammation, with more or less effusion, serous or sanguineous, into serous cavities, or into cellular or parenchymatous structures, according as pre-existing conditions, or previous lesions or predispositions may favour their occurrence. — Thus we observe, not only as *complications* of the several stages of scarlet fever, but also as *sequelæ* during desquamation and convalescence, various modifications and associations of the pathological conditions just stated — modifications and associations caused by states of predisposition, by the dose or amount of the infecting animal poison, and by the grade and kind of alteration produced in the circulating fluids, and consecutively in serous, mucous, and cellular parts.

45. Having shown the origin of the chief *sequelæ* of scarlet fever to be obstruction of the kidneys, frequently aided by constriction of the vessels, and obstruction of the functions of the skin, but as frequently arising without such aid, it is unnecessary to add more than to briefly notice the chief affections which supervene, either from this cause, or from the disease of the throat, during desquamation and convalescence. Certain of these require merely an enumeration at this place, although they are most important as repects the amount of lesion which attends them; but these lesions, when thus produced, are more fully considered under those heads to which they more legitimately belong — namely, as consecutive alterations or diseases of the structures or organs in which they are seated. Although obstruction of the functions of the kidneys and skin, with more or less of structural change of the former, is productive of a large proportion of the sequelæ of this malady, still the lesions, which were situated in the throat and its vicinity during the early stages, either by their continuance, their extension, or their severity, or by their recrudescence, owing to obstruction of the depurating functions, or to exposure to cold or humidity or currents of air, sometimes deserve to be ranked among the most serious sequelæ of scarlatina.

46. *A.* The most important of the sequelæ which are produced chiefly by the affection of the throat are, *the extension of disease to the ear*, with the consequences of this extension, especially destruction of the small bones of the organ; inflammation, ulceration, and perforation of the tympanum; chronic otitis with offensive discharge; inflammation, and ulceration of the membrane lining the cochlea and semicircular canals; caries of the petrous portion, or mastoid process, or other parts of the temporal bone; and even the extension of inflammation, suppuration, or ulceration to the membranes and substance of the brain, may supervene, and, as respects these latter changes especially, not infrequently at remote periods from the primary affection of the throat and the extension of lesion to the internal ear. When disease of the ear is so far advanced as to implicate the bone in which the organ is lodged, the consequences are serious, not only as respects the organ itself, but also as regards adjoining vital part the affection of which often occasions great an protracted suffering, and ultimately fatal re lts. (See arts. BRAIN AND ITS MEMBRANES, §§ . *et seq*. and EAR, §§ 20. *et seq*.).

47. *B.* The extension of inflammation, and ven of ulceration from the posterior *pharynx* *the cellular, muscular,* and *ligamentous tissues inte osed between this part and the base of the craniu and upper cervical vertebræ,* has been noticed ove in connection with the advanced course the malady (§ 31.). But this lesion is met wi not only as a complication, but also as a sequ a of scarlet fever. In either form, in the latter ore especially, it is often attended by spasm, co raction, or painful distortion of the head or nec and in this state, the lesion has often been vie l as merely consisting of irritation, or of simple ‘ rick in the neck,” or of rheumatism from col and been overlooked until it has advanced to ease of the intervertebral substance, to destruc n of the ligamentous or cartilaginous structure and even to *caries* of the bones at the base of the ull, or of one or more of the cervical vertebræ with thickening of the ligaments and of the theca the canal, and complete or incomplete, partial general paralysis. Of this sequela I have een several instances, and two of complete rec ery, with much shortening and stiffness of the eck from destruction of one or two of the c ical vertebræ, and ossific adhesion of those adjoi ng.

48. *C.* The *parotid glands*, the *lymphatic g nds*, and the adjoining *cellular tissue*, are not frequently enlarged, congested, or inflamed af an attack of scarlatina, especially in scrofulou subjects, and in delicate persons residing i ow, damp, or unwholesome situations. These are ften merely the persistent or exacerbated states the same affections which commenced at an ea period of the fever; but they sometimes do not pear until much later, and although the conn ting cellular tissue may be somewhat swollen it is much more rarely the seat of diffusive inflam tion than in the early stages of the malignant f n of the disease. Whether existing merely as t remains of an early complication, or as a m e or less remote sequela, these affections are ften troublesome, especially when they adva to chronic suppuration or abscess, as most freq ntly is the case in these circumstances; enlargem t of the parotids often accompanying the other se elæ of the disease.

49. *D. Affection of the kidneys, after arlatina, and its consequences.* — (*a.*) Whe the pulse continues very quick or sharp after carlatina, for a longer time and in a more n ked degree than may be attributed to debility erely, or to some degree of anæmia, the ntinuance of irritation in an internal organ o art, or the existence of obstruction of a de rating or excreting organ may be inferred; a the same inference may be drawn, although the rile symptoms had subsided, from the recurre e or supervention of this state of the pulse, dur ; or after desquamation, especially if there be al present languor and peevishness, heat and dry s of the skin, nausea or vomiting; pain or ach ; in the loins and limbs, drowsiness or stupor. hen these symptoms appear, or if, with these, the gue is loaded or furred, the bowels costive or irr lar, and thirst increased, with or without horripil ons,

ıen should the urine and the region of the kid- eys be carefully examined, and the approach of *dema* or *anasarca* be expected, if indeed either e not already present. In many cases the symp- ms which precede the anasarca are so slight as escape observation until œdema or fulness of e face, or indications of commencing anasarca ince the nature of the affection. In other in- ances the febrile commotion, with the symptoms ow mentioned, are more or less manifest for a ort time before, and contemporaneously with, e first appearance of anasarca. In every case e urine is at first scanty, often high-coloured, or rbid and albuminous; it is more rarely bloody, of a pale red colour; sometimes it resembles ater in which flesh has been washed; and there always a frequent desire to pass it. In the less vere cases the urine is more copious, but is still rbid, and sometimes it contains numerous small bres consisting chiefly of epithelium floating in . After the face, the feet, ankles, wrists and ands first become œdematous; and in some in- ances the dropsy may not advance much farther; ut more frequently the trunk and body generally ecome anasarcous; and in the more severe cases, when the urine is very scanty, bloody, and al- uminous, or altogether suppressed, either con- mporaneously with the incipient anasarca, or uring its progress, symptoms of effusion on the rain, or in the cavities of the chest, or in the domen, or even in all, make their appearance d sometimes rapidly terminate life. These ra- d and complicated cases of effusion are, in some idemics, more frequent than in others, and are ore especially so in the latent form of the dis- ase (§ 26.), or when there has been no ante- dent eruption or sore throat, or when the dis- se is apparently attacking the kidneys and se- us surfaces primarily, the evolution of its more ternal features being thereby prevented. The scular excrementitial plethora produced by the struction of the kidneys occasions effusion into llular parts, effusion from serous membranes, d asthenic or diffusive inflammation or œdema parenchymatous organs, which, with the morbid ate of the blood produced by the urinary obstruc- on, become the more immediate causes of death, ut chiefly in the severer forms and more com- icated states of the disease.

50. (*b.*) *Anasarca* and its *morbid associations* may cur at any period after the eruption, as well as ore rarely, but occasionally, in some epidemics, en during the eruption; but commonly from the urteenth to the twenty-eighth day from the com- encement of the disease, the 21st, 22d, 23d, d 24th days, being those in which it most fre- ently appears. The proportion of instances in hich these sequelæ or reliquiæ of scarlatina are served differs much in different seasons and pre- lences of the distemper. The dryness or hu- idity and temperature of the air, the weather, e prevailing epidemic constitution, and the treat- ent, must necessarily cause considerable dif- rences in the ratio of these sequelæ at different nes. Dr. WILLIAMS states that at HERIOT's ospital, in 1832 and 1833, nine cases of dropsy curred in forty-five; and that in the London oundling Hospital only three were affected with opsy out of 100 cases of scarlatina. Mr. HA- ILTON says, that a larger proportion of the nu- erous cases of scarlet fever which he attended in Edinburgh in 1832 and 1833, became dropsical. According to my observations, dropsy from obstructed kidneys, in all its forms and associations, have been common consequences of scarlet fever for several years up to 1848, during which year it was most frequent, and most complicated. But it appears to have been more or less frequent in all epidemics of this fever which have been fully described; the two occasions of its rare occurrence just mentioned being the most remarkable with which I am acquainted.

51. (*c.*) The *origin* of this dropsy was formerly ascribed to the state of the skin, and especially to obstruction of transpiration from this surface, in connection with loss of tone of the capillaries supplying the parts in which the effusion occurred. More recent researches have shown that, however these states may aid in the production of these sequelæ, the affection of the kidneys should be viewed as the chief source of the effusion, and even also of the asthenic or diffusive inflammation and irritation of one or more vital organs sometimes associated with effusion into the shut cavities, whether occurring as complications during the eruption or as sequelæ (§§ 28. 41.).

52. (*d.*) In the most favourable cases œdema, or slight anasarca, may only occur and be ushered in, as already stated (§ 49.), with acceleration of the pu.se, scanty urine, and other febrile symptoms. But the anasarca may be excessive; or, even without being excessive, effusion of serum may also take place in the *brain*, in both *cavities of the chest*, in the *pericardium*, or in the *peritoneal cavity*. It more rarely is confined to one cavity than extended to nearly all, although in different degrees. As far as I have observed, when it takes place into the pleural cavities, a slight effusion is not infrequent into the pericardium also; and the *lungs* and *pleura* are then sometimes *inflamed*, but more frequently *congested*; inflammation rarely advancing further than the state of splenization, but usually evincing the appearances of congestive or diffusive inflammation.

53. (*e.*) Effusion into the ventricles, or between the membranes of the *brain*, may take place without effusion into any other cavity, and even without anasarca; but it may also be associated with one or more of such affections. When it occurs as a sequela of scarlatina it is generally not so rapid or acute as when it appears as a complication, nor is it so frequently attended by convulsions; although the stupor or coma may be as profound, and the organs of sense as much affected.

54. (*f.*) Effusion into the *cavities of the chest* is generally preceded by anasarca, by congestion or inflammation of the lungs or pleura, or of both; and is sometimes attended by œdema of the lungs, and by effusion into the pericardium. The affections of the lungs and pleura, with effusion, are the most frequent internal complications of the anasarca, or remote consequences of the renal obstruction; effusion into the peritoneum being very much less common. The associated affections of the lungs and pleura are generally far advanced before they are fully manifested — are more or less latent in their early stages, and are seldom confined to one side, although one lung or pleura may be more diseased than the other. Dropsical effusion into the *peritoneal cavity* is generally preceded by œdema or anasarca, being in some instances an association of the latter; or

by diarrhœa. It is occasionally attended by signs of inflammatory irritation of the membrane, but these signs may have been wanting or obscure, although indications of general peritonitis with effusion are found upon dissection; the early supervention of effusion probably removing the more severe local symptoms, as well as partially resolving the attendant inflammatory state.

55. (*g.*) *Renal disease* and *dropsy*, as sequelæ of scarlet fever, may occur in patients of any *age;* but much more frequently in *children* from two or three years of age up to thirteen or fourteen. They are most common in the ill-clothed and ill-fed, and in those who live in low cellars or on ground floors, and in cold damp situations, or who are exposed to cold or vicissitudes of weather soon after or during desquamation. They are much more rare in the children of parents in comfortable circumstances than among the poor; from a fourth to a third or even more of the cases of the latter being probably thus attacked, especially in some epidemics, and late in autumn and beginning of winter. There is probably hardly a case of dropsy after scarlatina, or of inflammation of an organ or serous surface, particularly when associated with dropsy in connection with this disease, that has not its origin in renal obstruction, although the interrupted functions of the skin, and the antecedent states of the blood, caused by the infectious miasm, may be admitted as concurrent causes. The kidneys are, however, so generally implicated, as I have contended above (§§ 24. 28. *et seq.*), in all the stages of scarlatina — both primary and secondary—as to allow the inference, that the affection of these organs may exist in a grade sufficient to occasion indications of its presence, if attentively enquired after, and especially the symptoms mentioned above (§ 49.), with more or less alteration of the quantity, appearances, and constituents of the urine, without producing such obstruction of this excretion, or such change of the constitution of the blood, as to be followed by dropsical effusion, this result supervening chiefly in the more acute and complete states of the affection of these organs. The consecutive inflammations, so frequently associated with the dropsy, also chiefly depend upon the renal obstruction, aided however, as just stated, and as already more fully shown (§§ 44, 45..), by the states of the skin and antecedent alterations of the blood.

56. (*h.*) The renal and dropsical affections consequent upon scarlatina, especially when severe, are often followed, during convalescence from them, by more or less *anæmia;* the alteration of the constitution of the blood — the contamination of the blood, directly and indirectly, by the infectious miasm, and consecutively by the obstructed emunctories — not only impairing the vital crasis of this fluid, but also hastening the changes in, and the destruction of, the red-globules or hæmatoglobulin, whilst the primary and secondary functions of assimilation — the formation of healthy chyle and the conversion of chyle into blood, or of the chyle-globules into blood-globules — are slowly and imperfectly accomplished, owing to the debilitated state of the several assimilating organs.

57. (*i.*) *Inflammation*, generally of a diffusive or asthenic kind, and attended with more or less effusion of a turbid serum, when the serous surfaces are implicated, not infrequently is s- sociated with the consecutive dropsy; but it a , although much more rarely, occurs independe y of any antecedent or attendant œdema or anasa a. When thus complicated, and even when occu g simply, it is generally owing to the state of e blood, arising, as shown above (§§ 43. *et se*), from the primary and consecutive changes of is fluid, and the existing disturbance of the uri y and cutaneous excretions. The organs and r- faces which are most liable to be thus seconda y inflamed, either in connection with, or indepe l- ently of, dropsical effusion, are the *membran* of the *brain,* the *lungs* or *pleura*, or *both*, the *pi-* *cardium*, the *peritoneum*, the *synovial membra* s, the *parotid glands* and the *integuments;* and is not rare to find not merely one, but two or n e of these to be affected in the same case, more - pecially when the affection is associated with *dro* , and with manifest disorder of the *kidneys*, and h *albuminous* or otherwise *morbid urine* (§§ 60. *et s*)

58. (*k.*) Enlargement and chronic inflamma n of the *parotid glands*, with effusion of serum, lym , and puriform matter into the surrounding *cell* r *tissue*, and engorgement or inflammation of e *lymphatic glands*, are amongst the most frequ t sequelæ of scarlet fever, and are often associa d with œdema or anasarca, or with inflammatio of the organs and parts just enumerated, and t infrequently with chronic disease of one, o f both ears, producing offensive discharge, perf - tion of the tympanum, and caries of the bone of the ear. *Chronic otitis* following scarlatina is - nerally of long continuance, sometimes occas - ing caries of the mastoid cells and process; d even more extensive disease of the temporal b . In some cases the disease extends to the m - branes and sinuses of the brain, and even to e brain itself, as shown at another place (see . Brain, §§ 58, *et seq.*); but these results sel supervene until after several months, or e n years.

59. IV. State of the Blood in Scar t Fever.—Notwithstanding the chemical analy , which have been made in Germany and Fra , of the blood taken from the subjects of sca t fever, it is doubtful if any real or useful prog s has actually been made in this departmen of pathological research during the last cent y and a half. The analyses, especially as rega s this fever, have been few, and the results, connection with the visible appearances and p - sical states of the blood, and with the sta s and state of the disease, have not been sta l with the least degree of precision. As rega s the appearances and physical states of the bl , it may be remarked, that these depend u n the type of the fever, or the states of v l power and vascular action, and vary most - markably with these states, as observed in ot r fevers and maladies attended by contaminatio f the circulation, and as described in the arti s Blood (§§ 115. *et seq.*), Fever (§§ 93. 110. 52 , and Puerperal Fevers (§§ 215. *et. seq.*). I s chiefly in the more inflammatory types of sca t fever that blood has been taken and its appeara e observed. In the more malignant forms blood s rarely been taken from a vein, and on the occasions on which this has been done, it has - sented similar characters to those stated ab e (§§ 43, 56.), and to those mentioned in connect

h the fevers just referred to, and in the article OOD (§§ 78, *et seq.*). ANDRAL and GAVARRET alysed the blood of three persons in scarlet er, and LECANU in two cases; but the results ich these analyses furnish are not materially different from those obtained from the analysis of blood of a healthy person. It is chiefly in the re malignant, or putro-adynamic type, and in advanced course of the malady, that the blood sents morbid appearances such as are stated in articles referred to; but in these circumstances as not been chemically examined.

60. V. THE URINE.—The *urine* in scarlet fever sents the most important changes as respects the hological states characterising the several stages he disease, and as regards the treatment of these tes. These changes are various, not only in erent cases, but also in the same case at dif- ent periods, and even in the course of a few rs, and hence have arisen the opposite or vary- statements respecting this excretion which have herto appeared. The appearances and consti- on of this fluid, moreover, have been very im- fectly investigated during the early stages of malady; and the symptoms connected with kidneys at these periods very insufficiently in- tigated, if not entirely overlooked, by most ob- vers and writers on this disease.

1. The *urine* is always paler in children than adults, and hence the deep colour of it in the ner should attract more particular attention en observed in them — the most frequent sub- s of scarlatina. — (*a.*) The urine at the com- ncement, and *during the early stages* of scarla- is always scanty and very high-coloured, and n of a deep-red hue when there is much fever. enerally has an acid re-action in the *mild* and *ammatory* or *sthenic forms* of the disease. In *septic* or *asthenic types*, and especially when affection of the throat or the eruption presents ignant characters, the urine is either neutral or line and very turbid; sometimes it contains od-globules; and is always very scanty, al- ugh in these, as well as in the more sthenic ns, it is voided frequently, or is attended by uria or scalding. In most instances, even very y in the disease, it rapidly becomes ammo- al; but, in the more malignant states, it osits a viscid whitish sediment at an early pe- l, consisting of the earthy phosphates and cus, and it contains urate of ammonia and uric l. When the urine is of a dark-brown colour turbid, or deposits a loose sediment of this , the presence of partially decomposed blood- ules in it may be inferred. Albumen is also etimes present in the early stages, but in vari- or slight quantity; and it may be detected, or n be considerable, at one period, and not be d some hours afterwards, and yet be soon again sent.

2. (*b.*) During the *advanced stages* of the mild more *sthenic forms* of scarlatina, the urine omes more abundant, of greater specific gravity the abundance of saline matters, and presents characters usually observed during the decline flammatory and continued fevers. In asthenic, ic or *malignant cases*, the urine becomes, with progress of the malady, of a dark brown or owish colour, is very scanty, and of a specific ity varying from 1020 to 1025. It has an line reaction, with a disagreeable ammoniacal odour, and it occasionally contains blood and mucus, or partially dissolved hæmato-globulin, either diffused or in flocculent deposits, but rarely any or much albumen. It throws down a dirty white sediment consisting of earthy phosphates, urate of ammonia, urate of soda and mucus, with other animal matters. In these cases particularly, and less rapidly in others, the urine becomes more decidedly ammoniacal and offensive.

63. (*c.*) When the disease is *complicated in the early stages* or in its *advanced progress*, the urine is even still more changed from the natural state than above stated. If the attack be malignant or complicated from the commencement, and more especially if there be coma, or signs of inflammation of the lungs, pleura, or other internal organ or surface, with or without effusion, or external œdema, or if these complications occur in the *latent* and *non-eruptive* forms of the disease, the urine will be either *bloody*, or *albuminous*, and scanty, or it will be found to have been for some time previously either altogether *suppressed* or remarkably scanty, and high-coloured or bloody. Sometimes it appears like to the washings of meat, and is voided either frequently or involuntarily; and in others *hæmaturia* is decidedly present. In some cases urine has not been passed for many hours, and yet little or none has appeared to be retained in the bladder, indicating an arrest of the secreting function, owing either to suspension of the organic nervous influence of the kidneys, or to extreme congestion, or to both. In these cases, aching in the loins and lower limbs, nausea and vomiting, with general turgescence or œdema, headache, &c. may, or may not be present, with one or more of the complications described above (§§ 27. *et seq.*); but the pain and aching of the loins and limbs are not so great as usually observed in acute suppurative nephritis, although sufficiently indicative of suspended function and congestion of the kidneys, especially when viewed in connection with the state of the urine and the sympathetic phenomena. The connection of the renal affection, of the morbid and deficient urine, of the states of the blood and of vascular action, and of the consecutive inflammatory irritation, serous effusion, &c. with each other, and even the usual procession of these diseased states, in the course of scarlet fever, will be more readily understood, by a due and practical consideration of this topic, and of what I have already said respecting it (§§ 28. 41.).

64. (*d.*) During *desquamation* the urine generally contains albumen. SIMON remarks, that observations regarding the presence of albumen during this period are so contradictory as to render it a matter of interest to have the matter settled by further researches. "We have dropsical symptoms with albuminaria, dropsical symptoms without albuminaria, and albuminaria without dropsical symptoms. SOLON found albumen in the urine in twenty-two out of twenty-three cases of scarlatina. On the other hand, PHILIPP observed in Berlin at least sixty cases in which albumen was not detected."

65. In most cases, the urine is of a straw-colour in this stage, contains mucus-corpuscles, and is turbid owing to this circumstance, and to the quantity of epithelium, either in single scales, or in fragments of a connected series of scales, swimming in it. The sediment contains much

epithelium, occasionally formed by lymph into cylindrical fibrinous casts of the tubes, and crystals of lithic acid. These changes arise from the desquamation of the uriniferous tubes, and are sometimes antecedent to the desquamation of the cuticle. This early desquamation of these tubes furnishes a proof of the earlier and more constant affection of the kidneys than has hitherto been supposed; and is evidence of the important part performed by the pathological conditions of these organs at the commencement of the malady for which I have contended (§§ 28. *et seq.*). In favourable circumstances no albumen is found in the urine, in most cases, during desquamation and convalescence, or the quantity is slight. But it is found in small or moderate quantity, in a few instances, without either inflammation or œdema or dropsy in any form being present. In some of these a slight febricula is observed, and soon passes off without either of these results. When, however, dropsy or inflammation follows scarlatina, the urine becomes albuminous generally with, or previously to, the febrile symptoms ushering in, during convalescence (§§ 49.), the dropsy or inflammatory affection, and continues to present this state, more or less manifestly, during the persistence of these sequelæ. It is often most remarkable in those cases of dropsy or inflammation which are consequent upon the latent and non-eruptive forms of the disease; and is sometimes further attended by disease of the glands of the neck. When the urine becomes very albuminous during desquamation and convalescence, then acute febrile symptoms, and inflammation of some internal organ or part, or dropsical effusion, or both, either pathological state preceding the other, soon supervene, and rapidly assume a severe or dangerous form. The urine during this stage often contains an increased quantity of the animal extractive matters usually existing in this excretion.

66. VI. APPEARANCES AFTER DEATH. — These differ remarkably, according as this issue takes place at an early or an advanced stage, and more especially according to the nature of the local affections complicating or following the disease.— In the malignant form, decomposition follows dissolution sometimes with remarkable rapidity.—*A.* When death occurs at an *early period*, (*a.*) the *surface* of the body appears either of a livid or of a violet-coloured hue, generally in patches, when the eruption was present; but not infrequently all traces of the exanthem have disappeared. Upon dividing the integuments, the vascular rete is usually found more than commonly injected, and the subjacent cellular tissue is less turgid than during life.—(*b.*) Generally also the redness of the *mouth* and *pharynx* disappear after death. The *tonsils* present different states according to the prevailing type of the disease. They are frequently enlarged, softened, pultaceous, or gangrenous; and sometimes they are covered by a soft membranous exudation. The mucous surface of the *pharynx* and *œsophagus* is considerably softened, and that of the former is occasionally ulcerated, softening and infiltration of the adjoining parts being manifest. The *palate* sometimes is partially destroyed by sphacelating, or septic ulceration, especially when the tonsils are gangrenous, or the pharynx ulcerated and softened. —(*c.*) The *digestive mucous surface* varies with the character of the fever. In the more asthenic or malignant cases, it is softened, discoloured, and readily detached. Generally BRUNNER's g ds are more developed than natural, and the agmi ted glands of PEYER more tumid. The *mese ric glands* are only occasionally enlarged and ore vascular. The *spleen* is frequently enla ed, softened and friable; sometimes it is almost p taceous. The *liver* and *lungs* are often more o ess congested; and the *blood* found in the auric of the heart and veins is dark, semi-fluid or grum us; and, in the malignant cases especially, this ate of the blood is still more remarkable. he bronchial mucous membrane is injected with rk blood, and the *bronchi* often contain some muc — (*d.*) The *kidneys* are always congested, tumid nd often of a dark mottled hue externally; ilst an increased vascularity, varying in degree, i the different structures, is found at this period o he disease, upon dividing the organ longitudi ly. The urinary *bladder* is commonly contracted nd contains little or no urine.

67. *B.* When scarlatina presents any of th *rimary complications*, or prominent affections entioned above (§§ 27. *et seq.*), during the se nd stage especially, the appearances are very erent from those just stated; for, whilst those ist more or less manifestly, others are superadd — (*a*) If the patient have been the subject of rebral complications, the *membranes*, and eve the *substance of the brain*, present increased v ularity, with some serous effusion betwee he membranes, especially at the base of the in, and in the ventricles, particularly in those ca in which the urine has been very scanty or ppressed.—(*b.*) When the patient has been sud ly destroyed by the extension of the pharyngea isease to the epiglottis, *larynx* and *trachea*, nsiderable œdema of the glottis, between he chordæ vocales, &c., and general tumefacti of these parts, sometimes with the effusion of a ly friable lymph upon the surface, partially deta d, or but slightly adherent, and occasionally sp ding down a portion of the trachea, are obse d. This state of parts was seen by me, at an ly period of my practice, in a man, aged abou 0, who died of scarlatina with sore throat in tw yfour hours from the commencement of the dis e, owing to the extension of the local affecti to the larynx. In these cases the *lungs* are al ys found remarkably congested with black id blood, and the surfaces of the *bronchi* are da or livid, and injected, the tubes often contain a bloody mucus.—(*c*) When the *parotids* are ch enlarged, and the neck tumid, and the surroun g *cellular tissue* is the seat of asthenic or sprea g inflammation, then these glands, and generall e lymphatic *glands*, are found enlarged, inje d, and softened, and the adjoining cellular tiss is infiltrated with a sanguineous serum, or lymp r puriform matter; each of three several kind of morbid effusion predominating in different ts of the neck in the same case. If the patient e lived a few days, the morbid fluids infiltrating e cellular tissue have sometimes contaminated, d ultimately destroyed the vitality of this tis ; until the sphacelation which results has left e muscles and vessels of the neck almost as if ssected, and has even spread to the sternum. n case to which I was called, the gangrene adva d as far as the pectoral muscles; but death gene y takes place before disorganization proceeds s r as this. The changes observed in the *ear* an s

inity have been already noticed (§§ 32. 46.); t these are chiefly of the nature of spreading lammation along the Eustachian tube to the ernal ear, and sometimes also to the mastoid lls, cochlea and semicircular canals, and are casionally remotely followed by disease of the ne containing these parts.

68. (*d.*) When *pneumonia* complicates the disease th lungs are generally affected, although in ferent degrees, and the appearances vary some- iat with the type of the fever. Most frequently e lungs present in various grades, in different rts, but most remarkably in the posterior aspect, ngestion with effusion of a serous or fluid lymph, with a more firm lymph in some places, giving e to varied grades of splenization, death or re- very taking place before the change can proceed rther. The *pleura* is frequently either decidedly flamed, or contains fluid with or without ma- fest inflammatory changes; and often in con- ction with pulmonic congestion or inflammation. the more sthenic forms of the disease, lymph, some instances, is exuded, with or without, ost frequently with, serous effusion, and some- nes with adhesion of the opposite surfaces by nds of fibrinous lymph, or more continuously. -(*e.*) In the asthenic or malignant states, the arks of inflammation are less obvious, but the fusion into the pleural cavities is greater; and nilar changes are sometimes observed also in e *pericardium.*—(*f.*) Inflammatory appearances, nerally with a turbid serous effusion, and occa- nally with slight or partial adhesions, are some- nes found in the *peritoneum.*—(*g.*) The synovial embrane of the *joints*, in a few instances, has esented marks of inflammatory action, with ore or less effusion into its cavity.

69. *C.* When death occurs during desquamation subsequently, owing to either of the *sequelæ* — secondary complications — noticed above (§§ . *et seq.*), the appearances differ but little from ose just mentioned, with reference to their re- ective affections; excepting that they either nsist, in great measure, of dropsical effusion of eater or less extent and amount, or are associated th other lesions of an inflammatory, congestive, fusive, or of a mixed kind.—(*a.*) The most fre- ent changes exist in the *kidneys* and in the shut *vities* and *cellular tissue*, in the form of effusion, en with inflammatory appearances. The *kidneys*, the more rapidly fatal cases, and in those which cur at an early period of desquamation, are quently injected, or congested, mottled or arbled externally; and, internally, the consti- ent tissues present various appearances, certain them being very vascular, others pale or anæmic. ence the substance of the organ often is mottled, d generally not much increased in bulk, unless ien the congestion and vascularity predominate. n examination by the microscope, the Malpighian dies are often seen to be pale, and the surround- g capillaries injected, whilst the tubuli are filled th epithelium cells or scales. In those cases, in iich dropsy occurs later in the course of re- very, and which are of longer duration, the *lneys* generally present somewhat different ap- arances, which more nearly approach those served and described in the articles Dropsy 13.), and Kidney (§§ 23. *et seq.*), when treat- g of the changes connected with *albuminuria.* lthough the surfaces of the organs are sometimes mottled, and more or less congested, their structures, on division, are pale, especially in spots, as if anæmic, or from the deposition of lymph or albumen, and approach the characters of granular degeneration. The Malpighian bodies and the surrounding capillaries appear pale and bloodless under the microscope, and the tubuli are filled, in various places, with epithelium cells, and in others with what appears to be a mixture of albuminous matter or lymph, and oil-globules, or of these with detached epithelium.*—(*b.*) As respects the *cellular*

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* After this article was sent to, and whilst it was passing through, the press, Dr. G. Johnson's very excellent article on the kidney, in the *Cyclopædia of Anatomy and Physiology* (Art. *Ren*), was brought to my notice, as well as his valuable paper in the Transactions of the Medico-Chirurgical Society (vol. xxx.), in both which places the morbid anatomy of the kidneys after scarlatina is ably described. Dr. G. Johnson, who was the first to detect oil or fat in the kidneys, in granular disease of these organs, states that he has not found oil in the urinary tubes after scarlatina. I observed some oil-globules in two cases of a more than usually chronic duration, as stated above; but Dr. Johnson, who has examined more of these cases than I have, without meeting with this change, justly considers the scarlatinal affection of the kidneys as very distinct from the granular disease of the kidneys described by Dr. Bright; and whilst he denominates the former "*acute desquamative nephritis,*" he terms the latter "*fatty degeneration of the kidneys.*" I believe that the more acute or rapidly fatal cases of dropsy or inflammation after scarlet fever rarely present any oil-globules in the urinary tubes; but that, when the scarlatinal nephritis becomes chronic, and is followed by change of structure, then oil-globules are found in the tubes. In one of the cases in which I observed them after scarlatina, the man who was its subject was between 30 and 40 years of age, and was probably irregular in his habits; the consequent anasarca having been of considerable duration.

"*Acute desquamative nephritis,*" of Dr. G. Johnson, occurs frequently as a consequence of scarlatina, and is occasionally produced by other animal poisons, as that of typhus fever, small pox, or measles. I have noticed, in the article Kidneys (§ 56. *et seq.*), the connection of this form of nephritis, which I have named "*consecutive, or secondary asthenic nephritis,*" with febrile and other diseases, and the various circumstances of this connection. In relation to scarlatina, I have contended above that it occurs either *primarily* or *secondarily;* and that often there is thus a "*primary scarlatinal nephritis,*" and a "*secondary scarlatinal nephritis,*" (see also art. Kidneys, § 56.), or inflammation of these organs either associated with the scarlatinal fever, or occurring as a consequence of this fever. Dr. G. Johnson describes the nephritis *consequent upon scarlatina* as follows: — "The kidney in these cases is enlarged, apparently by the deposit of a white material in the cortical substance; the vessels in the cortical portion where they are not compressed by this new material, are injected, and of a bright red hue; the medullary cones are of a dark red colour, in consequence of the large veins which occupy these portions of the gland being distended with blood. The appearance of the entire organ is quite that of a part in a state of acute inflammation.

"When the kidney has been in a softened condition before the occurrence of the inflammatory disease, as often happens in elderly persons, the lobules on the surface appear larger and coarser than natural; the veins being less compressed than when the natural texture of the kidney is firmer and more unyielding, are much distended with blood, so that the entire organ is of a dark slate colour.

"On a microscopical examination the convoluted tubes are seen filled, in different degrees, with nucleated cells, differing in no essential character from those which line the tubes of the healthy gland. The Malpighian bodies are for the most part transparent and healthy, but the vessels of the tuft are sometimes rendered opaque by an accumulation of small cells on their surface. Some of the tubes contain blood, which has doubtless escaped from the gorged Malpighian vessels. There is no deposit exterior to the tubes.

"The condition of the urine in these cases is clearly indicative of the process going on in the kidney. After it has been allowed to stand for a short time, a sediment forms; and on placing a portion of this under the microscope, there may be seen blood-corpuscles, with epithelial cells in great numbers, partly free and partly entangled in cylindrical fibrinous casts of the urinary tubes, and *tissue* and the *serous cavities*, it need only be added, that the former is generally more or less loaded with serum, the latter sometimes contain effused fluid with, or without, slight or marked inflammatory appearances, although these latter are not so frequent or so marked as in the primary complications noticed above (§§ 27. *et seq.*). The effusion, as well as inflammatory changes, may exist only in one of the cavities, or may extend to two or more. Both pleural cavities are generally implicated, but sometimes in different degrees; and the *parotid* and *lymphatic glands* are often enlarged, and the *joints* occasionally inflamed. — (*c.*) I have likewise seen the *vertebræ* of the neck, their ligaments and intervertebral substance seriously affected, caries of the former with chronic inflammation, thickening, &c. of the theca supervening and occasioning cervical paraplegia or general palsy (§ 47.).

70. VII. Diagnosis. — Scarlatina can be confounded only with measles (*Morbilli*), or with the mixed or hybrid disease which I have described by the name of *Rubeola*. — *A*. Dr. R. Williams has stated that the earlier appearance of scarlatina after exposure to infection, and of the eruption after the primary fever, may serve to distinguish this disease from measles. But, although these circumstances frequently obtain, and may be viewed as the law, still the exceptions furnished by different epidemics and by individual cases are so numerous, that but slight importance should be attached to them. This will be still more apparent upon referring to what I have adduced respecting the periods of *latency* in these maladies in the article on Infection (§§ 31, 32.). The appearances of the efflorescence in both maladies, and the signs furnished by the inlets to the digestive and respiratory passages, and the states of the urinary functions are chiefly deserving attention in establishing a diagnosis between *scarlet fever* and *measles*. In the former, the tongue presents redness of the point and edges and strawberry surface, and the fauces more or less redness at an early period, whilst the tonsils are enlarged or soon afterwards are ulcerated. There is seldom, or very rarely, sneezing or coryza, both which usher in measles; and in the latter, the affection of the throat is either altogether absent or very slight, whilst cough is often severe. The *period* at which the *eruption* appears differs much with the constitution of the patient, the season, and character or type of the prevailing epidemic, as regards both maladies; and although deserving of mention as respects the description, cannot be depended on in the diagnosis. In scarlatina the patches are large, and the surface covered by them generally ample; but in measles the eruption consists of small circular dots like flea-bites, and when most confluent the patches or clusters are small. The colour of the rash is that of a vivid red in scarlatina, whilst it approaches a raspberry hue in measles. The former can hardly be mistaken for *roseola*, which is preceded by very little fever, and rarely by any affection of the throat; and the rose-coloured d irregular spots of which differ much from e large patches of scarlatina. In most cases, e eruption of scarlet fever is more general than at of other exanthematous diseases; whilst the f er is more persistent, and does not abate with e development of the eruption, and but slightl or not at all, with the disappearance of it, but c n continues many days, or even some weeks a rwards; or is sometimes considerably exacerb d after having abated. In measles, the fever usu y subsides with the disappearance of the rash.

71. *B*. The *kidneys* are not nearly so liabl to be affected in measles as in scarlet fever, in w h they are remarkably disordered, both prim y and secondarily, and the urine is either partiall r altogether suppressed or otherwise morbid. e infectious miasm of scarlatina has a special fluence on the states of the kidneys, as sh n above (§§ 28. *et seq.*), and thereby often ind s several secondary affections not observed to foll , or very rarely, the other exanthematous fev , more especially dropsies, diffusive or conges e inflammations with serous effusion, &c., affect s of the joints, gangrenous erysipelas, &c.

72. *C*. The diagnosis of the *primary feve* f scarlatina is often difficult or impossible, if the ginous affection be absent, and if no eruption h appeared. The circumstance of the disease be g in the same family, house, or immediate vicin ; the states of the tongue, throat, flexures of e joints, and urinary excretion, and the characte r type of the fever will sometimes aid the diagno ; although the severity of the disease, the affect n of the head, the convulsions or delirium, e vomitings and thirst may lead to the belief t the first stage of meningitis is actually present. most cases, however, of this period of scarlati , the severity of the vomiting; the pains in the b and loins; the remarkable scantiness and mor appearances of the urine; the burning heat dryness of the skin; the enlargement of the rotids, or the existence of some complication; great rapidity of the pulse, and the acuteness the attack, should induce suspicions of scarlati especially in the circumstances just mention although neither eruption nor throat-affection present (see above § 4., and art. Measles, § 48

73. VIII. Prognosis, &c. — It has been tempted by some writers to impart an *ad captand* precision to the prognosis of scarlet fever that t subject does not admit of, by calculating the p portion of deaths in this disease. But it is obvio that the rate of mortality will vary with the seve forms, types, complications, &c.; with the co binations of predisposing causes, and with t treatment. — *A*. In the simple, mild, and more sth nic types of the malady, the prognosis is favourab although the contingency of secondary disea should be taken into account, yet this may generally guarded against and prevented. Wh the malady is complicated, irregular, malignant asthenic, then the danger is considerable, althou numerous circumstances may indicate either diminished or an increased risk. It is chiefly fro the existence of certain *symptoms* that danger is be inferred; but there are *circumstances* connect with the pre-existing state of the patient whi often increases the risk, as the first period of *dent tion*, the period of *weaning*, the *cachexia* produc by unwholesome or insufficient food; a bloate

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very commonly numerous crystals of lithic acid are present.

"As the disease subsides, which under proper treatment it usually does in a few days, the blood, fibrinous casts, and epithelial cells diminish in quantity, and finally disappear; but traces of the casts may be seen some days after the urine has ceased to coagulate, on the application of heat or nitric acid." — (*Cyclop. of Anat. and Physiol.* art. *Ren.*)

cophlegmatic or plethoric habit of body, and
pregnant and *puerperal states.* In some epi-
mic visitations, and in some seasons, more than
others, pregnant and especially puerperal fe-
les are liable to be attacked by scarlatina; but
liability is not so great as the danger to those
o are infected; for the *pregnant* are prone to
ortion, and when this occurs the disease often
umes a most dangerous form; and if the dis-
se occurs soon after *parturition*, recovery rarely
es place, more especially as observed in some
idemics. In these latter circumstances the scar-
ina often assumes the appearances of, and can
rdly be distinguished from, the most malignant
m of puerperal fever. Scarlatina thus occurring
n after *parturition* has been described as follows
MALFATTI. — "It usually attacked patients
mediately after delivery, and caused the utmost
stration of strength, and slight pain in the
oat. The eruption assumed either the miliform
levigated character, and was of a dark violet
e. The strength of the patient now sank ra-
lly, and to a burning heat succeeded coldness
the extremities, and a very frequent and small
lse. To these symptoms were added great anxi-
, hæmorrhage from the nose, and a fœtid and
pious lochia." He adds, that the infected, in
s state, all died, "qualiscumque adhibita fuerat
dela."

74. *B.* The *symptoms* which more especially in-
ate danger are the occurrences of convulsions
or soon after the attack, or of delirium on the
t and second day. In these cases the child
en dies, as remarked by Dr. R. WILLIAMS, on
third or fourth day, and the adult on the
hth or tenth; but this issue sometimes in these
es place even earlier, more rarely later. A
ere affection, or sphacelating or foul ulcerating
te, of the fauces and tonsils; a brown state of
tongue, or a clean, raw tongue, or a glossy
te of the tongue or throat, with a rapid flut-
ing pulse, are very unfavourable symptoms;
also is a sudden fading of the eruption, or the
anging of it to a livid hue; or the appearance of
techiæ or of purple spots. The supervention of
ma, or of pericarditis, or of double pneumonia,
pleuritis, or peritonitis, is unfavourable, but
t necessarily fatal; but the danger of these, as
ll as of all the other primary and secondary
mplications of the malady, is remarkably
ightened by suppression of *urine*, or by a very
nty or bloody state of this excretion, and by
er indications of serious affection of the *kidneys.*
rsistent vomiting, a severe or obstinate diar-
œa; acrid or excoriating discharges from the
uth, throat, and nostrils, with or without hæ-
rrhages; hæmaturia, or melæna; the associa-
n of two or more of the complications or local
ections already described, especially in a severe
m; the appearance of diffusive inflammation of
cellular tissue in the vicinity of the parotids,
d extending down the neck, or of extensive
scesses, or sphacelation, in this situation, are
ry unfavourable occurrences. The same may
said of affections of the joints, erysipelas or
al gangrene, and affection of the cervical
rtion of the spine, with consecutive caries of
e or more cervical vertebræ. But these are
t necessarily fatal, although very dangerous;
en from the last of these lesions, recovery may
e place, a result which was obtained in two cases which were under my care, both of which are now alive and quite well, excepting a stiff and shortened neck.

75. *C. Dropsy*, in the form of anasarca, or taking place in any of the cavities, in connection with scarlatina, varies much in danger, with the season and the prevailing epidemic, with the seat of effusion, with the nature of other associated morbid states, and more especially with the states of the kidneys and urinary excretion. The occurrence of anasarca *during the eruption*, or of effusion in any shut cavity, at this period, with or without inflammation, is an indication of danger, more especially if the urine be very scanty, very deep-coloured, or suppressed. Anasarca occurring alone *during desquamation or convalescence*, although the urine is albuminous is generally cured, if no further complication take place, and if the urine is not very scanty, or very albuminous, or bloody. But if the urine assume either of these states in a remarkable degree, the supervention of most dangerous internal effusion or inflammation, chiefly of the meninges of the brain, of the pleura, pericardium, or peritoneum, or of the lungs, &c., may be expected. The danger and the frequency of these secondary complications of scarlatina, as well as of the primary associations, vary much in different epidemics, and with the numerous causes or occasions concurring to render the infection intense, or to reinforce the operation of the poisonous miasm, and with those more especially which are about to be mentioned (§§ 84. *et seq.*).

76. IX. CAUSES. — i. THE SPECIFIC CAUSE, OR POISON. — *A.* Scarlet fever is *caused* by a *miasm* or *emanation* from a person already the subject of this disease; but the exact and intimate nature of the miasm, and the origin of it, are unknown; we know only the effects or phenomena which this cause produces, and most of the circumstances which favour its operation; and we further know, that, however these effects vary in severity, in form or in character, they are always of a specific nature; the seminium attending them multiplying and disseminating itself, and spreading its kind, whenever circumstances favour the propagation. Upon these circumstances, the prevalence of the malady chiefly depend; for they favour the operation of the specific poison or infectious miasm which produces it, — 1st, by predisposing the system of individuals to the invasion of this miasm, — 2dly, by concentrating and increasing the dose or quantity of the poisonous emanation invading the frame. During many ages, and especially when the earlier accounts of the malady were furnished, either the combinations of these predisposing circumstances were greater at distant intervals, or their absence was more complete in these intervals than at the present day, or the infectious or poisonous miasm was entirely absent, or remained latent or concealed, for prolonged periods. Either of these conditions may have existed; or the infection, having produced its effects on all who had come within its sphere, had ceased to spread, and had ultimately disappeared from a place for a longer or shorter period, until it was introduced by a poisoned or infected person, or by contaminated articles or fomites. This latter circumstance — this re-appearance of the malady in a place long entirely exempt from it, suggests the following questions as to its origin, — 1st, Whether the disease is caused only by a specific seminium,

which had originated at some unknown period, and, having infected one and more persons, and subsequently all who were predisposed to the infection, had then ceased to produce its effects, but was retained by substances capable of preserving it under certain favourable circumstances, until it was again brought to act on those predisposed to its influence? — 2dly, Whether the disease is always thus perpetuated by the preservation of the infectious seminium by individual, or rare, or scattered cases, and by fomites; or is it produced, *de novo*, by the combination of those causes, in an intense form, which are usually viewed as concurrent and predisposing causes, and, being thus produced anew, is then propagated by the infectious emanation proceeding from those thus attacked?

77. I incline to the first of these opinions, because we have no sufficient evidence of the reproduction of this malady by the combination of the causes usually favouring it, predisposing to it, and rendering attacks of it malignant or complicated, and because an infectious seminium, as in the case of small-pox, may be preserved, propagated, and become epidemic — may almost disappear for a time, and then unexpectedly break out — without the means of its preservation, the sources of its infection, or the causes of its prevalence, and of its multiplied effects, being made manifest, or even admitting of solution, on many occasions. But the difficulty of tracing infection to its sources on all occasions, in this and in other infectious maladies, is by no means an argument against its existence; for causes are often inferred from their effects with greater certainty than from some other proofs upon which firmer reliance is often placed. The laws of infection, and the numerous circumstances connected with the sources, the preservation and the dissemination of infectious seminia, admit not of a rational doubt of the perpetuation of these seminia, although their effects may be sparingly or rarely disseminated, or even developed after long intervals. Indeed much of what is known of these favours a firm belief in this source of scarlatina, as well as of measles and small-pox, on all occasions and in all instances. We know that the vitality of several kinds of seed may be preserved for many ages; and why should not the poisonous properties of an animal fluid or miasm be preserved for months, or even for years, when exclusion from the air and other circumstances favour the preservation? Admitting this, allowing also that the seminium often requires many days to take root and to develope itself into full efflorescence, knowing, moreover, the diversified media by which the morbid or poisonous emanation may be preserved, conveyed, and brought even into unrecognisable operation, it cannot be a matter of surprise that the source of infection frequently admits not of demonstration. Two powerful circumstances in favour of the existence and operation of a specific infection or poison have too frequently been kept out of view, namely, — 1st, the non-existence, or non-appearance, at any time of this disease in several secluded or isolated localities and islands, although the several causes tending to favour the dissemination and malignancy of the disease — those very causes which have been belived by some to be capable of originating the malady *de novo* — have been there present, in the most pregnant forms of union and association, — and, 2dly, the fact that, when the disease has made its appearance in such places, it s always been traced to the introduction of infect ; and, having exhausted itself on all the predispo d to it, has entirely ceased and disappeared r years, until again introduced by the infected or y fomites.

78. If we refer to what is known (and r knowledge in this and in other allied topics is v y imperfect) respecting the statistics of disease n most of our cities and large towns, we shall fi , that at no time are cases of scarlatina altoget r absent. I believe, moreover, that cases often oc r which are either not recognised at all, or no s cases of this disease. Hence sources of infect n are rarely absent from these localities, irrespec e of the chances of transport to, and transmiss n from them, or, if absent for some time in e place, they are present in other places, from wh n they are transmitted to those which have been r a longer or shorter time exempt from them, d which, from this circumstance, furnish subj s predisposed to infection.

79. *B.* The *media* by which this disease s transmitted from those affected to the healthy, e generally the atmosphere surrounding the sick, d substances which imbibe the miasms emanat g from those who are, or have been, recently - tacked, and which retain it for a time, but s n impart it to the air — *fomites* (see art. INFECTI , §§ 16, 17.). It has not been demonstrated, r indeed does the matter readily admit of pre e demonstration, how far the miasm of scarla a may extend, by means of the atmosphere, fro a person sick of the disease. Much will dep d upon the state of the air as to humidity, mot , &c., and upon the predisposition of those expo d to it. It has been supposed, that the appropria n of a room in schools for such children as may e seized with either scarlatina or measles may prev t the spread of the disease among the healthy. T s has been attempted in many instances; and y myself, in respect of these diseases on sev l occasions, and on two occasions with comp e success, in others with partial but very consi - able success. Much depends upon the size d construction of the building, and the strictnes f the seclusion and of the precautions as to fomi . This measure failed in Heriot's Hospital, Ackwo t School, and the London Foundling Hospital, wh e the buildings furnished excellent means of iso - ing the infected. But I suspect that the prec - tions taken failed in preventing the transmiss n of the infecting miasm by persons or clot . Besides, when a school is large, some of its - mates may have been so long the subjects of e eruptive fever before the disease is recognised s to have infected others previously to their remo . When the building furnishes the means of co - plete isolation, the attempt at thus preventing spread of the disease should be made; for i better that the infected should receive due attent in such circumstances at the place of infecti than that they should be returned to their frien where they may transmit the disease to ma others; and it is even better that those in the fected school, who have not yet sickened, sho not be allowed to leave it, inasmuch as they m convey the disease in their persons or clothes the families to which they would return.

80. *C. Fomites*, or substances impregnated w the miasm exhaled by persons sick of scarlatina,

quent media by which this disease may be nsmitted to the healthy, either in the vicinity he sick, or in places at a great distance. The ation of the period in which the capability of ection is possessed by fomites is uncertain, and as not been ascertained. It may be inferred be very short when the impregnated substances e been exposed to a free current of air; and ch longer when they have been shut up and irely prevented from imparting or losing the ined miasm. Feather beds and woollen bed-thes retain the infection for the longest period, ecially when undisturbed or shut closely up. e duration of the power of infection, in respect these articles and of woollen body-clothes, has been and is not likely to be determined; for ious circumstances will either shorten or pro-g the period. Dr. SIMS remarks "that the ection seemed to remain in a house some, but many weeks, after all the family were reco-ed." In large airy houses, where ventilation l means of purification are adopted, a very few eks may be considered sufficient to remove the ectious property; especially if the beds and lding are subjected to a high range of tem-ature, as advised in the article on *the pre-tion of* PESTILENCE (§ 77.). But, where these ans are neglected, and in close, dirty, and low rtments and houses, and in crowded localities l houses, where the beds, bed-clothes, hang-s, &c. are foul, and insufficiently aired, the ver of retaining and transmitting infection may st for several, if not for many weeks. When nites are shut up, and excluded from imparting retained miasm, the disease may be thereby nveyed to distant or remote parts, and even hout the source of infection or the media of nsmission either being recognised or admitting ecognition.

31. *D.* The propagation of the disease by *inocula-n*, and by the contact of the morbid secretions the disease, has been demonstrated. Sir B. RWOOD and others have tried to inoculate lthy children with the fluid from vesicles netimes intermingled with the eruption of rlatina, in hopes of producing a milder disease, in small-pox; but, although the disease was s communicated in many instances, no mitiga-n of its type was thereby obtained. In a case ich came under my care, the disease was pro-ced by the contact of a small portion of the charge from the throat of a person with ma-nant anginous scarlatina, and the patient thus ected had the disease in the most severe form, l recovered with difficulty.

82. *E. The susceptibility* to the infection or con-ion of scarlatina is exhausted or annihilated er the disease has run its course — after the rlatinal poison has produced its specific effects. is law obtains as remarkably in respect of rlatina as of small-pox. The impossibility of ing infected by this malady a second time has en fully ascertained by Dr. WILLAN and many ners; but a very few exceptions to the law have en recorded,—so few as not to amount to more n one instance amongst two or three thousands nstituting the law. This immunity from a second ack may be viewed as a proof that the disease not merely one of the blood alone, but is also, not chiefly, one primarily affecting and chang- the susceptibility of the organic nervous system, the blood being altered by the state of this system, on the conditions of which this fluid is so intimately dependent.

83. *F. The coëxistence* of scarlatina with measles, with the vaccine disease, with erysipelas, and with small-pox, has been contended for by some, and denied by others. I believe in its coëxistence with measles, and in the production in consequence of the hybrid disease described under RUBEOLA; and its coëxistence with the other eruptive maladies just mentioned, especially vaccinia, is not unlikely to occur under circumstances favouring the operation of their respective poisons upon the frame at the same time. Dr. GREGORY states that he has seen at the Small-pox Hospital "several unequivocal cases of the simultaneous existence of small-pox and scarlatina anginosa." And Mr. MARSON, surgeon to that hospital, remarks that, in the course of eleven years, "he has seen seven persons who had variola and scarlatina simultaneously."—(*Med. Chir. Transact.* vol. xxx. p. 121.)

84. ii. PREDISPOSING CAUSES OR CIRCUMSTANCES.—*The causes predisposing to the infection of scarlet fever* are numerous, and may be referred to the *states of individuals* exposed to infection, and to the circumstances or *conditions favouring the concentration* and the invasion or operation of the poisonous miasm.—*A.* As the *mode* in which this disease is generally infected, whether the infectious emanation proceeds directly from the sick or mediately or by means of fomites, is by the inspiration of air contaminated more or less with the poisonous miasm, which affects, nearly at the same time, or in quick succession, the organic nerves of the respiratory surfaces and the blood distributed to these surfaces — morbidly impressing the former, and passing by endosmose through the latter — it follows that the susceptibility to infection must depend much upon the states of the organic nervous power, and of the vascular system, and that, when the energy of the one is impaired, and the action of the other is lowered, the frame will be more liable to be invaded by the poisonous influence. Hence some individuals are more prone to infection than others, and hence the same person is more predisposed at one time than at another, according to the varying states of nervous tone and vascular action. The conditions of the atmosphere, as powerfully modifying these states, have considerable influence in predisposing to infection; but to this and to the immediately preceding topic, I can add nothing to what I have stated in the article on INFECTION (see §§ 44—55.).

85. *B.* There is no cause of predisposition more generally manifested than the *age of childhood.* The susceptibility of infection appears to be greatest from the period of weaning to fully adult age. After thirty or forty years of age the susceptibility is remarkably diminished; but although I have seen several cases from thirty-five to fifty years of age, I have met with one only between fifty and sixty, and he died in twenty-four hours owing to the extension of the disease to the larynx. As the susceptibility of infection is greatest in childhood, and as the proportion of those who have had the disease at this epoch is very great, it follows that the number of non-infected at adult and advanced age is comparatively small. Although cases of the disease at these ages are thus few, yet they are generally of a most severe character,

especially about and after forty years of age, as respects not merely the complications, but also the type of the eruptive fever, from its commencement, and the danger is thus increased with advanced years. According to my experience, the younger the child the milder is the attack; but there are numerous exceptions to this law arising out of the aggravating circumstances connected with weaning and dentition, and the numerous *concurring predisposing causes*, observed among the poor — of which the most influential are, ill-clothing; insufficient and unwholesome food; low, ill-ventilated and malarious abodes; exhalations from cess-pools, privies, and sewers, and inattention to cleanliness, with various others tending to lower the constitutional powers and the vital resistance to the invasion of infection, to concentrate the infectious emanation, and thereby to increase the dose of the poison.

86. Infants during the period of suckling very frequently escape the disease, although every other member of the family may be attacked. I have seen, on several occasions, every one of a family of eight or nine children affected in a very short period of each other, and the infant at the breast to escape. The cause of this *comparative immunity* is not very apparent. Probably infants at this period are less exposed to the infectious emanation; but this depends much upon the circumstances of families; amongst the poor the exposure is not materially less. It is rather to be imputed to a less susceptibility of infection at this period, depending probably upon the circumstance of the infant being then nourished by a secretion directly from the secreting organs of the mother, and thus possessing some measure of an invigorating vital emanation, thereby enabling the infant to resist the infection. I have observed, in many instances, that persons who have experienced a very severe attack of measles, have escaped the infection of scarlatina, although much exposed to it. This circumstance is deserving of further observation; but, from whatever cause, some persons resist this infection, although frequently exposed to it from an early age. Out of 2614 cases recorded by Mr. FARR in his fourth report, 2419 were children, 182 adults, and 13 aged persons. Scarlatina may attack the *fœtus in utero*. Instances of this have been furnished by several writers. Dr. GREGORY states that, "on the 28th of April, 1839, his youngest child was born, evidently suffering from fever. The throat was affected the following day, obviously from angina maligna. Eruption was never developed. The infant drooped and died on the first of May." (p. 146.)

87. *C.* Scarlet fever affects both *sexes* in equal proportions, and very remarkably so. In London it destroyed, in 1838, 747 males and 777 females; in 1839, 1241 males, and 1258 females; and throughout England and Wales, in 1840 (exclusive of the metropolis)*, 8927 males, and 8935 females. This disease appears to be most prevalent in temperate climates. It is stated to be comparatively rare in Bengal. Dr. GREGORY remarks that Dr. JACKSON, formerly of Calcutta, could not recal to mind any cases which he had seen in India deserving the name of scarlatin I never met with a case within the tropics. I e-lieve that the disease has not yet been impo ed into Australia, Van Diemen's Land, and w Zealand. It was brought to North Americ in 1735, and its progress was very slow, but ry fatal. The epidemic in 1746 in that conti nt was most pestilential. "Villages were depu-lated by it, and parents had to bewail the lo of all their children."

88. *D.* As to the *complete immunity* conseq nt upon an attack of this malady, it may be rema ed that this is to be imputed to the exhaustion of s-ceptibility produced by this poison, as by sev al other animal poisons, as respects their sev al specific effects. That the poisonous emanatio or material should fail of producing any effect u n a person who has, at some more or less rer te period, been affected by it, is a most impo nt law in this and other exanthematous and p i-lential maladies, especially as respects the sa ty of the species. The protection thus obtaine is the chief means of preventing the depopulatio of

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* The following will show the comparative prevalence, *in the metropolis*, of *scarlet fever*, *measles*, and *small-pox*, from 1838 to 1848, both years included — during the last eleven years. It must be manifest that the numbers assigned can be an approximation only to the true amount, as the causes of death are in many instances arbitrarily assigned in the returns; but they are sufficiently accu te to convey useful information.

Years.	Scarlet Fever.	Measles.	Small- x.
1838	1524	588	381
1839	2499	2036	63
1840	1954	1132	12
1841	663	973	10
1842	1224	1293	3
1843	1867	1442	43
1844	3029	1182	18
1845	1085	2318	9
1846	928	747	25
1847	1433	1778	95
1848	4756	1143	161
During eleven years,	20962	14632	130

During the last eleven years the deaths, in the e-tropolis, from *scarlet fever* have been greater than n *measles*, or from *small-pox*, or from *hooping-cough* r from *continued fever*. In only three of these years e the deaths by measles been greater than those by sca -tina; and in only two has the mortality from small- x exceeded that of scarlet fever. In 1841 and 1846 e mortality of scarlatina and measles was low; and in e latter year that of small-pox was the lowest. In 1 , 1843, 1844, the mortality of both scarlet fever and mea s was high. During 1848 the deaths from scarlatina e about three times greater than the average of the for r years. The maximum mortality from measles occu d in 1845, and from small-pox in 1838.

The greatest number of deaths from scarlet feve -cur among the poor owing to the circumstances, w n both predispose to infection, and render the dis e more malignant; and even those causes which devel the sequelæ of the disease and render them fatal (s § 42.) are also most prevalent in the lower classes. If e above amount do not comprise the deaths from dro , or other diseases consequent upon scarlatina, the mo -lity from this malady must have been greater than e stated. The above results will show that there are diseases—perhaps none—from which the general am t of mortality, and of danger, is greater than in sca t fever, and yet there is not one, of which the pathol y and treatment has received less attention and elucida n in modern times than it.

The *proportion* of *malignant* to *mild* cases of scarla cannot be truly estimated, as it differs in different seas , in different localities, and in different epidemic pr -lences. Dr. WILLAN found it to be one of the forme four of the latter; and Dr. CLARK, one to two; and of six had dropsy during convalescence. The *rat* *mortality* must necessarily also differ with the ab causes — the fluctuation sometimes observed being markable, — being from one in forty to one in six ca . Dr. GREGORY considers that the average mortal t about six per cent.; and that, while throughout Engl and Wales, 19,816 deaths occurred in 1840 (a yea average mortality for London) the total numbe seizures must have amounted, according to this ca -lation, to about 330,266 in that year, for the whol England.

ricts where any of these maladies break out;
a accordingly it has been observed, that where
s let fever, or measles, or small-pox has been
i oduced for the first time, or after the lapse of
v many years, the whole, or a large proportion
d he population being susceptible of infection,
t destruction of human life has been there most
t ific. That the immunity obtained, by an at-
t of those diseases which infect the constitution
o once, cannot be imputed to any change in
t blood consequent upon such an infection, may
b nferred,—1st, from the impossibility of a per-
m ent change in this fluid that could prevent the
re rrence of any alteration in it which had taken
p e on some former occasion; and, 2dly, from the
g ual and entire renewal of this fluid after
lo er or shorter periods, a renewal of susceptibi-
li nevitably supervening, if this property resided
in e blood. We must therefore refer the im-
m ity from a second infection to the organic
n ous system, and view the susceptibility of this
sy m to have been so affected or specifically
ch ged by the first operation of the poison as no
lo er to be capable of being roused, by any
su equent application of the same species of
po n as previously affected it, to a similar series
of orbid changes and actions.

. *E. The Period of Latency or Incubation—the*
pr ursory or formative Period.—The time which
el es between exposure to infection and the
co nencement of the febrile action, may be ex-
pe d to vary much, as it actually does vary, ac-
co ng to the susceptibility of the individual either
fr constitution or from the influence of predis-
po g causes, or from the concentration or dose
of e poison. I have stated much of what is
kn n as to this matter in the article on INFECTION
(§ .). All that can be advanced is, that the
pe d is very uncertain. It may be only a few
ho , or it may extend to ten or twelve days.
D IATON has recorded some cases in which he
co lered this period to have been prolonged to
tw y-four or twenty-five days. The most com-
mo period is most probably three or four days, it
be rarely shorter than two days, or longer than
eig In a case referred to by M. ROSTAN, in
wh the disease was induced by inoculation,
sev days elapsed before the appearance of
eru on.

X. PATHOLOGICAL INFERENCES.—It may
be eful to conclude this view of the *pathology* of
sca t fever with certain inferences as to those
top connected with the nature of the malady,
tha ave an important relation to the treatment of
it, l that should furnish the basis of our inten-
tio of cure.—*a*. The *cause* of scarlet fever
app rs to be an animal miasm or poison of a
spe ic kind—a specific animal seminium repro-
duc itself to an indefinite extent.—*b*. It is not
pro l that this *seminium*, or specific form of fever,
is erated, or appears *de novo*, from the com-
bin on of circumstances or states shown above
to our the extension of the malady; but, on
the ntrary, it is much more probable that the
dise occurs only from the operation of this
sem um, or specific infectious agent, proceeding
eith directly from a person labouring under the
ma y, or mediately by fomites which retain,
con y, and communicate the seminium.—*c*. The
orig or *source* of this seminium is not known;
but ry probably, like small-pox, the disease was
first generated by the lower animals, or occurred among them as a pestilence or epizooty, and not unlikely among the equine race, and was thence communicated to man—the seminium formed among these animals having effected the human species in circumstances favouring the extension of it from the former to the latter, among whom it has been preserved ever since.—*d*. The spread of the disease is favoured by certain *conditions of the air*, but what these conditions are is chiefly a matter of inference: a humid, close, and malarious atmosphere appears to favour the extension and operation of the poison; and all the other conditions shown in the article INFECTION to favour or to restrain the extension of infectious agents, exert similar influences in respect of this. Extremes of temperature seem to diminish the spread of the malady, and to render attacks of it more mild.—*e*. The states of those exposed to the morbid poison proceeding from the affected appear either to favour or to resist the action of this poison; and, when favouring it, very remarkably to modify its operation and effects (§§ 84. *et seq.*), conformably with predisposition, susceptibility, diathesis, temperament, and existing constitutional or visceral conditions; the susceptibility of a second infection by the seminium of the malady being annihilated by an attack.—*f*. The poisonous material infects the frame of the healthy in the *manner* fully explained in the article on INFECTION (§ 44. *et seq.*), and developes its *effects* in the course of a period, varying in duration from two to twelve days, or even in a shorter, but very rarely in a longer time, according to the susceptibility and predisposition of the recipient, and the concentration or dose of the poison (§ 76.).—*g*. The effects of the poison, like those of all morbid poisons, are exerted *primarily* upon the organic nervous system, and consecutively upon the vascular system and the blood; and as respects this malady especially, *secondarily* upon the *kidneys*, the *throat* and *skin*; either of these parts, or any two of them, or even all of them, evincing these effects, in a more or less manifest manner; these latter, or local effects constituting the specific characters of the disease.—*h*. The early affection of the *kidneys* in this disease, especially when the affection is such as to impede or to interrupt, or to altogether arrest the *urinary excretion*, produces a change in the blood, in addition to that already occasioned by the infectious agent acting either directly upon this fluid, or through the medium of the organic nervous system; the change in the blood thus produced often occasioning asthenic or diffusive inflammation of serous surfaces, or of predisposed organs, with serous, or sero-albuminous, or sero-fibrinous infiltration or effusion of a watery lymph—causing the several *primary complications* described above (§§ 27. *et seq.*), and already more fully explained (§§ 41. *et seq.*).—*i*. After this malady has run its usual course, it is more liable than any other exanthematous fever, to be followed during desquamation and recovery,—during a period varying from seven or eight days, after the fading of the eruption, to four, or even six weeks at the utmost,—by a consecutive affection of the *kidneys*, indicated by scanty, albuminous, or even bloody urine, and by the presence of epithelial cells in this fluid, sometimes moulded in the fibrine or lymph into the form of the urinary tubes, and consecutively by *œdema*, *anasarca*, or *inflammation*

of *internal parts*, or by *effusion into serous cavities.* — *k.* These *sequelæ* or *secondary complications* result from the consecutive affection of the kidneys (§§ 42. *et seq.*), which appears to consist chiefly of an obstruction caused by the accumulation of exfoliated epithelium in the tubuli and of a deposition of albuminous lymph in the structure of the organ, this latter obstructing the circulation in the capillaries by its pressure, whilst the accumulated organic detritus in the tubuli obstructs the passage of the secretion along these canals, and impedes or interrupts the function of the organ. — *l.* The consequences of the affection of the kidneys, at an early stage of the disease, and of the consecutive obstruction of these emunctories, at a much later period, are, as shown above (§§ 41. *et seq.*), morbid or contaminated states of the blood — a state *of excrementitial plethora*, consisting of an excess of watery elements and of effete, deleterious, and irritating materials, and saline ingredients. The accumulation of these *excrementitial matters* in the circulation, as well as of *those usually eliminated by the skin*, occasions the several complications—whether inflammatory or dropsical — observed in the course of the malady, or subsequently as sequelæ or reliquiæ. — *m.* Not the least important of these latter is the *anæmia* observed not infrequently to follow the renal and dropsical affections during or consequent upon scarlet fever. — *n.* The occurrence of the usual *sequelæ* of scarlatina is favoured by several physical causes, to which the patient is liable to be exposed during the process of desquamation and recovery; and it is often prevented by measures calculated to restore the functions of the skin, and to prevent vascular determination to, or congestion of the kidneys, and to diminish these, with the other consecutive or associated causes of obstruction of these organs.

91. XI. Treatment.—*The treatment of scarlet fever* has hitherto been unsatisfactory, and in the worst forms of this disease most unsuccessful. This has arisen chiefly from our imperfect knowledge of the successive pathological changes produced by the scarlatinal poison, and from the varied character of these changes with the dose of the poison, with the constitution and circumstances of the recipient, with the season and weather, and with the prevailing epidemic constitution. It must be obvious that, if the earlier changes produced by the infecting or poisonous agent be either misunderstood or not recognised, the consecutive alterations will be very imperfectly, if not most injuriously combated; and that our means of cure will be either inappropriately selected, or misdirected. When treating of fevers, I have insisted in several places upon the importance of promoting the secreting and excreting functions in all our attempts to *preserve from*, as well as to *cure*, these maladies; for it is chiefly by such measures as promote the depurating action of the emunctories on the blood, through the medium of the organic nervous system, as shown in several parts of this work, that these great ends of practical medicine can be attained.

92. i. Preservative Treatment. — The fatality of the more malignant types of this malady induced physicians to recommend means for the protection of those exposed to infection; and these means were more frequently advised, and more generally adopted in former times than at present. The uncertain efficacy, or frequent failure of ese means, and the hopes of escaping the more angerous forms of the malady, probably indu a want of confidence in them, of which they a not altogether deserving, especially in some ci mstances in which the disease presents itself.

93. Dr. Withering remarks, that durin the prevalence of the malignant form of the d ase in 1778, when every one was alarmed for h self or his connections, means of prevention ere anxiously inquired after. “Some smoked, me chewed, and others snuffed tobacco: some d bed their hands and faces with *thieves' vinegar;* any more camphor at the pit of the stomach; an still more swallowed bark and port wine. But ose who were much conversant with the diseas had too ample occasion to observe that none of ese methods were effectual.” But Dr. With ing had his own notions of prevention based u n a supposition as to the mode in which the son invades the frame. He believed that the scar nal poison “first makes its lodgement upon the cus separated by the pituitary membrane linin the nose and fauces;” and that those who are ex sed to the infection should frequently spit ou the mucus that collects in the fauces and promo the discharge from the nostrils. He further a sed those who already had imbibed the poison and had experienced the premonitory symptoms, immediately to take an emetic; frequently to ash their fauces with soap-leys diluted with wate and to snuff something up the nose that will ake them sneeze.” After the operation of the etic he directed the patient to go to bed, and ink plentifully of wine whey with spirits of hart orn. He states that a large experience enable him confidently to assert that, if these preca ons be attended to, the infection will be either together prevented, or else very trifling in its sequences.

94. In the latest edition of Dr. Withe g's treatise, and after an extensive experienc he adds, that the progress of infection may be st ped by precautions which may be adopted in ost every house. He had observed that, when rding-schools were infected and the children ere sent home, the disease was more widely sp ad and that he therefore adopted the suggest of Dr. Haygarth, and had for several year ast never thought it necessary either to break a school or to disperse a private family. “All ing apartments on separate floors to the sick a the healthy; choosing for nurses the older parts the family, or those who had already had the di se, and prohibiting any near communications be een the sick or their attendants and the healthy ith positive orders instantly to plunge into wa all the linen, &c. used in the sick chambers, ave universally been found sufficient to chec the further progress of infection.” These recommdations are deserving of adoption, and confir the opinion which I have stated above (§ 79.).

95. Dr. Sims remarks, that the best prev ive of the disease was found by him to be rh arb taken in the morning in such quantity as uld produce one loose motion in the day. He d not see one who used this confined afterwards ed, though several persons began it after they ere infected, but before the time of their sick ng. Dr. R. Williams considers Dr. Sims' autho to be quite as veritable as that of Hahneman and

charm even more valuable than that of the
r. Probably any single *prophylactic*, of what-
kind, owes much of the influence it may
t to the confidence reposed in it by the person
has recourse to it. As fear favours, so does
idence resist infection; and when the object
onfidence is such as promotes the several
nilating, excreting, and depurating functions,
out lowering vital resistance, it combines the
ie of a *charm*—of a mental agent, with its
ical operation. The hypothesis of HAHNE-
N is, that diseases are best combated by reme-
which produce morbid actions similar to those
tituting the diseases themselves; and conse-
tly, as belladonna is capable of producing an
escence similar to scarlatina, that it is a pre-
tive against this disease. He asserts that one-
ieth part of a grain of belladonna given twice
will preserve a susceptible person from an
k of scarlatina; — or that three grains of the
ct dissolved in an ounce of distilled water,
three drops of the solution given twice daily
child under twelve months old, and one
more for every year above that age, will be
ient for this purpose. It is possible that bel-
na, by its irritant and alterant effects (see
OISONS, § 537. *et seq.*), may render the system
ceptible of the scarlatinal infection, inde-
ntly of the principle or law for which HAH-
NN has contended, empirically and absurdly
defiance of both reason and argument. It
possess this particular virtue, by producing
cific effects, without furnishing any support
irrational doctrine, the monstrous absurdity,
e most nefarious practice, which he has origi-
and promulgated — a practice which knaves
an adopt, and to which fools only will submit.
bvious that belladonna can exert no protec-
fluence until it produces, by the continuance
use, or by its dose, its specific effects, and
that, even admitting its efficacy, in virtue
se effects, it must frequently fail when it is
en in due season. As to its efficacy, opinions,
Germany, are much divided; some, with
LLER, SPEUN, BERNDT, KOREFF, HUFE-
&c. confiding in it; others, with SALZER,
veral beside, stating that they have found it
icious; whilst many agree with HILDEN-
in treating it with ridicule.

Calomel was recommended by KREYSIG
ELIG as a prophylactic, and as tending to
the severity of the attack, when it failed of
g it altogether. THEUSSINK advised the
l to be conjoined with the golden sulphuret
mony. EICHEL believed in the efficacy of
, as advised by WITHERING, especially
hey are followed by diaphoretics. Several
have recommended the mineral acids. I
eason to believe that the nitro-hydrochloric
e not devoid of efficacy as a prophylactic;
at capsicum may be placed in the same
y, especially when conjoined with small
camphor and quinine. The most certain
axis is, however, to be found in the adop-
hose measures which I have fully detailed
article INFECTION (§§ 55. *et seq.*), when
of its prevention and counteraction, and
n PESTILENCE, PROTECTION FROM.

97. CURATIVE TREATMENT. — It is obvious
at has been advanced, that the treatment
et fever should be directed with strict reference — 1st. to the type and form of the disease, — 2d. to the character of the prevailing or stationary epidemic constitution, as insisted on above (§ 10.); — and 3d. to the pathological conditions, primary and secondary, to which I have endeavoured to direct special attention. With these objects in view, I shall *first* describe the means which are most appropriate in the different forms of the malady; and *next* remark upon the several remedies which have been recommended by the best authorities, and the circumstances in which they may be most beneficially resorted to. Without failing to give these authorities their due weight, I shall be guided chiefly by the results of my own observation and experience.

98. *A. Simple Scarlatina — S. Mitis — S. Simplex.* — Mild or simple scarlet fever (§ 18.) may require but little treatment beyond attention to ventilation and diet, and to the several excreting functions, especially if the febrile symptoms be slight. If, however, the pulse is quick, sharp, or rapid, or the skin hot, the quantity, appearance, and character of the urine should be carefully examined, and if this excretion be scanty, and the fever considerable, although the disease may appear simple and regular, yet it may assume, even in the course of a few hours, a much more severe form. If there be vomiting at the commencement; and more especially if the retchings be attended by pain in the loins or limbs, and scanty or suppressed urine, an emetic should be exhibited, and its operation be promoted by demulcent diluents, and warm diaphoretics; and the functions of the skin be promoted by the tepid bath. The action of the emetic tends both to remove the congestion of the kidneys either already existing or apt to supervene in these cases, and to determine to the surface of the body. If the patient be strong or plethoric, and if the prevailing epidemic constitution do not contra-indicate this measure, a small or moderate cupping over the loins; and, in different circumstances dry-cupping in this situation, may be practised if the symptoms are not mitigated by these means. The bowels should be evacuated by suitable aperients — by one or two doses of calomel and antimony, followed by saline aperients, as the phosphate of soda, &c. taking due care merely to promote and to evacuate the secretions and excretions without causing unnecessary irritation.

99. The chief *intentions* directing our practice, in the milder cases of the disease, are, — 1st. to prevent the increase of febrile action, — 2d. to promote the excreting and depurating functions, — 3d. to remove local congestions and determinations, whenever and wherever they occur; and 4th. to preserve or to restore the functions of the skin and kidneys after the subsidence of the eruption, and during the process of desquamation. If we fail in the complete fulfilment of these intentions, the indications and means about to be described should be adopted, appropriately to the phases through which the disease may pass, and to the complications which may supervene. Although the mild and regular form of the disease generally proceeds favourably, yet, owing to many disturbing causes, and not infrequently in consequence of the nimia diligentia medici, it may assume a serious or complicated form, more especially when vital power is suddenly reduced, when

excreting functions are interrupted, or when local determinations are favoured or occasioned.

100. *B. Scarlatina anginosa* — *S. inflammatoria.* — The more inflammatory types or states scarlet fever (§ 19.) generally require prompt and active measures. But it ought not to be overlooked, that the terms here employed to designate the more *sthenic forms* of the malady are altogether arbitrary — that many mild, as well as all the malignant states of the disease are anginous; and that, whether simple, regular, mild, anginous, or malignant, it may also be inflammatory; the great and essential difference being the degree in which sthenic or asthenic action is present — in the amount of organic nervous or vital power, and in the state of the circulating fluids. This type or form of the disease requires a modified, or even very different, treatment according to the phases it may assume, and the grades of vascular action and vital power, as different or individual cases pass through the various phases from the mild to the inflammatory, or from the simple and regular to the complicated or malignant (§ 20.).

101. (*a.*) In the more *sthenic diathesis*, or *inflammatory* type, of this fever, an *emetic* of ipecacuanha, or of ipecacuanha and antimony, is generally of service, especially at an early period; and its operation should be promoted by warm diluents. It is not the less beneficial when vomitings are already complained of, and the urine is scanty, and pains in the loins are present. In these latter circumstances, especially when the pulse is full or strong, the abstraction of blood from the loins by *cupping*, the quantity taken being such as the age, habit of body, and peculiarities of the patient will warrant, is generally beneficial; but *bleeding* from a vein is seldom of service — more generally prejudicial, unless in the more sthenic diathesis and robust constitutions. If generally adopted, bloodletting is a destructive practice, unless in rare epidemic visitations, when the prevailing epidemic constitution admits of the practice, with such limitations and cautions as the nature of the disease and the peculiarities of the case suggest. During the stationary epidemic constitution from about 1810 to 1820 or 1825, bloodletting, even in this disease, especially in its more inflammatory types, was much better tolerated than subsequently; and some writers considered their recommendations of it as sufficient to constitute it the chief remedy, in all circumstances, and for all time; denouncing those who had preceded them for advising different means, although more appropriate for the types of the disease for which these means were employed. More recently, and since late writers have ascertained that bloodletting should be most cautiously employed, even in the most inflammatory type, cupping on the nape of the neck, or the application of leeches behind the ears, has been advised for the more sthenic anginous form of the malady, and often practised by myself for many years. But, when pain in the loins and limbs, and scanty, high-coloured, or otherwise morbid urine, or suppression of urine, are present, I then have preferred the abstraction of blood by cupping over the regions of the kidneys, to an amount dictated by the peculiarities of the case, and have prescribed the following *embrocation*, to be applied by means of flannel or spongio-piline around the neck and throat; or either of the *liniments* in the Appendix (see Form. 295, 296. 307. 311.) to be thus mployed. If either of these applications pr ice external inflammation or discharge from the urface, the consequences are never troubleson as sometimes observed when blisters are used.

No. 335. ℞ Linimenti Terebinthinæ, ℥ij; Lini nti Camphoræ Comp. ℥j; Olei Olivæ, ʒiij; Olei Caj uti, ʒj. *m.* Fiat Embrocatio more dicto utenda.

102. When the emetic action has subside the bowels should be gently or moderately evac ted by means of *calomel*, either alone, or with rh arb or jalap, or with the addition of magnesia c the dried sub-carbonate of soda; and followe by manna, salts, &c., in the infusion of roses of senna; or by castor or olive oil, according t circumstances; or by equal parts of the comp nd infusions of gentian and senna, with the carb tes of soda and ammonia.

103. The great heat of skin in this state c the disease suggested a recourse to the *affusion c old water* on the surface, as too strenuously and discriminately advised by Dr. Currie. Wh I commenced practice I adopted this treatme in scarlet fever, and extended it to several othe diseases, and certainly with more benefit in em than in this. For, in the more sthenic for , it was soon followed by an equal, or even an increased heat of the surface, and in the ore asthenic conditions, it appeared to favour th developement of internal complications: in m t of the forms of the malady, it contingently fav red congestion of, or determination of blood t the kidneys, and thereby aggravated the disea I therefore relinquished the practice, and subst ted the *tepid bath*, or the *cold or tepid sponging* the surface, using simple or medicated fluids f this purpose, according to existing states of the er; and preferring of the latter, such as were em ent and alkaline.

104. After moderate evacuations from the b els, saline mixtures or draughts, of a *diaphoreti* and *diuretic kind*, in a state of effervescence, will a ays be agreeable, and tend to moderate the febrile a ion, as the acetate or citrate of potass, with the a l in excess, in the more sthenic cases; or the a tate or citrate of ammonia, with the ammonia in e ess, in the more asthenic; and with the spirits of tric æther with either, will be generally appro ate. In this form of the disease, *gargles* have bee ery generally recommended, and are sometin of service when their composition is such as s the state of the case. Those which are cooli or which contain the nitrate of potass, or the drochloride of ammonia, are the most grateful a beneficial. Children can use them only as hes for the mouth; but they are useful as such and they may be injected into the mouth and th t of younger children; or a clean sponge, attac l to a piece of whalebone, may be moistened with em, and be employed to cleanse the mouth and roat from time to time. The infusion of roses r of cinchona, or decoction of cinchona, or re ine and water, or camphor or rose water, may employed as the vehicle for these salts, or the other substances which may be used in this m ner. (See Form. 158—167, in the Appendix.)

105. A prompt recourse to the mean ow advised will generally prevent the occurre e of the *complications* (§§ 27. *et seq.*) often me with in this form of the disease, more especially i ese

ans secure a free excretion of urine. But if local determination or complication arise, not- hstanding; or if it have taken place before the atment was commenced, the agents used for abating it should have strict reference to the sting state of vital power. *Local depletion* will n be of service when power is not much re- ed; but we must not expect that the com- ation, however inflammatory it may seem, is be removed by depletions only or even chiefly. e pathological source of these complications, as eady explained (§§ 28. *et seq.*), will show the ility of the expectation. Whilst the local de- tion may tend to reduce the vascular fulness, al and general, means should be employed to se the action of the kidneys, to determine to cutaneous surface, and to promote the secre- s and other depurating functions. In the cir- nstances now being considered, there are no ans more efficacious, especially in restoring the ctions of the skin and kidneys, and in deriving n the seat of local affection, than flannel cloths ing out of hot water, freely sprinkled with the it of turpentine, or with the embrocation just scribed (§ 101.), and applied either over epigastric and abdominal regions, or over the s. This *epithem* should be covered with oiled , or with a warm napkin, so as to confine the es from it as much as possible to the surface he body. In most of the complications of this m of the disease, the bowels should be preserved a moderately open state, by the means al- dy mentioned (§ 102.), or by castor or olive ; and their action may be promoted by the asional administration of an *enema*, containing er or both these oils, with spirit of turpentine. cooling diaphoretics and saline medicines ad- d above (§ 104.) may also be given from e to time in a state of effervescence, or other- e. If the bowels be irritated or too much re- d, the liquor ammoniæ acetatis may be given the ammonia in excess, and with the tinctura phoræ composita, or the syrupus papaveris; the epithem or embrocation already prescribed uld be assiduously applied over the abdomen.

06. (*b.*) When the anginous or inflamma- form of scarlatina assumes more of the *enic* diathesis or type, and according as it roaches the malignant form, the treatment uld be modified. In these states even local cular depletion is either inefficacious or injuri- . But *emetics*, especially early in the attack, generally beneficial. The other means al- ly stated are also of service, more particularly terebinthinated *epithem* or *embrocation*, and saline diaphoretics; and, if congestions of in- al parts take place in this state of the disease, epithem or embrocation should be energeti- y employed. If an aperient be required, a lerate dose of the spirit of turpentine should added to the oils, advised above (§ 105.), be administered by the mouth, or as an ma, as the circumstances of the case will gest. In the less urgent or dangerous cases his form, and in the complications which may ervene, the internal and external means al- ly recommended will generally be appropriate; the urinary excretion should always receive ntion; and when it becomes scanty or sup- sed, an ipecacuanha emetic should be given, the terebinthinate epithem or embrocation be applied over the loins, and the spiritus ætheris nitrici and liquor ammoniæ acetatis be prescribed in sufficient quantity. In proportion as the case assumes, either primarily or consecutively, a malignant character, so ought the means about to be advised for the next form of the disease to be employed.

107. *C. Scarlatina maligna* — *Malignant Scarlet Fever* (§§ 20. *et seq.*), is often so sudden in its seizure and so rapid in its progress as to require the most efficient means, with the utmost promptitude; and, if the means be either inefficient or delayed, the extension of the affection of the throat to the adjoining passages, and the supervention of complications, which vary or differ in different cases, are common results. The severity of the affection of the throat, in these cases, has frequently induced the practitioner to apply leeches to the neck or behind the ears; but they are generally injurious, more especially when the pulse is very rapid and compressible. Even local depletions in this form of the malady are rarely of service; and when leeches are applied to the neck or throat, diffusive inflammation of the cellular tissue, in connection with enlargement of the parotids, &c., either extending from the internal parts, or excited more externally by the leeches, is not an infrequent result. Whatever may be the state of the urine, — however morbid or scanty this excretion may be, as it usually is, in these cases, — an *emetic*, consisting either of ipecacuanha or of sulphate of zinc, or of both, to which a little pulvis capsici may be added, should be given without delay, and its operation be promoted by drinking a warm infusion of chamomile flowers, or of bark, — the latter made weak in proportion to the quantity to be taken, — and the terebinthinate embrocation or epithem ought also to be applied over the loins, in the manner advised above. The throat should also be surrounded by either the embrocation or the epithem. In a very short time, the relief which the patient will experience, especially as respects the state of the throat, will be remarkable; but, to render the relief permanent or progressive, further means should be employed.

108. In this state, the decoction of *cinchona* should be given every three or four hours, with the carbonates of *soda* or *potash*, or *ammonia*, either in a state of effervescence, the alkali being in excess, with acetic or citric acid, or with the carbonate of the alkali only. If the decoction be not taken with the acid, the fixed and volatile alkalies may be given at the same time, with the addition of the spiritus ætheris nitrici and tincture of serpentaria. It is often difficult to determine whether or not the decoction should be combined with an *acid* or with an *alkali*, in the more malignant states of scarlatina. The choice should depend, in some measure, on the state of the urine. If this excretion be not suppressed, and if it be alkaline or contain phosphates, the cinchona should be conjoined with *hydrochloric acid* and *hydrochloric æther*; or the *sulphate of quina* may be given, in the infusion of roses, with dilute *sulphuric acid* and *sulphuric æther*, or the compound spirit of æther. When, however, the urine is suppressed, or nearly so, and when it presents an acid reaction, or is albuminous, or bloody, after having recourse to emetics and terebinthinate epithems over the loins, I have generally preferred

a combination of the decoction of cinchona with the liquor ammoniæ acetatis and the carbonate of ammonia; or with either of the alkalies, in a state of effervescence with a vegetable acid. (See APPENDIX, Form. 385. 388. 416. 437.) More than half a century ago Dr. GARNETT recommended the *chlorate of potash*, with or without the decoction of bark, in malignant scarlatina; and Dr. CLUTTON the *hydrochloric æther*. I have often prescribed them both since 1820, in public and private practice, and with marked benefit, in the malignant or putro-adynamic states of the disease, appearing either primarily or consecutively. If the symptoms are not ameliorated, an emetic should be again administered, and even repeated, but it should be conjoined with capsicum, or some other stimulant; and the decoction of cinchona, combined as above, should be continued afterwards, with the addition of either the compound tincture of bark, or the tincture of serpentaria or of capsicum, the embrocation or epithem being repeated, and the bowels moderately evacuated by the means already suggested (§§ 102, 105.).

109. In the more putro-adynamic or malignant states of the disease, *chlorine* and the alkaline *chlorides* have been given with benefit, either alone or conjoined with the means already mentioned; but the external applications advised above, and the evacuation of morbid secretions and excretions by emetics and the aperients already prescribed, should not be neglected. Frequent and considerable doses of powdered *carbon*, or charcoal, have also been given, and on several occasions by myself, conjoined with *quinine*, or powdered *cascarilla* and *cinnamon*, or with the addition of *camphor*, *creosote*, and two or three drops of the tincture of *capsicum*. These, mixed in treacle, have a good effect in correcting the morbid action and secretions in the throat and fauces, especially when aided by the application of the terebinthinate embrocation around the throat. When the throat and fauces are much affected in this form of the disease, as is generally observed, not only should these substances be taken, either in treacle, or in syrup or conserve of roses, or such other vehicle as would form them into a *linctus*, but the *gargles* mentioned above (§ 104.), or those referred to in the APPENDIX, should be employed, in the manner there particularised, in the intervals between the administration of the other means. Gargles, however, are often unavailing, and in children can be employed only as washes in the manner already noticed. In the more severe and malignant affections of the throat and fauces, the application, by means of a brush, or sponge attached to a piece of whalebone, of a strong solution of *nitrate of silver* (℈j. or ʒss. to an ounce of water), or of *alum* in *acetic acid*, will be much more efficacious, especially when early adopted. In this very malignant state of the disease, it may be necessary not to rest satisfied with quinine, or preparations of cinchona or serpentaria, capsicum, camphor, ammonia, chlorine, &c., as severally above prescribed, but also to give *wine*, or even *brandy*, with various farinaceous or dietetic substances, as sago, arrow-root, yelk of eggs, &c., or with certain beverages, as Seltzer water, soda-water, or ginger-beer, or spruce-beer.

110. *D. Scarlatina sine Exanthemate.*—*Scarlet Fever without eruption* should be treated with strict reference to the character of the attendant fever and to the state of the throat. Some of these cases present more or less of an inflammatory diathesis, whilst others are remarkably asthenic, or are attended by extreme depression of vital power. According as these different states occur, so should the treatment be directed, conformably with what has already been advanced. When vascular depletion is indicated in this form, the evidence which I have observed of congestion of the kidneys and the state of the urine have induced me to direct *cupping* on the loins, followed by the terebinthinate *epithem* or *embrocation*, in that situation; and around the neck and throat, if the fauces are much affected. I have already contended, that the primary affection of the kidneys, in this form of the malady, very often prevents the developement of the cutaneous eruption, and that the consequent imperfect depuration of the blood by these organs causes various internal complications. The removal of this congestion or affection of the kidneys should therefore be a primary intention of cure; and when the state of constitutional power does not admit of vascular depletion, as now advised, it should be attempted by the exhibition of *emetics*, by dry-*cupping* on the loins, and by the terebinthinate application already mentioned. *Purgatives*, especially those already mentioned, administered by the mouth or in enemata, and the other means specified above, according to the character of the fever and state of vital power, are generally also required. In this form, various complications are apt to appear, either at an early or at an advanced stage, generally owing to the pathological cause already assigned. The head, the lungs, the pleura, or the digestive mucous surface, &c., or even two or more of these, may manifest the most serious and even the most rapidly disorganizing change, and require the most efficient and prompt measures. If the morbid action approach, and according as it possesses, a sthenic character, local vascular depletions are necessary; but no dependence should be placed on these alone. The functions of the kidneys should be strictly examined, and the treatment be directed to them. Cupping or dry-cupping, followed by the terebinthinate applications, in that quarter, emetics, saline diaphoretics conjoined with diuretics, warm medicated baths, especially warm baths containing salt or carbonates of the alkalies, with mustard, are amongst the chief means of cure in these and similar cases. When vital power appears extremely depressed, or exhausted, the tonic and restorative remedies advised above (§§ 108, 109.) must be prescribed in order to resist the tendency in these circumstances to contamination of the circulating fluids and to fatal sinking.

111. *Blisters* have been recommended by many as derivatives, especially when internal complications occur in this form of the malady; and in adult subjects, they are often of service, although not so immediately and generally beneficial as terebinthinate epithems and embrocations, when these latter are judiciously employed. In children, blisters, even when cautiously managed, are often dangerous applications in scarlatina. Mustard poultices are preferable, but are much inferior in efficacy to the terebinthinate embrocation.

12. When the affection of the *throat* is very n gnant or threatens to extend to the adjoining p ages, especially if it advances to the *layrnx*, tl emetics, especially such as have been advised a e (§ 107.), should be administered, and the c titutional powers fortified by tonics so as to r t the extension of the local mischief; and the tl at and neck should be surrounded by a tereb ninate epithem or embrocation. Blisters in th e cases are generally more injurious than b ficial; and the same may be said of *mustard p tices*, when applied to the throat. Emetics c isting chiefly of mustard have been given in th cases, but they often irritate the throat too m h during deglutition, and are not so immediate o ertain as the sulphate of zinc or ipecacuanha, o a combination of these. When an ichorous o coriating discharge proceeds from the throat, fa es, &c., or when these parts indicate or manife a sphacelating state of ulceration, then the ap ication of *pyroligneous acetic acid* with *creasote*, o e strong solution of *nitrate of silver*, prescribed a e (§ 109.), by means of a sponge, to the af ted surface, or the use of *gargles* containing th substances, with the addition of the tinctures of *yrrh* and *krameria*, and the administration of *to s* and *restoratives* internally, are chiefly to be c ded in.

3. *E. Scarlatina Latens — Latent, suppressed, or sked Scarlet fever*, in which neither eruption n sore-throat appears, is comparatively rare, but it most serious, and often a fatal form of the disea when it occurs (§ 26.). It would seem, as a e stated, that the scarlatinal poison or infection pr arily affects the kidneys, in this form, or both th idneys and serous membranes, primarily and ch ly; the affection of these parts preventing th evelopement of the disease in the throat and sk and rapidly increasing the contamination of e blood, and the effusion into serous cavities. In ese cases, the disease has proceeded to effusi either into the cellular tissue, or into a serous ca y, before medical care is required. In all th nstances which I have seen, the urine was eit r suppressed or very scanty, albuminous an ometimes bloody, from the earliest period of th recognition of the nature of the affection: an here were, moreover, febrile symptoms, with sic ess and vomitings, and pain in the loins and lin , for at least one, or two, or even more days, be e any indications of ædema or internal local aff ion had appeared. When, therefore, these ph omena are observed in susceptible persons, in e same family, house, or locality in which sc et fever prevails, then should energetic measu be instituted to remove the active vascular co estion manifestly existing in the kidneys, and no nfrequently also in other parts, and rapidly in ing further and most irremediable changes. Bu hese measures should, as in other circumsta es of the malady, have strict reference to the xisting states of vascular action, in connectio with constitutional power or resistance. *Cu ing* over the loins, or even a repetition of it, an immediately or soon afterwards procuring ful omiting by *emetics*, are the means which sho d be first and promptly employed. When blo cannot be further abstracted without risk, the *dry-cupping* may be substituted; and terebin inate *epithems* or embrocations should be ap ed over the loins, or over the region of the prominently affected organ or part, and repeated or persevered in, according to the effect produced on the system and on the local affection, and more especially on the functions of the kidneys. In some cases it will be most advisable to cause the patient to be placed in a *tepid* or *warm bath* after the cupping and operation of the emetic; and the effect of the bath may be increased by adding either the carbonate of potash or the carbonate of soda, or common salt, and the flower of mustard to the water, so as to determine to the surface of the body, and procure a free cutaneous exhalation. This intention will be promoted by applying, immediately after the patient is removed into bed, the terebinthinate epithem or embrocation, as just advised, and by prescribing *saline diaphoretics* and *diuretics*, especially such as contain the liquor ammoniæ acetatis and spiritus ætheris nitrici. The state of the bowels also requires attention. A full dose of *calomel*, either alone or with an *antimonial*, should be given after the operation of the emetic, and even repeated after a few hours; and some hours afterwards, either of the *purgatives* mentioned above (§ 102.) ought to be administered, and be followed by the terebinthinate *enema*, if the evacuations be not sufficiently free; or if a purgative be subsequently required, without interfering with the exhibition of the diaphoretics and diuretics indicated by the state of the case. As this form of the malady is usually more or less complicated (§ 26.), the means about to be further suggested in respect of the complications of scarlatina, are equally applicable to it as to the other forms of the malady.

114. *F. The complications of scarlatina* are often the chief causes of danger, and hence require the most active and best devised means. The remedies which most of those complications require, have been in great measure anticipated by my remarks on the curative treatment of the several forms of the malady, for it is inconsistent with the due consideration of the subject to separate the complicated, and hence the most severe states of these forms from those states or phases into which they insensibly pass. There remain, however, a few prominent topics, or pathological conditions of importance, which occasionally present themselves as dangerous emergencies, and which require a more especial notice.—(*a.*) I have already insisted sufficiently on the prominent *affection of the kidneys* (§ 28.), which may be detected at an early stage of many of the more severe and complicated cases of scarlatina, and have fully stated the means which I believe to be most efficacious in removing it, viz. cupping, or dry-cupping, or both, on the loins, followed by emetics, terebinthinate applications, the tepid or warm bath, simple or medicated, diaphoretics and diuretics, &c.

115. (*b.*) The extension of an asthenic or *diffusive form of inflammation* from the throat and pharynx to the *larynx*, or along the *Eustachian tube to the ear* (§§ 30—32.), is to be prevented chiefly by emetics; by the application of terebinthinate epithems around the throat; by tonics or restoratives, in order to increase the vital resistance to the spread of the local mischief; and by antiseptic and astringent gargles, washes or similar applications tending to correct or arrest the local morbid action (§§ 104, 109.). *Hæmorrhage* from the nose, throat, or ears, requires consideration. If it take place from the nose — epistaxis — and especially if

the patient be subject to this occurrence, it may prove critical, especially in the more inflammatory or sthenic cases, and should not be prematurely interfered with. But, an intercurrent epistaxis, even in these cases, if too profuse, but still more readily in the malignant or asthenic, may so reduce vital power, as shown above (§ 33.) as rapidly to sink the patient. Therefore, in this latter state of the disease, and especially when the blood proceeds from the mouth, throat, or ears, the hæmorrhage should be arrested, if possible, as soon as may be, by the astringent gargles or washes for the mouth already mentioned (§§ 104, 109.), pecially those containing the pyroligneous acetic acid and creasote. The difficulty of arresting the bleeding is always the greatest in the most malignant cases, owing to the state of both the blood-vessels and the blood circulating in them. In these cases the attempt to arrest it should be made early; and if the means already indicated, aided by tonics and astringents taken early, should fail, the administration of the spirits of turpentine internally, either in considerable or frequently repeated doses, ought not to be delayed; for this is one of the most energetic anti-hæmorrhagic medicines which can be prescribed — if, indeed, it be not the one chiefly to be relied upon in these and similar cases.

116. (*c.*) *When diffusive inflammation of the cellular tissue of the neck or throat* occurs (§ 34.), then the most active tonic and stimulant remedies are required, in connection with antiseptics, both internally and externally. The selection of these should be made, as already advised (§ 108.), with reference to the state of the excretions, and more particularly of the urine, the same indications guiding the choice as have been there mentioned. The means which have been already advised for the most malignant form of this malady (§§ 107. *et seq.*), and for *diffusive inflammation of the cellular tissue* (see Cellular Tissue, §§ 34. *et seq.*), are also appropriate in this complication.

117. (*d.*) *Gastro-enteric disorder with diarrhœa* (§ 35.), is a frequent occurrence, and requires an early recourse to astringents, antacids and aromatics, especially when it is consequent upon malignant affection of the throat, and is attended by suppression of the eruption. In these circumstances coma soon supervenes from exhaustion, if vital power be not duly supported by suitable tonics and stimulants. The warm bath, containing salt and mustard; terebinthinate embrocations over the abdomen after coming out of the bath; the infusion of cascarilla or of cinchona, or the decoction of the latter, with lime water, or with ammonia, camphor, compound tincture of camphor, capsicum, or other aromatics, or aromatic confections; wine or brandy, with spices, in farinaceous preparations, as advised above (§ 109.); or the means which are recommended in the enteric complications occurring in continued fevers (see Fevers §§ 549. *et seq.*) and in Measles (§§ 75. *et seq.*), are severally beneficial. I have recently prescribed *salicine* in this complication with great advantage, in doses varying with the age and severity of the bowel affection, and in conjunction with the substances just mentioned in the more obstinate cases. The bark of the willow may be given in decoction, infusion or powder (from 5 grains to ℈ij); or the salicine in doses of one grain to five or six.

118. (*e.*) *Convulsions, coma,* &c. (§ 36.) are most unfavourable complications, although not necessarily fatal. The former occur chief in young children, sometimes on the accession o the disease; the latter in both children and a lts. They are both, even when occurring e ly, often consequences of obstruction of the ur ary excretion, although the cause is generally erlooked. When these affections appear early nd manifestly from this circumstance, cupping ver the loins, or the application of a few leec in this situation in young children, the warm or pid bath, terebinthinate embrocations on the back nd active purgatives are generally required. hen the symptoms in other respects display no p roadynamia, and when the pulse retains me strength as well as fulness, then vascular dep ion is more beneficial than in some states, in wh it is more commonly resorted to. Calomel ith antimony, or jalap, and followed by other p gatives, especially by castor oil and spirit of turpe ne, and by terebinthinate enemata, are generally n essary. When coma is obstinate, then a full d of spirit of turpentine, according to the age o the patient, with assafœtida and camphor, shou be administered as an enema; and, as soon a the bowels are freely evacuated, saline diaphor ics, and diuretics may be given. In some severe ses of this complication, I have directed the he to be surrounded, and the vertex to be covere by flannel moistened with turpentine, or wit he terebinthinate embrocation prescribed ove (§ 101.). During the treatment the state o he urinary function should be carefully ascert ed; and if it be suppressed or scanty, endea urs should be made to restore it, and at the same me to excite other emunctories or depurating org to increased action, especially the skin and b ls. The existence of coma or convulsions shoul not prevent the administration of emetics, whe he measures just advised have failed; for the e tic action both rouses the action of the kidneys nd determines to the surface of the body, whi it procures a discharge of fluid from the dig ve mucous surface, thereby relieving the vas lar system from a portion of the serous fluid erdistending it, and congesting the vessels o he brain.

119. (*f.*) The appearance of either of th *ffections of the lungs, bronchi or pleura* (§§ 37, .), or even of the *peritoneum* (§ 39.), which en complicate the severer cases of scarlatina, es cially the forms unattended by eruption, req es both judicious and prompt measures. If er occur during the eruptive stage, and more rticularly if it be followed by the sudden isappearance of the eruption, local bloodle ng is generally necessary; but the quantity of l od which may be taken, and the propriet of taking any, as in all other circumstances, s ld depend upon the state of the pulse, upo he existence of deficient vital power, or of p oadynamia, and upon the state of the ur ry function. Cupping, or the application of lee s, followed by dry-cupping, and the terebinth te embrocation or epithems, assiduously or repea ly applied, are the principal means of cure. B ve should not confide too much in vascular depl on even in these complications, especially in e epidemics, and in certain localities which de ss vital power and render the disease either malig nt

complicated (§ 85.). The external applications st mentioned are often more beneficial than any her means, especially when aided by appropriate ternal remedies, as the liquor ammoniæ acetatis, iritus ætheris nitrici, and moderate doses of cam- ıor. It sometimes becomes a question as to the uation, in which local depletion, and external ap- ications should be employed, If in these com- ications, as not infrequently observed, the urine either suppressed or very scanty, or bloody, or buminous, the local affections being the con- quences of obstructed elimination and depuration the kidneys, the loins are the situations in hich these means should be applied, especially the first instance; but otherwise over or near e chief seat of local complication. In other spects the treatment may be the same as just lvised for coma or convulsions (§ 118.).

120. G. *The sequelæ of scarlatina* are sometimes ore dangerous than the primary disease. The nsecutive affection is generally *caused* by *errors diet or regimen* during the process of desqua- ation, and during recovery; and the treatment ould, therefore, be directed with reference to ese causes. During early convalescence the gestive functions are weak, and the primary ocesses of assimilation are imperfectly per- rmed, unless the nature and quantity of the ment be such as will be readily and perfectly posed of. As the appetite during convalescence greater than the power of digestion, food is often ken of a kind and quantity furnishing a chyle isuited, owing to imperfect digestion, to the state the blood, and which, in conjunction with the rge proportion of effete materials, absorbed from e various tissues and surfaces, and carried into blood during the advanced stages of the dis- se and during convalescence, renders the blood ner too irritating or otherwise injurious to the creting structure of the kidneys; and this effect on these organs is heightened by the interruption the eliminating or depurating function of the in during early convalescence, the kidneys thus staining, during this period, the whole burthen depurating function, at a period, moreover, ien the blood most remarkably and unusually ounds in hurtful and irritating materials, derived m imperfect assimilation, and from the absorp- n and accumulation of effete molecules and uctural elements derived from the several tissues, these elements or materials constituting the ea, uric acid, animal extractive matters, &c., ming the products of a destructive assimilation, the ultimate products of animalization. It ist be further manifest that if the blood, thus ided with effete or irritating materials, be de- mined in unusually increased quantity to the lneys by exposure to cold, by damp clothes, or sufficient clothing or other causes, even by great midity of the air, these organs will sustain, as spects their minute excreting structure, more or s irritation or other injury, interfering with or errupting their eliminating function, the blood ereby becoming still more impure and consisting an increased proportion of watery and ex- ictive constituents, as already more fully con- ided for (§§ 28. *et seq.*). These *causes* and their *ects* upon the frame — the *primary effects* now own, and the *secondary effects*, constituting the eral sequelæ of the malady, — being manifestly d certainly those just stated, it follows, that the means most appropriate to the removal of the *secondary effects* or sequelæ, are such as will most efficiently remove the *causes* and *primary changes* which produce the secondary effects or sequelæ, whatever these latter may be.

121. Conformably with these pathological principles, the treatment should be directed — 1st. To the state of the kidneys, as indicated by the condition of the urinary function and excretion, and by other signs or symptoms; — 2nd. To the causes, extrinsic and intrinsic, remote or pathological, of the state of these organs; — and 3rd. To the secondary affection, or sequelæ, resulting generally either from the persistence of some lesion which originated during the course of the malady, or from the affection of the kidneys caused as just shown (§ 120.).

122. (*a.*) *The prevention of the affection of the kidneys*, upon which the most frequent of the secondary diseases or sequelæ of scarlet fever chiefly depend, should be a principal object in the treatment of this malady. During desquamation and early or advanced convalescence—for a month at least after the disappearance of the eruption—the patient's *diet* and *regimen* should be strictly prescribed, however mild the disease may have been. The food should be bland, light, and digestible, chiefly farinaceous, so that as little as possible of the irritating materials to the kidneys should accumulate in the blood. The *beverages* of the patient ought also to be of a bland or demulcent kind, and consist chiefly of soft or distilled water, wine and malt liquors being avoided. Exposures to cold, currents of air, to humid and cold states of the atmosphere should be carefully prevented, and the clothing ought to be warm. The due restoration of the functions of the skin should be attempted early in the stage of desquamation by recourse to tepid or warm baths, in which a quantity of the sub-carbonate of soda or potash, or biborate of soda is dissolved; and the secretions and excretions duly promoted by purgatives or aperients, and by diaphoretics. By attention to these, the sequelæ of scarlatina proceeding from obstruction of the kidneys will rarely be observed.

123. (*b.*) If, notwithstanding these precautions, or owing to the neglect of them, the state of the urinary excretion or other symptoms indicate *congesti*[illegible]*r obstruction of the kidneys* (§ 49.), the treatment should be directed chiefly to these organs. Unless the constitutional powers have been, or still are, extremely depressed, the antiphlogistic regimen, medicinal and dietetic, ought to be adopted. As this affection is so often the result of over-feeding during convalescence, or of a too early recourse to animal food and exciting beverages, these causes should receive due attention; and if the mischief can be referred to them, not only ought they to be prevented, but the removal of the disorder should be attempted chiefly by means of local depletion from the loins, of purgatives and diaphoretics, by the tepid and warm bath, and by terebinthinate epithems or embrocations applied over the regions of the kidneys. The vascular depletion may even be repeated, for it is not unusual to find the sequelæ of scarlatina to require, and the patients affected by them to tolerate, the bleeding more than in any of the previous stages of the malady.

124. (*c.*) When *anasarca* or *effusion into any*

serous cavity, or from any serous surface (§§ 50—55.), is consequent upon this disease, in the manner now shown, the effusion, in whatever situation it may occur — between the membranes, or in the cavities of the brain, in the pleura or pericardium, in the peritoneum, or in the capsules of the joints, — is the consequence of active determination of blood to, or of irritation of, these membranes, caused by vascular excrementitial plethora, as above contended for (§§ 28. 120.); and if it should occur independently of these states of vascular action, it may be admitted as a very likely means to excite these states, owing to the morbid or irritating properties possessed by it, especially when it is retained long in any of the cavities formed by these membranes; so that upon post mortem examination it may be difficult to determine, whether or no such inflammatory appearances as are found are actually the cause or the effect of the effusion: it is not improbable that they are in some measure both the one and the other. But it is not merely effusion into shut cavities which may follow upon obstruction of the urinary and cutaneous excretions after scarlatina, but a form of *congestive inflammation* of parenchymatous organs (§ 57.), characterised by more or less *œdema* or serous infiltration of the affected organ, may supervene, or this latter affection may be associated with serous effusion into the adjoining serous cavity — an association which is frequent, and although the extent of the internal lesion may escape detection during life, or the one part of the mischief may mask the other, examination after death discloses the combination. I have on several occasions found, on inspection of cases of this description, the lungs condensed more or less by the infiltration of a watery lymph, and serous effusion in both pleural cavities; and in other cases the substance of the brain vascular, watery, or œdematous, although there existed also serous effusion into the ventricles and between the membranes. These are amongst the chief lesions which destroy life after attacks of scarlatina, and are merely the remote effects of the arrest of the eliminating or depurating functions, to which I imputed so great importance many years since, in the articles on the Blood, Disease, Fever, &c.

125. It is obvious that the *treatment* of these affections ought not to be directed to them only or chiefly, but to the pathological causes or states of which they are the effects — to the obstructions of the kidneys and skin. However much bloodletting may be indicated by the state of the pulse and other circumstances of the case, a chief dependence ought not to be placed on it, even when apparently most required, but other active agents should be brought into operation, more especially purgatives, the tepid or warm bath, medicated as above (§ 122.), terebinthinate epithems or embrocations over the loins or seat of local affection, after local depletions in either or both situations, and diaphoretics, followed by diuretics. These means are appropriate in the several sequelæ of scarlatina, the chief differences as respects either sequelæ being the extent to which each of them may be employed, and the succession in which they may be prescribed so as to obtain the greatest amount of benefit. After vascular depletions have been carried sufficiently far, dry-cupping will then be of service; and after terebinthinate epithems have been applied, oleaginous purgatives and enemata may be administered, containing spiri turpentine in sufficient quantity to excite organic functions, to restrain effusion, and to mulate the kidneys. In most respects the tre ment of the sequelæ of scarlatina is the same that of the complications (§§ 114. *et seq.*); an should be based on the same pathological therapeutical principles.

126. (*d.*) I have noticed amongst the seque of this malady, the *extension of disease to the e* to the *cervical vertebræ*, &c., to the *parotid glan* the *surrounding cellular tissue* and *lymph* *glands*, &c. (§§ 46—48.), giving rise to more less chronic disease of these parts; but it is necessary to add, at this place, any thing to w has been stated respecting these lesions in articles Cellular Tissue (§§ 34. *et seq.*), E (§§ 29, 30.), Paralysis (§§ 129. *et seq.*), Pa tids (15. *et seq.*), and Spine. It has also been marked that affections of the large, but more quently of the small *joints* (§ 57.), or even both, may occur at any period after the subside of the eruption; and that *erysipelas*, or even *g* *grene* of an extremity may thus supervene. Wh the *joints* are affected, the synovial membranes the chief parts implicated, and generally in c sequence of the same pathological conditions have been shown to originate with the emunctori and these conditions, by contaminating the blo affect these parts in an analogous manner to affection of the serous membranes; and, in so instances, and in certain epidemics especial give rise to severe pains, resembling those of g or rheumatism of the joints. In these cases treatment should not vary much from what been advised for articular rheumatism or go Generally warm anodyne fomentations, or a co bination of these with terebinthinate embrocatio and the use internally of the means already vised, and particularly of such as the state of urinary excretion will suggest, are sufficient remove this consecutive affection. If erysipel or either of its consequences should appear, treatment for that disease ought to be adopted.

127. iii. Remarks on certain Remedies vised for Scarlatina. — After the full expo tion of the *treatment* of the *several forms, compli* *tions*, and *sequelæ of scarlet fever*, which I ha endeavoured to give, my remarks on this he will be brief, and be confined to those mea which are most important. — (*a.*) *Bloodletti* either general or local, or even both, have be recommended by Borsieri, Schrader, Grun mann, Armstrong, Craigie, and many other but the impropriety of having recourse to it ge rally, or even frequently, in some epidemic p valences of the malady, has been demonstrated very numerous authorities. It would be impro to decide categorically either in favour or agai the practice; for the character of the prevaili epidemic constitution, of the existing form or ty of this fever, and the several circumstances of t case and of the patient, may render vascular d pletion either most beneficial or most injuriou The propriety of the practice and the benefit sulting from it must necessarily depend upon t judgment of the physician, as respects not on the peculiarities of the case that especially requ it, but also the extent to which it should be ca ried, and the period and mode in which it shou be resorted to. If the practice be adopted su

ently early in the attack, and be aided by icious means, *local bleeding* by cupping over loins will be sufficient. A quantity of blood, large as the exigencies of the case can require, y be taken in this way, and with a more ided effect as respects the organ which is most cerned in developing the most serious complions and symptoms of the malady, and in proing those changes which are usually termed lignant. In very young children a few leeches y be substituted, but the quantity taken by ping is correctly ascertained, and hæmorrhage revented from being troublesome. The loss of od in this way is also less felt, and less injurious n by venesection, in doubtful cases; and even en early employed in those cases or epidemics, ch seem to contra-indicate the propriety of it, ch less injury results from this mode than by other.

28. (*b.*) *Emetics* have been strongly recomnded by Fothergill, Withering, Stoll, Johnne, Clark, Lentin, Hufeland, and many ers; but they have been unaccountably neglected modern practice. I can assert that there is no edy more generally appropriate — so suitable all forms of the disease, if the substance be y selected, and the periods of exhibition alether proper. In most instances an emetic uld be given as early as possible, and when en thus early, and before the type or character he disease has fully declared itself, then ipecanha, or this with sulphate of zinc, may be erred. When the disease is more fully deped, and assumes a sthenic or inflammatory racter, then emetic tartar, or a combination of with ipecacuanha may be prescribed, and cupg over the loins to an amount indicated by the ptoms and its effects may precede the emetic. en the disease presents malignant characters manifest adynamia or putro-adynamia, then hate of zinc with capsicum, &c. may be pred, and dry-cupping only be employed. An y recourse to emetics frequently prevents the urrence of inflammatory symptoms on the one d, and of malignancy on the other. But the ibition of them, especially of the one last ied, should not be confined to the earlier pes of the malady. The state of the throat, or extension of disease to the larynx, may require course to this practice oftener than once dur the course of the disease; and in the low or nced states of the malady the combination of emetic, whether ipecacuanha or sulphate of , with stimulants and hot spices, will be of ntage. When tartar emetic is prescribed as emetic in divided doses for children in scara, it sometimes fails of producing this effect, if the exhibition of it be persisted in, even for ort time, it may produce dangerous or even sinking, although the form of the disease may been more than usually sthenic or inflamry when it was first prescribed.

29. (*c.*) There are few remedies which require e judgment in their exhibition and selection carlatina than *purgatives* and *aperients*. For ey be given at the period of eruption, espey when the efflorescence is being evolved, they interrupt the regular course of the disease; if they be too long omitted, the retention of bid secretions and excretions may be equally imental. If again they are of a too irritating kind they may develope an enteric complication, or, in the more asthenic forms, seriously depress or exhaust the patient. They are often exhibited with much benefit, as already advised (§§ 102. 165.), after an emetic has operated, when the patient is first attacked, and before the eruption begins to appear. After this period, or during the eruption, if the disease assumes a regular course, mild aperients, sufficient merely for the prevention of accumulations of the excretions, are only required. If, however, determinations to the head or suppressed function of the kidneys supervene, then the more active purgative, conjoined with calomel, terebinthinate enemata, &c. already mentioned, are of service. When the disease assumes an asthenic or malignant form, the purgatives should be conjoined with tonics, stimulants, and aromatics, as with cinchona, cascarilla, gentian, ammonia, spices, &c. In the more regular forms, purgatives are generally of greater service upon the disappearance than during the continuance of the eruption; and in every circumstance the combination with them of the alkaline carbonates or sub-carbonates is most beneficial. The indications for or against a recourse to purgatives, and the choice of them, depend upon the type, form, and complication of the disease, and upon the states of the alvine functions and evacuations, which ought to be always carefully examined.

130. (*d.*) Preparations of *cinchona* and other *tonics* have been much employed in the treatment of the malignant and asthenic scarlatina; and in these forms especially, after the exhibition of emetics and after morbid secretions and excretions have been duly evacuated, and after cupping or dry-cupping has been employed, in cases requiring either or both, these medicines are most beneficial; much, however, depending upon the selection and combination of them with other means. Vascular depletion early in the disease may be beneficial, and yet the exhibition of tonics may be imperatively required at a more advanced period. But a recourse to the latter should very much depend upon the state of the urinary function. Most of the earlier writers on the disease since the time of Morton, and especially those who observed chiefly the more malignant types, have insisted much upon the necessity of recourse to *cinchona*, in the forms either of powder, decoction, or tincture, especially Huxham's tincture. But even in these types this medicine is best prescribed as just advised; and if the urine be suppressed, bloody, very scanty, and very high-coloured, cupping even in these ought to precede the administration of this remedy. In cases which suggest doubts of the propriety of having recourse to it, the infusion or decoction, conjoined with the liquor ammoniæ acetatis, with the acid or with the alkali in excess, or with nitrate of potash, according to the peculiarities of the case, and with spirit of nitric æther, will never be injurious, but most frequently very beneficial. When symptoms of malignancy are unequivocal, and the urine not suppressed, the decoction with the compound tincture of cinchona, or with tincture of serpentaria and carbonate of ammonia, and sometimes also with the bicarbonate of potash or soda, will be of service; or the mineral acids, especially the *hydrochloric*, or *nitro-hydrochloric acid*, with the æthers, may be given in the decoction of the cinchona when the urine indicates the

propriety of exhibiting these in preference to the alkaline carbonates. If the bark affect the bowels, the *cascarilla* or *willow bark* may be substituted, or *salicine* may be employed. Other tonics, or tonic febrifuge preparations, may be prescribed in mild cases; but in the malignant type, these just mentioned, or the sulphate of *quina* conjoined with camphor, and other substances noticed when treating of the malignant form of the malady (§§ 107. *et seq.*), are most deserving of adoption.

131. (*e.*) *Stimulants* are required in the asthenic forms of the disease, and often at an advanced stage of the more sthenic type, but generally in conjunction with other means. The *sesqui-carbonate of ammonia* was strongly recommended by Peart, and is certainly often most beneficial when combined, as above advised, according to the peculiarities of individual cases. It is frequently prescribed in too small and consequently in efficient doses; and the same remark applies to the *æthers* and their preparations. When a tonic and antiseptic effect is desired, ammonia should be conjoined with the preparations of cinchona and camphor; and when a diaphoretic action is indicated it should be given with the solution of the acetate of ammonia and spirit of nitric æther. The æthers are most useful when the patient complains of sinking faintness, or leipothymia. With quinine and compound infusion of roses, *sulphuric æther* may be preferred; and with the decoction of bark, and hydrochloric acid, or the nitro-hydrochloric acid, *hydrochloric æther* may be prescribed. The *chlorate of potash* may be conjoined with tonic infusions or decoctions, or with alkaline carbonates and æther; and in the more malignant states of the disease these medicines should be ordered in frequently repeated doses, and be further aided by *camphor*, *musk*, *serpentaria*, or *capsicum*. The combination of camphor with spirit of Mindereri was much confided in by Hufeland in this class of cases. A recourse to *wine*, or even to *brandy*, in the forms mentioned above (§§ 109.), may not only be of service, but even indispensable, in the more asthenic and malignant states of the disease.

132. (*f.*) *Diaphoretics* and *diuretics* are medicines of great importance in this disease. The functions of the skin and kidneys are interrupted by the active vascular congestion, and by the alteration of the organic nervous influence of these parts, and therefore, whilst means are being used to equalize the circulation and to relax the cutaneous surface, medicines should be prescribed to aid these intentions, and to rouse the secreting and depurating actions of these organs. In the more sthenic or inflammatory types, and at the commencement of the disease, the antimonial diaphoretics, conjoined with the solution of the acetate of ammonia and spirit of nitric ether, or with nitrate of potash, will generally be of service, even although they may fail of materially promoting the functions in question. But, in other states of the malady, diaphoretics of a warm and restorative nature, or a combination of the more common diaphoretics with stimulants and antispasmodics, as with ammonia, the æther, &c. especially after the tepid or warm bath has been resorted to, will be found most beneficial.

133. *Diuretics* should be given in similar combinations to those now advised, in the asthenic or malignant form of scarlatina; but in this form, and in the advanced stages more pecially, the most certain diuretic is the spi of turpentine administered in an enema, or th terebinthinate epithem or embrocation ap ied over the loins, as already mentioned. D ng desquamation, when the kidneys are frequ tly congested or the tubuli obstructed by the de uamated epithelium, the supertartrate of potash nd biborate of soda, or the acetate or citrate of p sh with either the acid or the alkaline carbona in excess, or any of the saline diuretics, or c ers mentioned in the article Dropsy (§ 135. *et* .), when describing the treatment of *anasurca*, w be appropriate.

134. (*g.*) Besides the above, *various means* ve been recommended by writers, in the treatme of scarlatina, as either empirical remedies or as tiseptics and stimulants. The most serviceal of these, when judiciously employed, are the mi ral acids, the alkalies, and certain vegetable acid nd products. Of the *mineral acids*, the most bene ial are the hydrochloric and the nitro-hydroch ic, either in simple dilution, or conjoined wit the decoction, or infusion of cinchona, or with cam or, or with these and the hydrochloric æther. Of the vegetable acids, the *acetic* and the *citri* are the most useful. The former has been frequ tly employed both internally and externally, sinc the earliest irruptions of the malady in an epic ic form, chiefly on account of its antiseptic prop y; and with reference to this virtue I have en employed it; but more recently I have pref ed the *pyroligneous acetic acid*, either combin as above, or given with creasote, or other anti tic agents, in the more malignant states of the di se. *Citric acid* is also beneficial in similar cir mstances; but whilst I have considered it as referable to the common acetic acid, I have bel ed it inferior to the pyroligneous. Either of ese acids is often beneficial; but the vegetable ids now recommended should be given more libe ly than they usually are.

135. *Chlorine* and the *chlorides* are also ry excellent remedies in the more malignant tes and advanced stages of scarlatina, their influ ce being aided by other restorative means, as nchona, serpentaria, camphor, musk, capsicum c. *Chlorine* was first prescribed by Braithwa e; and its excellent effects in the more malig nt states of the disease have been acknowledge by many British and foreign authorities. The *lorine-water*, of the Dublin Pharmacopœia, ma be given in doses suitable to the age of the pa nt, in camphor mixture, or in any other p er vehicle. *Alkaline carbonates*, both the vo le and the fixed, have been recommended by m y authorities in scarlatina. They may be escribed with the remedies just named, an in the states of the disease, and in the combina ns mentioned above (§ 108.). *Nitrate of po* h, in full and frequent doses, has been advise y Frunk; and it is often of service when assoc d with other means which are appropriate to e peculiarities of the case, more especially h camphor and others already noticed. The u of *colchicum* has recently been recommended; b it is a hazardous agent even in the more st ic forms of the malady, as its injurious operati is liable to be confounded with the unfavou e course of the disease. It should be given on n similar states and circumstances of the cas o

e for which I have admitted that the tartrate ntimony may be prescribed.

36. (*h.*) *Gargles*, or, preferable to these, sti- ating *lotions* or *washes*, with a strong solution he *nitrate of silver*, or of powdered *alum* in the oligenous acid, are often extremely beneficial, en employed early in the anginous form of the lady, especially when the affection of the throat umes an asthenic, malignant, or offensive cha- ter. Either of these solutions, or others already ntioned (§§ 109.), should be applied early means of a camel's-hair brush, or of sponge, the manner already pointed out; and the ution should be strong in proportion to malignancy of the affection. At the same e as these means are being used, the external lications to the throat, about to be noticed 140.), should be resorted to, and the tonic, torative, and antiseptic medicines, mentioned ve, ought to be administered. A strong solu- of the *bichloride of Mercury* has been re- nmended by Dr. Sauter to be used as a gargle the more asthenic affection of the throat; and, ging from my experience of it as a gargle in logous affections of this part, it is very likely to ve of service. In some of the more prolonged es, and when the tonsils are much enlarged, I e directed the parts to be pencilled with the cture *of Iodine*, and if there be, as often ob- ved, much external swelling, after the eruption disappeared, I have prescribed the same ap- cation externally. In less malignant cases, the oro-sodaic solution of Labarraque in the pro- tion of an ounce to five of camphor water and f an ounce of honey, is a very useful gargle; or decoction of contrayerva with hydrochloric d and tincture of capsicum; or a filtered solu- n of the confection of roses with the same acid and cture, or the tincture of myrrh, and camphorated rit, may be employed in still less severe forms the disease.

137. (*i.*) *Cold*, in various modes of application, s been resorted to for the removal of the pungent at of the surface, which is believed to increase t only the distress of the patient, but also the scular action and the exhaustion of organic rvous power. It may always be safely applied en the skin is very hot and dry. Various modes employing it have been advised. Beddoes di- cted a free current of *cold air* to pass over the tient. But in resorting to this mode of reducing e temperature of the surface, the respiratory ssages and organs may suffer, and the com- ications described above, especially bronchitis, eumonia, pleuritis, or peritonitis may be thereby casioned; or the eruption may be suppressed. e obvious benefit resulting from treating the tient in a large airy apartment, where the tem- rature is cool, rather than very cold, and in hich the air is being continually renewed, should ver be overlooked; and the bed and bed-cloth- g ought to be cool and light, especially during e eruptive stages: but subsequently both the e and the other ought to be so regulated as to vour the restoration of the cutaneous functions, d to equalize the due distribution of the blood.

138. The *affusion of cold water* over the surface patients in scarlatina, so strenuously advised y Dr. Currie, and so generally and indiscri- inately practised during the commencement of is century, has been found beneficial early in the more sthenic and regular forms of the disease. But an injudicious recourse to this practice in asthenic, malignant, and complicated cases, has brought it into disrepute. In the hands, however, of a discriminating physician — of one capable of interpreting aright existing pathological states, and of selecting and applying judiciously medicinal agents for the removal of these states — the cold affusion is still deserving of estimation. I have, however, preferred in most circumstances, *cold* or *tepid sponging* of the surface, adapting the temperature, and the fluids employed, to the peculiarities of the case — *cold* or *cool fluids* at an early stage and in sthenic cases, and *tepid*, or even *warm fluids*, at an advanced period, and in the asthenic or malignant forms, whenever the skin is hot and dry. These are in many respects preferable to affusion, for they may be more frequently resorted to, and may be employed for a longer time, without exhausting the patient. The fluids which may be selected for this purpose deserve some notice. I have usually directed equal parts of vinegar and water, or of spirit of Minderrie and water, or camphor water, during the early stages; but have subsequently employed a weak alkaline solution, or a solution of borax, as being more likely to facilitate the restoration of the functions of the skin, during the advanced stages, and to prevent the affection of the kidneys and the dropsy often supervening as sequelæ of the disease. Frequent sponging of the surface with a solution of the *nitro-hydrochloric* acids, of a tepid or warm temperature, according to the state of the case, will be found of much service in the malignant and asthenic forms of the malady.

139. (*i.*) *Baths, tepid* or *warm*, according to the period of the disease and the peculiarities of the case, are often beneficial. The tepid bath in the earlier stages, generally lowers the heat of the skin, mitigates the uneasiness and burning attending the eruption, and relaxes the surface. When the disease is further advanced, especially if it be complicated, then the *warm bath* may be preferred; and when the eruption has suddenly or prematurely disappeared, salt and mustard may be added to the water. If a warm bath be required during desquamation, or if any of the sequelæ of the disease supervene, the alkaline sub-carbonates, or the biborate of soda, will be a very useful addition; and if the complication be of a very serious character, mustard may be added. A frequent recourse to warm baths, during desquamation, will generally prevent the sequelæ of scarlatina, especially if the alkaline additions just mentioned be made to the baths.

140. (*k.*) *Embrocations* and *external applications* of various kinds have been employed; but they are required chiefly for the severer states, and internal complications of the malady; or when the eruption either does not come out, or prematurely disappears. *Blisters* are most hazardous applications for children in this disease, and are generally so in proportion to their youth. In the mild and regular forms they are not required, and in the malignant or complicated may produce gangrene of the part. They are sometimes of service in adults, especially at an advanced stage, and when due reference is made to the state of the urine. *Mustard poultices* are often of use in the circumstances just mentioned; but in the more malignant type of the disease, in very young subjects, they

may be followed by effects almost as dangerous as those produced by blisters, if they be too long or injudiciously applied. The *embrocations* and *epithems* prescribed above (§ 101.) and i the Appendix (Form. 295, 296, 307. 311.), are the most efficacious, and are attended by none of the risks and ill effects often produced by blisters, and other external derivatives and counter-irritants. When properly employed, especially soon after a warm or tepid bath, they powerfully promote the functions of the skin; and, by the absorption of their fumes, chiefly by the lungs, they tend to restore the secreting and excreting functions generally. The application of these, in the several states of the disease, has been pointed out in the remarks already offered.

141. (*l.*) The *diet* and *regimen* of the patient must depend, in some measure, upon the type and the stage of the disease, upon the peculiarities of the case, and the circumstances of the patient. In the more regular, sthenic, or inflammatory forms, and in the more complicated cases, especially if the complications occur at an early stage, the *diet* and *regimen* should be antiphlogistic. Barley-water, thin water-gruel, &c. are generally sufficient during the earlier periods; but afterwards, and from the commencement in the more asthenic or malignant types, seltzer- or soda-water with milk may be given; and as the disease proceeds, or begins to assume putro-adynamic or malignant characters, spruce-beer, soda-water, or seltzer-water with wine; sago, arrow-root, or tapioca with wine, or even with brandy in some cases, may likewise be prescribed; beef-tea, chicken or other broths being also allowed according to circumstances. Due ventilation should always be insisted on, avoiding however, currents of air, especially during desquamation; the bed and bed-clothes being regulated according to the type, character and stage of the disease, as above advised (§§ 97. *et pluries.*). In order to prevent the usual sequelæ of the disease, during desquamation and recovery, the diet and regimen of these periods ought to be strictly prescribed, comformably with the advice already given (§§ 120—123.); and, if *anemia* or much *debility* be observed, the treatment prescribed for these, in the places referred to, should be adopted. (See arts. Blood, *Deficiency of* (§ 48.), and Debility (§§ 35. *et seq.*).

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15.

SCIRRHOUS AND OTHER MORBID GROWTHS.

— Synon. — *Squirrhus* (*σκιρρος*, hard), *Scirrhoma*, *Scirrhosis*; *Carcinos*, *Induratio maligna* ; *Cancer scirrhosus*, *C. fibrosum* ; *Carcinoma*, Celsus ; *Encephaloma* ; *Scirrho-fungus* ; *Scirrho-encephaloid* ; *Scirrho-encephaloma* ; *Scirrho-cancer* ; *Scirrho-colloid* ; *Colloid*, *Colloid tissue*, of recent writers ; — Καρκινος, Hippocrates, Galen ;—*Skirrhus*, *Carkinoma*, Swediaur ;—*Carcinus*, Good ;—*Krebs*, *Krebsschaden*, *Skirrus*, Germ. ; — *Scirrhe*, *Carcinome*, Fr. ; — *Scirrho*, Ital.

Scirrhous and other Tumours. — *Adventitious Growths.* — *Malignant and Non-Malignant Tumours.*—*Cancerous and Non-Cancerous Formations.* — *Cancer and Cancroid Growths*, J. H. Bennett.

Classif. — See Cancer and Fungoid Disease.

1. Defin. — Scirrho-Cancer. — *A morbid growth or structure possessed of the power of extending itself, or of redevelopment after removal, and arising from constitutional vice.*

2. Non-Malignant Growths. — *Structures which are adventitious, and possess the power of extending themselves locally, but which do not return after removal, nor contaminate the constitution.*

3. Professor Bennett has defined true cancerous growths to consist of a structure which, " once existing may spread to other tissues or organs, causing in them a disease or growth similar to itself, by a species of propagation similar to that possessed by animalcules or vegetable fungi." In the articles in this work devoted to the consideration of the chief forms of Cancer, *scirrhus* has been treated of in its principal pathological and therapeutical relations (see arts. Cancer, Disease, §§ 141, 142, and Fungoid, or Fungo-Hæmatoid Disease). Since these were published, the researches of several eminent British and Foreign physicians have appeared and have added considerably to our knowledge of the intimate structure of cancerous growths, into which the scirrhous conformation enters more or less, and upon which the other forms of cancer often supervene or are engrafted. Most of the recent writers on cancerous formations have described the microscopic appearances of these formations ; but they rarely agree as to what really constitutes the cancerous elements of structure ; and hence they contribute comparatively little to the diagnosis between truly cancerous and non-cancerous growths ; and that little is neither generally nor readily applicable in practice ; whilst it in other respects does not tend to the advancement of practical knowledge. The purely practical physician, however scientific and rational his acquirements, may, perhaps, value the researches of the " *Histologists* " — as the microscopic observers, comformably with Germanic custom, denominate themselves — at too low an estimate ; but there is little risk of any of them falling into this error, however they may fail in adding to our knowledge of the causation, prevention, or removal of the diseases which they microscopally investigate. Nevertheless, the information which they furnish ought not to be neglected ; but should stimulate others, by its very deficiencies — by showing how little is really obtained by carrying us a step or two forward in our analysis — by comparing numerous discre-

pancies, opposite views, apparent differences, contradictory assertions, &c. — to attain greater precision of observation and description, unbiassed by hypothesis or hastily formed opinion.

4. All the forms of cancer were, up to an early period of the present century, limited to — 1st. Scirrho-cancer and Carcinoma; and 2d. to Fungus Hæmatodes, or Hæmato-fungoid disease. To these were successively added, 3d. Encephaloma; 4th. Colloid disease, and 5th. Melanosis. Encephaloma, or encephaloid tissue, and hæmato-fungoid disease are evidently identical; the former being a more remarkable development of the brain or milt-like production than the latter, which presents, with more or less of this production, a much more remarkable state of abnormal vascular development. Colloid formation has greater claims to the rank of a variety of scirrho-cancer, although it is often associated with, or approximates to, the scirrhous structure. Melanosis should be viewed as a distinct formation; and not more intimately connected with true cancer than are tubercles. Amongst the earliest investigators of the microscopic structure of scirrho-cancer, Müller is most deserving of mention. In his work he divides scirrho-cancroid growths into the following varieties:—1st. Carcinoma fibrosum seu simplex;—2d. Carcinoma reticulare; — 3d. Carcinoma alveolare; — 4th. Carcinoma melanodes; — 5th. Carcinoma medullare; — 6th. Carcinoma hyalinum seu fasciculatum. Vogel reduced the varieties to *four:* — 1st. Cellular cancer; — 2d. Fibrous cancer; — 3d. Melanotic cancer; — and 4th. Colloid cancer. Gluge distinguishes only *three* forms: — 1st. Fungus medularis; — 2d. Scirrhus; — and 3d. Cancerous ulcer. Dr. Walshe, and more recently professor Bennett, consider that there are only three forms of cancer, properly so called, namely, (*a.*) Scirrhus, or hard; (*b.*) Encephaloma, or soft; and (*c.*) Colloid or jelly-like cancer. All the forms mentioned by morbid anatomists may, they think, be readily comprised under one or other of these heads.

5. Professor Bennett remarks, that "when we endeavour to define what a cancerous growth really is, according to the description of morbid anatomists, or the symptoms of medical practitioners, we are at once thrown into a crowd of inconsistencies, from which the sooner we emancipate ourselves the better. This can be only done by attaching the term cancer to some characteristic structure. Lebert has endeavoured to do this, and to establish that the existence of the *cancer-cell* is pathognomonic; that it may be distinguished from every other kind of cell formation, and at once indicates the nature of a cancerous growth." But Dr. Bennett adds, that the numerous observations which he has made obliges him to differ from M. Lebert, and rather to agree with Müller in thinking that no single element is diagnostic of scirrho-cancer. The circumstance that no individual element is characteristic of cancer led Müller to maintain that there is no histological difference between it and healthy textures. This also induced Virchow to coincide with him in the opinion, that "carcinoma is no heterologous tissue, and its finer parts are not essentially different from the tissues of benignant textures and the primitive tissues of the embryo." If this be true, much indeed, nearly all that I have to add, under this head, to what I h e already written on scirrho-cancer, or malig nt growths, may be spared; and I might join r. Watson in remarking that "microscopic obser rs say, that, in their minute and original struct e, there is no perceptible distinction between e most innocent and the most malignant grow ; nay, that both agree in their primary corpusc r elements with the healthy tissues of animals d even of plants. This very agreement, if it re y be so complete, shows that in classifying mo d growths, we must reject the aid of the microsc , and attend to their proper and more palp e features." — (*Princip. and Pract. of Physic.* d Edit. vol. i. p. 217.)

6. But the "Histologists" aver, that the -croscope alone can furnish the diagnosis and e basis of classification, and it alone; and as t y include in their ranks illustrious names, -withstanding equally illustrious dissentients, i s due to them to hear their statements and we h their arguments. Professor Bennett obser , that "this dispute as to whether a cance s growth be heterologous or homologous (Laenn), heteromorphous or homorphous (Lebert), ar s from two modes of viewing the subject. If y one individual element be chosen as the tes f comparison, then it does not essentially differ f n others existing in healthy tissues, and the struc e is *not* heterologous; but if several be chosen, d their relation to each other studied, then they -fer from those in normal textures, and they e heterologous." (*Op. cit.* p. 171.) Vogel s , that "our diagnosis must be based, not so m h on the coarser physical characters, which in car r are liable to extreme variations, as on the hi -logical relations as viewed through the mi -scope." Before, however, the consideration of e distinctions which histologists believe may e drawn by means of the more powerful microsco , it will be necessary, in the *first place*, to tak a view of the *elements* assigned by them as ente g into the structure of scirrho-cancer and mo d growths. According to Professor Bennett, e latest writer on morbid structures of a scir -cancerous and cancroid nature, the following -mentary forms enter into their composition: — . Molecules and granules; — 2d. Naked nuclei - 3d. Cells of various kinds; — 4th. Filaments r fibres; — 5th. Blood-vessels; — 6th. Cryst . These he considers as the elements of all mor l products. And agreeably with his own researc s and with those of several other observers, he st s that there is not any thing characteristic of can r in either of these elements when viewed alo ; and that it is only in relation to each other t t they become important. — In this article I s l consider the elementary structure of both Scirr -Cancerous and Cancroid Growths — of b Malignant and Non-Malignant Tumou ; and shall follow the arrangement and researc s of Professor Bennett.

7. I. Elements of Morbid Growths. — Molecules and granules are described by Bennett as varieties of the same form. A *molec* he defines to be a minute body presenting determinate edge or internal centre; a *granul* body which varies in size, and is distinguished a distinct margin, the external edge of whic abrupt. When transparent, granules refract li and present a bright or dark centre, according to

f l point in which they are viewed. A molecule r y become a granule under a greater magnifying p er, and the latter appears as the former under a ss power; so that there is actually no real dis- t tion between these two organic elements. T se bodies seem to vary in composition. They r y consist of various kinds of fat, and disappear o the addition of potash or ether; or they may b lbuminous, and be partly dissolved by acetic a ; or partly fatty and partly albuminous; or t y may consist of pigmentary or mineral matter. A granule may be so large as to be called a g bule; such as the bodies found in milk. Mole- c s and granules differ in shape; in general they a spherical, but they are sometimes more or less a ular; they may be isolated, or grouped, form- i granular masses; they may exist alone, or be n ed with other elementary forms. Dr. BENNETT c siders them the most universal element in t ies, and of the greatest importance in their i cations of the nature of structure.

. These bodies appear to be formed *primarily* b precipitation, and *secondarily* by disintegration. T *primary* change in the germinating seed or o m is the gradual appearance, in a transparent f l, of numerous molecules and granules, which, b coalescing or enlarging, are gradually changed i more compound structures. The *secondary* f ation is when a structure decays, and gradu- a breaks down into an organic or animal debris; t is resolved into granules and molecules, which a ultimately reduced to a fluid state and are ab- s ed. Thus there may be granules of evolution a granules of disintegration. (BENNETT.) Mole- c s and granules have distinct movements of t r own; they turn round in a liquid with a t bulous movement. In the interior of cells t e movements are often well marked, and very r lar. "When we magnify a salivary globule 6 or 800 diameters linear, we can see the minute g ular contents in a state of continual vibration, o evolving in circles of extreme minuteness. In c ain vegetable cells these circles are enlarged s s to constitute a visible circulation. We fre- q ntly find molecules and granules encrusting or a hed to larger globules, and they, doubtless, o sionally serve to assist the progress of deve- l ent. Sometimes they are attached together i masses, at others repelled and kept isolated. S lar facts may be observed wherever minute s l particles are seen floating in fluids, which p e that the movements of the minutest mole- c s are governed by laws as definite and fixed as t e which rule the planets revolving in space.

. "Molecules and granules may be produced m hanically, and are thus capable of being sub- je d to the same laws as those which are formed n rally. Thus, the pigmentary and mineral g ules precipitated by the chemist are identical w those precipitated in living fluids. Again, w n transparent oil and transparent albumen a brought into contact, a precipitation in a m branous form takes place at the point of u n. Thus, a drop of oil cannot for a moment b urrounded by an albuminous fluid, without it eing inclosed in a vesicular membrane or cell. R bing the two drops of oil and albumen to- g er resolves them into granules composed of a m ute particle of the one surrounded by a thin fi of the other, which granules are identical with t e found in animal fluids. Now, when it is remembered that oil and albumen pervade all organised bodies, that they are continually coming in contact, and that membranes and cells must thereby be necessarily produced; moreover, as the other soluble elements which enter into organised structures must communicate to the fluids various kinds of densities, — it will be clear that all the physical conditions necessary for endosmosis and exosmosis must be present. When, in addition, it is considered that modern anatomy and physiology have demonstrated that all organised structures consist of granules, nuclei, and cells, composed, in like manner, of a membranous envelope, and endowed more or less with the same physical properties, the importance of these facts must be recognised." (p. 140, 141.)

10. Professor BENNETT considers it in the highest degree probable that all blastemata — (*blastema* or *cytoblastema*, or the *amorphous plasma*, which gives origin to cells or organised formations; see art. PUS, § 2.) — containing the necessary nutritive principles in solution, precipitate minute oily particles, which are the elementary granules of histologists. These, either separately or united, constitute nuclei composed of oil, surrounded by an albuminous membrane. In this condition they become subject to the physical law of endosmosis and exosmosis, and absorb or exude materials, according to the circumstances in which they are placed, and the unknown vital power to which they are subjected. "It must always be remembered that the granules produced mechanically by the union of oil and albumen, are not vital structures; but when formed in the animal body, under certain conditions, they become so. The physical relations pointed out are only necessary preliminary steps for the addition of that unknown force we call vitality, which directs the ultimate form these structures assume. They are a *sine qua non*, without which vitality cannot be called into existence. The different cells entering into the composition of the tissues are not formed from them directly as ASCHERSON supposed, but are the result of a series of physical and vital changes occurring in the elementary granules and nuclei, which, however, are themselves produced in the manner he pointed out." (p. 141, 142.) Instead, however, of saying that the physical conditions or relations here adverted to "are a *sine qua non* without which vitality cannot be called into existence," it would be more correct to say, that they are the simplest and the earliest material or physical entities with which vitality is allied, and that, with the agency, or under the influence of this alliance, they are capable of passing through a series of changes of a more and more complex kind; — that, although vitality could not be manifested without such material entities or alliances, in their earliest as well as in their progressively advanced states, the development and preservation of these states are entirely owing to the vitality with which such material entities are endowed from their earliest periods, and in their simplest forms, of existence. Dr. BENNETT concludes, that the above considerations lead to a generalisation that is of some importance, namely, that the molecular element is the real basis of all the tissues, and not the cell, as maintained by SCHWANN, or the nucleus, as is contended for by HENLE; for no cells are formed without nuclei, and no nuclei without granules; and it is a know-

ledge of the laws regulating the deposition of the latter in an exudation, and within nuclei and cells, that must guide us to a rational therapeutics, so far as the diseases of nutrition are concerned.

11. ii. NAKED NUCLEI. — Nuclei may be formed, according to Professor BENNETT, *primarily* and *secondarily*. — 1st. By the aggregation or confluence of molecules and granules, upon which a cell-wall is afterwards formed, "during the transformations of which the nucleus may remain permanently, may undergo a species of development, or completely disappear." — 2d. The original nucleus may expand and form the outer cell-wall, and another nucleus may be produced within it, also by the deposition and confluence of granules, which, by division, or the formation of other internal nucleoli, produce new nuclei and cells. "In either of these cases, occurring in healthy or morbid tissues, we may observe the nuclei of cells in all stages of their growth, and can have little doubt as to the progressive steps of their production." Dr. BENNETT considers that the nuclei formed in scirrho-cancerous and cancroid growths are produced in the same way as similar bodies in other textures; and that, when seen in well-formed cancer-cells, they are for the most part secondary — that is, formed subsequently to the cell-wall which incloses them. He has, however, often found numerous naked nuclei mingled with the fibrous stroma. In some of these, doubtless, their occurrence is explained by the breaking down and disappearance of the cell-walls, which at one time inclosed them. In this manner *free nuclei* occur secondarily, and are the result of disintegration; but, at other times, they are undoubtedly a primary formation, existing in an advancing, and not in a retrogressive growth, and are then often unconnected with cells. Whether free nuclei are ever capable of producing similar bodies, as BRUCH believes, without the agency of cells, is very doubtful. But Dr. BENNETT considers them in no way necessarily connected with cancerous growths. In some instances they are associated with fusiform corpuscles; and are observed either to be identical in form and appearance with their nuclei, or as elongating to constitute that corpuscle itself—a transformation rendered very probable by their appearances in several cases. "The true signification of these free nuclei is in some instances difficult to determine; for, whilst we may occasionally with M. LEBERT consider them as fibro-plastic, in progress of development into fibres, and at other times the remains of broken-down cells, the result of disintegration, there are other instances where the growth is advancing, and where there are no evidences to warrant either of these explanations." If they be connected with the fibrous element, it is easy to conceive that any of them remaining in a tissue may cause the return of a swelling in the cicatrix, or in the situation of a former tumour. But Dr. BENNETT is unacquainted with any fact which proves that a growth consisting of great multitudes of free nuclei among the fibrous stroma ever possesses the power of spreading to other tissues, as is the case with cancer. "It is therefore probable, that as granules, which are in many respects identical, may be transformed into the nuclei of different textures; so nuclei, which are alike, may be connected with fibres, or with various kinds of cells. Of the laws regulating these transformations we are ignorant; bi there are no granules distinctive of cance ucleoli, so there are no nuclei distinctive of ca ercells. Moreover, the observations allude to show the necessity of considering nuclei as b ies distinct from cells. They may occur alone ith fibres, producing a texture which may be c ed fibro-nucleated." KÖLLIKER and HENLE ve described the occurrence of diaphanous b ies floating among various tissues. Dr. BEN TT has frequently seen these not only in canc us and cancroid growths, but also in a varie of morbid products, and in the fluid squeezed om the lungs in catarrh and from other œdem us tissues. He thinks that they may present ertain stage in the development of the nucleus ut that they are more probably nuclei enlarge by the endosmosis of fluid, a view which is fav ed by the fact of their frequency in textures v ch are softened or infiltrated with serum.

12. iii. CELLS. — Professor BENNETT tes that there is no kind of cell-formation whic at all times and under all circumstances, is ca ble of being distinguished from every other for of cell-growth. Nevertheless, very characte tic differences may exist among cells, the stu of which is of the greatest service in distingui ng one tissue from another. These differences incipally depend upon the age or state of dev opment, the situation in which the cells are fo ed, and a variety of concomitant circumstance all of which should be taken into account befo an accurate opinion as to their nature can be fo ed. The different kinds of cell which Dr. BEN TT has observed in scirrho-cancerous and can oid growths are — 1st, The cancer-cell; — 2d, pithelial-cell; — 3d, Cartilage-cell; — 4th, mpound granular-cell; — 5th, Fibro-plastic nd fusiform-cell; — 6th, Pus-cell. These nam he admits to be open to objection, but he has ne other to substitute for them. One viewe by itself is often not to be distinguished from other. It is only when occurring in group or examined in relation to surrounding textures at these terms becomes significative. An exac ppreciation of each is of the utmost importan in the microscopic study of morbid growths.

13. *A. Cancer-cell.* — Dr. BENNETT's des ption of this cell is the most elaborate. He tes that it exists under numerous forms, presents ry different appearances at different times, and of variable size. In form it is either round, al, caudate, spindle-shaped, oblong, square, h rt-shaped, or of various forms, from pressure its sides. The external edge is generally shar nd well-defined on the field of the microscope It varies in size from 1-100th to the 1-10th a millimetre in diameter; the former size occu ng in a very early stage of its development he latter when the cell is old, and contains er cells. It is most commonly 1-50th to 1-3 of a millimetre in diameter. The cell is des te of colour, except in melanotic cancer, whe he pigment-granules it contains tinge it of a lig or dark bistre brown, passing into deep black. he cell-wall, when young, is smooth and diste d; when old, it is more or less corrugated nd flaccid. Its contents are various. There always one nucleus, often two, and sometimes m three to nine. Most frequently there is only ne, which is round or oval, generally the latter nd

tains one or two granules or nucleoli. The
leus, like the cell itself, varies in size, and
y occupy from 1-6th to 4-5ths of its volume.
ween the nucleus and cell-wall there is a
ourless liquid, which, at first transparent, be-
es afterwards opalescent, from the presence
molecules and granules. On the addition of
er, the cell-wall becomes distended by endos-
is, and is enlarged. Syrup and thick muci-
cause it to shrink and contract by exosmosis.
addition of acetic acid renders the cell-wall
e transparent, and dissolves the young cells;
lst the nucleus either is unaffected, or its
gin becomes thicker, and its substance more
tracted. Liquor potassæ reduces the whole to
amorphous mass.

4. The mode in which the cancer-cell is
eloped offers, in the opinion of Dr. Bennett,
of the best examples of the endogenous
wth and multiplication of cell within cell.
first, numerous molecules and granules are
ed in the semifluid or solid blastema, several
hem coalescing to constitute a nucleus, which
mes an oval or round form. On this a cell-
arises, and gradually enlarges, apparently
ed either by the confluence of molecules
acted to the nucleus, or by the expansion of
nuclear wall. In either case, the cell-wall
rges and separates itself from the nucleus by
endosmosis or assimilation of fluid from the
ounding blastema. Another nucleus may
often be observed arising within the cell-
, first assuming the form of a granule, which
ually enlarges until it presents the same form
size as the former one. Double nucleated
are very common. Within each nucleus
now also be seen one or two nucleoli, which
etimes form very early and hold the same
ion to the nucleus as the nucleus does to the
One or both nuclei now enlarge: the
eoli also increase in size, and not infre-
tly within these latter other granules may be
, forming and enlarging in their turn. "As
ncluded nuclei grow and become transformed
cells, the original cell-wall becomes gra-
ly atrophied, and dissolves or breaks down
granules of disintegration; but in cases where
growth is rapid it expands, and constitutes
has been called a mother-cell, within which
ral cells, nuclei and nucleoli, may be seen in
ous stages of development. More commonly
dissolve or break down before arriving at
and their progress is often checked by the
ation between the nucleus and cell-wall of
erous fatty molecules and granules, which at
th fill up the cell, press upon the nucleus,
render it abortive." This constitutes one of
nodes in which the so-called compound granu-
ell is produced.

5. As the cell-wall becomes older, it seems
icken, and to be less readily affected by re-
ts. Vogel says that the thick cell-wall may
me a fibrous character. Dr. Bennett has
r seen this, nor any appearance of cancer
being developed into fibres. These cells
become caudate, elongated, and throw out
ted prolongations, but they do not split up
filaments. It is probable that fusiform or
elial cells have been mistaken for them.
does Dr. Bennett agree with Küss in sup-
ig that the mother cells may split into smaller segments, and so multiply by division. It is probable that cells impacted in masses of coagulated blastema have been mistaken for compound cells, owing to their close resemblance. Bruch considers that secondary cells form within the parent one not only endogenously, but by the division of the nucleus; and supports this opinion by numerous known facts in the development of embryonal cells and of plants, in which the nucleus is seen dividing in various ways: but he denies that the cell-wall itself ever thus divides.

16. The *cause* of the cancer-cell varying in size, appearance, and structure, according to Dr. Bennett, is the arrest of the process of development at different stages. It is, he supposes, with a simple cell as with the most highly organised plant or animal. It may perish at birth, infancy, youth, or maturity, while comparatively few arrive at old age. The situation and the amount of exudation or blastema thrown out also influences their number, form, and size; while the degree of pressure to which they are subjected produces a similar result.

17. Is the cancer-cell a *new substance*, or is it only a modification of cells pre-existing in the body? Dr. Bennett states, that examined by itself, there is no possibility of distinguishing a cancer-cell from many epithelial, cartilage, or embryonal cells. "When, therefore, a cancerous growth involves a mucous membrane, the skin or bone, it may be maintained that the cells contained in it are only excessive multiplications of normal structures. When the universality of mucous membranes is considered, how they line all hollow viscera, and permeate the various glands in which cancer is common, the difficulty of disproving such a view becomes very great." In the liver also, the hepatic cells may be confounded with those of cancer in certain stages of their development; and it may be asked whether, in this situation, the morbid cells are not altered normal ones. This question, then, can only be solved by paying attention to a series of observations; and Dr. Bennett thinks, that those which he has detailed are sufficiently numerous and varied to prove the following: — 1st. That the cancerous originates in the same nervous and vascular disturbances as the other forms of exudation. — 2d. That cancer-cells, in whatever tissue they may be found, whether glandular, areolar, osseous, &c. present the same characters; and — 3d. That cancer may be actually seen to arise in tissues altogether separate from epithelium or cartilage. "It may be doubted whether the true cancer-cell be ever formed by transformation of a previously existing one. On the other hand, the epithelial and cartilage-cell may assume all the characters of that found in cancer, but a detection of their normal or anormal origin constitutes one of the distinctions between cancerous and cancroid growths." — (*Op. cit.* p. 149.) It is manifest from the foregoing that "Histology" throws but a faint light upon the diagnosis of the several forms of scirrho-cancer. But it may be interesting to know what one of the ablest and most zealous histologists further states respecting other cells found in morbid and in healthy structures.

18. *B. Epithelial cells.* — The different forms of epithelial or epidermic cells, and the mode of their formation, appear to be much the same

in morbid as in healthy tissues. Dr. Bennett states that young plastic epithelial cells, when isolated and viewed by themselves, present all the physical characters of cancer-cells, especially when they have been lying for some time in a fluid, as often observed in the air-vesicles of the lungs, in the ventricles of the brain, or in the mucous coat of the bladder. When studied, however, in mass, nothing can be more easy than to distinguish them. They have a disposition to run together in groups, and to adhere at their edges; they are of tolerably uniform size. Cancer-cells, on the other hand, never exhibit a tendency to coalesce, but are for the most part separated by a greater or less quantity of molecular and granular matter, either disintegrated, or aggregated together: they vary greatly in size. As epithelial cells become older, their dissimilarity from cancer-cells becomes greater; they are then flatter, and resemble scales. They are also more opaque, and more resistant to the action of acetic acid. When epithelial cells constitute the principal portion of a morbid growth, such as corns, warts, scaly eruptions, &c. they become greatly compressed together, those external presenting a series of superimposed laminæ, whilst the deeper are round, oval, spindle-shaped, or more or less altered in form, or sometimes united into a firm growth, by pressure. "Occasionally such growths soften and ulcerate at their summit, especially on mucous membranes, when the superficial cells imbibe moisture, enlarge, and occasionally again present many of the characters of cancer-cells.

19. *C. Cartilage-cell.* — Dr. Bennett states, that many young cartilage-cells present the physical characters of cancer-cells, and are similarly developed, so that at an advanced stage they resemble, with their included cells and nuclei, mother cancer-cells. They may, however, be distinguished in healthy adult articular cartilage, by the hyaline solid blastema in which they are imbedded; and by the great distinctness of their margins and the high refractive power of their nuclei. Even in diseased states of articular cartilages, the cells of this structure may be distinguished from cancer-cells, by the presence of some of the former in a healthy state, although the majority of them become more or less opaque, from the deposition of molecular matter, and from the cells becoming partly or wholly filled with fatty granules.

20. The cells in *morbid cartilaginous growths* are large, and according to Müller more resemble those of the embryonal, than of the adult tissues. These cells, when they become separated by disintegration of the hyaline substance, as observed in softened enchondromatous growth, pass more or less from the normal type, and resemble cancer-cells. In these cases the solid hyaline blastema breaks down into a molecular fluid, the cells are liberated, become enlarged, and float in it, together with broken up fragments of the fibrous structure, should any have existed. Water and acetic acid produce different effects upon these from those occasioned on cancer-cells.

21. *D. Fibro-plastic and Fusiform cell.*—M. Lebert describes under this term a peculiar round or oval corpuscle, with a small nucleus, which has a tendency to elongate at both extremities, and to be transformed into fibres. Dr. Bennett has met with these in all stages of their development, even in cancerous and cancroid growths; but ery often also in tissues and under circumstance nconnected with cancer, as in gelatinous pol us, and in the coagulated exudation from infl ed serous surfaces. From this he concludes, hat fibro-plastic corpuscles are formed independ tly of all cancerous complication, and that ce so produced have the power, as stated by Schw n, of developing themselves into fibres. Mü er remarks that "the caudate corpuscles are l no means peculiar to fungus medullaris: they ay, indeed, often be observed in its substance ut they frequently do not exist in it, while the are as often met with in non-carcinomatous in medullary growths." He adds, that they pro bly depend only on the transformation of cells nto fibres, and are consequently merely fibres an early stage of development. Both Lebert nd Bennett conclude, that the round or oval roplastic cell, by elongation on one or both es, become caudate, spindle-shaped, and at l gt fusiform; and that "after a time, fusiform orpuscles, by being aggregated and compr sed together, may produce a fibrous texture of onsiderable density, and by subsequently splitti up into fibres, occasion a true filamentous or de ely fibrous tissue." Dr. Bennett adds, that the roplastic cell may so resemble the young cance nd epithelial cell as not to be distinguished from her when viewed alone; but, by observing the rm and character of the structures associated w it, and paying attention to the concomitant ci mstances, it may in general be recognised.

22. *E. Compound granular cell.* — This is common in all morbid growths, and is frequ tly present in all the forms of cancer. It is rou or oval, with a nucleus sometimes visible, at her times not. This cell varies from the 1-5 to 1-35th of a millimetre in diameter, or eve till more. It sometimes contains a few granules ly, at others it is so completely filled with them to assume a brownish or dark appearance. ter produces no change in this cell, but acetic cid sometimes renders the cell-wall more transp nt. Compound granular cells are soluble in ethe nd break down into a molecular mass on the ad on of potash and ammonia. On gradually pr ng these cells by a compressor, large drops, like ose of oil, sometimes appear within the cell-w or exude through it. The cell-wall may be rup ed by friction, and its contents dispersed.

23. The *development* of these cells has en watched by Dr. Bennett in all forms of m bid products, and especially in the softenings occu ng in nervous centres. There it may be obs ed that the exudation first coagulates in minute lecules and granules, among which larger, c rless, transparent bodies are soon perceived. ese are nuclei, upon which a cell-wall arises. ranules, nuclei, and cells may frequently be se in all their stages of development, coating o ncrusting the vessels externally. The granul re generally formed in the cell, between the nu us and its wall. These become more and mor umerous, until at length the nucleus is obse ed, and the whole cell appears full and distende th them. The cell-wall is now dissolved, a its contents escape. Conjoined with this cell, n es of granules are often seen cohering togeth of various shapes, and not surrounded by any nbrane. These masses sometimes arise from he

ution of the cell-wall, or consist of portions of coagulated exudation, frequently seen to break, d peel off from the vessels. The cells and sses now described are found in the exudative tening of parenchymatous organs, on the surface granulations and pyogenic membranes, in the ostrum, accompanying pus corpuscles, and nbined with cancerous, tubercular, encysted, d all other kinds of morbid growths. They were t described by Gluge, who called them "in-nmation-globules." Vogel termed them "gra-ar cells;" and Dr. Bennett first called them xudation corpuscles;" but afterwards "com-und granular cells," as involving no theory.

24. The true *nature* of these cells has been iously viewed. They were long considered to icate the existence of inflammation, and their sence in various kinds of exudation supported opinion; but Bennett states, that the recent arches of Reinhardt and Virchow have wn that there is no form of cell-growth which, ler certain conditions, may not exhibit nu-ous fatty granules in its interior, and resemble different stages of the compound granular . In this manner epithelial, cartilage, hepatic, , cancer, and indeed every other cell, may be nsformed into the compound granular cell, by ctly the same series of changes as are above cribed. These observers consider that the fre-ncy of this form of cell in so many kinds of bid growth, and in such various textures and ls, is not so much evidence of exudation as of fatty degeneration of all cell formations: and further point out this fatty transformation as etimes commencing in the nucleus, or even in nucleolus when it is enlarged — a fact which lains many of the appearances observed in ho-cancerous and cancroid and other growths.

5. *F. Pus-cell.* — In the article Pus I have cribed the *Pus-cell*, according to Vogel. *Pus* sists of numerous corpuscles floating in a clear l—*liquor puris*. These corpuscles are perfectly ular, and vary from 1-100th to 1-75th of a imetre in diameter. Their surface is finely nular. They have a regular, defined edge, and freely in the liquor puris upon each other. addition of water increases their size, their ly granulated surface disappears, and they ome more transparent. Weak acetic acid par-y, and the strong acetic acid completely dis-es the cell-wall, and brings into view the leus, which assumes the appearance of two or e, or even four or five granules close together, with a central shadowed spot, and generally ut 1-400th of a millimetre in diameter. Al-es and ether completely dissolve the pus-uscle. Dr. Bennett describes the production he pus-cell as follows: — The exudation first s a molecular and granular blastema, the in-lual granules of which unite together in twos threes, and constitute a nucleus, from which ll-wall arises. The early formation of pus may bserved in the matter squeezed out of unripe esses, and in the exudations from blisters and r inflamed surfaces. The cell-wall thus ed is about 1–50th of a millimetre in dia-er, is highly elastic, and assumes shapes ac-ing to the degree and direction of the pressure hich it is subjected. Water and acetic acid lve the cell-wall, whilst the nucleus — which e the addition of these reagents, resembled an ordinary pus-corpuscle — exhibits the usual two or three granules, which may be considered as nucleoli. Dr. Bennett thinks that the bodies, which have hitherto been considered as pus-cells, are only the nuclei of corpuscles, the delicate walls of which are dissolved very rapidly and at an early period; but whether this is invariably the case requires to be confirmed.

26. *Pus* varies in its characters with the surface on which it is formed, and the stage and course of its formation — with its age and circumstances affecting it. When formed on a *mucous membrane*, it is often mingled with epithelial cells in various stages of development. Some "*Histologists*" have talked of mucous corpuscles; but Dr. Bennett very justly remarks that there are no bodies peculiar to mucus, what have been described as mucous corpuscles being either epithelium or pus-cells. When formed on a *serous surface*, pus-cells are associated with filaments, and with corpuscles which differ from them in structure. These corpuscles, from the frequency of their occurrence in plastic lymph, Dr. Bennett has called *plastic corpuscles*. Valentin and others have termed them *exudation corpuscles*; and M. Lebert and Dr. Walshe *pyoid*, from their resemblance to those of pus. They are composed of a distinct cell-wall, inclosing from three to eight granules. They vary in size from the 1-100th to 1-75th of a millimetre in diameter. The addition of water and acetic acid causes no change in them, although the latter reagent sometimes contracts and thickens the cell-wall, and at others renders it more transparent. On some occasions, when the exudation is so abundant on a serous membrane as not to coagulate, and when the fibrinous and serous portions are not fully separated, the corpuscles assume the characters of those of pus, although some of the fibrous element, with plastic corpuscles adhering to them, may still be observed. Dr. Bennett states that *pus-cells* are occasionally found in the fluid on the surface of cancerous ulcerations; but that he has never met with them in softened cancer of internal organs but in one case, when they were at once distinguished by the action of acetic acid. This reagent, by exhibiting the peculiar granular nucleus — or nucleoli — of the pus-cell, at once distinguishes this cell from young cancer-cells (§ 14.), from young epithelial-cells (§ 18.), and from fibro-plastic cells (§ 21.).

27. iv. Filaments and Fibres. — Scirrho-cancer, cancroid, and various other morbid growths have generally for their basis a fibrous structure more or less firm, which presents all the characters as to early formation and development of fibrous tissues in healthy structures. Professor Bennett* states, that sometimes the fibrous tissue consists of delicate filaments of 1-600th of a millimetre in

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[*] The author has much pleasure in adopting the descriptions given by Dr. Bennett of this and other tissues, because he has satisfied himself of their accuracy. Both in this country and in Germany, from 1816 until 1820, the author was much engaged in researches, chiefly anatomical, with the aid of the microscopes then in use; but he found his eyes so seriously affected, that he gave up the pursuit until recently, when the excellence of modern instruments induced him partially to resume it, as occasions offered. He has it in his power to state, that the observations he has made, which, however, have been comparatively few, have always proved the accuracy of British observers, more especially of Bennett, Walshe, Bowman, Dalrymple, Johnson, &c.

thickness; at other times of well-formed areolar tissue, the diameter of each filament varying from 1-500th to 1-400th of a millimetre in diameter. The addition of acetic acid often renders it more transparent, and presents visible permanent elongated nuclei. Such fibrous tissue is probably formed by the juxtaposition and ultimate development of the fusiform cells described above (§ 21.). Occasionally the fibrous structure resembles elastic tissue, the filaments varying from 1-300th to 1-250th of a millimetre in diameter, and presents the characteristic curled appearance. These different kinds of filaments are sometimes so closely placed together as scarcely to be separated by the needle, at other times they are loose, widely separated, and easily torn. "They may run together, side by side, in wavy bands; be mingled together in an inextricable meshwork; or arranged in the form of loops or circles, surrounding openings or loculi."

28. Fibrous tissue is said to be formed in three ways: — 1st. By the precipitation in a fluid blastema of fibrinous molecules, in the form of rows, which afterwards coalesce and become consolidated into filaments. This process has been shown in the buffy coat of the blood and in recent exudation from serous surfaces. — 2d. By the accumulation of granules, so as to form a spindle-shaped nucleus, which by its elongation splits up the coagulated exudation into laminæ and fibres, as is observed in many forms of fibrous tissue. — 3d. By the development of cells which become elongated at both ends so as to form a fusiform corpuscle, which ultimately splits up into filaments, as seen in chronic exudation on serous surfaces. All these modes of formation are seen in cancroid and other morbid growths.

29. v. CRYSTALS. — These are sometimes found in cancerous and other growths, especially if these growths have been kept any time, or are partly decomposed; or if they occur on mucous surfaces. "They then assume the prismatic and other shapes of the triple phosphate, and are the results of putrefaction. Irregularly formed crystalline masses are present in the structures, which undergo a calcerous degeneration. Crystals of cholesterine are occasionally found in the reticulum of cancer, and sometimes needle-shaped crystals of margarine." — (*Op. cit.* p. 160, 161.)

30. vi. BLOODVESSELS. — Dr. BENNETT states that he has never observed any thing peculiar about the *bloodvessels* in cancerous or cancroid growths, and that he believes them to present the same structure, and to be formed in the same manner, whatever that is, as in other tissues.

31. II. CHEMICAL COMPOSITION OF MORBID GROWTHS. — This subject has been considered by BENNETT and WALSHE, conformably with recent chemical doctrines; and for a full account of it the writings of these physicians, as well as those of LIEBIG, SIMON, DUMAS, DAY, and others, will be consulted with great advantage, although the chemical nature and relations of morbid growths are very imperfectly known. Dr. BENNETT indeed admits, that the present imperfect state of organic chemistry renders any investigation into the composition of morbid structures most unsatisfactory. All that can be determined is that morbid growths partake of the same constituent elements as other forms of exudation from the blood; and "that not only are there no means of separating chemically the different forms of scirrho-cancer and can oid tumours from each other, but that it is also m possible to distinguish those from other m oid products, or even from healthy tissues. It i ot by analysing large masses of morbid struc re, including, as they do, granules, cells, filam ts, and salts, mingled together, that any light wi be thrown upon the chemistry of tumours; ut rather by first separating, with the aid of the i croscope, the minute structural elements ent ng into the composition of the growth, and the by endeavouring, by chemical manipulations u er the same instrument, to ascertain the exact n re of each. Chemists have not turned their atte on in this direction to any great extent; but his o gists are enabled, by the use of very simpl e agents, to separate the chemical principle of cancerous and cancroid growths into four gro s, viz. 1st. Albuminous principles; 2d. Fatty n ciples; 3d. Mineral principles; and 4th. g mentary principles. Further than this they ca ot go; but, fortunately, a knowledge of the rel ve amount of those is easily obtained, and y ds very important information." — (*Op. cit.* p. 1)

32. i. ALBUMINOUS PRINCIPLES. — Unde is head Dr. BENNETT classes *albumen*, *fibrin*, nd *caseine*, associating *gelatine* with these, althou it materially differs from them. Albumen is he most abundant constituent of morbid struct es. In this opinion—frequently stated in the cour of this work — VOGEL, BRUCH, and BENNETT a e, whilst they also admit, that the more solid ts are fibrin, and that the fluid in which the corp es swim is albuminous, the one being necessa to form the filaments, the other the cells. F in may thus be considered as being formed m albumen; for ZIMMERMANN has shown that in results from a change in albumen, and has ref ed to the experiments of TIEDEMANN and GMELI on the chyme, chyle, and blood of herbivorous ni mals, compared with those of carnivorous ani ls, which show that, notwithstanding the natu of their food, the chyme of the latter contain no fibrin, and their blood less fibrin, than the od of the former; the fibrinous principle of the od of the carnivora being reduced to albumen d ng the primary digestion. The experiments of A GENDIE, NASSE, and others, have shown that od deprived of fibrin transfused into an an l, contained fibrin and became coagulable er having circulated for some time. From se facts it is manifest, that the fibrin of the blo is developed chiefly during circulation. On is subject Dr. BENNETT remarks, that "it seem x traordinary, if the muscular and fibrous tissue re formed from fibrin, that this principle sh ld exist in normal blood only in the small propo on of from one to three parts in one thousand a quantity wholly inadequate for the purpose."

33. But it should be recollected that e nutrition of muscular and fibrinous tissues i ot merely an attraction of fully developed fibrin t of the constituents or elements of fibrin, whic e changed into, or incorporated with, fibrous s tures by the influence of vitality; the fibrin isting in healthy blood being merely the resid n of the conversion of these elements. This vie f the subject is supported by what is actuall served in diseases which impede the nutritio f fibrous structures, as in acute rheumatism, p monia, consumption, inflammatory fevers, &c n

h the quantity of fibrin in the blood is ssive; for in these diseases the nutrition of structures is either impeded or arrested, and e the accumulation in the circulation of the ents forming them favours the development brin in the blood, when vital power is not so reduced as to prevent the attraction and co- n of the constituents necessary to the pro- ion of fibrin. According to this view the ease of fibrin in the blood is a consequence of mmatory diseases; the non-incorporation of constituents of fibrin by fibrinous tissues — or nterrupted nutrition of these tissues — causing xcess of these constituents, and the attraction cohesion of a certain proportion of them, ac- ing to the state of organic nervous energy, in form of fibrin, during the process of coagula- , when the blood is removed from the system.

4. The existence of *casein* in scirrho-cancer, in other morbid growths, is very doubtful, ough its presence has been contended for several chemical pathologists, in tuberculous some other diseased structures. Müller ed the presence of *gelatin* in enchondroma- and colloid formations. Dr. Bennett states e preparations of colloid in his possession are perfectly transparent after long immersion lcohol; whilst others have been transformed a white opaque matter, resembling boiled te of egg. Hence the chemical composition of viscus fluid in cancer may be inferred to r in different cases; but in what this difference sists, unless it be owing to the quantity of al- en it contains, has not been determined. The investigator just mentioned remarks that, in a l state, the albuminous principles are, with the ption of caseine, not affected by the addition cetic acid; but when once coagulated in the of molecule, fibre, or membrane, they are n rendered more transparent by this agent. s property of acetic acid enables the histologist ender their sections and filaments of structures sparent, and to partly dissolve cell-walls. filaments and cell-walls of scirrho-cancerous cancroid growths are composed of albuminous ciples, and the more filamentous and dense the cture is, the more does it abound in this mical constituent.

5. ii. Fatty Principles. — The modes in ch fatty matters may be produced in the em, in health and in disease, have been much differently discussed amongst chemists and mical pathologists — a class or sect of patholo- s which have again risen to celebrity, with big at their head. Fatty matter exists in rho-cancer and other morbid growths in four es — as a nearly pure fat, in an almost saponi- state, in a non-saponified state, and as a fatty l. Dr. Bennett states that it is never structu- y free, for, being invariably associated with d albumen, no sooner is oil precipitated so as assume form, than the minutest granule of it omes enclosed in a thin coagulated film of umen. Such granules may be recognised by resistance they offer to the action of weak tic acid, or by their disappearance on the ad- on of ether; and their number, in any given nt of a structure, is a tolerable index of the ount of fatty matter present. Fat may also st in the form of crystals of cholesterine, and margaric acid. The French chemists insist that fat enters the body ready made in the food; whilst Liebig and his disciples maintain that it is formed in the system, 1st, by the *primary digestion*, and 2d, by the decomposition of the tissues or by *secondary digestion*. It is probable that, in morbid structures, its presence may also be sometimes imputed to a transformation of the albuminous constituents, or of a portion of them.

36. The existence of fat in healthy and in morbid structures may, therefore, be more correctly referred to the following different sources: — 1st. To the introduction of ready formed fat in the food; — 2d. To the early processes of digestion; — 3d. To the decomposition and absorption of the tissues; — and 4th. To the transformation of the albuminous principles. The *first* of these sources requires no remark. As regards the *second*, it cannot be doubted that animals which become very fat by feeding on grain, must have the power of converting the constituents of these into adipose tissue, as the very small proportion of oil which these contain could not be adequate to this result. The *third* source may be less readily admitted, although various considerations suggest its existence. As to the *fourth* source of fatty production, it certainly exists in morbid formations, and especially in albuminous exudations, more generally than is supposed. I have seen it repeatedly to a very great extent in the albuminous exudations formed between inflamed serous surfaces, more especially in the chronically inflamed cases; and when the albuminous exudations had passed to the state of organised, or partially organised, areolar tissue, this adventitious tissue appearing not only to contain oil-globules thickly disseminated throughout it, but, in some instances of long standing, gradually to pass into masses of fat, identical with other adipose parts. These changes in the adventitious membranes, adhesions, and parts connecting inflamed serous surfaces have been already noticed when treating of the alterations consequent upon inflammations of the *peritoneum* and *pleura*; but they have hitherto escaped the notice of pathologists. I have also observed this conversion of old exudations from, and adhesions between, serous surfaces into fat within the vertebral theca, in cases of prolonged paraplegia; and very probably this conversion is one of the modes of reparation, or of removing these consequences of inflammatory action, the albuminous principles passing into the fatty to facilitate their absorption through fine vessels or canals.

37. Connected with this subject, Dr. Bennett remarks that it is probable, under favourable circumstances, that the albuminous principles may be converted into fat; for pathologists are acquainted with numerous facts, which prove that muscular, areolar, fibrous and other albuminous tissues may be so converted. The universal occurrence of compound granular corpuscles in old exudations is evidence of this, although it may be erroneous to suppose that the original transformation is connected with any influence possessed by cells. Donnè, after carefully removing all the globules from milk, and leaving no visible evidence of fat under highly magnifying powers, still succeeded in extracting it by means of ether. " Fat, then, is probably held in solution, and enters the cell-wall by endosmosis; where it is precipitated in the form of granules, which become enveloped

with a layer of albumen, and are prevented from passing out. In this manner fat, resulting from the disintegration of exudations, becomes accumulated in previously existing cells. Hence various kinds of these bodies act as mere storehouses for excessive formations of fat in morbid growths, as the adipose cells proper perform the same function in healthy tissues. In one, fat exists in the form of granules, in the other as a fluid oil, because pre-existing cells generally have for their contents albuminous matter in a state of solution, which is not the case with the adipose cells."—(*Op. cit.* p. 166.)

38. When the muscular system undergoes the fatty degeneration, it has been supposed that the deposition of fat by its excess causes atrophy, and subsequently destruction of the muscular fibres. But Dr. BENNETT states that, in watching carefully the progress of fatty transformation, he has convinced himself that it often commences in the very centre of the muscular fasciculus, apparently by the fibrillæ breaking up, losing their continuous and characteristic transverse markings, and assuming the form of minute fatty molecules, which afterwards become larger and larger, so as to constitute granules of various sizes. The same change is observed in muscles in the vicinity of diseased parts which for a long time have not been called into action. This observer adds, that "the whole fasciculus becomes thus affected, and at length large drops of oil accumulate in the interstices of the fasciculi, which gradually assume all the appearances of adipose cells, and, by their increase at the expense of the muscular fibre, communicate to it the yellow colour and other physical characters of fat. This conversion of the albuminous principle into the fatty, is brought about independently of the agency of cells or nuclei, and shows that, in the retrograde, as in the advancing process of nutrition, the molecular and granular element is the form of structure which is the basis of every other."

39. iii. MINERAL PRINCIPLES. — In scirrhous, cancerous, and various other morbid growths, as in every other exudation from the blood, more or less of mineral or saline matter is present, the amount however of which varies much in different cases. These form into crystals with the progress of decomposition, crystals of the ammoniaco-magnesian phosphate being not uncommon. More generally small collections of phosphate of lime are found either in granules or in masses, or in irregular fragments, which are soluble in the nitric and hydrochloric acids. Sometimes the mineral substance is so abundant as to impart to the dried growth an osseous appearance. This change may take place in cancerous as in tubercular formations, although not so frequently, converting portions of either into calcareous concretions. Dr. BENNETT states, that in some forms of cancroid growth, the mineral principle, like the fatty, seems to enter pre-existing cells in a state of solution, and to become afterwards precipitated, so as to assume somewhat of an organized appearance.

40. iv. PIGMENTARY PRINCIPLES. — The exudation of blood into the substance of scirrhous, cancroid, and other morbid structures, and the change in the exuded blood, as well as the alteration thereby occasioned in the tissues in which the blood exudes, are manifestly the causes of the different tints of colour which these s c-tures present. The deeper hues are prob ly owing to some chemical change in the ex ed blood and other fluids, and probably the colo ng matter of bile may sometimes aid in modifyi or deepening the tint. Dr. WALSHE considers he bright yellow matter, associated with fatty m er, sometimes forming a reticulum, or collecte o-gether in masses, to be analogous to the kirro sis of LOBSTEIN; but LEBERT views it as a pec ar kind of fat, which he calls xanthose. The l ck matter sometimes found in cancer, is owing e er to the action of the morbid secretion of the is-eased part upon the globules of the blood in he capillaries or exuded from them, or to the s-sociation of melanosis with cancer (see art. E-LANOSIS, §§ 4. *et seq.*). That it originates in ne change which the blood undergoes, is show by the circumstance of this change having been tr ed in the same specimen through all the interme te tints from blood-red and rusty brown to e deepest black. Dr. BENNETT has ascertained at the colour of the black matter, occasionally f d in cancerous growths, is destroyed by nitric id and chlorine, — a change which distinguish it from the black matter which commonly accu u-lates in the bronchial glands and lungs of d people, and in the black phthisis of colliers. n the latter instance the black matter is undoubt y carbon, in the former its nature is unknown. (See arts. LUNGS, § 185.; and MELANOSIS.)

41. III. GENERAL ANATOMY OF SCIR s-CANCEROUS AND OTHER GROWTHS. — i. r SCIRRHO-CANCEROUS GROWTHS. — Continuin o adopt the description of Professor BENNETT, t e growths are constituted of nucleated cells, e-senting the characters attributed above to can r-cells (§§ 13. *et seq.*), and infiltrated among the me s of a fibrous stroma. Conjoined with the fibres d cells there is invariably present a viscous flui n which the cells swim, as seen under the mi -scope. The fibres, the cells, and the viscous fl , are the three essential elements of these grow ; and it is on the relative amount of each wh determines the species of cancer. "If the fib s element be in excess, it constitutes *scirrhus*, r hard cancer; if the cells be numerous, *ence* -

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* According to SIMON and DAY, the following *pr mate analysis* of scirrhus have been made by L'HERETIER: —

	Of Breast.	*Of Uterus.*	*Of Do Regi*
Water	29·75	21·15	24·
Albumen	28·10	29·85	21·
Fibrin	18·80	15·20	27·
Gelatin	7·60	-	8·
Fat	2·00	-	8·
Phosphorized fat	-	6·00	
Proxide of iron	1·15	1·25	trac
Yellow pigment	-	7·00	
Salts	12·60	9·55	10·1

A fatty growth analysed by NEES VON ESENBECK c tained 23·0 of solid fat; 12·0 of extract of flesh; 11· gum-like animal matter; 23·0 of albumen; 19·0 of ph phate of lime; and 1·5 of carbonate of magnesia. I not stated whether this solid fat contained cholesteri in all probability it did, as this substance is often fo in fatty tumours. In a fatty tumour examined by MÜLL acicular crystals were found mixed with a grey substa which was deposited in vesicles and dissolved by boil water, from which it was not precipitated by acids the ordinary metallic salts. The crystals were insolu in acids, water, or alcohol, but dissolved in eth hence they probably consisted of cholesterine. Anot fatty tumour contained some casein, precipitable fr the aqueous solution by acetic acid.

or soft cancer; and if the fluid abound, or
ollected into loculi of little cysts, it is *colloid*
cer. All these forms of cancer may frequently
observed in the same tumour—in one place
d or scirrhus; in another soft or encephaloid;
in a third jelly-like collections, or colloid.
, although they may pass into or succeed one
ther, they are not infrequently distinct from
r origin to their termination."

2. *A. Scirrhus.*—Hard cancer has been fully
cribed in the article CANCER; and I have
efore only to add at this place, that at all
s a pulpy substance may be removed from a
h-cut surface of it by scraping, which, on
roscopic examination, is seen to contain nu-
ous cancer-cells, mingled with molecules,
aules, and fragments of fibrous tissue,—an
earance which distinguishes scirrhus from
ain forms of fibrous tumour, which to the
ed eye exactly resemble it. A thin section of
scirrhous growth is seen to be principally
posed of filaments, of various sizes, running
ifferent directions, sometimes forming waved
ds, at others an inextricable plexus, among
ch the cells may be seen infiltrated, or form-
loculi or cysts enclosing masses of these cells.

3. *B. Encephaloma.* — Soft, or brain-like
cer, has been considered in the article FUNGOID
EASE. It consists of a soft pulpy growth, of a
tish, yellowish, or bluish tint, breaks down on
lerate pressure, and yields a copious milky or
my juice. It presents different degrees of
cularity; reddish parts or spots appearing,
ng to extravasations of blood, or to degrees of
cularity. On examining a fresh-cut section, it
ents a very loose fibrous texture; but in the
ser parts it approaches the character of the
portions of scirrhus. In the pulpy parts no
e of fibres is visible, or merely fragments of
n. Yellowish parts, either reticulated or col-
ed into masses, generally consist of fatty
eneration of the cancerous tissue, and form
cancer reticulare of MÜLLER. This yellow
ter is often of cheese-like consistence, friable,
resembles tubercle, for which it has been
taken. The blackish tinge is owing to black
nent (§ 40.) infiltrated in the cancerous
nents, or existing within the cells, constituting
malignant melanosis, or melanic cancer of
e authors. The cream-like fluid presents, under
microscope, a number of the cancer-cells
ady described (§§ 13. *et seq.*). Sometimes
gled with a large number of molecules, gra-
es, compound granular cells, blood-corpuscles,
more or less of the fibrous element. (See art.
NGOID DISEASE.)

4. *C. Colloid or Gum-Cancer.*—Glue-cancer,
collections of gelatinous matter resembling
e, calves'-foot jelly, or semi-fluid gum, are found
nasses varying from a minute point to the size
large orange. In colour colloid is yellowish,
yish, brownish, or reddish; very rarely green
black. It may be transparent or amber-like,
emi-transparent or opaque, resembling honey.
nay be disseminated in a fibrous texture, giving
pearly aspect, or it may be collected in distinct
ts. "It is one of the most common constituents
compound encysted growths of the ovary, and
s not infrequently seen in cysts of the kidney,
follicular swellings of the skin."—(BENNETT.)
examination with the microscope, this substance
is occasionally seen quite structureless, or exhibits only a fine molecular appearance, and it then has been called *colloid tissue*. At other times numerous nucleated cells, presenting all the characters of cancer-cells, in various stages of development, are found in it as a blastema; and it is then observed that the growth has a tendency to spread. This is *colloid cancer*.

45. "When colloid cancer is formed on a free surface, as on the peritoneum, it often presents small grains, of a grey colour, resembling coagulated gum-arabic. When collected in masses, these have an irregular nodulated aspect. A fresh section presents a surface with numerous loculi or cysts, which vary from the size of a pin's head to that of a walnut, filled with a clear glistening gelatinous matter, surrounded by fibrous substances or mesh-work." Cancer-cells originate in colloid matter, as in other kinds of blastema, by the formation of granules, nuclei and cells. The fibrous structure of colloid, according to Dr. BENNETT, never contains permanent nuclei, or affords any evidence of being developed from nuclei or cells; it seems rather to be formed by precipitation alone.

46. *D.* These *three forms* of true cancer are vascular, but in different degrees. Scirrhus is least so; colloid is more so then scirrhus; and encephaloma is most vascular — sometimes so much so as to bleed readily and profusely. These forms pass into each other, sometimes so imperceptibly as to render the arrangement of several specimens a difficult matter; more especially as respects scirrhus and encephaloma or fungoid cancer.

47. ii. OTHER MORBID GROWTHS.—Morbid structures, which, to the unaided sight, to the touch, and often in the progress of the case, so closely resembles cancer as to be frequently mistaken for it, and yet which presents on microscopic examination differences of a very marked character, have been termed cancroid by Dr. BENNETT. Hitherto, he remarks, this distinction has not been very accurately attended to; for, although practitioners have recognised the existence of fibrous, sarcomatous, warty, fatty, and other so-called non-malignant growths, experience every day proves that there are no symptoms which enable them to detect these with certainty.

48. *A. A fibro-nucleated cancroid growth* is described by this writer to consist of filaments infiltrated with oval nuclei. It can be distinguished from scirrhus and from encephaloma only by microscopic examination, as it sometimes closely resembles the one, and at other times the other. As to its minute structure this growth ought to be separated from true cancer on the one hand, and from fibrous tumours on the other. It is deficient in cancer-cells, which are essential to the first; and it possesses numerous naked nuclei in no way connected with cell-formation, which are not found in the second. This form of cancroid growth, however, evidently so closely resembles cancer, or possesses so much of what has been usually called the malignant character, in other respects, that a diagnosis is difficult. The most important distinction between it and true cancer is that, although it may return in the place originally affected, after excision, it does not appear ever to occur secondarily in the glands or other organs.

49. *B. Epithelial Cancroid Growths.* — Dr.

Bennett considers that cancer of the lip, chimney-sweeper's cancer, noli me tangere, malignant ulcer of the face, cauliflower excrescence of the uterus, and other appellations are given to morbid growths, which have been considered cancerous or malignant, but which possess a very different structure, and are therefore only cancroid. Mr. **Paget** pointed out the identity of several of these, considered them as warty in their nature, and ascribed them to hypertrophy of the papillæ of the skin. Dr. **Simpson** classed cauliform excrescence of the cervix uteri with soft warts and condylomata, and stated that it had often been confounded with carcinoma or medullary fungus. Examined by **Reid** and **Goodsir** it was shown to consist of groups of large nucleated cells. These and similar alterations of the epidermic and mucous surface Dr. **Bennett** views as epithelial cancroid growths, and as essentially consisting of an hypertrophy of the mucous or epidermic layer, composed of numerous epithelial cells more or less impacted together (§ 18.). They may occur on large free surfaces, as the skin or digestive mucous membrane; or within mucous follicles, and the minute ramifications of secreting glands, as the mammæ, kidney, &c. In the former case, corns, callosities, condylomata, warts, and scaly eruptions of the skin, or polypi and fungous excrescences of the mucous membrane are occasioned. In the latter case, various kinds of encysted swellings, hairy and horny productions, and dilatation of the minute ducts in secreting glands by the desquamation and retention of their contained epithelial cells are produced. The forms of epithelial growth which more especially resemble cancer, and which are therefore cancroid, are — 1st. Certain warty and fungoid excrescences of the skin and mucous surfaces; — 2d. Some ulcerations of mucous membranes, especially those of the lip, tongue, and cervix uteri; — and 3d. The changes occurring in follicles and excretory ducts, the latter, when associated with hypertrophy of the surrounding fibrous tissue, constituting some forms of so-called sarcomatous tumours.

50. (*a.*) *Warty* and *fungous excrescences* are very common. The former are often observed on the fingers of young persons, more especially of those addicted to the vice of self-pollution; and they sometimes also appear about the face and neck. They consist of a congeries of elongated papillæ, sometimes flattened at the top, at other times presenting fissures and sulci leading to a common root. These tumours may vary from the size of a millet seed to that of a child's head. Dr. **Bennett** describes them as having their surface sometimes smooth, at other times lobulated, composed of rounded groups of papillæ resembling a cauliflower. When small, they are almost wholly composed of epithelial scales, which assume a square or elongated form, their nuclei being usually very distinct. The larger growths internally consist of a fibrous structure, into which loops of vessels from the capillary network of the dermis is prolonged. They are covered by compressed epithelial scales. They often soften and ulcerate on their surface or at their base, some of the epithelial cells then enlarging from endosmoses and often resembling cancer-cells, whilst others are elongated and split into fibres. Mingled with the altered cells are numerous molecules and granules, and often pus-corpuscles,
giving an ichorous character to the discharge f n
the sore or ulcerated surface. In this mann a
cancroid ulceration may be produced, and pro d
to a greater or less extent, the base of the ul s
being generally covered by papillated fun d
projections, the edge being elevated, indurated, d
rugged.

51. The *polypi* which grow from the surfac f
mucous membranes are covered externally y
thickened epithelial cells, are internally comp d
of fibrous tissue more or less dense, and e
abundantly supplied with blood-vessels. T y
resemble in structure the excrescences just
scribed, and like them may ulcerate, the ulc
tion, however, being much more frequently
tended by hæmorrhage. These polypi are y
common in the cervix and os uteri, and less s n
other mucous surfaces.

52. (*b.*) Another form of *epithelial cancroi* s
described microscopically by Dr. **Bennett** as
pearing first as an ulcer, sometimes as a sl t
induration of, or small wart on, the affected p .
It is common on the under lip, on the tongue, d
in the cervix uteri. In the lip, a furrow or g e
is often observed early in the indurated spot. s
slowly extends, in the form of ulceration, h
indurated, thickened, and raised margins s
circular and cup-shaped, its surface being so
times covered by a white-cheesy matter, t
others by a thick crust; and proceeds unti t
involves a considerable portion of the struct ,
pouring out a foul ichorous discharge. In e
tongue the base of the sore is fungoid and pa
lated, and dense, owing to the close impactio f
laminæ of epithelium. On the cervix uteri, t e
ulcers have hard, irregular edges, yield a copi s
ichorous discharge, and cause more or less th
ening of the adjoining textures. When exami d
microscopically, these cancroid ulcers present
their surfaces masses of epithelial cells, in all t r
stages. Some of these cells are spherical,
cleated, about 1-50th of a millimetre in diamet ;
others much larger. They often resemble can
cells when viewed alone, but are associated w
flattened scales, varying in size and shape, so
times in groups adhering at their edges, at ot
forming confused masses. Many of the cells
scales often reach an enormous size, and as t
become old split into fibres. These elements
commonly associated with numerous molec
and granules, naked nuclei, fibro-plastic, fusif .
and pus-cells. Immediately below the surfa ,
the epithelial cells are more or less compres
and condensed; and, when the disease is very c
they present concentric laminæ, surrounding
hollow space.

53. (*c.*) *Cystic Growths*, consisting of epithe
cells and scales, often occur in minute follic
and crypts. They may also form within
excretory ducts of glands. They have been w
described by M. **Lebert** and by Dr. **Benne**
The contents of these cystic growths are
merely epithelium-cells in all stages of devel
ment, but also fatty cells, granules, and cryst
of cholesterine. These obstruct the duct, and t
enlargement or tumour of a cystic kind is form
These cysts vary from the size of a pea to tha
a large orange; their appearance varying w
the proportion of epithelium, or of fat, or
cholesterine they may contain. Quantities of e
thelium are also thrown off from the lining of

ral ventricles in cases of cerebral meringitis, l in the ovaria during ovarium dropsy.

54. "In many fibrous, or so-called sarco- tous growths in glands, we frequently find the pertrophied filamentous tissue forming loculi ich vary in shape with the amount of lateral ssure they receive. This may occur in can- ous and cancroid growths, and the spaces so duced may be occupied by either cancer or thelial cells. Hence, even on a microscopic mination, the latter may be readily mistaken an experienced histologist for cancer. The rous tissue in both cases is the same, but the ls present the differences formerly pointed out ween cancer and epithelial cells (§ 18.), latter being frequently about the same size, l exhibiting a great disposition to run together groups." The cystic formations in sarcoma are ised by the same circumstances as produce ple cysts in the liver, kidney, and other ndular organs: the minute excretory ducts are structed by granular exudations or exfoliations, l fluids accumulating behind them produce tations or cysts. Hence the frequency of en- sted growths in structures furnished with follicles ducts. Occasionally the epithelium is so sely impacted in the dilated ducts as to be ned out in the form of moulds of the tubes on king a section through them. "This form of thelial accumulation in the ducts of glands, ich are the seats of fibrous or sarcomatous wths, merits great attention, as to this circum- nce must be attributed their great resemblance cancer." — (p. 183.)

55. *C. Fibrous cancroid growths* consist olly of fibrous or filamentous tissue, and so sely resemble scirrhus as to be continually staken for it. This fibrous tissue is formed as ve described (§§ 27, 28.), and it may be thus duced in various tissues and organs. This ue is the most universal both in healthy and eased parts. It forms the stroma, or frame-work, nearly all the tissues. "It exists in almost ry kind of cancroid and cancerous growth: so t a fibrous tumour is one of these, minus the clei and cells, which give to each its peculiarities. rous growths present themselves in numerous ms. One of the most common is that of *cica- x*; another is that of a white glistening patch, so nmon on serous surfaces; a third is the chronic nd or ligamentous tissue uniting serous mem- nes, the result of simple exudations of some nding; and a fourth is the peculiar induration the skin, constituting sclerosis in children, and phantiasis in adults." — (p. 184.) Cancroid rous growths assume two principal forms, — . Thickening or hypertrophy of the sub-areolar sue of mucous membranes; — 2d. Tumours of ferent varieties.

56. *α. Thickenings* and *indurations* of the sub- ucous areolar tissue cause strictures of canals, in the alimentary canal, urethra, &c. They y follow any protracted irritation causing ex- ation. Chronic irritation of the stomach, or stritis, may induce a similar lesion, with hyper- phy of the muscular coats, so as closely to re- nble scirrhus; and many cases of stricture of intestines have a similar resemblance; and yet on a close examination they contain nothing t the elements of fibrous tissue — are merely nply fibrous. This form of morbid growth consists almost entirely of dense bands of filaments of a glistening or dull white colour. Here and there, naked nuclei varying in size, or fibro-plastic corpuscles, mingled with fusiform bodies, may often be detected between these fibres.

57. *β. Fibrous cancroid tumours* comprise, besides those which are strictly fibrous, those which have been usually called sarcomatous and neuromatous. Dr. Bennett considers them all "to consist of a fibrous structure in different stages of development, the softer and more vascular forms being such, even when their elements have not yet completely passed into the perfect fibrous state. For this reason they have been made to constitute a distinct group by Lebert, under the name of fibro-plastic tumours. Such growths may always be seen passing into true fibrous tissues. In some, whilst one part may be called sarcomatous or fleshy, another is truly fibrous. Other kinds of fibrous tumour resemble tough ligament and fibro-cartilage, presenting all kinds of intermediate degrees of conversion between the areolar and elastic tissues. Fibrous tumours may therefore be divided into — 1st. Sarcomatous; — 2d. Desmoid; — 3d. Chondroid; — and 4th. Neuramatous fibrous tumours." — (p. 185.)

58. 1st. *Sarcomatous tumours* are either spherical or more or less lobulated. The first are of the consistence of muscular tissue or soft cartilage. Their surfaces, when divided, are smooth or finely granular, and their colour varies from a whitish yellow to pink or deep red, with the amount of vascularity. Sometimes on section, the surface is mottled from an intermixture of these tints, or ecchymosed. The vascularity of these tumours disposes them to ulceration and to the breaking down of their substance with the formation of a purulent fluid. They are generally encysted, originate in cellular tissue, and are found in fibrous and osseous structures. In the last-named situation they have been called osteo-sarcoma, a name which has been sometimes given to cancerous disease in this situation. Lebert considers fungus of the dura mater to be sarcomatous. These tumours increase in size slowly, causing injury by their pressure on adjoining parts, not only impairing function but producing absorption and ulceration of the parts pressed upon. In a gentleman whom I attended for gradually increasing hemiplegia, passing slowly into general palsy and coma, one of these tumours existed in the upper jaw and another in the pericranium; and I stated that the palsy was most probably owing to a similar formation in the dura mater. On examination after death, this was found to be the case. A large tumour on one side having caused the hemiplegia, a small one being also present on the other side, and having produced the palsy of the other side also, shortly preceding dissolution. (See art. Brain and Membranes, §§ 8, 9.).

59. Sometimes these tumours are more soft and lobulated, and are then readily mistaken for encephaloma. The lobules vary greatly in size, have externally a papillary or cauliflower appearance. They frequently resemble the pancreas, and were hence called pancreatic by Abernethy. The lobules are surrounded by a layer of more or less dense areolar tissue; and are of a greyish, yellowish, or rosy colour, according to their vascularity.

60. These tumours are found in many places

below the skin copiously supplied with cellular and fibrous tissue. They are not infrequent in the mammæ; and in this situation they are distinguished from scirrhus with the greatest difficulty. M. Lebert describes small mushroom-like growths on the conjunctiva which are sarcomatous, and which may destroy the eye by their size and pressure. Dr. Bennett has found many granulations on the valves of the heart to consist of a sarcomatous and fibrous structure.

61. " The minute structure of these tumours is essentially fibrous, but many of the fibres are seen to be made up of congeries of fusiform cells closely applied together. These cells are of a spindle-shape, varying in length and breadth, and for the most part distinctly nucleated. Many of them may be seen branched at their extremities and passing into fibres, according to the mode of development of fibrous tissue described by Schwann. In some the nucleus will be found to have disappeared. Other of the cells will be found round or oval, or only slightly elongated; these are younger growths. In the same tumour all these different stages may be observed. In the softer parts, isolated cells and nuclei abound; whereas in the harder and denser parts, the development into fibrous tissue will be found more perfect."—(p. 187.) Some of the softer forms of sarcomatous growths contain cysts, and in these groups of transparent cells are observed, which present on the addition of acetic acid distinct round nuclei, about one-third the size of the cell. These cells closely resemble epithelial cells. The fibrous structure sometimes forms loculi, which may be crowded with these cells, so that in these cases fibrous and epithelial growths are conjoined.

62. 2d. *Desmoid fibrous tumours* are generally of a white or whitish yellow colour, tough and elastic, resembling the structure of the dermis. They are of a rounded or oval form, often imbedded in a cyst, consisting of the structures in which they lie. They vary in density from that of tendon to that of fibro-cartilage. On section they present numerous white glistening fibres intimately interwoven, or arranged in bundles, forming circles or loops interlacing with each other. They sometimes have a bony centre or nucleus. They are not very vascular. They vary in size from that of a pin's head to several feet in circumference. Dr. Bennett possesses one four feet in circumference, and he refers to one still larger. They may occur in various tissues and organs—in the sub-cutaneous cellular tissue, in the sub-mucous tissue, and in the mammæ and uterus, where they are common. In the last situation, they often push the mucous membrane before them, and in this way grow outwards, forming one of the so-called polypi uteri. In other cases, they grow towards the serous or peritoneal cavity, pushing the membrane before them, and thereby forming a neck by which they are attached to the uterus, as if growing from it. The pedicle thus formed may break off, and the tumour thus become free in the peritoneal cavity. In the same way these tumours may become detached in the joints-loose fibro-cartilages; and even in the veins—when they have been named *phlebolites*. The minute structure of these tumours is chiefly filamentous, the fibriles varying from 1-700th to 1-800th of a millimetre in diameter. Their softer portions may be separated by a fine needle, but
this is impossible in the denser parts. Somet es
the filaments are more or less waved; at ot s,
they are curled and brittle, as in elastic ti e.
Occasionally fusiform nucleated cells are fo d,
indicating that these fibres are probably for d
from cells. Sometimes isolated nuclei and r-
puscles are also found, as in sarcomatous tum s,
but the proportion of them is very small. he
bony centres of these tumours are somet es
cartilaginous, at others composed of amorp us
mineral matter, more rarely of true bone, o
instances of which latter were seen by M. Leb r.

63. 3d. *Chondroid fibrous tissues* were first c-
curately described by Müller, and shown y
him not only to resemble cartilage, but als o
possess much gelatine in their composition. T y
vary in shape. When divided they prese a
smooth, milk-white, glistening surface, like fi -
cartilage. Their thin substance is very de ,
separated with great difficulty by needles, it
easily cut into thin layers. It crunches under e
knife, and is very little vascular. Its intin e
structure consists of fibrous tissue, resembling e
fibro-cartilage of the ear, or the interverte l
substance.

64. The preceding kinds of fibrous struc e
may be associated in one tumour. Some are co-
posed of several rounded or oval masses, vary g
in size, and surrounded, and separated from e h
other by a cyst, or layer of areolar tissue. e
external surface, under such circumstances s
more or less nodulated. Some of these are -
casionally soft and pulpy — semi-gelatinous, v a
a very sparing layer of fibrous tissue, whilst ot s
are more or less tough, gradually passing int a
fibro-cartilaginous density, and grating under e
knife. Dr. Bennett has observed, even of
nodule, parts soft and others hard, the for -
being cellular, the latter fibrous, every degree
variation existing between them.

65. 4th. *Neuromatous fibrous tumours* are form
in the nerves sometimes spontaneously, at oth
consecutively of injuries, especially of amputati
In the museum of the Richmond Hospital, Dubl
a series of these tumours are preserved, most
them taken from a person in whom almost ev
nerve presented knotty swellings, some of th
varying from the size of a nut to that of a chil
head. Dr. Bennett examined them microscop
ally. Having been long kept in spirit, he cou
only determine the existence of fibrous ban
running in various directions, mingled here a
there with compound granular masses. In so
fresh neuromatous tumours which he examined,
was demonstrated, " that in addition to bands
fibres running in waved lines, and sometim
forming loops, there were occasionally transpare
cells, with a nucleus composed of two or mo
small granules, not affected by the addition
acetic acid."—(p. 190.)

66. *D. Cartilaginous cancroid growths* were fi
separated from cancerous and osteo-sarcomato
tumours by Müller, who called them *encho*
droma. " When found in soft parts, or merely a
tached to bones, they are surrounded by a
envelope of condensed areolar tissue, when in t
bones by a bony capsule. In the first case th
occur, although very rarely, in the glands, as
the parotid or mamma. In the second case, th
are most common in the bones of the extremitie
When formed in the substance of long bones, th

sent rounded, smooth tumours; when in the
iosteum or flat bones, their surface is rough
l nodulated." The *structure* of enchondroma is
same as that of cartilage; it presents transpa-
t nucleated cells, varying in size, isolated or in
ups, situated in a hyaline substance. A net-
rk of filamentous tissue runs through the
stance of the tumour, forming areolæ in which
od vessels ramify. The cartilaginous and
olar tissues vary in amount in different tumours.
netimes the cartilage is in excess; and it then
embles that of young animals, the cells being
usually large. When the fibrous element
ounds, then the whole mass is identical with
o-cartilage, as in sarcomatous tumours (§§
—61.). Between these extremes there are
nite varieties, many of which may often be
n in one tumour. Occasionally a bony nucleus
found in a nodule of enchondroma, and some-
es these nodules present all the stages of trans-
mation into bone.

67. Notwithstanding these peculiarities of
ucture, these tumours are often mistaken for
eo-sarcomatous or cancerous growths, chiefly
ing to their occasional softening, and to their
senting, in such circumstances, the external
aracters of encephaloma. The softened portion,
en under the microscope, may, without great
e, lead to error, as the cartilage cells which
at loose, mixed with granules and debris of the
nour, closely resemble those in cancerous
wths.

68. E. *Fatty cancroid growths*, in the form of
nour, when mingled with fibres and other
ments, may be mistaken at first sight for scirrhus.
atty tumours vary in size, but they may reach
rowth weighing 30lbs. Sometimes their surface
smooth, at others lobulated. They are of a
low colour, resembling adipose tissue; some-
es divided into bands by white fibrous tissue.
e relative amount of these two elements varies
atly in different specimens; some being soft,
, containing few fibres; others being harder,
se, the areolar tissue preponderating. For the
st part they are very sparingly supplied with
od vessels, but these abound more in the fibrous
ieties. In the latter case they are liable to
erate, and, under such circumstances, have
quently been mistaken for cancer. Some of
se tumours, indeed, may be considered as
rous or sarcomatous, combined with an unusual
antity of fat. Occasionally they are connected
h the ordinary adipose tissue of the body.
ey are often surrounded by a delicate cyst or
velope; sometimes this is not perceptible.
hen the collection of fat resembles the ordinary
pose tissue, the tumour has received the name
lipoma. When it is more lardaceous, some
ve applied to it the term *steatoma*, in the same
nner as when the substance is encysted."—(*Op.*
. p. 193.)

69. The minute structure of these tumours
ies with the amount of adipose or of fibrous
ue. The former is composed of vesicles of a
und or oval form, altered more or less in shape
pressure. The vesicles vary from 1-20th to
50th of a millimetre in diameter. They are
nposed of a diaphanous cell-wall, frequently
luding a nucleus. The nucleus is round or
al, about the 1-100th or 1-200th of a millimetre
diameter. Occasionally it appears stellate, of a crystalline aspect, from the formation of crystals of margarine or margaric acid around it. On rupture of the cell-wall the oil may be made to flow out, and the cell-wall shrinks up. Collapsed cells may often be seen among the more perfect vesicles, mixed with globules of oil and fat granules. The fibrous element consists of filamentous tissue running between groups of adipose cells; but is denser, and occupies more space, according to the proportion in which it enters into the tumour. Steatomatous and melicerous fatty matter may sometimes consist chiefly of the cells or vesicles just described; or these may be mingled in various proportions with granular matter. In some melicerous encysted growths Dr. **Bennett** found the whole to be composed of granules, among which faint traces of delicate cell-walls might be observed more or less compressed together. In all such productions the relative amount of the vesicular and granular element varies greatly.

70. Another form in which fat may occur is that of *atheroma*, consisting, for the most part, of numerous fatty granules, varying in size. Atheroma may constitute the contents of cysts, or the entire degeneration of certain glands, especially the mesenteric and lumbar. The fatty granules composing it vary from 1-600th to 1-400th of a millimetre in diameter. They almost entirely disappear in ether, leaving only a molecular albuminous matter. Similar fatty granules are also associated with most morbid formations, sometimes free, at others existing within cells. "This kind of atheroma is identical in structure and chemical composition with certain forms of the reticulum in cancer. The granular fatty matter is often combined with crystals of cholesterine, more or less numerous." Sometimes they accompany various kinds of chronic exudation, and formations of epithelium, as above noticed (§ 53.).

71. F. *Tubercular growths resembling cancer* are not uncommon. Dr. **Bennett** remarks that a mass of enlarged tubercular lumbar glands in his collection presents all the external characters of cancerous growths; and that he has no doubt that many cases of so-called cancer of the brain and other structures in youth are only tubercular; for, however easily the tubercular structure may be distinguished in its miliary or infiltrated forms, it may closely resemble cancer when it exists only in one or two large rounded masses in an organ, and is more or less softened. In such cases it can be distinguished only by a microscopic examination. The characters of tubercle which readily distinguish it from cancer therefore require to be pointed out. A tubercular mass presents a yellowish or dirty white colour, and varies in consistence from that of tough cheese to that of thick cream. Sometimes it is soft in one place and indurated in another. On dividing the harder parts, the surface is smooth or waxy; the softer parts present a slightly granular surface. On pressure they are friable, and break down into a pulpy matter, but never yield a milky juice. "A small portion squeezed between glasses, and examined under the microscope, presents a number of irregular shaped bodies approaching a round, oval, or triangular form, varying in their longest diameters from the 1-120th to 1-75th of a millimetre. These bodies contain from one to seven granules, are unaffected by water, but rendered

very transparent by acetic acid. They are what have been called tubercle corpuscles. They are always mingled with a multitude of molecules and granules, which are numerous as the tubercle is more soft. Occasionally, when softened tubercle resembles pus, constituting scrofulous purulent matter, we find the corpuscles more rounded, and approaching the character of pus-cells. They do not, however, on the addition of acetic acid, exhibit the peculiar granular nuclei of these bodies." Tubercle corpuscles are very readily distinguished under the microscope from cancer-cells. Compound granular masses and cells, mineral matters, crystals of cholesterine, and the debris of the texture in which the morbid product is found, are also often detected in tubercular masses of some standing. These masses may also be sometimes transformed more or less into cretaceous and calcareous substances and either remain latent or be thrown off.

72. *G. A tumour*, which M. VELPEAU has called *fibrinous* is occasionally met with. It may, under certain circumstances, be mistaken for cancer. It is caused by an extravasation of blood, which coagulates, becomes paler, and ultimately yellow, like a clot of blood in the sac of an aneurism. These tumours vary in size, may occur in various situations, especially in the female breast, when they may be mistaken for cancerous tumours. Dr. BENNETT has also seen these tumours in different textures, especially in the placenta and in the spleen. The structure of one found in the spleen consisted of numerous molecules and granules, fusiform corpuscles, compound granular masses, and irregularly formed bodies, probably altered blood corpuscles, such as are commonly found in old extravasations. Instances in which these tumours in the breast were mistaken for cancer have been recorded by MM. LEBERT and BERARD.

73. *H.* A peculiar form of tumour, which HENLE has called *syphonoma*, is described by him and Dr. BENNETT. The specimen seen by the latter consisted of a large mass attached to the mesentery, that was in one place hard, fibrous, and nodulated, in another soft and cheesy, or even purulent, and in a third fibrous, but soft and of a dark red, resembling coagulated blood. Having been long steeped in spirits its minute structure could not be exactly ascertained. The part examined resembled a vascular plexus, anastomoses here and there having been distinctly seen.

74. *I.* The *enlarged glands* which accompany *typhoid ulcerations* in the intestines, and which are sometimes found especially in the mesentery, will rarely be mistaken for cancer. They vary in size from that of a hazel-nut to that of a hen's egg. They are vascular externally, of a bright red or purple colour, are soft and pulpy to the touch, and on section present a slightly granular surface, of greyish or fawn yellow colour, frequently exhibiting the commencement of softening. They are friable, and yield a greyish, or dirty purulent-looking fluid on pressure. The matter infiltrated into the texture of the gland is the typhous deposit of ROKITANSKI, ENGEL, and other German pathologists. The fluid squeezed from these glands was found by Dr. BENNETT crowded with cells, naked nucleoli, blood corpuscles, granules and molecules. The cells are generally spherical, varying in diameter from the 1-50th to the 1-35th of a millimetre. The nucleus occupies about t ee- fourths of the cell, and is composed of a g- gregation of numerous nucleoli, of abou he 1-200th of a millimetre in diameter. "Some es from one to four of these nucleoli are seen at- tered within the cell, either with or with round or oval transparent nucleolated nu us. On the addition of acetic acid the cell-w is rendered very transparent, whilst the nucleo re unaffected. Many of them are free, and l ed at first like altered blood globules, from w ch they are at once separated by the action of a tic acid. I have called these bodies nucleoli, m their holding that relation to the nucleus in ll- developed cells, although at other times they ay be considered as nuclei, no other bodies b ng present within the cells." — (BENNETT, *Op* it. p. 200.)

75. IV. PATHOLOGICAL RELATIONS OF S R- RHOUS AND OTHER TUMOURS. i. OF SCIRR US GROWTHS. — *A.* The *origin* of these growths as been the subject of much discussion. In article CANCER certain views of this matter been noticed, but others have been recently b- lished. It was supposed by VELPEAU (*R e Médicale*, t.i. 825, p. 357.), from two case in which encephaloid-looking matter was foun in venous coagula, without disease of the veins, at cancer may form primarily in the blood. it there is no evidence that the matter was r y cancerous in these cases. VIRCHOW, howe r, states that he has seen cancer in the large ve s trunks in six cases, and that he is convinced at they may thus arise locally in coagula of bl d. GLUGE and NONAT discovered cancer-cells a clot in the right iliac vein, the walls of the being smooth and not red; but in these, a n several others which have been recorded, cance s disease existed in the viscera, and the cance s matter in the blood may have arisen from ver s imbibition. In the present state of our knowle e there is no proof that cancer may exist in e blood primarily, or independently of sim r growths in other parts of the body. It is possi , however, that the liquor sanguinis may, in - culiar circumstances, act as the blastema f cancer within the vessels as well as when exud ; such an occurrence however must be rare. BENNETT, whose researches have been so a , infers that the filaments, cells and fluid, wh together compose scirrho-cancerous structu , originate in a coagulated exudation, which s poured out in the same manner as other form f exudation — namely, by enlargement of the ca - laries, their repletion with blood, and the tr - udation through their coats of the transpar liquor sanguinis, which, coagulating outside vessel, forms an exudation more or less so . The exudation when first perceptible consists finely molecular and granular matter, in wh the cancer-cell arises as in a blastema, in manner already described (§ 14.). This v accords with that which I have stated in article CANCER (§ 26.); and shows that change in the blastema, or exuded fluid, depe upon the state of constitutional and local v endowment.

76. The exudation constituting the blastema cancer is generally infiltrated between the f ments of areolar tissue. The nature of the tis influences the formation of adventitious growt

the areolar tissue, probably from its lower endowment, seems to favour the production irrho-cancer. While part of the exudation in tissue passes into cells, another portion be- es fibrous, as observed to occur in a simple lation during the healing of an ulcer or wound. hat is known of this stage of the production hat filaments and fibres are formed, which are laced among the granules and cells of the ema, to constitute the stroma of the growth, orm and density of which is dependent upon rrangement and amount. "At first the can- us exudation is fluid; and some of the albu- ous principle held in solution, by coagulating, vs a certain quantity of serum to be set at ty. In most instances this is in a great mea- absorbed; but in a few, owing perhaps to peculiarity in its formation or amount, it is ned in the meshes of either the pre-existing or areolar tissue." Such Dr. Bennett considers e the origin of colloid cancer. The colloid er so collected becomes in turn a blastema the formation of cancer-cells, as above de- ed (§ 14.).

7. It is obvious that the exudation productive of scirrho-cancer must differ, either pri- ly or consecutively, or both, from the ation of inflammation, or of scrofulous or rcular cachexy. In what the difference con- we are ignorant. In this the histologists not enlightened us. Most probably the erous exudation is primarily different from , owing to the state of vital endowment of the e affected, and that the difference increases the retention of the exudation in the tis- which it infiltrates. The characters imputed e blood by Rokitanski, Engel, Heller, others, assigning a specific dyscrasia of the d, or an excess of albumen or of fibrin in lood, are vague, uncertain, and unsatisfac- Dr. Bennett believes that the cancerous liarity depends not upon the vascular system, h is the mere apparatus for the production of xudation; not upon the nervous system; and upon the texture, which is merely the seat of xudation, as that varies: but in the inherent position or constitution of the exudation itself. in this belief, this pathologist is not suffi- ly precise; for if he means by the nervous m the spinal nerves, then it may be admitted these can have little or no influence in deter- ng the nature of the adventitious growth pro- d from a fluid blastema. It is, however, by means so certain that the soft or ganglial es, which supply the vascular system, and h preside over nutrition and secretion, are so ncerned in determining the nature and growth e morbid formation as here stated. We know all the forms of scirrho-cancer appear in cir- stances and from causes which depress organic ous energy, and impair the activity of the eting or depurating functions; and which, eover, diminish vital resistance, and favour development of adventitious cell-formations of parasitic productions. As these cell- ations become more perfect, and acquire the er of self-development, so as to spread and de adjoining tissues, they soon burst forth, rate, contaminate the circulation, and form erant fungoid excrescences, filling up or extending beyond the textures which they destroy; and they thus impoverish and infect the fluids, and exhaust organic nervous or vital power. (See arts. Cancer, §§ 11. *et seq.*, and Disease, §§ 151. *et seq.*)

78. *B.* The *growth* of scirrho-cancer is merely the extension of the fibrous tissue, cancer-cells, and nuclei above described (§§ 41. *et seq.*). The old cell-walls dissolve or break down, and the included new cells and nuclei are liberated, and give rise to others in turn. For this purpose, however, a certain amount of blastema is requisite. "This is obtained at first from the original exudation poured out; but, after a time, as the fibrous tissue increases, new vessels are formed in it, which continue to furnish materials for the new growth, in the same manner as the old vessels furnish materials of growth to the old tissues." A pre-existing tissue exerts much power over new formations in its substance or immediate vicinity; and hence, when a bone is fractured, the matter exuded is transformed into bone; and other tissues are restored when divided by a texture analogous to the one injured. "Very compound tissues, as the skin, lungs, muscle, &c., are never completely restored, but a cicatrix is formed, composed of fibrous tissue. On the other hand, epithelial and epidermic structures are easily restored and reformed, and so are all textures which wholly consist of cells. Hence the more a cancerous growth abounds in cells, the more rapidly it grows, and the greater is its power of re-development." Some pathologists suppose that this power depends upon pre-existing and permanent nuclei, or germinal centres. But as to the truth of this, Dr. Bennett does not inquire, considering it sufficient to know — what, however, was sufficiently known before histology came into vogue — "that a tissue once formed and furnished with blood-vessels possesses the property of growth; that is, of exerting a species of selective vital attraction on the blood, whereby such matters are transuded through the capillaries as are readily transformed into a substance like itself." But this act of growth, which I believe to be correctly attributed to vitality, the sect of chemical pathologists would consider as altogether chemical; whilst another sect would consider it as simply one of endosmosis. Of the more prominent features of the growth of cancer, and of the extension of the malady and contamination of the circulation, I have nothing to add to what has already been stated in the articles Cancer and Fungoid Disease.

79. *C. Is cancer contagious?* This question has been answered in the negative by some, and in the affirmative by others. Inoculation has even been resorted to in order to test the fact.—(*a.*) The *negative* evidence is chiefly the following. Dr. Walshe says that he has known women afflicted with advanced cancer of the uterus take refuge in hospitals from the importunities of their husbands, and that these men were perfectly free, according to the assurance of their wives, from ulceration of any kind. Dr. Bennett states that his hands, more than once, have been immersed in the creamy fluid of encephaloma, whilst recent scratches have been upon them, without the slightest irritation having resulted. Vogel states that he injected fresh cancer-cells from a tumour into the blood-vessels of a dog, without any morbid change being manifest eight months after-

wards. **Gluge** has also been unsuccessful in his attempts to inoculate the disease.

80. (*b.*) The *affirmative* evidence is chiefly the following. **Langenbech** injected the fluid from a cancerous tumour, while still warm, into the blood-vessels of a dog, with the effect of inducing secondary cancerous formations in the lungs of the animal. Dr. **Watson** states that he has known two cases of cancer of the penis in men, whose wives were afflicted with cancer of the uterus. Some years ago, a patient was attended by Mr. **Mayo** and myself who was the subject of carcinoma of the penis and inguinal glands, and who soon afterwards died of the disease. The malady had commenced in the glans penis, and he had infected his wife, who was found on examination with open cancer of the os uteri; and she died of the disease a considerable time after her husband. In this case there was no doubt of the husband having infected the wife, owing to the morbid matter from the ulcerated glans penis having been left in undisturbed contact with the os uteri. Mr. **Mayo** informed me that he had met with another case altogether similar to this. Dr. **Bennett** asks if the cases, to which Dr. **Watson** has alluded, were proved to have been cancer by a microscopic examination? But he has already shown that such examination adds but little to the diagnosis of cancer; and it is well known that the majority of cases of open cancer, as these were, are so obvious, as not to be mistaken even by the most inexperienced. Dr. **Bennett** concludes, that it is certainly opposed to experience that cancer can be communicated by contact or inoculation. I believe, however, that it can be so communicated, if circumstances favour the communication, more especially if the recent discharge from a cancerous ulcer is brought into, and remains for some time in undisturbed contact with a mucous surface, or part denuded of its cuticle.

81. *D. Degeneration of cancerous and cancroid growths.* — Dr. **Bennett** remarks, that it is with the life of a cell as with that of the most highly organised individual: " it has its origin and birth, it gradually increases until it reaches maturity, then declines or degenerates until it has ceased to exist. The individual elements of a cancerous growth, like those of the healthy tissues of the body, are continually undergoing this process; like them, it leaves germs which continue to regulate its growth so long as they receive nourishment, and thus the structure, as a whole, is perpetuated. Sometimes this process receives a check from the cells, which are the entire agents of growth, being rendered abortive, and the result may be — 1st. A fibrous cicatrix; — 2d. A fatty mass; — or 3d. A calcareous concretion." — (*Op. cit.* p. 210.)

82. (*a.*) It has been stated above (§ 78.) that the cell-wall of the cancer-cell dissolves and breaks down, and thus liberates the young cells. This is the natural completion of individual cell-life. It has been shown that the increase of cells is dependent upon a due supply of blastema, in order to supply the materials of assimilation. Several cases are known, and one has come under my own especial and prolonged observation, when a cancerous ulcer has undergone the same changes as a simple ulcer; the cancer-cells in the one, and the pus-cells in the other, becoming gradually less in number, the *fibrous element* has increased and termina the formation of a cicatrix. Dr. **Walshe** h duced several instances of this transforma and Dr. **Bennett** thinks that this is a mor quent occurrence than is generally supp The only question is whether the pre-ex morbid growth was actually cancerous or but the local appearances and sensations, ar constitutional symptoms, have certainly been in rare cases, as warranted the inference th growth was actually malignant. This states, that Dr. **Bochdalek** of Prague ha with instances of cancer of the liver, in whic diseased structure broke down into a crear matter, the fluid parts being absorbed, an whole shrinking together, forming a puckeri the surface often corresponding to a fibrous or a fatty material, in which collapsed cance may be detected.

83. (*b.*) It has been stated above (§ that the cancer-cell may be rendered ab by the deposition of fat-granules betwee nucleus and cell-wall, and by their pressure the former, and the ultimate disintegration whole body into numerous fatty molecule granules. "This is a very common termi of the life of individual cancer-cells; and, the process is carried on to any great exten fat granules often collect in masses, and n with old cells, which exhibit various sta their retrograde progress, and old nuclei, have more or less resisted disintegration, length observable to the naked eye. In manner the yellow masses, and yellow retic appearance in certain cancerous growths of standing are produced — an occurrence so mon that **Müller** described it as a part form of the disease, under the name of *c reticulare.*" — (p. 212.)

84. Professor **Bennett**, H. **Meckel**, **Virchow**, agree in describing the reticulu **Müller** as disintegrated cancer; or as com of broken-down cancer-cells, the nuclei of w sometimes remain; at other times the whol undergone the fatty transformation, and been verted into compound granular cells; anc infrequently, in the last stage of the pr nothing but molecules and granules can be covered. Dr. **Bennett** considers that this ch is not a proof of so-called secondary inflamm of the growth, as is supposed by **Walshe**, R **tanski**, and **Lebert**; but that it is the transformation that occurs in all old exuda and in various organs where pre-existing undergo the fatty transformation, as in the to constitute fatty liver, the kidney to **Bright's** disease, &c. The matter forming reticulum occurs in *two forms.* In one, it is in the fresh-cut surface, scattered throughou growth, in the form of a net-work, more t however, and abundant in some places tha others. In the second form it forms masses, bright yellow or orange colour, occasionall sembling tubercle, more or less friable, ar cheesy consistence. In the former comp granular corpuscles are most common; in latter, irregular bodies, resembling tubercle puscles, resulting from alteration in the for the nucleus, after the cell-wall has been br down. These are called bodies of the retic

RUCH. Compound granular cells are very ion in cancer, and are to be considered as nces of degeneration of the cancer-cell. The r their number and agglomeration, the greater generation. The fatty degeneration is rarely m throughout a cancerous growth; com-, whilst one part is converted into a fatty rk, another is only partially so changed. accounts for cancer having such a tendency ead to other tissues, and for the destruction part being rarely attended by the reduction whole mass. Sometimes, however, the fatty eration is associated with the fibrous de-ation (§ 82.), and extends to the whole d structure; and it may then be further ated with an early stage of the calcareous rmation next to be mentioned. (BENNETT.)

(*c.*) A cancerous growth may degenerate accumulation of the *earthy matters* origin-ntained in the exuded matter. This form ncerous degeneration is analogous to that mes observed in tuberculous formations. ells break down, the more fluid and soft parts sorbed, and the mineral parts are left con- in the form of a calcareous mass or masses, ous sizes and shapes. This degeneration of is very rare. Dr. WALSHE appears not to met with it; although he mentions the bony æ, which are continuous with part of the n, and which characterise certain cancers ted with the osseous structure. Dr. BEN-has however observed it in two instances. e he observed mineral masses mingled with down cancer-cells in the mesenteric and tric glands, "some of which felt hard from eous depositions, others were infiltrated with y-like substance, and a few were composed external shell of hard calcareous matter; their interior consisted of a semifluid, gritty, nt material, which flowed out on breaking '

(*d.*) The *three kinds* of degeneration of can- growths may be variously associated in re-de cancer; these may be the fibro-fatty de-tion, with either element in excess, or one h these conjoined with the accumulation of l matters in smaller or greater masses. In cases there is generally a loss of substance, oning a sinking inwards, with puckerings of joining surface. These changes occur only ncerous growths of considerable duration, t ulceration or the formation of a cicatrix, served in the mamma when the nipple is ed, and in the surface of some cancerous rs. VIRCHOW ascribes the central depres- the white encephaloid masses of the liver cause. Dr. BENNETT views the stellate rings on the surface of cancerous growths as m uncommon; and certainly when this ap-nce exists there must necessarily be loss of nce and contraction of surrounding tissues; ese changes can only result from a partial eration of the morbid structure, more espe- of the older parts of it, although an extension to adjoining parts may actually be proceed- I may therefore conclude, with the writer nentioned, that cancer may undergo trans-tions, tending in very rare cases to a sponta- cure; and that these transformations are fatty or a calcareous matter, — that the d growth is checked, and that it consequently shrivels up, some of the softer parts being absorbed, the rest remaining inert. The contraction of the surrounding parts in these cases, and the fibrous stroma of the cancer, constitute the puckerings and cicatrices observed as evidences of a cure. Dr. BENNETT considers that the facts which he has adduced are unequivocal proofs that a cancerous growth may undergo spontaneous cure. In the case of a lady nearly related to, and almost constantly under the observation of the author, a cure certainly took place without any local treatment, the constitutional means about to be mentioned (§§ 122, 123.) having been assiduously employed.

87. ii. THE PATHOLOGICAL RELATIONS OF OTHER GROWTHS. — This subject has been noticed, as to most of what is known respecting it, when describing the anatomy of non-cancerous tumours, and in the article DISEASE (§ 110.). Fibrous, epithelial, cartilaginous, and fatty growths, or those formations which are not adventitious as respects the œconomy (see DISEASE, § 111. *et seq.*) may be ascribed to an error in nutrition, or to a hypertrophy or excessive deposition or nutrition of these several structures in the parts in which they occur. The cause of their origin and development is not known, although certain circumstances connected with their formation have been noticed. But, why either of these formations should occur in preference to the others we are ignorant. Certain of them may be caused by an injury of, followed by increased exudation into a part, the exuded fluid undergoing changes favouring some form of nutrition in preference to others; but the same kind of tumour may occur without any such or any manifest cause. Tumours may form in the ovaria, or even in the substance of the uterus, or rather within the ducts and uterus, owing to an imperfectly developed or an unimpregnated ovum, detached partially or altogether, and arrested in either of these situations, sexual excitement having been imperfectly gratified or insufficiently developed. Other morbid growths are to be ascribed to an original constitutional vice, as the scrofulous and tubercular; and some are more or less dependent upon a constitutional predisposition acquired at an antecedent period, as the sarcomatous, fatty, and some others described above.

88. *A. May morbid growths, not originally scirrhous or cancerous, be transformed into either of the forms of cancer?* — This question has been differently answered. As respects certain tumours or growths, as the tubercular and enchondromatous, no such transformations take place; but as regards some others the change is possible, although not demonstrated. Dr. BENNETT remarks that growths furnished with blood-vessels, such as the fibro-nuclear, epithelial, and fatty, may possibly be so changed, although it would be difficult to establish the change. But with respect to fibrous growths, the result of a simple exudation, or hypertrophy, at first of purely local origin, its occurrence seems to him to be absolutely proved. "According to LEBERT, inflammation (simple exudation), tubercle, and cancer, are separated by distinct characters, originate from separate blastemata from the first, and never pass into each other. In this opinion I think he proceeds too far; for why may not a cancerous exudation be formed into the filaments of a vascular, fibrous, or fatty tumour,

as well as among the filaments of the normal areolar tissue of the body? We are continually meeting with cases where a blow or injury on a part producing a swelling with the ordinary symptoms of inflammation is, after a time, followed by cancer. An indolent tumour may exist for years, and then suddenly assume the characters of cancer. Are we to suppose that such a tumour was composed of fibres and cancer-cells from the first, and that the growth of the latter had remained stationary all that time; or that nothing but a fibrous tumour existed at first, in which cancer-cells were afterwards formed? The latter appears the most reasonable proposition."* (p. 217.)

89. *B. The enlargement of growths* takes place from blood-vessels, which either permeate the mass, or supply only portions of it, or reach to a greater or less extent of its surface. "In the first the growth is said to enlarge by intussusception; in the third by pure imbibition; in the second by both means. These distinctions are less important than they on first view seem; the perfect nutrition of the extra-vascular natural tissues proves, as a general fact, the vigour and efficacy of the imbibition process; and, in truth, imbibition is at play in all nutritions; for the nutrient elements of vascular tissues must be imbibed through the coats of their vessels, and it may be in addition through a stratum of cells. Enlargement by intussusception differs therefore from that by imbibition, in degree rather than in kind. In whichever way conveyed to the seat of growth-formation, the nutrient material, at first fluid, is *evolved* and *appropriated* by continuous cell-generation. Now this cell-generation may be affected on an *endogenous* or an *exogenous* plan. When the plan is endogenous, the germs of young cells are evolved and contained within older ones; those secondary cells are endowed with a similar procreative faculty; the tertiary series are in like manner fecund, and so on. Here a single cell may be regarded as the *potential embryo of an entire growth.* When, on the other hand, the plan is exogenous, the germs of new cells are not found within, but lie, and are evolved outside old ones."

90. "Where endogenous evolution prevails, and a cell is, potentially considered, a tumour in futuro, the perpetual production of similar cells is easily intelligible; the offspring that follows is as the parent that went before. But, in exogenous growths the continuous germination of infinite series of like cells is not readily conceived. It may be surmised that, when a series of cells has sprung into being, this series acts on the evolution of succeeding ones, as a natural vascularized is known to do on the generation of epithelium cells; the formed series so influences newly-exuded blastema (of which it constantly excites the accession), that this shall produce a new series of cells similar to itself. But, however the perpetuation of like cells be understood, be it remembered that the thing itself has its limits; for deposits may appear in growths, pseudo-tissues are their frequent constituents, and a growth kind may establish itself a nidus within th of another generically dissimilar. Elder cel seem (within certain limits) to cause the in and regulate the qualities of younger Younger cells are, on the other hand, more active agents in effecting the destruction older ones; less so in endogenous growths, the elder may increase materially in size (contained brood multiplies), and acquire ened walls; more so in exogenous growths, such enlargement of cells is not witnesse where the production of young is coeval w disintegration of old ones."—(Dr. WALSH PRODUCTS, ADVENTITIOUS, *in Cyclop. of An Physiol.*, vol. iv. p. 120.)

91. *C. The reproduction of growths or tun* of importance as regards the diagnosis as the treatment. Dr. WALSHE, in his ver article just quoted, observes that "growths descriptions are liable, when removed sp ously or by art, to be *reproduced* in the sp previously occupied, if the removal have n absolutely complete. The particles left beh as attractive forces for new blastema con into cells, similar to those of which themsel composed. This mode of reproduction (erroneously called, for it is nothing more t largement, facilitated by removal of pres pre-existing substance) occurs with growth kinds, cancerous, sarcomatous, fibrous, fa chondromatous, erectile, &c. But it would that in some cases of surgical removal, w whole mass has, as is presumed, been extirp new growth vegetates in its place. The dif of the cases is often rather apparent than re have distinctly found the germina of ca tissue, reputed healthy, surrounding a ca mass; and it is manifest that such germina, invisible to the naked eye, may, quite as as a fragment of diseased tissue of even co able size, act as the efficient agents of n velopment. When, independently of thi of generation, the disease returns in the sea former growth, the occurrence must depen the continuance of that depraved state of th which is fitted to supply the necessary bl and likewise, possibly, upon some pecul of vessels of the part favouring its exudati rather than elsewhere." (p. 121.) That th and blood-vessels are thus more or less co in the re-development of morbid growths admitted; but something, if not more, sh imputed to the depraved influence of the nerves supplying these vessels and the fected. (See art. CANCER, § 26.)

92. In cases where the growth appears or more places remote from its primary se WALSHE remarks that the occurrence, w termed the "distant reproduction" of the is explicable in two ways. "The new covered growth may have existed previo the extirpation of the old one, and having acquired additional activity, so become o after that extirpation; or the new growt have really first appeared subsequently removal of the old one." The latter alte Dr. WALSHE believes to be rare. There is ever, reason to consider it to be more fr than he admits; and to be produced not me

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* I have, in the foregoing pages, been much indebted to the work of Professor BENNETT on "*Cancerous and Cancroid Growths;* but I have been unable to adduce more than a part only of his researches. His numerous and interesting cases, his careful microscopic examinations, and his graphic illustrations, should not merely be perused, but carefully studied, by every physician and surgeon, in connection with his lucid descriptions of each kind of morbid growths, as exhibited in the pages of his very original and able work.

which he states, although that way cer-
xists to a certain extent. Of this consecu-
duction of the morbid structure in distant
e considers the simple explanation to be
vitiated state of the blood, proper for the
f the necessary blastema, continues; and
blastema is poured out in some other part
ame, the original tumour no longer exist-
tract its deposition within or around itself.
is explanation may hold good, either alto-
r in part, I shall not here dispute; but
nic nervous influence, controlling, as it
e functions of assimilation, nutrition, de-
, and excretion, certainly has a primary,
o means a small, share throughout, in the
eproduction and extension of cancerous
r tumours.

. *The changes produced in tumours* during
lution may be viewed as departures from
ar processes of their formation. The most
t of these changes are their degeneration,
s been considered as regards cancer, and
val or conversion of some of the non-
spontaneously, or by the aid of internal
These, however, are only rare occur-
Much more frequently morbid growths
e the principal diseased actions to which
ral or healthy structures are liable, as
n, infiltrations of serum or of blood,
ge, inflammation, gangrene, depositions
s foreign to their nature; and, as con-
s of these, various discolorations and
n consistence.

The effects produced by tumours and other
roductions upon surrounding structures
important, the injuries produced by
many instances, being chiefly of this
hese effects are *mechanical* and *vital*.
).—(*a.*) The *mechanical effects* are prin-
essure, displacements, detrusion or ex-
ondensation, discoloration, infiltrations,
d circulation, occlusion of natural cavities
. When tumours form between mus-
noveable parts and the membrane cover-
parts, they generally are detruded from
l seats of formation, and, as they increase,
nt stalks or peduncles by which they are
to these seats, as most commonly shown
rs in the uterus, which, assuming this
n detrusion, and often subsequently from
beyond the cavity of the organ, have been
y called polypus.

) The *vital effects* of tumours on the sur-
tissues are softening or rarefaction,
hypertrophy, inflammation and its usual
adhesion, induration, ulceration, morti-
erforation; changes in the blood-vessels;
ages; alterations of the sensibility, from
to the most intense pain; and infiltration
rrounding textures with matter similar to
osing the morbid growth — an effect ob-
iefly in respect of cancerous tumours.
SHE considers this last effect to occur in
n with no other growth except cancer,
nstitute one of the most evident distinctions
ancerous and other allied formations.

. THE SEATS OR LOCALIZATIONS OF
AND MORBID FORMATIONS.—*A.* Certain
d organs are much more liable to be the
rowths than others, more especially the
tissue, and the female sexual organs.
Dr. WALSHE observes that, while cellular tissue is the favourite site of growths, fibrous textures but rarely afford them a nidus. The mammæ, the ovaries, and the uterus, are frequent sufferers; the lungs and brain are much more rarely affected. Certain parts of organs also are much more commonly attacked than other parts, as the pylorus and the epididymis, than the rest of the organs. Some organs, or parts of organs, are prone to be affected by certain growths in preference to others, as the mammæ, the stomach, the liver, &c. are most liable to be affected by cancerous productions; the bones to enchondroma; the neck of the uterus to cancer, in preference to the body of the organ, where fibrous tumours are chiefly developed; and the large intestines are very much more frequently the seat of cancer than the small.

97. *B. Sex* influences the site of growths. The female sexual organs are much more frequently their seats than the male organs; whilst the male urinary organs, especially the kidneys, are more frequently thus affected than the urinary organs of the female. *Age* has also considerable influence; certain epochs of life favouring the development of certain growths in preference to others. Some tumours often appear to be compatible, and others incompatible, with the co-existence of others. Dr. WALSHE remarks, that some growths, as cystoma and carcinoma, are sufficiently prone to appear in the same person; others, as fibroma and carcimona, are rare co-existences; none is actually incompatible, either as unconnected co-existences, or as developments in each other.

98. *C. The course* of tumours, or other morbid growths, topographically, is either *solitary*, *secondary*, or *multiplied*. — (*a.*) A tumour may remain solitary until the death of the person in whom it exists; no other organ or tissue than that in which it commenced being involved by similar disease. This occurs chiefly in respect of enchondroma, of cystoid tumours, and occasionally of fibrous growths.

(*b.*) *Secondary* growths arise by the spreading of the morbid structure from its original site to parts either *adjoining* or at a *distance*. — (1.) *Adjacent parts* are *secondarily* affected by infiltration or imbibition of the morbid matter from the site of preceding disease, a morbid mass thus gradually extending from the primary seat to circumjacent tissues, and co-ordinately enlarging. — (2.) Secondary growths in *distant parts* are produced by the transmission of the morbid matter by either the lymphatic or vascular systems. The matter, especially of cancerous and tuberculous growths, may sometimes be traced in the lymphatic vessels; and a lymphatic gland, in connection with a cancerous mass, not infrequently becomes cancerous also; and, although the morbid matter cannot always be detected in the communicating vessels, there can be slight reason to doubt this mode of transmission. These glands may, however, be secondarily attacked, independently of this transmission of the cancerous matter; but this can rarely be the case where the vessels proceed from the primary site to the secondarily affected glands, and, as transmission is demonstrated in some cases, it may occur in all. When parts far distant are secondarily affected, these parts manifesting no lymphatic connections, then it may be inferred that the secondary growth has either originated independently of the primary one, or been produced by the transmission of the morbid matter from it through the medium of the veins, in which cancerous as well as other morbid matters proceeding from the primary seats of disease have been detected. (See arts. Absorption, and Abscess, Secondary.)

99. (*c.*) *Multiplied growths* may exist primarily and independently of the transmission by the lymphatics or veins of morbid matters from preexisting growths. The disease in distant and unconnected parts results from the constitutional morbid condition which thus manifests itself in sundry situations. This circumstance is often observed in cancerous and tuberculous maladies, and in cases of fibrous growths; and of cancerous diseases, the encephaloid, or fungo-hæmatoid, the most frequently manifests a multiplied origin.

100. V. Diagnosis of Scirrhous and other Morbid Growths.—The most important point of this part of the subject, is the distinction between tumours or growths which are truly cancerous, and those which possess a different structure, although resembling the former. Histologists consider, that "the local symptoms, and the general signs observed in individual cases have been found insufficient; such as the lancinating pains, unequal surface, hardness, elastic feel, softening, ulceration, the surrounding tissue being affected, a general alteration of the constitution and return after excision" and have been, at various times, absent in cases undoubtedly cancerous, whilst they have existed in growths the nature of which is doubtful, and often been connected with epidermic, fibrous, fatty, or cystic tumours, of the most innocent nature. That this difficulty exists in rare cases,—that the symptoms and signs of cancer have been absent in truly cancerous diseases, and have existed in cases of an innocent nature, may be admitted to have occurred in rare instances; but these have not—at least rarely or never—furnished opportunities of examining the morbid growths microscopically until both diagnosis and treatment have been equally of no avail, or even until they have come under the knife of the anatomist. And even were opportunities of microscopic investigation afforded, it is manifest from what is above stated (§§ 5, 6.), and from what has been advanced by the ablest histologists, that the diagnosis is by no means easy, even by the aid of the microscope. But I shall allow Dr. Bennett to state the case in favour of this instrument.

101. "Symptoms alone, however, from their very nature, are apt to mislead, caused as they are by a variety of disorders which may affect an organ; whilst physical signs, once established and ascertained, are in conjunction with those of universal value. The only physical proof we can arrive at of the existence of cancer is by means of the microscope; not that this instrument is in itself capable, even in the most expert hands, of doing any thing; but, conjoined with a knowledge of symptoms, progress of the case, form and appearance of the morbid growth, it offers us an additional and most valuable means of prosecuting our inquiries. It is from an union of these circumstances, combined with a minute examination of the growth, under such magnifying powers as will clearly display its cells and other primary elements, that we ought to found a diagnosis, and not from one or the other separately."—(p. 222.) It is
evident, however, from the admissions of
and others, and even from what has been
Professor Bennett, that the microscopi
of morbid structures is only in its infan
there still remains much to be known
it; and that the connections subsisting
vital power, vascular action, and morbid
—connections of the utmost importanc
physician, in a therapeutical point of vi
cially—have been generally overlooke
there has been much difference in the in
furnished by those who have professed th
to be observers, gifted with the greatest
microscopic research.

102. *A. The diagnosis of cancer* by me
microscope, as already stated (§§ 100, 1
seldom be determined until the disease
vanced so far as to become quite manifes
this aid. Dr. Bennett remarks, that
we see, in a morbid growth, cells inclu
cells, there can be no doubt of its canc
ture; and that it is not by fixing attentic
one particular cell that we can discover
difference between it and a variety of o
when grouped together we observe in diff
a variety in size and shape, some conta
nucleus, others two or three, and rarely
the nucleus containing one or two nucle
a group of cells is distinguished,—
groups of epithelial cells;—2d. From fib
cells;—3d. From pus and plastic cell
From compound granular cells;—and
fat-cells. The difference of the cancer-
cartilage-cells is also easily ascertain
softening, but after softening, the di
more difficult; but even in this latter ca
tion of water and acetic acid on the cel
examination of different sections of th
will assist the diagnosis. In all cases,
ation and characters of the tumours, an
comitant circumstances and symptoms
taken into account. Open sores, the
med on the tongue, lips, or faces on th
and os uteri, furnish the best occasions
scopic diagnosis during the life of the
and even in these situations many diffic
often occur.

103. It is interesting to add what
Walshe has stated respecting this
matter. "A constant and unfailing mic
characteristic of cancer has hitherto b
sought for; the following propositions
as a commentary on, and, in some sort,
tion of, the statement.—(1.) Parent
taining within them sub-cells having dar
and these, in turn, bright nucleoli, ar
characteristic of cancer; but such cell
in, and may be altogether absent from,
encephaloid, in some phases of its growth
be without them.—(2.) The shapeless
cell seems significant of cancer; but
absent from encephaloid, and it is exces
in scirrhus and colloid.—(3.) A tumou
sent to the naked eye the characters of en
be the seat of interstitial hæmorrhage,
communicating lymphatic glands, run
spects the course of cancer, and neverth
tain no cells but such as are undistingui
the present state of our knowledge, fron
exudation cells.—(4.) Nay, more, while
'malignant' tumour alone contains th

phatic glands secondarily affected may compound nucleated cells, spherical and ly caudate. — (5.) The granular and im- nucleated cell of scirrhus is valueless dence of cancer. — (6.) The true fusiform adventitious formation when it occurs in nd has no diagnostic signification. — (7.) iation of fibre and cell-structure, which nguish scirrhus from fibrous tumour, may wanting in encephaloid; and it exists a and enchondroma. — (8.) If fat be as- in large quantity with fibre and cell- the certainty that cancer is present be- eat, but not absolute.

The property of infiltration, which serves listinguish cancer *from other growths* no- y, fails practically in the distinction of generally, because a true cancer *is not* infiltrated, and because tubercle and -matter may be infiltrated. In ultimate he *single* character least likely to deceive if a tumour be cancerous it will yield on an opaque, whitish (milky or creamy- albuminous fluid; if it be not cancerous, yield a fluid of these qualities."—(*Cycl.* *nd Physiol.* vol. iv. p. 137.)

. *Fibro-nucleated tumours*, or growths, ned by the presence of fibres amongst infiltrated naked nuclei, have hitherto founded with sarcomatous, encephalo- r osteo-medullary tumours. LEBERT con- s to be a peculiar form of fibro-plastic Dr. BENNETT has observed but three or nces of this tumour, and has viewed them ing marked peculiarities in structure, presenting most of the appearances of wths with which this has been con-

Epithelial growths generally commence ration or wart upon the skin or mucous nd are harder in the former than on the ccasionally they appear as cauliform es or condylomata, made up of elon- illæ aggregated together, with their ore or less flattened. In this condition nosis is easy. Sometimes they soften sooner or later after their formation, and vered with crusts of inspissated pus and . "This crust on separation leaves an surface, presenting irregular clefts be- hypertrophied papillæ, the edge being d the base and margins greatly indurated. may slowly spread over a considerable the surface, and cause great swelling of atic glands from the irritation produced. dition such ulcers are usually considered cerous." But the progress of an ulcer ng externally in warty excrescences, laterally, slowly, and proceeding from wards, is distinctly opposed to the pro- ue cancer, which almost invariably is l at its commencement, produces ulce- ecutively by thinning of the integument, s out subsequently and rapidly fungoid The progress of the case, the absence of ls, the microscopic appearance of the papillæ, will establish the nature of the

7. *Fibrous formations* cannot, at an early listinguished from scirrhous. Dr. BEN- ders, that at their commencement they are both identical, and remarks that experience is daily showing the truth of this statement; and that the distinctions between them insisted upon in surgical works are illusory. When a hard knot or induration follows a blow or injury, it may result from a simple exudation; but it may nevertheless become cancerous; although this conversion is much less likely to take place in a young than in a cachectic or aged person. When more advanced, fibrous tumours are distinguished, by partial elasticity, smoothness, and regularity of surface, from the irregular nodosities and stony hardness of scirrhus, and the pulpy feel of encephaloma. But these symptoms are sometimes deceptive. So that at an advanced, as well as at an early stage, the diagnosis may be occasionally impossible. Dr. BENNETT advises a cautious use of the exploring needle and microscopic examination. When the latter can be obtained, the presence or absence of cancer-cells will decide the question. But the former, however cautiously employed, will often aggravate the local mischief, and prove of questionable utility as respects the results.

108. *E. Cartilaginous growths*, when occurring in the extremities connected with the bones, and surrounded by an osseous capsule, may readily be distinguished from cancer; but when they are deep-seated, covered by soft parts, and have no distinct bony capsule, their detection is very difficult. Enchondroma may thus be readily confounded with cancer of the bones, of which disease it presents all the general symptoms and signs; and, as already stated (§§ 66, 67.), if it be softened it is not easily separated from cancer by the aid of the microscope, even after excision. In doubtful cases, during life, a microscopic examination can be obtained only by means of the exploring needle, and even then it may be unsatisfactory. The progress of the growth is more distinctive, cancer of the bones being generally more rapid in its progress than enchondroma.

109. *F. Fatty tumours.* — "Simple lipoma and most encysted fatty tumours are readily distinguished from cancer, the first by their lobulated, and the second by their rounded form, together with their doughy feel and non-attachment to surrounding parts." A fatty growth may, however, assume all the symptoms and signs of encephaloma. SEDILLOT excised a fatty tumour from a man aged forty-seven. The growth returned twice after removal, and was excised the third time. It was considered to be encephaloid, from the local and constitutional symptoms and its return; and yet, on a microscopic examination, it was shown to consist only of adipose and filamentous tissue; and a chemical analysis proved it be almost entirely composed of fat.

110. *G. Tubercular growths* can rarely be confounded with cancer. They simulate it only when the glands are enlarged in youth, and at an age when cancer scarcely ever attacks the frame, unless in the form of encephaloma, or fungohæmatoid cancer. "Undoubtedly many of the so-called cases of cancer in the young are softened tubercle. The nature of the growth may be suspected from its cheesy consistence and absence of cancerous juice; while the differences between tubercle and cancer corpuscles under the microscope are so great as to be unmistakeable. The only danger is confounding tubercle with the reticulum of cancer, which it closely resembles, and

is a mistake that a critical examination of all the concomitant circumstances will alone enable us to avoid." — (BENNETT, *Op. Cit.* p. 229.)

111. VI. PROGNOSIS OF SCIRRHOUS AND OTHER GROWTHS. — i. *Of scirrhous or cancerous formations.* — Little may be added at this place to what I have stated when treating of CANCER (§ 11. *et seq.*), and FUNGOID DISEASE (§ 17.). — *A.* MÜLLER considers that *growths which are truly cancerous* when extirpated invariably return, and are inevitably fatal. Dr. WALSHE observes, that " cancer is not, as a matter of absolute necessity, a fatal disease; but the number of recoveries is relatively so small that, practically speaking, they are almost without numerical value, and may be excluded from consideration." Professor BENNETT states, that he can no more agree with the modified statement of Dr. WALSHE than with the unqualified one of MÜLLER; and remarks, that the established recoveries may be small in number, but their numerical value is altogether unknown in the present state of science. He believes, that a cancerous growth is for some time purely local; that indolent tumours exist in a female breast or elsewhere for years, without making progress, or causing much inconvenience, and after a certain time they often suddenly increase, and evince signs of malignancy; that a fibrous vascular tumour may exist, in the filamentous meshes of which a cancerous exudation may be afterwards infiltrated; and that in this indolent state, a tumour may often be discussed by suitable means, and, if excised, be permanently eradicated. These propositions may be conceded to Dr. BENNETT; they have been long received as practical doctrines, and long acted upon by both physicians and surgeons. Even when a growth has become undoubtedly cancerous, complete excision of it has been said to have been successful in a few instances; but still the actually cancerous nature of the tumour has not been satisfactorily established, for the histologists argue that it has not been determined by a sufficient microscopic examination. But even they admit, as stated above (§§ 100, 101.), that a microscopic investigation is not sufficient always to determine the fact; so that the imperfections, which they impute to the infancy of the science, may be admitted to belong to the nature of the subject — to the varying, ever changing, and constitutional relations of these growths — to the alterations which take in them under the influence of changes in the state of vital endowment and of vascular action, both of the growths themselves, and of the body in which they occur as parasitic or other productions. t is in vain to look for precise marks of demarcation, either in the diagnosis or in the prognosis, where none exists, and where every phase, grade, and form of morbid growth is observed, although in different cases; each of which phases and forms are continually undergoing further changes, and assuming varying local and constitutional relations. The histologists, after all they have observed and written, leave the subject of prognosis, as well as that of diagnosis, pretty much in the state in which they found it; for one of the latest and best writers in this department has remarked, that " in the present state of our knowledge, there is no possibility of pronouncing accurately whether an operation will be successful or not." (p. 233.)

112. ii. *The prognosis of morbid growths which are not cancerous* depends chiefly upon their situation and nature, and has reference to bability of removing them by medical t or by surgical means. The growth may a situation which precludes an operati which an operation or simpler mechanic would be extremely dangerous, and wh course to medicine in order to arrest its or to remove it altogether should be tried confided in, although the chances of suc it may appear small. Adipose or fatty tubercular growths, and glandular enla admit of a more favourable prognosis th and furnish the greatest number of chanc removal by medical treatment. Dr. BE marks, with reference to operations for th of tumours, that " it is now well under not only cancerous, but the most innocen may return after excision. It is gene posed, however, that in all such cases t growth originates in some germ which left in the part. Hence it is of great i to separate a recurrence in the seat of t tumour, from that occurring in other p textures. The former is not necessar dreaded. Numerous instances are on fatty, fibrous, and encysted growths retur and again, and finally extirpated with Epithelial growths also occasionally re enchondroma, according to MÜLLER It should, however, be recollected tl truly cancerous growths generally retur the same situation or elsewhere, non-tumours seldom return, even in the same unless a portion be left behind, and w return, they appear not often in ot Warty and encysted growths, may oc veral places; several fibrous tumours in the body of the uterus; and neur affect several nerves. Although cance time, extends itself to the lymphatic the neighbourhood, the affection of the is not to be received as a proof either o cerous nature of the primary growth, fatal tendency of the malady; for a nc ous growth may cause, but much m enlargement of these glands, owing to t of local irritation produced by it. Wl ever, this affection of the glands occur cates, even in non-scirrhous tumours more serious malady, than when no s dular affection is observed.

113. VII. TREATMENT OF SCIRRH OTHER TUMOURS. — i. *The Treatment of Growths* I have considered fully in the CANCER (§ 27. *et seq.*); but there are a which have been agitated since that w which require a brief notice at this pla means which Dr. BENNETT advises for *tardation and resolution* " of cancer are *ness*, *pressure* and *locality*; and these as the principal known measures by can hope to retard the production and cancer-cells. He remarks that " a growth is a vascular structure, which nucleated cells infiltrated among a fibro and that its power of growth, extensio development is dependent upon the amou it contains. It follows, that to retard t of the cancer-cell when once formed, is the advance of cancer itself, and that it unproductive is to arrest its progres

appears plausible at first sight; and the s proposed are to a certain extent appro- to the pathological doctrine entertained. it is questionable how far the doctrine is l, and to what extent the means are bene- As to the former, if it be conceded, that ormation of cancer-cells are the results of a grade of vitality in the part — that cancer- like hydatidic formations, are parasitic pro- ons, proceeding from low grades of vital r and of vascular action, and, like all such ictions, consequences of these states, the nent here advised has reference merely to norbid results, and has comparatively but regard to the antecedent vital conditions, of the cancer-cells can be viewed only as the icts. In this instance, as in many others, stologists would induce us to grapple with orbid product, to the total disregard of the condition producing that product — to the neglect of those states of vital power and lar action, upon which all morbid growths d, whether parasitic, hydatidic, cell-forma- or simple exudations.

4. Viewing, therefore, cancerous produc- or growths as depending upon the causes, itutional and local, which I have set forth in rticle Cancer (§ 26.), — entertaining the ne there stated, and knowing that it is sup- d by the ablest and most experienced writers bservers, as well as confirmed by my own ience, I firmly adhere to this doctrine, and e *intentions of cure* set forth conformably it in that article (§ 40. *et seq.*), believing hey are the best calculated to enable the tution to resist the inroads of the malady, long life, and to give the patient a chance owing off, or resolving the local evil. The ires which have more recently been advised l not, however, be passed over without no- although but little evidence of benefit from has hitherto been obtained. Dr. Bennett ves, that "all eggs and young animals re- warmth to favour their growth, and ma- is reached earlier in the tropics than in rate regions. In the same manner, exces- old, dryness, want of room, and unfavour- position, are circumstances hostile to cell- opment. But it requires no lengthy argu- to prove the great influence of these agents al growth." Without disregarding this view subject, I would still insist upon the im- ice of the principle for which I have con- l, both in the article Cancer (§ 26.), and t in Hydatids (§ 24.), that these and all parasitic formations encrease and multiply portion as the parent animal becomes weak- and as the secretions and excretions accu- e, and that those formations are most dis- to diminish and ultimately to disappear, he full restoration of the vital power, and the healthy nutrition of the animal which iced them.

5. *A. Cold.* — Dr. Bennett remarks re- ng this agent, that "in a cancerous growth, tendency of which is to excessive cell- tion, we evidently retard its advance by the application of cold. Were it pos- indeed, to bring down the temperature of tire growth below the vegetating point we inevitably kill it; but, supplied as it is with heat through the warm blood within, this is impracticable. Still the external application of cold is one of the most powerful means we possess of retarding the progress of a cancerous or any other kind of growth." The beneficial agency of cold has, however, to be proved. If it be employed so as to promote and develop organic nervous energy and vital power, there can be no doubt of its proving more or less useful.

116. *B. Dryness.* — It has been supposed that, as the development of cell-formations depends upon a blastema or nourishing fluid, it follows, that, if this were cut off, the growth would die. In order to accomplish this intention, it would be necessary to tie the principal vessels nourishing the growth. This has been done by Magendie, Jobert, and Hossack, with partial success in some instances and with complete success in others: but it is doubtful whether or no the disease was cancerous in all the cases. Dr. Hossack applied a ligature on the carotid artery in two cases of scirrhus of the parotid gland. In one case the growth of the tumour was arrested, and the suffering of the patient relieved: in the other a complete cure was produced. Lotions and humid applications should be avoided, and those which produce a drying or absorbent, with an astringent, action ought to be preferred.

117. *C. Pressure* was first advised by Young, and has since been adopted for the cure of Cancer (see § 37.) by several writers. Pressure acts, 1st, by diminishing the supply of fluids to the morbid growth; 2dly, by preventing the expansion and development of the cancer-cells; and, 3dly, by promoting the disintegration and absorption of the morbid growth. Dr. Bennett remarks, that "pressure applied externally to so-called cancerous tumours has been pretty extensively tried, and been found successful, sometimes in retarding, and at others in altogether removing them." Travers has seen cases of this kind; and Recamier gives the following results of the practice tried in 100 cases. He says, of these, "sixteen appeared to be incurable, and underwent only a palliative treatment. Thirty were completely cured by compression alone, and twenty-one derived considerable benefit from it: fifteen were radically cured by extirpation alone, or chiefly by extirpation and pressure combined; and six by compression and cauterisation. In the thirteen remaining cases the disease resisted all the means employed." Dr. Walshe states that Dr. A. R. J. Bayle, out of 127 recorded cases, gives 71 cured, 26 improved, and 30 unaffected. These results are certainly much more favourable than could have been obtained from the treatment of the several kinds of scirrho-cancer; and I would therefore infer, either that the favourable results have been prematurely reported, or that cases actually not cancerous have been confounded with the cancerous.

118. Dr. Neil Arnott has greatly facilitated the employment of pressure by the invention of an instrument for this purpose; and which has been described by Dr. Walshe. It consists of a spring, an air-cushion, supported by a flat resisting frame or shield, a pad and two belts. It does not interfere with the movements of the thorax, and the amount of pressure can be nicely regulated and equably applied; causing great relief from pain, and restraining hemorrhage in ulcerated cases. It has proved useful in cases in which

I have seen it resorted to. Dr. Bennett remarks, that, if pressure alone be capable of producing such good results, its conjunction with one or more of the other means capable of retarding growth may be attended by even greater utility; and thus the apparatus invented by Dr. J. Arnott, by means of which pressure may be combined with external cold and dryness, is directly indicated, and deserves to be tried; or his apparatus, applied when the patient is at rest, may be alternated with that of Dr. Neil Arnott when exercise is desirable. I believe, however, that pressure will be found most efficacious when conjoined with those measures which are the best calculated to improve the general health, and to enable the vital power to throw off the parasitic formation. (See art. Cancer, § 40. *et seq.*)

119. *D. Locality* has been shown, in the article Cancer, to have considerable influence in favouring the development of this malady. Cold, humid and malarious situations, unwholesome food, insufficient nourishment, and mental anxieties and depression, are amongst the most influential causes of scirrho-cancer. Therefore a choice of locality, and with reference to season, prevailing winds, and exposure, should be made with due care; a dry, moderately warm and bracing situation and air being selected. A clay soil, or a low alluvial, wet, and swampy soil should be avoided, even to a considerable distance; and food, exercise, and the regimen of both the body and mind should be such as are most calculated to give due tone to the former, to refresh and agreeably engage the latter; interesting occupations being calculated to promote both intentions, whilst the want of occupation leaves the patient a prey to ennui and to his own depressing anticipations, or his still more lowering fears.

120. *E. Excision.* — The propriety of excising tumours, from a belief in their cancerous nature, or dread of their assuming this nature, or as the best mode of removing them, has been much discussed by both physicians and surgeons, especially in recent times. It may have been supposed that the discoveries of the histologists would have gone far to determine the question of excision, in as far as the nature of the growth may be concerned. But they have left the matter pretty much in the same state as that in which they found it. Professor Bennett, after alluding to the discussion on this subject, and the differences of opinion expressed by the most eminent surgeons of Paris, remarks that "a knowledge of the structure and natural progress of cancerous and cancroid growths must in future exempt surgeons from the doubt and difficulty they formerly experienced. At the same time it cannot be denied that considerable obscurity still hangs over our knowledge of the pathology of cancer, and that there are no means of diagnosing a cancerous from fibrous and other forms of cancroid growth at their commencement. It seems to me certain that a cancerous may supervene upon a cancroid growth, and that both for a time may be local, so that, under all circumstances, where the nature of the tumour is doubtful, after means of retardation and resolution have had a fair trial, excision should be at once had recourse to. As there is no possibility at an early period of knowing whether the growth may or may not ultimately become cancerous, prudence demands that *as soon as it becomes evident that these means have failed to arrest its* o-*gress*, an operation should be performed. If e y excision were more practised, many of the lar t-able cases which occur would never appear." (o. *Cit.* p. 242.) This is sound advice; and e same eminent physician further remarks: " e practical rule, then, which pathology and e e-rience unite in causing us to adopt, seems t e this, *that so long as cancer remains fixed in a rt which is capable of being removed, and the stre th of the patient is not too much reduced, so long e surgeon warranted to interfere.* If this appli to cancerous, it does with tenfold force to can id growths, which, every thing that we know, r-rants us in asserting, are much less fatal and a-lignant." (*Op. Cit.*, p. 245.)

121. *F. Chemical applications, &c.*—The des c-tion of morbid growths by various cauterisi or dissolving applications, can scarcely be ac n-plished unless at very early periods of their o-duction; and, as regards cancerous format s, these applications would increase rather n arrest the disease. Dr. Bennett remarks, at "Acetic acid dissolves the cell-wall more or s, and strong potash reduces the whole to a g u-lar mass. The continued application of se agents, therefore, would tend to dissolve if br ht in direct contact with the cells, and need no e-cessarily excite such irritation as to cause sh exudation. The only objection is, the utter n-possibility of affecting the whole mass, ev in cases of ulceration, and preventing the form n of deep-seated cells, while the superficial one re destroyed. In certain cancroid growths s-pecially epithelial ones, the application of a ic acid is an established remedy, and should al ys be tried when it is thought possible to brin he fluid successively in contact with the entire ss of the disease." (p. 250.) The external a li-cation of the chloride of zinc has been adv d, and of iodine, and of several of its prepara s. Probably the application of an iodide of zinc y deserve a trial.

122. *G. Internal Remedies.* — Before excis is attempted, and often contemporaneously w a judicious recourse to external means, sever n-ternal remedies, either singly or variously n-joined, may be tried, more especially those v ch tend to promote the digestive, assimilative, nd depurative functions, and to develop the pc rs of life. As respects cancerous growths, this n-ciple of treatment has been fully insisted on ee arts. Cancer, § 40. and Fungoid Disea § 21.), it therefore only remains briefly to notic e importance of adopting it in our attempts t e-move other morbid growths, especially before e constitution is subjected to the shock of an o a-tion; and in cases where the situation of a tu ur or other circumstances may render the succe of an operation either extremely improbable o n-possible. In three cases of large tumours,— e seated superficially, evidently a fatty tumour d about the size of a person's head, the o rs seated very deeply amongst the muscles o e upper half of the thigh, — and in one case c u-mour, apparently attached to the pericraniu a course of internal medicines entirely remove e disease. I had advised a recourse to surgica d, but the patients having been desirous of t g medical treatment before any surgical means re adopted, a course of the medicines about e

m tioned was prescribed, very nearly the same su tances having been employed for the four ca s. Those cases occurred some years ago; bu the persons who were the subjects of them ha not, up to recent periods, experienced a return of hese growths. The medicines which were pr cribed consisted chiefly of the Iodide of pota um, conjoined with solution of potash, the de ction or compound tincture of cinchona, the in nal use of tar-water, and the fluid extract or other preparations of sarsaparilla, with due at tion to diet and to exercise in the open air. W en treating of CANCER (§§ 34—41.), the pr riety of prescribing the preparations of *iron* w insisted upon, especially in such combinations as e peculiarities of the case would suggest; and th *odide of iron* was then for the first time reco mended in the treatment of cancerous diseases. T medicine has frequently been given by me in th maladies with sarsaparilla, or dissolved in th syrup of sarza with more or less benefit; and th *nitro-hydrochloric acids* have been sometimes p cribed with vegetable tonics, or bitter infusi s. Considerable advantage has been derived, in veral cases, from the use of inspissated *ox-gall*, as commended in the first part of this work, and p cribed in numerous and varied formulæ in the A ENDIX which accompanied that part, more es cially in correcting and promoting the functi s of the digestive canal. *Conium*, and other n otics, formerly much praised for cancerous m adies, have rarely proved of advantage beyond th temporary relief to pain, or to other urgent sy ptoms they have sometimes afforded.

23. *H. Diet and Regimen.*—These require to b adapted to the temperament, diathesis, habit o ody, and other circumstances of the patient, as ell as to the presumed nature of the tumour. W en treating of CANCER (§ 44.) I mentioned th advantages generally derived from attention to th secretions and excretions, and from promotion o he primary and secondary assimilating proce es. There can be no doubt of the good effects o oderate exercise in the open air, of a residence in mild dry atmosphere, and of pleasant occupati s, with a cheerful state of mind. But the n ure of the food admits of much more discussion. I the cancerous or scirrhous forms of morbid g wth, the adoption of a farinaceous and vegetab diet has been advised by Dr. LAMBE and a few o ers. I have seen this diet most beneficial in a c which was considered cancerous disease of th os and cervix uteri; but the patient enjoyed at th same time the advantages of removal to a good a and her sanguine temperament and full habit o body favoured the change of diet. When, h ever, the patient is of the melancholic, lymp tic, or nervous temperature, or if anæmia or a c hectic habit of body be manifest, I believe that a dicious combination of animal with vegetable f l, and the promotion of the assimilating and e reting functions, are most beneficial. In all c es of a malignant or contaminating nature, and in ll cases which are likely to assume this nature, t chief indication of treatment is to enable the v l energy, by the aid of diet, air, and exercise, t resist the extension of the local evil, and to f our its transformation or resolution.

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on the Microscopic Appearances of Morbid Growt
(See also Bibliog. and Refer. to art. Cancer.)

SCROFULA AND TUBERCLES.— Syn
—*Struma*, Celsus, Pliny, Linnæus, Good;
Scrophula (from Scropha or Scrofa, a pig
sow), Sauvages, Vogel, Sagar, Cullen, M
bride, Darwin, Young; — χοιρὰς, Hip
crates; — *Scrophulæ*, Pinel; — *Scrophulo*
Scrophulosus Morbus, *Vitium Scrophulos*
Dunglison, — *Cachexia Scrofulosa*, *Aden*
Scrofulosa; — *Glandes*, *Strumes*, *Ecrouel*
(*Cruels*, Scotticè) Fr. — *Kropf*, *Skroph*
Skrofelkrankheit, Germ. — *Scrofula*, *Scrof*
Ital. — *Scrofula*, *the King's Evil*, *the Evil.*
External Scrofula or Struma.

TUBERCLES. — *Tuberculum*, (from tuber
tumour); *Tuberculosis*, *Morbus tuberculo*
Strumosis, — *Cachexia tuberculosa*, *Dyscr*
tuberculosa, — *Diathesis seu Constitutio St*
mosa; *Tubercular or tuberculous Cache*
Diathesis, or Vice, &c. — *Internal Scrofula*
Struma.

Classif.—3d *Class*, Cachectic Diseases
3d *Order*, Impetiginous Affections (*Culle*
— 3d *Class*, Diseases of the Sanguine
function:—4th *Order*, Cachexies, (*Goo*
— Class IV. Order I. (*Author in P*
face.)

1. Definit. — *Constitutional asthenia; a w*
or an atonic development of the frame, with a fla
state of the soft solids and predominance of cell
and lymphatic conformation; and a disposition
or the presence of, swellings of the lymphatic gla
of disorder of the mucous surfaces, and of depo
in various organs or parts, of small masses, vary
in size, consisting of a firm, friable, inelastic s
stance resembling cheese, and denominated tuberc

2. From the *synonymes* enumerated above
may be inferred that the terms *Scrofulous diathe*
or *cachexy*, or *vice*; *Strumous taint* or *consti*
tion; *Tuberculous cachexy* or *evil*, *Tuberculo*
Scrofulosis, may be considered as nearly syno
mous, although the scrofulous taint or cachexy n
be viewed as sometimes existing without the
bercular deposit being yet formed, this deposit,
some one or more of its numerous seats or ma
festations, being the common structural cha
resulting from this taint — resulting so genera
as to render it doubtful whether or not this ta
ever exists without the tubercular formation be
present in some situation or other, either in a
veloped or in a rudimental and latent fo
Scrofulosis and *Tuberculosis* will, therefore,
considered by me as nearly synonymous — as v
nearly allied, if not identical morbid conditions;
former, however, being more frequently appl
to the *external* manifestations of the constitutio
taint or diathesis, the latter more generally to
internal structural changes. I am aware t
this opinion is different from that supported
Schönlein, Scharlan, Dr. Evans, Mr. Ph
lips, and M. Legrand; but I believe that th
doctrine will, in this respect, be considered
correct, after the consideration which will be gi
to it in the sequel. In discussing the subject
Scrofula and *Tubercules* I shall follow this arran
ment: —

3. i. *Of the Scrofulous diathesis or taint*
Latent or inactive Scrofula: — ii. *The Cause*

Scrofula and Tubercles: — iii. *The Structure and Composition of Tubercles:* — iv. *The Pathology of developed, open or manifest Scrofula and Tuberculosis:* — v. *The Pathogenesis of Tubercles:* — vi. *The Comparative Pathology of Tubercle:* — vii. *The Scrofulous Taint as predisposing to, and influencing the symptoms, course and Terminations of various diseases:* — viii. *Diseases attack the Scrofulous diathesis, without being essentially scrofulous or tubercular, although more or less nearly allied to Scrofula:* — ix. *The associated alterations and complications of Scrofula and Tuberculosis:* — x. *The Prevention of Scrofula and Tubercles:* — xi. *The Treatment of Scrofula and Tubercles.*

4. I. Indications of the Scrofulous diathesis or taint.—The *Strumous* or *scrofulous taint* was no further recognised by the ancients than in connection with swollen external or lymphatic glands, the constitutional vice being overlooked until the writings of Fernel, Plater, Baillou, and others, directed attention to a more correct pathology of the disease. More recently numerous writers have furnished interesting information respecting Strumous affections, especially Hoffmann, Huber, Van Swieten, Lalouette, Hufeland, and Hecker; and, in the present day, the writings of Carswell, Glover, Phillips, Bennett, Walshe, Tyler Smith, and others, are especially deserving an attentive perusal. Dr. Glover very justly remarks that "a careful distinction should be made between the scrofulous diathesis, or predisposing constitution, and the actual processes of the disease, — between the *Ens in potentia* and the *Ens in actu.*" The scrofulous diathesis may, by the debility or the susceptibility accompanying it, predispose to other diseases besides those which are more strictly strumous or tuberculous; and a distinction should therefore be drawn between the latent or inactive scrofulous taint, the diseases which are not strictly attributable to this taint, and those maladies which are actually the structural manifestations of it. But is this distinction readily drawn? I believe not; and that the descriptions and distinctions adduced by Hufeland, Lloyd, Lugol, and many others, are so loose, and present so numerous exceptions, that they deserve, in many particulars, but little credence, and certainly some of them at least require a more particular investigation. Several of these have been subjected to a minute examination by Mr. Phillips; but, as he considers tubercles to be distinct from scrofula, much of his reasoning on this subject fails in strictness of application to the subject in the wider signification which I have assigned to scrofula. M. Lugol assigns so many indications of the scrofulous diathesis, and those with so little justice and precision, as to have it remarked, that, of all his characters of this diathesis, there is not one which may not, with equal value, be replaced by a phenomenon diametrically opposed to it; yet this is one of the writers who is so much praised by the Gallic school in this country. Of the various indications of the scrofulous taint enumerated by this and other writers, many will appear to the experienced writer as possessed of little signification and dependence, and as deserving of very slight consideration.

5. *The chief characters of the scrofulous taint* enumerated by writers are the following: — (*a.*) A want of due bodily symmetry; small, weak, or crooked limbs; a gibbous or pigeon breast and flattened ribs; hare lip (Bredow); hypertrophy of the pubis, the sacrum and the ischia (Lugol): — (*b.*) A certain character of the head and face: the jaws are said to be broad, the forehead low and angular, and the neck long and rounded; a head larger than natural, especially posteriorly; a puffed up rounded visage; great transparency or whiteness of the skin, often with a rosy-tint of the cheeks; "a pale, inflated countenance; the chief colour of the dark complexion is dull or dirty, of the fair an unnatural whiteness, frequently with an agreeable redness of the cheeks; in others a waxy yellowness, with a dirty pallor round the mouth." (Bredow.) Bluish rings round the eyes; the eyes most frequently large, oftener blue than dark; the pupils are commonly large; the tunica albuginea of a pearly whiteness, traversed by injected blood vessels, especially if the mesenteric glands are affected (Hufeland), or of a bluish whiteness, and the pupils large when the lungs are diseased. The eyelids are often œdematous, the eyelashes are long, the Meibomian secretion is increased. The nose is wide or swollen, or red or shining; the upper lip is thick and projecting, and the furrow between it and the nose is deep. The general expression of the countenance indicates indolence and want of energy. The first teeth are small and subject to caries. The second are broad, often covered by a glairy secretion, are very white, readily split, and often become carious.

6. (*c.*) The appetite is irregular — sometimes impaired, at other times voracious; occasionally there is nausea; the tongue is often foul, the breath fœtid or sour; the bowels are irregular; flatulent eructations are frequent and acid; and the excretions are also acid. The abdomen is large, tumid and flatulent on percussion. Discharges from the nose are common, and from the vagina not unfrequent. The soft solids are flabby; the adipose and cellular tissues abundant but soft, giving the surface of the body a full and rounded contour; the limbs are deficient in rigidity and firmness. The tendons are small and yielding; the capsules of the joints are weak; and the heads of the long bones are large. Hence a disposition to lateral curvatures of the spine, thick ancles and joints, large ill-formed hands and feet, and falling of the arches of the latter. The shoulders are high.

7. (*d.*) According to Heusinger, one of the correctest writers on Pathology, the strumous taint consists of a torpid state of the nervous system. The *blood*, whose condition is yet but little known, appears to be, from the commencement, poor in globulin and hæmatin, rich in albumen, which, at a later period only, diminishes also. There are abundance of lymph, extension of the lymphatic vessels, marked development of the lymphatic glands, and predominance of the cellular system, not only under the skin, but in all the organs, where it commences to replace the specific tissues, which is especially apparent in the muscles, the bones, &c. All the mucous secretions are augmented, and they often become albuminous.

8. (*e.*) General lassitude, languor, and debility are commonly experienced, with an inability to sustain prolonged physical and intellectual exertion. The powers of the mind, although generally feeble, are often precocious. Dr. Glover

remarks that, in very few of the subjects which he had examined, has he found the bodily or intellectual powers fairly developed in a degree proportionate to the age and circumstances of the patient; and that a general retardation of development seems one of the most constant features of this peculiarity of constitution. According to Hufeland and Fischer the generative functions are early and powerfully manifested. They may be early and frequently, but certainly not powerfully exerted. Lugol maintains that these functions in scrofulous subjects are below the average.

9. (*f.*) All that is known of the *Blood* of scrofulous persons has already been stated (§ 7.). The *Urine* has been described by Simon and others to be usually very pale, unless vascular excitement be present. Its specific gravity is low, and in children it is more acid than usual. There are differences of opinion as to the nature of the free acid; some consider it phosphoric acid, others hydrochloric acid, and others, again, lactic acid. The urea and uric acid are often diminished, whilst the salts, especially the phosphates, are increased; and even oxalic acid — an acid foreign to normal urine — has been found in the urine of strumous children. According to Schönlein the chief alterations observable in the urine of scrofulous persons consist in the diminution of nitrogenous constituents — the urea and uric acid; and in the appearance of the non-nitrogenous oxalic acid, and more rarely of Benzoic acid. The acids are frequently so abundant that the urine, upon cooling, deposits copious sediments of the oxalates, and these sediments sometimes form renal and vesical calculi. The frequent occurrence of oxalate of lime or mulberry calculus in children is well known.

10. (*g.*) The observations of Mr. Phillips on the characteristics usually assigned to the scrofulous taint are not devoid of interest, although open to the objection already noticed (§ 4.). He states that, in many "instances, most of the alleged characteristics of the scrofulous constitution may distinctly exist, whilst no strumous deposit takes place, and in others, diseases ascribed to the strumous habit may take place in persons in whom the marks alluded to cannot be recognised." In addition, however, to most of the indications which have been enumerated, Mr. Phillips notices others, which characterise also this diathesis, namely, a want of muscular development; an hypertrophied or infiltrated condition of the cellular tissue, which rapidly disappears under privation or disease; a pallor and coldness of the surface, owing to a feeble circulation; a marked disposition to disorders of the respiratory and digestive mucous surfaces; frequent soreness of, or discharges from, the nose, the eyes, and the ears; enlargement of the tonsils; the frequent dryness of the skin, or a greasy, sour, or fœtid exhalation from the skin; and more or less disorder of nearly all the abdominal secretions and excretions.

11. (*h.*) The colour of the hair is very variable; but for the most part it inclines, according to Mr. Phillips, to a dark tint. Of nearly 9000 scrofulous children he found a little over 32 per cent. had light hair and eyes. Barthez and Rilliet state that, of 314 tuberculous children, the hair was fair in 150, red in 4, chesnut in 71, black or dark in 40, and not observed in 49. Dr. Glover remarked that, in 126 cases, 86 had fair hair and eyes, and 40 were of a dark complexion; and that in some workhouses, 97 cases had a light, and 47 a decidedly dark complexion. Mr. Phillips remarks, that "the alæ nasi may be broad, but for the most part they are not so. The upper lip or even both may be tumid, but in the majority of cases they are not so. There is not, as some have supposed, any thing constant in the shape of the lower jaw, or in the appearance of the teeth." He observes that the scalp and other parts of the integuments are often the seat of eruptive affections.

12. (*i.*) It is obvious from the above, that the strumous diathesis may be viewed as an original or an acquired deterioration of the constitution from the natural healthy pitch or condition, — and that, before any actual manifestation of disease takes place, there may long exist such a state of organic nervous power, of circulation, of function, and of nutrition, — of general asthenia, and of deficient structural development, as to constitute an obvious and wide divergence from health, before the scrofulous formation or tuberculous deposit takes place, — and, moreover, that the characters now described, as constituting the scrofulous taint, cachexy, or divergence from the actual healthy condition, may exist for many years, or throughout a long life, without being followed by any of the marked structural manifestations of strumous disease or tuberculous deposit, although many determining or concurring causes very easily develop these diseases, in very active and manifest forms.

13. II. Of the Causes of the Strumous Taint and of External and Internal Tuberculosis.— The *Causes* of scrofula have been investigated with much assiduity by Mr. Phillips, but chiefly with reference to the external forms of scrofula, and, as observed, in young subjects. The limitation which he has assigned to the disease — the exclusion from his calculation of the tubercular or more internal states of struma — impairs or even altogether destroys the value that he has assigned to each of the causes he has investigated; and therefore they must be estimated either with reference to this limitation, or more loosely in the extended acceptation in which I have received the term. Mr. Phillips remarks that "hereditary influence, syphilis, bad air, bad food, and a cold and damp atmosphere, are the causes to which have been most frequently assigned the production of scrofula. The error of each theory is its exclusiveness; and when we reflect upon the difficulty of estimating the unmixed influence of any single cause, and when it is made probable that many causes are in action, we can scarcely comprehend how it happens that able enquirers should maintain, with so much pertinacity, not alone the efficiency but also the universality of one." When describing the *ætiology of* Disease (see §§ 7—62. of that art.) the combined, the concurrent, and the determining operations of several causes were insisted upon in the production of the morbid effect; and this associated action has been duly recognised in the causation of most diseases, the one now under consideration certainly being no exception. The difficulty of estimating the influence of any one of the several causes which usually co-operate in producing a disease is certainly great, and is owing

circumstances which are more or less obvious.
t has been attempted by certain writers to confer
n arithmetical value on each particular cause,
nd the attempt has been followed by some in this
ountry. But the nature of the subject, the
arying influences of seasons, weather, localities,
ocial and moral conditions, and numerous con-
urring and intercurrent agencies, render such
recision unattainable, even if the requisite data,
t given periods, could be obtained with due cer-
ainty; the attempts which have hitherto been
nade being characterised by more manifest errors
han have distinguished even the loosest descrip-
ions of much less ambitious writers.

14. The author now mentioned justly observes,
hat the difficulty of estimating "the force of any
f the so-called causes of scrofula is owing to the
act, that the opportunity of observing a single
gent in action alone is very rarely afforded:
vhere one cause exists another is, almost cer-
ainly, intimately associated with it; and to assign
o each its proper influence is rarely possible.
his is particularly the case with bad food, bad
ir, and bad clothing; the existence of the one
lmost implies the presence of another." Never-
heless the attempt to estimate aright the influence
f individual causes should not be neglected,
vhen it can be made with a reasonable hope of
uccess. And that it may be made with success,
he following instances will show: — 1st. In a
arge charity school, of considerably above 100
irls, cases of scrofula became remarkably pre-
alent, notwithstanding a sufficient supply of
vholesome food and clothing, and attention to
entilation, and treatment produced no benefit.
uring my duties as a visiting trustee, I ascer-
ained, that the wooden floors of the sleeping and
ther apartments of the institution were washed
aily. I contended, in the committee managing
he charity, that this was the cause of the disease,
nd advised dry-rubbing; and that washing the
loors should be adopted only on requisite occa-
ions. This advice was followed, and the cases
nder treatment soon recovered, and no new case
ccurred. 2d. In a large school of boys, scro-
ula, both external and internal (tubercular), was
f frequent occurrence, several of the parents
aving removed their children, not unfrequently
uring advanced or incipient tubercular disease.
aving been sent to one of the children, I could
nd no fault with the food and exercise of the
upils, nor with the beds and cleanness of the
partments. But the sleeping apartments were
nuch too close — too crowded and ill ventilated.
pon the removal of the cause, the school be-
ame remarkably healthy. Now, in these in-
tances, the causes just named could not be dis-
uted as having been the most active; most
robably, however, various predisposing causes
aving existed, especially hereditary constitution,
s respected the individuals affected.

15. The *causes of scrofula* have been variously
rranged by writers. Some have viewed them as
redisposing and *exciting*, others as *hereditary* and
ccasional. I shall notice, 1st. *Those which de-*
end upon one or both parents; and, 2d. *Those*
hich change the constitution of the individual,
specially during childhood, and which are inde-
endent of the constitution of the parent; both
lasses of causes often concurring to produce one
r other of the morbid results, usually termed
scrofulous, strumous, or tubercular, — or external or internal scrofula.

16. i. Causes appertaining to one or both Parents. — *A. Hereditary constitution or Predisposition.* The operation of this cause has been much over-estimated by Lugol, and many other writers, and as much underrated by Louis, Henning, Baudelocque, Phillips, and others. The circumstances which chiefly occasion this difference of opinion are the confounding of hereditary and congenital transmission of the disease with hereditary diathesis or constitution, and inattention to the fact that the parent or parents, who possess only the latent diathesis, may have children with the external signs of the disease in childhood, or with tubercular or internal scrofula at any future period of life, or with both manifestations of the disease; or that a parent affected with either the one or the other may have children presenting no indication of the malady, beyond the latent diathesis, which, however, may be very obscure, or altogether absent, or may have an offspring affected by a different form of the disease from that of the parent. Let any observer of experience refer to what must be familiar to him, and he will find, what I have often remarked, that one parent possessed of the scrofulous diathesis has passed on to the age of sixty or upwards, and has at last died of tubercular consumption, the other parent being of a sound and strong constitution, and either one or more of the offspring have had forms of external scrofula, before puberty, or have grown up and been carried off by phthisis in after life; or have been affected both before and after puberty — some with external, some with internal scrofula. I have known many such occurrences, and even instances where the scrofulous diathesis, either latent or manifested by active disease, existed only in one parent, and yet, of numerous families, part died in early life, with external signs of scrofula, as well as internal disease, and the rest, or the majority of the survivors, became consumptive at various ages, more or less advanced. Now, Mr. Phillips and other writers, who consider tubercles a distinct lesion from scrofula, keep out of their calculations the former, and consider the one to have no hereditary connection with the other — a position which is altogether overturned by the numerous facts which are identical with the statement I have now made, the faithfulness of which is open to the investigation of every observer.

17. It is unnecessary for me to enumerate the authorities who have contended for the hereditary character of scrofula and tubercles — for the possession by the offspring of the diathesis or constitution of the parent or parents, more or less, or in one or more instances, and therewith the disposition to the same disease to which the latter was most liable. But, without regard to authority, let the matter be made one of observation, respecting which common sense is sufficient to judge. Mr. Phillips remarks, that after reading the essay of Portal on "Hereditary diseases," he rose up in doubt, whether, in the strict sense in which alone he thinks the question should be regarded, there be clear evidence that almost any disease is hereditary, though with respect to syphilis and small-pox the proof may be sufficient. Certainly much of the difference of opinion respecting the hereditary nature of diseases

depends upon the signification assigned to the term. No one at the present day considers that the offspring is born with the disease which afflicted the parent, although even this is the case in rare instances; but only that the constitution or diathesis is inherited, and with it the disposition to the same diseases which attended it in the parent or parents. This subject is, however, sufficiently discussed in the article DISEASE (see § 11. *et seq.*).

18. (*a.*) *May the parent transmit scrofula or tubercles to the fœtus?* — Scrofulous tumours and tubercles have been observed in the fœtus and in very young infants by DUPUY, ANDRAL, CHAUSSIER, BILLARD, and a few others. The instances in which they have been found are few, and the connection of these cases with disease of the parents has not been shown in the majority of them. In three instances, in which the mothers died of consumption very soon after delivery, I found the lungs of the infants studded with tubercles, in the first stage, a few having advanced to the second stage. The infants were remarkably emaciated, had cough very soon after they were born, and died in a few days. In these three instances, tubercles of the lungs of the fœtus were expected during the gestation of the parent, by the practitioners in attendance (Mr. NICOLSON and Mr. WINSTONE), as well as by myself, and in each case the mother considered the child to have been born with the same disease as that with which she was afflicted.

19. (*b.*) *To what extent may scrofula and tubercles be viewed as hereditary?*—The statistical or numerical writers on this subject have mystified and misled many who pin their faith to authority and numbers, without inquiring into the data upon which their calculations are based, or into the meaning of the terms they employ. One of the most recent numerical pathologists, having defined and limited scrofula to be "enlarged cervical glands discovered by the touch or sight, sinuses or ulcers succeeding to such glands, scrofulous bones or joints, or the consequences of them;" and at another place having further limited his definition to "disease of subcutaneous lymphatic glands," gives the results of his examinations of 7587 children, and found nearly 23 per cent. of these bearing such marks of scrofula. He further ascertained that, of 2021 children whose parents were both *untainted*, 21 per cent. presented marks of scrofula; that of 1092 children, whose parents were both *tainted*, nearly 25 per cent. presented marks of scrofula; that of 2107 children whose father only was scrofulous, nearly 23 per cent. had marks of the disease; and that of 2367 children, whose mother bore the marks of scrofula, whilst the father did not, nearly 24 per cent. presented signs of the distemper. Thus all that statistics here furnishes in favour of the hereditary influence of the scrofulous diathesis, is not quite 4 per cent.; and many believing in the precision and truth of numbers, would consider the evidence here adduced as most conclusive and incontrovertible. But, of the children thus examined — their ages probably being from two to sixteen years — the lymphatic glands may have been enlarged, and returned to their healthy state before the examination was made, or either these glands or some other parts may have presented evidence of scrofulous change *after* the period of this examination; and taking the more enlarged signification generally adopted, some internal organ may have become affected by the disease either before or after puberty. It is not only external and palpable scrofula which is caused by the scrofulous taint, but also various internal maladies which are actually scrofulous or tuberculous in their nature, and which may be developed into an active state at any period either before or after puberty, an examination, on a single occasion, of numbers thus circumstanced detecting a few merely from among them with the fully developed or manifested malady.

20. But Mr. PHILLIPS does not stand alone in his scepticism of the generally received doctrine of the obvious hereditary nature of scrofula, and in his faith in statistics, for LOUIS, the apostle of the numerical method in medicine, states, with reference to phthisis, that in reality he had observed nothing decisive in favour of the hereditary character of that disease; and, in another place, that he had not collected any fact in favour of the hereditary nature of phthisis! But there is one circumstance connected with the hereditary nature of scrofula to which the numerical pathologists have paid little or no attention; namely, that the parent or parents may possess the scrofulous taint without any mark of the external or internal disease, and have one or more children which are either affected with open scrofula in childhood, or attacked with phthisis in early life; and even that one or both parents of a scrofulous diathesis, without any developed disease, may have children, whose lymphatic glands or bones become tuberculous in early childhood, or whose lungs are thus diseased after puberty, and yet may not be the subjects of manifest strumous disease throughout life, or not until a far advanced period. In these circumstances the hereditary tendency would not be detected or reckoned by those who employ figures as their arguments, and thus their statistics would be vitiated, or rendered by this and other sources of error altogether worthless. That the hereditary character of scrofula and tubercles has been exaggerated by some writers may be admitted; but that it is so low in amount as some recent writers contend, or even nearly so low, will not be demonstrated by future observers who shall view all the circumstances and facts connected with the subject with due accuracy.

21. Of 80 cases observed by Dr. GLOVER, the predisposition to tuberculous affections — to scrofula in the sense in which I have viewed it — was hereditary in 42; very few of the remainder furnishing clear evidence of the transmission. There appears some reason, he adds (and I agree with him), to conclude "that the popular idea of evidence of the family taint often passing over one generation, or appearing in the uncles and aunts, while the parents are free from the disease under which their offspring labours, may not be incorrect."

22. The hereditary predisposition is, according to my own observation and that of several others, more frequently derived from the mother than from the father, although the difference is not great, much depending upon the causes in operation in early life. The mother of nine children — six females, three males — had early signs of external scrofula; four of the female offspring died of phthisis between the ages of 20 and 30, and one of the males. All the children of the two remaining

fe les are possessed of the scrofulous taint, and a t one third of them have external scrofulous d ase. Dr. Pritchard has justly remarked, that a original connate bodily peculiarities tend to b me hereditary, while changes in the organic st cture of the individual, from external causes d ng life, commonly end with him, and have no o ous influence on his progeny. There is no d t of the strumous hereditary taint having disa eared from families, especially when it existed o on one side, more particularly when the m her was strong, healthy, and suckled her own c lren, and when the latter were placed in fa urable circumstances in childhood and early li s respected air, locality, ventilation, exercise, a food.

3. *B. Diseases of the parents.* — It has been ju y remarked by Sir James Clark, "that a st of tuberculous cachexia is not the only morbi condition of the parent which entails the tub ulous predisposition on the children; there a several diseases which have this effect, the m t important of which are a disordered state of th digestive organs, gout, cutaneous diseases, th njurious influence of mercury on the system, de lity from disease, age, &c. In short, a dete rated state of health in the parent, from any ca e, to a degree sufficient to produce a state of ca exia, may give rise to the scrofulous constitu n in the offspring." This opinion has been q stioned by Mr. Phillips, but I believe it to b the main correct. Not, however, that pare s thus circumstanced necessarily have chil d who became scrofulous in childhood, or tu rculous subsequently; but that the children o uch parents are much more liable to be so d ased than the offspring of strong and healthy pa nts.

4. (*a.*) *Of the influence of the syphilitic ta , and of the mercurial cachexia in the parent,* in fecting the organization of the offspring so as to vour the development of external or internal sc fula, many writers are quite convinced. AliB r says, "that almost all the scrofulous cases at t. Louis are owing to a syphilitic infection tr smitted hereditarily;" and Camper, Stoll, P tal, and Hufeland, entertain a similar opin . Others are of a different opinion, especi y Kortum, Cullen, Baumes, BaudeL que, and Phillips. It is impossible to separa the influence of secondary and tertiary sy ilis from that produced on the constitution by th excessive or prolonged courses of mercury, as, in rmer times especially, both were more or less in rious to the constitution of parents, and most fr uently in connection with each other. That p nts thus circumstanced may have children fr from any scrofulous taint may be conceded; b that their offspring are more frequently affecte vith either external or internal scrofula, at th respective ages of the occurrence of these, th the children of parents who have not been si larly circumstanced, I am convinced by the fr uent occurrence of these states of scrofula in c dren born of a parent or parents, whose const tions, originally most sound, were deteriorated b one or both of these causes. I am aware that n erous instances will occur of the immunity o he children of parents thus circumstanced fr scrofula; but many of these have not been o rved or traced further than childhood, or even than the earlier years of this epoch; and of those, thus accounted exempt, or even robust or healthy at this period, many become tuberculous at more advanced ages.

25. (*b.*) *That very aged, gouty, exhausted, or debilitated parents,* have children much more predisposed to external or internal scrofula than the offspring of healthy, mature, or young parents, has been asserted by many, and denied by some. It is more generally admitted, that the children of such parents are delicate; but the opinions of many of the most observant writers of the seventeenth and eighteenth centuries confirm that of Fernelius, no mean observer, and justly possessed of the highest reputation in the sixteenth century, viz. "Senes et valetudinarii imbecilles filios vitiosa constitutione gignunt;" and Van Swieten has illustrated the opinion with his wonted ability. In the same category parents who have exhausted themselves by *masturbation* or by *premature or excessive venereal indulgences,* may also be placed. On this subject Mr. Phillips remarks: — "I do not, however, deny that children born of parents advanced in life, as well as those born of youthful parents, may present less of vigour, than the offspring of persons in the prime of health and strength, but it is not proved that they usually become scrofulous:" and he admits only that these children are often, though not always, weakly, and that a weakly child, placed under unfavourable circumstances, is more likely to suffer from scrofula than a strong one, but simply because he is weakly. It is difficult to prove the extent to which children born of parents of the description under consideration are liable to be scrofulous or tuberculous, or are more liable to become so than other weakly children; but that they are actually more or less liable to be thus affected I believe.

26. (*c.*) *Does the milk of a scrofulous nurse occasion scrofula in the child?*—Mr. Phillips has ably discussed this topic, and has adduced opinions in the affirmative as well as negative. Bordeu said that scrofulous nurses communicate the disease to the child. White, Faure, Lalouette, and Pujol, on the contrary, denied that a nurse could transmit scrofula to her nursling. "But the impression that the disease may be thus communicated, exists on the minds of many medical authorities in the present day." Yet in support of this opinion, Mr. Phillips states, that he knows no single well-observed fact on record. I agree with him in concluding, that, although there is no proof of the justness of the opinion, "that the disease may be propagated in this way, neither is it easy to procure proof that it could not happen, since such proof could only be negative; meanwhile, as all our present evidence is negative, we are justified in saying that such communication is, in the present state of our knowledge, inadmissible."

27. (*d.*) *Frequent intermarriages, or marrying in and in.*—It has been alleged by Mr. Carmichael and others, that frequent and close intermarriages are generally followed by a puny race, and frequently by scrofula, in one shape or another. On this topic Mr. Phillips remarks, that there is no clear evidence of the bad consequences, either on the mind or body, of frequent intermarriages. As concerns the human race, the point is not easily elucidated, and the evidence is not con-

clusive that the practice is very injurious in the lower animals. Isolated classes, as Jews, Quakers, &c., furnish no evidence in support of the opinion; but the isolation of these or other classes is not so complete as to determine the question. The closest intermarriages or connections between the sexes exist in several countries of Central Asia, as Thibet, &c.; but the inhabitants are said to be robust and healthy, the population being, however, kept down by one female in a family having several husbands, and those frequently her nearest male relations. Mr. Phillips concludes, that intermarriages among healthy persons tend to no such calamity as the production of scrofula; but that he must not be understood to assert that other physical or mental influences may not result from such unions. I believe, however, that a comprehensive consideration of the subject, and with reference to the lower animals, as well as to man, will show that a close breeding in and in, when continued for more than three or four generations, will occasion a degeneration of the offspring; whilst crossings of races or breeds will give rise to increased development of constitution and power, especially in the weaker race. The Turks and Persians are manifestly indebted to the females of Georgia and Circassia for the best of their constitutional features; and few who have taken any interest in tracing the history of aristocratic families, even in this country, and are acquainted with the private histories, the intrigues, and intermarriages or crossings of many of them since the commencement of the seventeenth century, can fail of knowing how often family descent has thereby been preserved nominally, although not most legitimately.

28. (*e.*) *Does the habitual use of certain articles of food predispose the offspring to scrofula or tubercles?* — It has been supposed that pork and the viscera and blood of animals, favour the occurrence of gout in those who frequently use them as food, and often give rise to scrofula in their offspring. That these articles of diet are very often productive of diarrhœa, dysentery, and other disorders of the digestive organs, more especially in warm climates, cannot be disputed: and I believe that the offspring of those who live much on pork and bacon are more liable to scrofula, in some one or other of its forms, than persons who use a different or more wholesome diet. The food of the parents may reasonably be expected to influence the constitution of the offspring, and hence to predispose to certain diseases, in preference to others. It is difficult to determine the influences, either of an excessive use of animal food by the parent or parents, or of the restriction to vegetable diet solely, in causing scrofula in the offspring; but that either extreme may have a predisposing effect, especially when aided by other causes, may be reasonably inferred. That the vegetable diet of the Hindoos does not exempt them from the presence, if not from the prevalence, of struma, appears to be established. It is not improbable, however, that a vegetable diet in a temperate and healthy climate, when it is wholesome in kind and quite sufficient in quantity, does not, *cæteris paribus*, predispose the offspring to this distemper; whilst the excessive use of animal food, and more especially of the articles of food just noticed as often injurious, is more likely to produce a noxious effect.

29. (*f.*) *Insufficient*, as well as *unwhol ne food*, certainly predisposes the offspring to scro a, both external and internal; and when this i ssociated, as it too frequently is in the lower cla ss, with addiction to *spirituous liquors*, the inju influence is the more marked, particularly en the mother is thus circumstanced and add ed during the periods of utero-gestation and of ctation. I have on numerous occasions rema ed this to be amongst the most undoubted caus of strumous affections in the poor; but it is sc enerally associated with others about to be not d, especially impure air, and insufficient ventila n, that it is impossible to say truly what degr of influence may be assigned to it solely. The umerical pathologists may, however, assign a number; I therefore leave its true value t be calculated by them.

30. ii. Causes acting chiefly during E Y life. — The causes of struma occurring d g early life, act directly on the subjects of the stemper. These causes may be in operation ring infancy solely, or during later childhoo or not until puberty, or even not until after is epoch. They are amongst the most influe al causes of the distemper, especially when a g more or less in combination, as often obse ed respecting some of them. It is generally dif lt to determine the influence of each, or eve of several of them, when operating either co-e eously or in succession, particularly when the nstitution presents an hereditary taint, and, i is case, those causes are the most efficient i eveloping this taint into open or manifest disea — The *milk* of the nurse, especially if she be rcumstanced or addicted as just mentioned (§), or if her health be such, owing either to atural delicacy of constitution or to disease as to render her milk insufficient, innutritiou or unhealthy, is a most influential cause of del ty and disease of the infant, this disease assu g more frequently the form of internal or ext al scrofula, than any other. In connection th suckling of the infant, there are several c es which often concur in the production of the m id effect; the most influential of these are the ar es of food given to the infant either supplement of the milk of the nurse, or during and after w ning, and the state of the air which the child bre by night as well as by day.

31. *A.* The *food* and *drink* which are st adapted to the infant, before it has got several t h, is the milk of a healthy mother or nurse; and as far as a departure from this food takes place, s ar will the development of scrofula be risked. W n the mother is incapable of suckling, or her m is unhealthy or insufficient, a healthy nurse i equired; and if she cannot be obtained, the e best means of feeding the infant should be ado d. In the various circumstances in which chil en are brought up, it is very difficult to deter e the share of injury, which may be imputed s y either to the nature and amount of their foo r to the state of the air which they breathe, o the other influences which surround them. l. Benoiston de Châtanneuf states, that of in ts nursed by their mothers in Paris, 18 per cen ie in the first year, and that of those suckle y strangers, 29 per cent. die in the same e, Doubtless much of this mortality is to be imp d to other causes, as to the close unhealthy air a

ity, as well as to those connected with the f infancy. Both in towns and country dis- healthy wet-nurses cannot be obtained owing circumstances of the majority of those re- g them; and artificial feeding becomes their esource. This feeding, independently of the unfavourable influences which concur with s of furnishing an appropriate nourishment; onsequently a very large proportion of the s who are subjected to this mode of rearing, their first year; and of those who live, become the subjects of internal or external la. Mr. Phillips has adduced a series of cal details, illustrating the deaths during in- of the inmates of several infant institutions, the children are brought up by hand; and e the deaths in the first year appear to vary pwards of 80 to 50 per cent. In *Lyons*, a ed manufacturing town, where the infants ckled, the mortality in the first year was 33 nt.; the ordinary mortality at Lyons during st year being about 20 per cent. In the n Foundling Hospital, where the children ovided with wet-nurses, the deaths are 22 nt. during the first five years, and of these cent. only die during the first year; but it be recollected that a child is rarely ad- before the third month, and that it is during st three months of life that the mortality is st. In large manufacturing towns and cities mber of infants reared by hand is greatest, e deaths are also much the greatest; and portion of the survivors that become scrofu- also the greatest. In London, the number nts thus reared who die during the first year ee or four times as many as those who om among those similarly reared in the y.

Whilst very much of the mortality, and of sease of the survivors, of those reared by is to be imputed to this cause, much also be referred to the kind of food which is uted for the milk of the mother, to the air the infant breathes, and to the other circum- s by which it is surrounded. As respects *d of food* which is thus substituted, it may ed that, in manufacturing towns, where the d women employed in the factories rear nfants by hand, little attention is paid to the of the food, and few of the children sur- e first or second year, most of the survivors ing scrofulous or tuberculous. Mr. Phil- ustly remarks, that there are two things to ed in respect of children thus circumstanced, e nature of the food and the manner of it. The food, even if it be milk, instead g drawn directly from the mother, has pro- been obtained some time before from a herbivorous animal—the cow, between the f which and that of human milk there is a considerable difference, that of the former ning more than twice as much caseine, and less butter and sugar of milk. Moreover, in the milk of cows is often unwholesome, ally to infants, owing to the confinement of, odes of feeding, these animals, and not un- ntly to tubercular disease developed in them se causes. The same author justly adds, that de of taking the food exercises an important nce on the health of the infant. By the act of g, a certain quantity of saliva is pressed into the mouth, and is mixed with the milk so as to render its digestion easier. Indeed, this is essential to good digestion in infants. Moreover, the act of sucking is an exertion which can be made only for a certain time, and hence over-distension of the stomach is prevented; whilst, when fed by hand, the risk of over-feeding is often run, by the anxiety of the nurse, and harm from this is not infrequent.

33. In the greatest number of instances, instead of milk, gruel with a little milk, sopped bread, or flour, or other farinaceous substances are used. This food is assimilated with difficulty, and readily gives rise to acidity, flatulence, and irritation of the digestive mucous surface, with all the consequent evils of insufficient secretion and excretion and impaired nutrition. Mr. Phillips justly remarks, that these evils are made evident by the following facts:—"In Lancashire and the West Riding of York, the deaths in the first year of life are to the total deaths as 1 to 3·9; while in Devon and Wilts, they are 1 to 6·4! Now it is in the great factory towns, which are found in Lancashire, Cheshire, and Yorkshire, that the system of bringing up the child by hand is most commonly practised, and where its evils are most apparent; first in the great destruction of infant life, and failing that, in the development of scrofula. It is not that the mother has no milk, but that in such places she is enabled to make what she considers a more profitable use of her time, than by staying at home and nursing her child. Her infant may be suckled at early morn, and again in the evening, possibly too, at the middle of the day; but whatever food it may require at the intervening periods, if furnished at all, is afforded in the shape of the crudest and most inappropriate substances, and restlessness is known, in many places, to be habitually repressed by Godfrey's Cordial." But the mothers are not solely the guilty parties in these circumstances. The fathers are often so drunken and dissolute as to provide little or no food for their families, and the mothers are therefore obliged to be employed in the factories to provide for the wants of their children, entertaining at the same time but little desire to add to their number, or to devote much care on those which require it the most.

34. The digestion of infants is rapid, and as the quantity of food taken at a time is small, it is necessary that, during the first month, the interval of feeding should not exceed from one and a half to three hours. If, in addition to inappropriate food, the intervals between the periods of administering it be much more prolonged, as it often is in manufacturing towns, the evils must be so much the greater. Mr. Phillips states, that in the larger factory towns, the deaths from tuberculous and scrofulous diseases are as 1 to 31 of the total deaths during the first year of life, whilst in the metropolis they are as 1 to 42. During the whole of life, they are 1 to 5·6 in the factory districts, and 1 to 6·4 in the metropolis. According to the experience of Friendly Societies, he adds, the expectation of life in rural districts, at 30 is 38·4 years, and in cities 32·8 years. Of the total population living at the age of ten, one half will have disappeared in cities before the age of 62, and in towns before 65; whilst in rural districts half the population will attain nearly 69 years. The greater longevity of the latter, or the

less prevalence of scrofula, is not to be imputed to the food only, even granting this be more nutritious and more appropriate, for the former may possess the greater advantages in this respect; but to the air, ventilation, exercise, &c., enjoyed by those residing in country districts.

35. Dr. Baron Howard gives a just but melancholy description of the character of many of the operatives in large towns.—"A large proportion of those who regularly receive high wages are constantly in a state of the greatest poverty, and often bordering on actual starvation; their houses are almost destitute of furniture, comfortless, and uncleanly; too often damp, cold, and ill-ventilated. Their families are ill-fed, scantily clothed, and badly lodged. They live much on innutritious and indigestible food, and often use articles of bad quality, or such as are rendered unwholesome by adulteration, or by being kept too long. They are extremely intemperate in their habits, and instead of purchasing wholesome food and proper clothing, the greater part of their wages is often expended by anticipation at the public house. The effect of the intoxicating liquids they consume is of course to produce a temporary excitement of the whole system, which is succeeded by a corresponding depression; they lose all relish for plain nutritious food, and their appetites can be stimulated only by something savoury and piquant. This kind of diet does not afford sufficient nourishment to repair the losses the body is continually sustaining; great languor and debility are the consequences; for the removal of which stimulants are again had recourse to, and thus an alternately excited and depressed state of the system is kept up. By this mode of life too, the digestive organs become impaired, and the function of digestion is so feebly and imperfectly performed, that even much less nutrition is extracted from the indigestible and impoverished diet they use, than would be the case if the digestive organs were in a healthy condition." This writer adds, that "scrofula in all its varied forms may be mentioned as one of the commonest diseases prevalent among the destitute poor, and which frequently originate in deficiency of food." There can be no doubt of the justness of the conclusion at which Mr. Phillips arrives from his researches, namely, "that in Great Britain scrofula is least prevalent where children and others are best fed; and although I by no means assume that the immunity is entirely owing to better feeding, because where much attention is bestowed on the food, it is hardly likely that other means of maintaining health will be neglected; yet I would submit as a fair deduction from the foregoing evidence, that food exercises a more important influence than any other agent in the production of scrofula."—(*Op. cit.* p. 175.)

36. (*a.*) *What influence has particular kinds of food in causing scrofula and tubercles?*—This question has been differently, but not satisfactorily answered. Several articles of diet have been accused of producing this effect; and to certain of these I have adverted above (§ 28.). Haller was amongst the first to mention the opinion of the prevalence of this distemper being caused by the use of potatoes. The use of these, as the staple article of food in Ireland, where scrofula is more prevalent, and the value of life is less than in England, tends to show that they may be concerned in producing these effects; but it
not to be overlooked that they afford insu
nourishment, and that there are other ca
operation. Mr. Phillips believes that those w
almost exclusively on vegetable food in this
try are less robust, and exhibit a greater te
to scrofula, than those who subsist on an adn
of animal and vegetable food; and he co
that our own rural population, as well as
Scotland and Ireland, bear out the as
"But, although it has been shown that insu
and improper food, however associated, n
a foundation for that disease, we have, in
no conclusive proof that any particular
of food directly tends to the production o
fula."

37. (*b.*) The *drink* or *beverage* used by infa
children has no mean influence in favouri
development of scrofula, and of tubercle
more advanced age. Among the lower
especially in large and manufacturing tow
frequent recourse to anodynes and carmi
containing narcotics, sedatives, &c., in o
procure sleep or quiet for infants and
children, and to allay their wants, crav
appetite, and irritations of temper, is of it
mean cause of their weakness of constitu
imperfect development of both mind and
of scrofulous and tubercular formations,
various other diseases, as they advance to
and manhood. The not infrequent p
amongst the lowest and most abandoned
of giving spirituous and other intoxicating
to their children—of causing their infa
spring to partake of the noxious bevera
which they are themselves indulging, is pro
of effects, in the innocent victims, of a simil
to those just stated. The vices of the
are, in the present state of society, not
passively propagated in the offspring—to e
third and fourth generation; but are not
quently most actively and feloniously ex
at the most tender and helpless periods o
ence, to those for whom the ties of nature
be most intimate and indissoluble.

38. *B. Contaminated states of the atm*
are often not less influential than the natu
quantity of the food in causing scrofula
bercles, and frequently they are the chief
The air may be contaminated by exhalatio
drains, cesspools, sewers, and water-clos
by stagnation or insufficient renewal; or b
respired frequently or by a number of per
animals, without the requisite renewal;
these several causes conjoined. In a ver
proportion of the houses in manufacturi
other towns, as well as in many in count
tricts, the water-closets, drains, and sewe
so imperfectly constructed as to admit of t
lution of the foul air from the exuviæ, &c.
inhabitants, not only around, but even withi
dwellings, so that they who reside in those
are constantly breathing an air loaded w
vapours arising from the decomposition c
own excretions, which remain collected un
close to, or even within, their apartments.
sources of contamination have been fully e
in the article Pestilences — Protection
(§ 9. *et seq.*).

39. *C.* Next in importance to this source
congregation of numbers in a close or insuffi

lated place, more especially in a close sleep- apartment. Amongst the most prevalent s of scrofula and tubercles, especially in the nt state of society and manners, there are ps none more influential than congregating ren and young persons in boarding and large ls, where they are often scantily fed, and gh the greater part of the day restricted in d exercise,—confined in a school-room, often iciently or improperly warmed, and imper- ventilated, in order to economise fuel,—sub- l to premature mental exertion, or to cram- modes of instruction,—and packed into sleep- artments insufficiently ventilated and much nall for the number confined in them. It is mmon practice in boarding schools in large s to put from six to twenty children or young ns in the same sleeping apartment; and the ts are, from ignorance, or the delusion of g a bed assigned to each, contented with rrangement. Many such apartments even not, during night, any ventilation, except- hat takes place by the fire-place, both the and windows being closed; and so foul the air become by the morning, that it is ning to a healthy person entering the cham- o completely is it loaded with the emana- resulting from the insensible and sensible iration, and from having been repeatedly ed.

This *self-contamination* of the air is often upplemental of the contaminations derived other sources, especially from such as have ust mentioned; and which, although injurious ny private seminaries, are even still more so y large institutions and charities, owing to the egation of greater numbers, particularly in g apartments, to ill-regulated diet-tables, to cient exercise in the open air, at a period of hich requires air and exercise for the healthy pment of the frame, and to the over-exertion mind to the neglect of healthy pastimes and ements. This cause is especially productive more internal forms of scrofula, and parti- y of tubercles of the lungs; and is the more ntial as being in continued operation during riods of the growth and development of the . These congregations of young persons, ally during the age of puberty,—at the period ual evolution, when instinctive impulses are ong for the controul of the weakly-exerted es of reason, often lead to practices which — and tend more than any other cause, ally at such early periods of life — to ex- the powers of life, to impair and vitiate ion, and to favour the production of the l forms of the distemper now being con- d. This mode of life, at this early age, as as several others to which the lowest and the highest, are often subjected — the one misery and necessity, the other from ig- ce, vanity, and excessive care, — is not in- ently rendered still more injurious by the of due exposure to the sun and air.

Exhalations from privies, cess-pools, drains, ewers, especially in large institutions, manu- ries, and towns, occasion this as well as states of constitutional disease; and to these ften added the emanations from burying- s. Amongst the poor, the influence of cold, conjoined with humidity, and with over-crowding and insufficient ventilation; the exhalations from the soil, and from the animal and vegetable matters which are undergoing decomposition in or upon the soil; living in damp cold cellars and apartments on the ground floor, insufficiently drained and ventilated; and want of light and sunshine, are causes which aid the operation of hereditary predisposition, and of deficient or improper food.

42. Children and young persons subjected to the causes now mentioned become delicate or sickly. The vital endowment and the structural development of the several organs and textures are impaired or arrested in their progress. Like plants growing excluded from sun and wind, their vessels often extend rapidly in the direction of their axis; but the parietes of the vessels and their lateral branches are thinly or weakly formed, are surrounded by a lax cellular tissue or parenchyma, and both the organic nerves and the animal fibres are imperfectly constituted. The formative processes seem arrested before they are completed. The circulating fluids present a superabundance of the serous and albuminous con stituents, and a deficiency of fibrine and of red-globules. Whilst the blood is defective in its crasis, the blood-vessels are impaired in their tone; and the veinous and lymphatic systems are more manifestly or more prominently developed. This condition of the frame often proceeds, as shown above, from the parent or parents. In many cases it is acquired in early life from various causes, especially from those now mentioned, as insufficient or improper food, breathing an impure or self-contaminated air, a cold and humid atmosphere, or dark, cold and damp apartments, cellars, &c., the crowding of numbers in ill-ventilated places, and particularly in sleeping apartments, premature sexual indulgences, and solitary vices which waste or exhaust nervous and vital power, and consequently impair the digestive and nutritive processes, at the periods of life when due assimilation and nutrition are most required; and, whilst these causes often generate this state of frame, they produce, in various parts, textures, and organs, but particularly in the lungs, the deposit of tubercular matter.

43. There are other causes or circumstances influencing the constitution of young persons which have been viewed by some, and denied by others, to be concerned in the production of scrofula. But much of the difference of opinion on these topics depends upon the limitation of the term scrofula, or the extension of it, to the senses already stated (§ 4. *et seq.*). That confinement in prisons, in poor-houses, in asylums, in charitable institutions for education or reformation, in factories, &c., will occasion some form or other of scrofula, more especially tubercular deposits in internal organs, cannot be gainsayed with truth, although this morbid effect may be manifested in so few as to almost justify the denial of its existence, especially where a sufficiency of wholesome food, exercise in the open air, due light, ventilation, and sunshine are enjoyed. But where these are more or less wanting, and especially where there are over-crowding, particularly in sleeping chambers; low ranges of temperature, conjoined with dampness; contaminated states of the air; depression of spirits or anxiety of mind, &c., the morbid effects will soon become manifest, and

frequently in the forms constituting those now under consideration. Most of the causes already considered have been numerically and statistically investigated by Mr. Phillips, who has thrown much light upon several of them; but, in the extended sense in which I have viewed the subject, — not solely with reference to external scrofula, nor to childhood, but with regard to both the external and internal distemper, as observed at all periods of life,—I believe that several causes, which he views as possessed of little or no influence, are actually deserving of more consideration and elucidation than they have hitherto received. There can be no doubt that, in the several circumstances just enumerated, and in the different classes, positions, and employments of life, certain causes are more influential in some of these than in others — in one class or occupation than in the rest; and that, where several causes are in simultaneous action, it is difficult to estimate the relative value of each; but, nevertheless, whatever cause has the effect of lowering the powers of life, of impairing assimilation, nutrition, and strength, will, in a considerable proportion of those thus affected, give rise to tuberculous deposits, particularly if an hereditary predisposition or constitution already exists, and will reinforce or determine the action of other agents in developing this mischief.

44. *D. May scrofula and tubercles be communicated by contact or inoculation?* — (*a.*) Aretæus believed in the communicability of scrofula, and considered it dangerous to live in the same room with scrofulous persons. Baumes, Chaumeton, and others, have entertained the belief of the transmission of the disease to infants suckled by scrofulous nurses. Bordeu, no mean authority, states that young healthy women have married scrofulous men, and have become so themselves. Baudelocque, however, remarks that, in the "Hôpital des Enfans" there are 150 beds occupied by scrofulous patients, but that he has never observed any thing that occasioned a suspicion of contagion. Mr. Phillips says that he never heard of a single instance of the communication of the disease by contagion in the several institutions which he has visited. Pinel and Richerand have furnished a similar testimony.

45. (*b.*) *Inoculation* of scrofulous matter was practised by Hébreard on dogs, but no sign of scrofulous infection was observed. Lepelletier tried similar experiments without effect; and Mr. Phillips states that Lepelletier, Goodlad, and Kortum applied scrofulous pus to the wounds made for vaccination, and also to wounds made without reference to vaccination, but that scrofula was not produced, although the vaccination succeeded when the vaccine lymph was introduced with the scrofulous pus. Such experiments are most unwarrantable, and even criminal.

46. There may be but little risk of infection from cases of scrofula, when the disease is seated externally. But I believe that there is some reason for believing tubercular disease of the lungs, in the second and third stages, by no means devoid of risk to healthy persons, who may frequently inhale the breath of persons in either of these stages of the malady, or may sleep in the same bed, or even live in the same room, if small or ill-ventilated, with persons thus diseased. It should not be permitted for a sickly or scrofulous child, or even for any one with pulmonary tubercles or with
open scrofulous sores, to sleep in the same b
a healthy child or person, however confide
veral writers may assert the non-communi
of this distemper; for, although this may
in ordinary circumstances, those which I ha
mentioned may favour the occurrence of v
ferent effects.

47. (*c.*) *May pus from a scrofulous per*
though not derived from a scrofulous ulcer, co
cate the malady?—It has been supposed that
rhœa in scrofulous females, and that vacc
or variolous inoculation, from a scrofulous
will communicate scrofula to persons of a
constitution. Several writers have favou
affirmative of this question, but their fa
false, and their reasoning inconclusive. Mr
lips remarks that "an important question i
by Rilliet and Barthez with reference
influence of small-pox and scrofula. W
seen that De Haen and Rowley were of
that the inoculation of small-pox had a te
to excite in the system the development of sc
while Rilliet and Barthez state, that i
the variolous cases they have observed, th
tive fever has not been terminated by t
lisation. They believe it to be proved tha
pox and tubercular disease are of different
and mutually repel each other; that since
of vaccination tubercular diseases had
more frequent; that those children who d
out having had small-pox are more fre
tubercular than otherwise; and that of th
cinated a greater number are disposed to t
than of those who have not been vaccinated
however, guard themselves from assigning
tion as a cause of tubercles; all they ha
able to observe is, that a greater number
cinated children die with than without tu
The only precise evidence they furnish
opinion is the following: — Of 208 vac
children, 138 died tubercular, 70 non-tub
Of 95 children who died without havin
vaccinated, 30 were tubercular, 65 not
(p. 149.)

48. These results certainly agree with
observations, and confirm an opinion I ha
entertained respecting the comparative e
vaccination and small-pox upon the preva
scrofula. That scrofulous and tubercula
may become partially resolved and absorb
cretaceous or mineral parts of the deposit
maining, has been proved to take place,
exact circumstances in which it does tak
have been very insufficiently ascertained.
and Barthez believe that small-pox mo
cially, scarlatina and typhoid fever, tend t
this resolution. That scrofulous and tu
affections have increased since the introdu
vaccination is undoubted; and that the
from the inoculation of small-pox, under
nagement and care in preventing the occ
of the non-inoculated disease, were actual
although remarkably exaggerated, are also
so that balancing the results from the intro
of the one, and from the suppression of th
it is very difficult to say, that humanity or
has gained any thing by these measures.

49. *E. May other diseases occasion scrof*
tubercles? — As already shown, it can
doubted that vaccination favours the preva
the several forms of scrofula; but it is not

his result is produced. Can it be occasioned e inoculation of a virus, which, although ctive of a local effect, causes a certain taint e constitution, which is not prevented, or re- d, by its elimination in the form of pustules e external surface? According to this view, ation may be, in many instances, the intro- on of a poison or virus, which slowly and y contaminates the frame, without being ated and thrown out on the surface; whilst -pox has a very different effect, owing to the ppuration of the pustules and the elimination y of the morbid material or virus from the . Besides vaccination, inflammations, es, hooping-cough, &c. have been supposed our the production of scrofula; but there is fficient evidence to prove this occurrence, r than that all diseases which lower vital and resistance will more or less aid the ion of the more efficient causes of this dis- r. Notwithstanding the laudation bestowed vaccination, I believe that, as the lapse of llows the fact to be more fully demonstrated, be found to be a not unfruitful source of la and tubercles; and that its effects will be ed to the circumstance just mentioned.

F. Climate, residence in large towns, occupa- n factories, confinement in union-houses, in institutions, in prisons, &c., and other circum- s tending to prevent due exercise in the open sufficient ventilation, or to deprive persons in ife of the requisites to healthy assimilation and on, may be considered as concurring agen- the production of either external or internal a. Mr. Phillips has investigated these ana- ly, but with reference only to the production rnal scrofula, and has come to the conclu- at "the development of scrofula is not shown o influenced by climate or temperature as to ny definite relation to the warmth or cold- f the country in which the disease is found. r the general mortality, nor the deaths from lous diseases, bear any definite relation to seness with which the population is crowded er, whether the comparison is made between wn or district and another, or between dif- portions of the same town or district. Par- occupations and social conditions exercise ter influence on health and the duration of an is produced by impure air or insufficient tion, but they do not operate in the produc- scrofula in the sense of a specific agent, or irect cause. The general mortality and the from particular diseases, bear a close rela- the poverty of the population, and to the udes, or alterations of prosperity or adver- which they may be exposed; whilst wealth ation, which insure to the more elevated of the community abundant food, ample g, convenient and well ventilated dwellings, ure air, are nevertheless unfavourable to ity; and the industrious labourer, whose sures steady remuneration, and whose tem- habits and provident character insure him cessaries of life, good of their kind and ample ntity, is in the condition the most favourable g life and uninterrupted health. In the last then, it is to diseased nutrition, however t about, that we refer the production of la; an opinion in which there may be some y, inasmuch as many authors have assigned to perverted nutrition a powerful agency in developing the disease — especially Carmichael in England, and Lepelletier and Baudelocque in France; yet my controversy with Baudelocque consists in a denial of the exclusive agency which he assigns to impure air in deranging nutrition." (p. 239.)

51. Whilst the disease is imputed chiefly by Mr. Phillips to insufficient food, the other circumstances, which I have viewed as concurring causes of no mean influence, especially a self-polluted or otherwise contaminated air (§§ 38–42.) are considered of little importance by him, provided that the food is sufficient. It is manifest, however, that his investigation of external scrofula, chiefly with reference to an early age, has led him to overlook the more remote influences of certain causes, which he accounts of little importance. "But the cause of diseased nutrition," he remarks, "at that period of life when the seeds of scrofula are sown, is, in the vast majority of cases, insufficient food or improper feeding; and even if the less direct agencies, which we have been considering, occasioned scrofula much more frequently than we believe they do, the distinction is of great practical importance,— viz. that they do not act in virtue of a specific influence suited of itself to produce scrofula, but as general morbific agencies which impair digestion, and thus indirectly contribute to the production of the disease. That food, insufficient in quantity, or innutritious in quality, stands in the relation of cause to the development of scrofula, more directly than any other morbific agent, is shown by this circumstance, that whenever food is abundant in quantity, and of a sufficiently generous character, scrofula is kept under, that is to say, it is less frequently seen, although other noxious agents are, perhaps, rife, and the general mortality is great; and that in our rural districts, where the air is probably pure and the occupation healthy, and where the general mortality is small, scrofula is largely developed; because the food, even when abundant, does not contain sufficient stimulus to preserve the frame in healthy vigour. Yet, although we may have no satisfactory proof that a contaminated atmosphere, or any one of the other indirect agencies to which we have referred, will operate so injuriously on the digestive functions as of itself to induce scrofula, I do not the less deplore the influence of those debilitating agencies, which impair the healthy activity, and lessen the proper vigour, of large numbers of our countrymen." (p. 241.) But that the injurious or indirect agencies which Mr. Phillips considers so little influential, are really of importance as respects the development of external and internal scrofula, both in early life and in more advanced age, I am convinced, although a sufficiency of wholesome food will counteract them to a considerable extent, and especially when an hereditary taint or predisposition is not present.

52. The injurious influence of insufficient feeding in poor-houses, union-houses, in other pauper institutions, and in prisons, has been sufficiently demonstrated by Carmichael, Baly, Phillips, Tyler Smith, and others. But it is not to the insufficiency of food alone that the production of scrofula should be imputed, although it may be admitted to be the chief agent. Crowding of the sleeping apartments, breathing an impure or con-

taminated atmosphere, insufficient ventilation, confinement or deprivation of exercise in the open air, and depression of spirits, co-operate more or less with this more efficient cause. But, as in most of the union-houses, the inmates have more food than the independent labourer can procure, even when fully employed, it cannot be a matter of surprise to find scrofula more prevalent in some country districts than it is even in some manufacturing towns. In connection with this subject Mr. Phillips very justly remarks, that, believing the health of the child, and the vigour of the man, to depend upon the sufficiency and nutritious character of their food, a still more liberal diet for pauper children than is at present afforded would, at one and the same time, better the health of our population, and be consistent with a sound national œconomy. The reports of the Inspectors of Prisons furnish numerous instances where prisoners have manifested glandular tumours under the discipline to which they have been subjected, and have quickly rallied under an improved diet. Dr. Baly states, that a "marked difference in respect of their general health and the number affected with scrofulous disease is presented by the convicts sent to the central prison at Milbank, from different parts of Great Britain, preparatory to their transportation. By far the thinnest convicts, and the largest proportion of unhealthy and scrofulous individuals come from the Scotch prisons, in which the diet consists of a sparing allowance of vegetable and farinaceous food."

53. iii. Other Causes concurring in the Production of the Scrofulous Taint, and aiding or determining the Development of Tubercular Formations.—*The Causes* which have been here insisted upon are certainly the most influential in the production of latent and developed scrofula and tubercles; *but there are others*, which concur with the foregoing either in producing a scrofulous taint, or external scrofula merely, or in developing internal tubercles, especially in the lungs, in persons who are already imbued with this taint, and which, when acting energetically, may produce this effect even on those who are not manifestly thus imbued. In this latter case, the causes in question, acting either independently of the foregoing causes, or conjointly with them, or aiding and determining their effects, impair not only the vital energy and vital functions throughout the frame, but also the nutrition of the several tissues, and the intimate condition of vital cohesion and action. Many young persons, possessed of a scrofulous diathesis, or who have been the subjects of external strumous disease in childhood, and even some who present no very marked sign of a scrofulous taint, become, as puberty, or early manhood, or more mature age, is arrived at, the victims of tubercular formations in some internal organ, especially in the lungs, owing to the operation of those causes, which I am now about briefly to consider.

54. *A. Neglect of Exercise in the open Air* — of exposure to the light of day and to sunshine — is one of the causes which is most influential in superinducing tubercular formations in the scrofulous diathesis, and even in constitutions which evince no evidence of this taint. The general neglect of the indications suggested by the alternations of night and day — the neglect of repose during the hours of darkness, and of rising and of being employed during the hours of day - he common practice of pursuing our avocation nd recreations during a large portion of the tim in- tended by nature for our repose, and of dev ng a large portion of the day to sleep, is not wi out influence in impairing the constitutional po rs, in weakening the assimilating and excreting c- tions, and in relaxing the mental vigour. An early departure to nocturnal repose, anc he limitation of this repose to the hours of dar ess — the trite maxim of "early to bed and ea to rise," &c., is of much greater importance th is indicated by the practice of modern times.

55. *B.* Inattention to a *due preservation of t u- taneous function* is not without its influence. he imperfect performance of this function, the su en arrest of it, or the entire suppression of it, hov ver well it may be vicariously discharged b he lungs, kidneys, or intestinal canal, endange he healthy condition of the blood, and disorde he assimilating processes. It should not be overlo ed, in our pathological speculations, that the ta- neous function is supplemental of other imp ant functions — of the respiratory, of the renal, the hepatic and of the intestinal, — and that, en when no supplemental or vicarious office m be traced to this function or to either of these ner functions, a very intimate relation subsists be een them, the due discharge of the one influenci the others more or less. The importance, ther re, of duly regulating this function, guarding a nst its excess as well as its suppression, by per clothing and exercise, will be admitted.

56. Among the *dark-skinned races*, a fre nd even an abundant cutaneous perspiration is ost necessary to the continuance of health; and ien it is habitually diminished, especially by mig ng to a colder climate, tubercles, especially i the lungs, supervene in very numerous instances A diminution of the accustomed perspiration ay not, however, be the sole cause of this liabil of the Negro and other dark races to tubercles ter migrating to temperate or cold climates. he sedative influence of cold upon the constitut of these races may have a considerable or ief share in the production of this effect, especia in connexion with the obvious want of adaptat of the constitution of these races to temperat nd cold climates. Of the *influence of Climate* gen lly upon the prevalence of scrofulous and tuber lar diseases no precise data exist. The subject, w- ever, will be adverted to in the sequel, and he article on Tubercular Consumption.

57. *C.* Intimately connected with the fore ng is *the influence of Dress and of various Ph cal Conditions depending on Occupations and Ha of Life*. Exposure of parts of the frame requirin ro- tection or uniformity of temperature, as the per regions of the chest, and the hips and lower re- mities, to vicissitudes of season and weather nd sleeping in too low a range of temperature, are u- rious, the effects being more frequently mani ed in the lungs than in any other organ. To re ain habitually the movements of the thoracic an b- dominal parietes, by position, by occupation, by dress, or to otherwise embarrass the functi of respiration, is much more injurious than is gen lly considered. The stooping position, partic ly when long continued, or frequent; stoopin a low desk or table, especially if a part of the pa es of the chest is brought in contact with, or rests on,

esk; and, above all, stiff and closely-laced
or corsets, are amongst the most injurious
s to which youth or mature age can be sub-
l, and their effects are most frequently mani-
by favouring the development of tubercles.

Stiff or unyielding stays prevent the due
ise of the muscles of the trunk, impair their
opment in early life, and weaken these mus-
t later periods. If this article of dress be too
y applied or drawn around the waist, the
ments of the ribs are restrained or even pre-
d; the liver is carried upwards, and it in-
the thoracic cavity, compressing the lungs
embarrassing the circulation through the
and large vessels; and the colon is more
s displaced, or pressed upon, with the rest
abdominal viscera. The undoubted con-
nces of these conditions — consequences,
vary in amount and danger with the
now assigned — are an imperfect per-
nce of the respiratory, of the digestive, of
ssimilating, and of the excreting functions;
ltimately a morbid state of the blood, tuber-
depositions, especially in the lungs, hæmo-
, anæmia, &c.

Not less injurious than tight lacing is the
ce of wearing unyielding supports in the
especially steel supports, which, however
covered, tend to carry the electro-motive
nce from the frame, and to withdraw a salu-
timulus of nervous power from the system.
mportance of attention to this matter is not
hetical but real, as proved by long and
ent observation, and by the results following
emoval of this evil. The more freely the
ments of the trunk and spine are allowed to
rformed, and the more efficiently the actions
muscles concerned in these movements are
nplished, the more certainly and healthily
he functions of the several organs contained
e trunk be discharged. (See art. DISEASE,
et seq.)

. *D. Excessive secretion*, and more especially
cess of the recrementitious secretions, or an
e discharge of the latter contrary to the
ions and indications of nature, and particu-
the unnatural and debasing vice of manu-
ation — a vice most generally practised by
es, the unmarried, and the sanctimonious —
no mean influence in the production of
culosis, especially of the lungs, even inde-
ently of the pre-existence of a scrofulous
esis. The vice now adverted to, and a pre-
re or excessive sexual intercourse, are in-
us both by the discharge from the œconomy
secretion intended to aid the healthy develop-
of the frame, and afterwards to support and
omote the nervous and other functions, and
he frequent and excessive excitement, by
h this discharge is preceded, a consequent
of languor, depression, and vital exhaustion
ys resulting.

. *E. Prolonged mental application*, or ex-
, is more or less exhausting to both mind
body, as respects not only its direct operation,
also its indirect influence, especially in pre-
ing a salutary recourse to hygeienic measures,
inducing a neglect of exercise in the open air,
ange of air, and of the various recreations
h tend no less to strengthen the body than to
orate the mind.

62. *F. An inordinate indulgence of the passions* and affections; the various depressing moral emotions, anxiety of mind, hope deferred; frettings and disappointments, losses of fortune and friends, and all the sentiments which tend to weaken the organic nervous energy and lower the heart's action, more or less affect the digestive and assimilating as well as the excreting functions, lower the powers of life, vitiate the circulating fluids, impair or alter the nutrition of the structures, and thereby favour or develope tubercular formations. But it is unnecessary to pursue this topic any farther, as it is more fully considered in another part of this work (see art. DISEASE, *the Causation of*, § 22. *et seq.*).

63. III. OF THE PATHOLOGY OF SCROFULA AND TUBERCULOSIS. — Writers on scrofula and tubercular deposits have differed remarkably not only in respect of the identity of these morbid states, but also as regards the origin, modifications, complications, and various other pathological relations of both. It will, therefore, be requisite to describe — 1st, *The Structure of Scrofulous and Tubercular Matter* — *a.* as anatomically displayed, — *b.* as appearing under the microscope, — and *c.* as determined by chemical examination; 2nd. To enquire into *The Identity and Dissimilarity of Scrofula and Tubercles*; — 3d. To consider *The Pathological Relations, Origin, and Nature of these Maladies*; — 4th. *Their Localization or Seats*; — 5th. *Their Modifications and Complications*; — 6th. *The Comparative Pathology of Scrofula and Tuberculosis.* — The discussion of these topics will prove the best introduction and guide to the consideration of the very important subjects of the *prevention* and *cure* of these very prevailing diseases.

64. i. THE STRUCTURE OF SCROFULOUS AND TUBERCULAR MATTER. — Scrofulous and tubercular matters are peculiar morbid formations, the product of an altered secretion and nutrition of the parts containing them, arising independently of inflammation, although frequently associated with a modified state of inflammatory action, apparently induced by these morbid products. These morbid formations are different, — 1st, from the products of ordinary inflammation, occurring in a previously healthy constitution; — 2nd. from other morbid growths, as shown in the article on Scirrhous and other Morbid Tumours. The scrofulous change, matter, or deposit, present various appearances, superficially, according to its stage, its seat, and the alteration of the surrounding tissues; yet it is essentially the same, at each of its stages, whether it is formed in a scrofulous external gland, or in an internal organ. It varies chiefly in grade or stage, or in the successive changes which it undergoes, and in the form of its infiltration, especially at an early stage. Opinions, however, on these and other allied topics are extremely various, but I shall notice the chief of them.

65. *A. The Physical or Anatomical Structure of Scrofulous and Tubercular Matter.* — (*a.*) As respects *scrofulous* or *enlarged superficial lymphatic glands*, the difficulty has been to demonstrate the changes which take place at the commencement, or at an early period of this disease. The question to be solved respecting them is whether the tubercular deposit, which is undoubtedly the chief change even in them, is the primary mani-

fest lesion, or whether the increased vascularity often attending this deposit, is the primary morbid alteration? This question will, however, be more fully considered in the sequel, but before it can be entertained, the appearances presented by the scrofulous deposit, in various situations and seats, require to be noticed. The most obvious change in a scrofulous gland is its increased size. Lloyd and Soemmering ascribe this enlargement chiefly to thickening and increased vascularity; but it is more certainly owing to tubercular infiltration, in patches and rings, throughout the structure of the gland. The gland often remains in a stationary condition for a long time, presenting a granular yellow tuberculization, with little or no increase of vascularity, and with a permeable state of the vessels. But as the morbid deposits augment, the vascularity of the gland itself diminishes, or is gradually obliterated, owing to the pressure of the infiltrated matter, although the vascularity of the cellular tissue surrounding the gland is increased. Bredow considers that the vessels found early in scrofulous glands belong to the tissue of the gland itself, and not to the scrofulous deposit in it.

66. Tuberculous matter, then, is infiltrated in the tissues of a gland, organ, or part. Sometimes traces of those tissues may still be recognised in the tubercular mass. It is only in such cases that any appearance of blood-vessels can be traced, the vessels being merely those belonging to the infiltrated tissues. In other cases, the tissues, being more and more compressed by the increase of the tubercular matter, almost or altogether cease to be distinguishable, and nothing is to be found but a homogeneous mass of this matter. In some instances, the mass is isolated by degrees from the surrounding living parts, and a cyst becomes formed around it, as is formed around pus or any foreign body. Here there is a close analogy between the formation of pus and tubercular matter, either of which being infiltrated into the tissues of the part in which they are found, and afterwards becoming isolated by impacting the tissues around them into a cyst. According to Meckel (*Pathol. Anatomie,* 2ter Bd., 2ter Th., s. 370.), the encysted state of tubercles is more frequently met with in the lower animals than in man.

67. Kingston, Thompson, and Lugol, however, maintain that they have recognised blood-vessels in tubercles; but Canstatt remarks that Sebastian explains this rightly in viewing it as a mistake, arising from the circumstance of tubercular matter being sometimes deposited on a small blood-vessel without giving off a branch to this deposit. Andral, Rochoux, Carswell, Canstatt, and others agree in asserting that lymph-vessels do not communicate with the scrofulous deposit.

68. MM. Barthez and Rilliet infer— 1stly, that, when a *lung* contains grey granulations isolated from one another, an injection penetrates easily by the bronchi and by the pulmonary arteries and veins; — 2nd. That the vascular network which surrounds the granulations communicates very evidently with the pulmonary artery, and probably not with the vein; — 3rd. That the bronchial injection surrounds on all sides the grey granulation, and conceals it in part only: it is not disposed in very fine ramifications similar to a vascular lacework, but in little grains united to one another; and 4th, That perhaps the bronchial injection can penetrate the granulations. A respects the semitransparent, grey infiltration, ey state that there the veins and pulmonary ar ies are very penetrable by injections, whilst the all bronchi are obliterated, which latter fact is si lar to what is observed in pneumonia. Thes observations, however, do not prove the vascu ity of tubercular deposits, but rather that this de sit, as respects the lungs, often takes place in the esicular structure or air-cells of the organ, as pposed by Magendie, Cruveilhier, Carsw ll, Andral and Kingston. That the vessels be me obliterated with the progress of tubercula infiltration is contended for by Guillot and nstatt, according to whom the tubercle its is always non-vascular, but around the mas or around the cavity left by it, an infiltrated la of grey matter exists, which obliterates the vess in the space that it occupies.

69. Dr. Glover remarks on this topic, that ese facts and observations, taken together, lead the conclusion of the vascularity of tubercle be a non-essential phenomenon; and that the obl ation of the vessels of the tissue into which the ofulous or tubercular matter is effused ma be carried to a greater or less extent. And it fu er agrees with my own observations, that the i ation produced by the infiltrated matter in the urrounding tissues may cause either increased v ularity, or in some instances obstruction o he vessels, — and that the enveloping tissue o he tubercular mass may thus be either more o ess vascular or devoid of vessels; but that tuber ar matter is itself non-vascular.

70. The tubercular deposit, whatever ma be its seat, may be viewed as a small tumou or tubercle, varying remarkably in size, from at of a small pin's head to that of an orange; a in colour from a greyish, semi-translucent hue a yellowish white or greyish yellow, commonly a round form, at first firm but friable, afterw ds being transformed into an heterogeneous m er consisting of whitish, curdy masses and a opuriform fluid. When the tubercle is changed t his state, it generally gives rise to an ulcerous ca y, which extends more or less rapidly in every ction, sometimes remains stationary for an inde te period, and, in much rarer cases, becomes atrized, or covered by a sero-fibrous lining.

71. (*b.*) Much discussion has arisen as t he *earliest recognised form and appearance* of the tu rcular formation. M. Laennec conceived, tha ne white opaque corpuscle, constituting tuberc is preceded by a greyish, semi-transparent gra e, in whose centre is developed a whitish p t, which by degrees extends to the surface, an nvolves the whole substance of the granule so that the granule is really the first stage of tube e. Dr. Baron and M. Dupuy believed that t rcles originate in a transparent vesicle. M. An l has endeavoured to ascertain the accuracy of is opinion: and he states that it is quite certain t, in some few cases, small, round, transparent icles, filled with a serous fluid, are found a g with undoubtedly genuine tubercles of va us sizes in the lungs of the horse; but that he as never been able to find this appearance i e human subject, excepting in one solitary case. e has sometimes seen the fluid, contained in se vesicles in the horse, lose its transparency and ecome turbid; and the entire vesicle thus as ne

th aspect of the opaque, white tubercles around it. From this M. **Andral** infers that the transpent vesicles found in rare cases among tuberc are only accidental productions, with which th latter are complicated; that they cannot be csidered as the early stage of tubercles; and th, although they occasionally seem to secrete a nter similar to that observed in the early stages oubercles, yet this does not prove identity.

2. M. **Andral** further contends that the origl form of tubercle is not a serous vesicle, nor areyish semi-transparent granule, as **Laennec** mntained. The opinion of this latter pathologist reccting the origin of tubercles in granulations hled to the notion, that the small, greyish, irregrly rounded bodies sometimes found studding tl free surface of serous membranes, are incipient tuercles. M. **Andral**, however, more correctly vs them as the mere rudiments of false membes; and a similar mistake has been made in csidering as incipient tubercles, those greyish gules sometimes found in mucous surfaces, wch seem to be merely mucous follicles in a state oenlargement. The identity, therefore, of the gulations found in different organs and surfaces w tubercles is not proved, although those granulns are frequently complicated with tubercles, a may secrete tuberculous matter as they may sete pus.

3. M. **Cruveilhier** has advanced another oion, namely, that before the occurrence of tuercle as a hard body, and at an earlier period, itmay be detected in a fluid puriform state. MI. **Trousseau** and **Leblanc** have, as well as **Cuveilhier**, found among well formed tuberc clusters of points, in some of which was a plent infiltration, in others very small abscess. M **Andral** has seen, in a few cases, a similar aearance; but although those facts seem to o some confirmation to M. **Cruveilhier's** oion, yet the same objection applies to it as I he already adduced. It is probable that tuberc are secreted in the fluid state, but the fact is n demonstrated; and, however small tubercles m be, they are always found in the solid state. I ave observed these bodies in the lungs of very yng infants, and of the fœtus at the full time — wre they are extremely rare — but they have aays presented the solid or consistent form.

4. It may be granted, as contended by M. **An**d**l**, that tubercles are in their first stage when they aear as minute, opaque, friable, rounded bodies o yellowish-white colour, and without any trace oorganisation or texture. But this is not the o form in which they may commence. Besides te *yellowish miliary tubercles*, there is another fn, which, since the appearance of the writings o**Bayle**, has been the subject of much discussion, nely, *the grey, semi-transparent granulations*, wch, according to **Laennec** and **Louis**, are the f degree of development of tubercle, the miliary yowish tubercle being only a transformation of t greyish granulation. This is, in fact, confed by microscopic observation by **Lebert**. (35.) The grey granulations, transparent towds their margins, and sometimes also at their ctres, often show in this latter situation a point re opaque and yellower than the rest. They a not surrounded by any envelope. They do not cstitute the necessary and constant origins of fy developed tubercles, but are only one of *two forms which these bodies assume at their commencement*, the yellowish miliary tubercle often commencing as such, and sometimes being a transformation of the greyish granulations. Tubercle may, therefore, at its commencement present either of these forms; or it may appear as a grey and yellow infiltration, as a gelatiniform infiltration, or as tuberculous dust, according to French pathologists. It was supposed that the grey granulations occurred only in the lungs; but it has been shown by MM. **Valleix**, **Papavoine**, **Nelaton**, and others, that they are found also in other organs.

75. In scrofulous meningitis grey granulations and yellow particles are observed as in the lungs. The former may also be detected in the glands, especially in the mesenteric glands, and between the coats of the intestinal canal. **Barthez** and **Rilliet** also view the grey granulation as a form of incipient tubercle, not peculiar to the lungs, but existing occasionally in other organs, as under serous membranes, in the spleen, kidneys, liver, lymphatic glands, &c. It is chiefly developed in the cellular tissue, especially that connecting serous or other membranes to adjoining parts, and is often produced by congestion or by a mechanical hyperæmia. It is not improbable that the grey and gelatiniform infiltrations of **Laennec** are early stages of tubercular formations. The gelatiniform infiltration may pass into a grey infiltration, and this latter into a grey granulation, which may or may not go on to the state of yellow tubercle. The tubercle-grains, whether yellow, miliary, or semi-transparent granulations, are most separated and scattered when small, or at an early stage of development. As they increase in size, they often become confluent. In the lungs more especially, they present every grade or stage both of change and development: — There are often found, even in the same subject, the grey or semi-transparent granulation, rarely alone, but usually accompanied with yellowish granulations; the small miliary tubercle, quite yellow and caseous; tubercles much larger; masses more or less softened, or even cretaceous cavities, &c. In many cases death supervenes before a large proportion of the minute greyish tubercles, or granulations, has reached more advanced phases of their growth or progress. In many instances, greyish granulations are found as the commencement of tubercular disease in one organ, and the yellowish miliary tubercle in another organ or part. It is not rare to find in young children the latter in the sub-arachnoid cellular tissue, and the former under the pia mater. Grey granulations are often found in the sub-pleural cellular tissue, and yellowish tubercles in the lungs.

76. (*a.*) *Grey granulations* are ound to possess the globules of tubercle from their earliest appearance (see the microscopic appearance of tubercles, § 81.), and may exist in every part in which tubercle has been detected. — *b.* They are not a product of inflammation, although they may be found in inflamed structures. — *c.* They are most abundant and most frequent in the lungs and in the pia mater. — *d.* They are sometimes accompanied in the lungs with a dark or melanotic secretion. — *e.* When death does not take place early, they generally pass into the form of *yellowish tubercles*, by the destruction of the fibriles which separated their constituent elements and by the

progressive deposit of the tubercular matter. — *f.* *Tubercles* do not necessarily commence in the greyish semi-transparent granulations, but also as frequently commence as yellow and opaque miliary tubercles. — *g.* In the same body both these forms of commencing tubercle are not unfrequently found, not only in different organs, but even in the same organ.

77. (*d.*) *Growth.*— Besides the transformation already stated (§ 70.), and previously to it, tubercles experience an *increase of bulk.* It seems important to ascertain how a body of the size of a small pin's head may acquire the bulk of a small orange. To account for this remarkable development, it has been supposed that this morbid production has the power of living like organised beings — of growing by intus-susception. But if this were the case, it would show appearances of organisation and vascularity : now, however large the tubercular mass may be, no trace of either the one or the other can be detected in it. We can, therefore, view this formation merely as a morbid secretion, which, having once commenced, continues; the deposition of the particles of tuberculous matter separated by the vessels from the blood increasing the mass.

78. (*e.*) The *softening* of tubercles, or the puriform transformation of them, seems to arise from the circumstance of their acting as foreign substances on the surrounding tissues, the tubercular matter exciting a secretion of sero-puriform fluid from those tissues. This fluid divides mechanically the tubercle, and changes it into the state usually termed that of softening. The tubercular matter being once secreted in the tissue of an organ or part, thus becomes, after a time, a source of irritation to the vessels of the tissue in contact with it ; and the consequence of this is the effusion of a fluid secretion which breaks down the tubercular matter. The semifluid matter thus formed tends to perpetuate and to increase the irritation of the surrounding tissue, and necessarily leads to a solution of continuity by which a way is opened for the escape of the tubercular matter, as in the case of a foreign body. But even after this has been accomplished, the morbid process excited in the surrounding texture generally continues. This theory of the softening of tubercles does not differ materially from that adopted by MM. LOMBARD and ANDRAL. After the expulsion of the tubercle has been accomplished, the process of suppuration may continue, and, moreover, the same cause which had produced the tubercle before, may produce it again ; the same process which eliminated it may contribute to the renewal of its formation : so that, far different in this respect from a foreign body introduced from without, the tubercle may be indefinitely recreated simultaneously with the pus destined to produce its discharge. It has been asserted by ROKITANSLY, MR. RAINEY and several pathologists, that the softening of tubercles always commences at their centres : this is certainly the case in many cases ; but the process may also begin in other parts, and particularly towards their surface. When it commences in the centre, it may be imputed to a decomposition taking place in those molecules of the mass first deposited and furthest removed from the surrounding living tissues.

79. (*f.*) In rarer instances tubercles, in place of being softened, acquire unusual hardness, are *transformed* into a firm gritty mass, in wh a considerable quantity of the phosphate carbonate of lime is found upon chemical a lysis. These salts likewise exist in the soften as well as in the early stage of tubercles, but much smaller quantity. The transformatio the tubercles into a harder substance seems proceed from an absorption of a considera portion of the animal matter of which they chi consist. M. THENARD found tubercles, in t primary or unsoftened state, to consist, in parts, of 98·15 of animal matter, of 1·85 of muriate of soda, phosphate of lime, and carbo of lime, with a trace of oxide of iron ; wh those tubercles which had undergone the cr ceous transformation presented inverse proport of those substances : that is, in 100 parts, of animal matter, and 96 of saline matter.

80. The *cretaceous transformation* occurs n commonly in those cases where the tubercles h long ceased to exert any hurtful influence on constitution, this being the reverse of the pu lent transformation. This change has been monstrated to me in several cases, three of wh occurred in medical men. I shall briefly allud one case, as having lately come before me. young man, about twenty, evinced symptom incipient phthisis, for which he was recommen to visit the Mediterranean. After being ab for several years he returned to London in a lerably good state of health. I attended some time afterwards for an attack of pa bronchitis, during which he expectorated tw three cretaceous masses, evidently transfor tubercles : He recovered, travelled abroad returned again to this country, where he contin for a considerable time in apparent health. was afterwards attacked — about twenty y subsequently to the appearance of phthis symptoms—by an acute disease of which he d Upon examination, a considerable number cretaceous tubercles were found in the lu which were not otherwise much diseased. may generally infer that, when symptoms h announced the presence of tubercles, and h subsequently disappeared, the patient contin afterwards to enjoy tolerable health, the cretac transformation of the tubercles has taken pl M. ANDRAL states, that he has occasionally fo surrounding the cretaceous tubercle, a tissue appears shrunk, and occupies less space tha the healthy state ; indicating that, in some cas least, this tissue has actually been in part stroyed and absorbed, along with a tuberc mass, whose remains appears as a calcareous cretion. This inference is further confirmed the fact of tubercles being sometimes found, in the softened state, containing hard gritty ticles, formed of phosphate of lime, mixed the curdy masses floating in the puriform flui

81. Tubercles being produced from a mo state — whatever kind that may be — of nutrition, and interstitial exhalation consta going on in the different organs of the bod follows that they may be developed in any on more of them. As to the particular tissu which this morbid exhalation or secretion t place, some doubt may be entertained. The general diffusion of tubercles and other c derations indicate the cellular tissue, either fr

mbined, as its seat; but although this tissue y be the most common, it is not the only seat this secretion. It should, however, be stated t Dr. Baron refers it to the radicles of ab- bent vessels, and some circumstances seem to pport his opinion. M. Andral remarks on this ic, that "the submucous, subserous, and in- muscular tubercles are evidently developed, in cellular tissue. It would be difficult to prove t the same holds good of tubercles of the een; and we can admit it only by analogy in se of the brain, liver, kidneys, testicles, and nphatic glands." As to the lungs, we may dily detect tubercles in the substance of the lulo-vascular tissue which forms the parietes of air-vesicles, and the extremely small bronchial es opening into them. An apparently tuber- lous matter, he adds, has been found in the erior of cavities lined with mucous membranes, hout the presence of ulceration. This rare currence leads to the inference that tubercles y be secreted in other tissues than the cellular; proves that, as they arise from a morbid state the interstitial exhalation constantly proceeding the different organs and tissues of the body, y cannot be referred to a single tissue or sys- n merely, however generally diffused through body such tissue or system may be.

82. *B.* The Structure of Tubercles as dis- ayed by the Microscope.—The lower micro- pic powers furnish but little information as to intimate structure of tubercles; and those o have employed the highest powers differ to the most important topics connected with s subject Even the results published at dif- ent times by the same observers differ re- rkably. Thus Canstatt states, that "every ce of organised structure is wanting to tuber- -matter: vessels which have been observed in either belonged to false membranes developed its bounds, or were the remains of tissues ac- ently destroyed." And he adds that, "mi- scopically observed, the peculiar fine tissue of ganised bodies, growing by intus-susception and mposed of cellular cytoblasts, is wanting to ercle-matter. A mass, composed, in great part, imperfect cells easily broken down, is only tinguished. As the tubercular deposit increases m without, the tubercle grows by apposition, d in this way increases from tubercle-molecule tubercle-mass, formed of layers placed concen- ally. The outer layers more recently deposited nsist of a more transparent matter. This mode growth forms an essential distinction between ercle and idioplastic parasitical formations, ich increase, like organised beings, by intus- sception, whilst tubercle grows more like in- anic bodies." But Canstatt afterwards states t, contrary to his earlier view of cell-formation ing wanting to tubercles, he has since con- nced himself of the existence of cells, as Vogel scribes them; and he recalls what he had for- rly said about the amorphous condition of tu- rcle. He adds, that "Scharlan describes tubercle grains as an accumulation of minute rpuscles about the $\frac{1}{2000}$th of a line in size, which many situations form a dark blackish grey anulated mass; and that Gluge and Cerutti e a similar description. The observations of uhn as to the papillary appearance of tubercle der the microscope, rest on an illusion. The peculiar bodies, described by Gruby in tubercular sputa, as consisting of whitish-yellow lenticular, round, or oval corpuscles, from one to ten times larger than pus-corpuscles, of a darker yellow, and of concentric layers, are not confirmed according to others, and appear to have been a misconception. Tubercle consists, at its commencement, according to I. Vogel, of an amorphous mass, which almost disappears in acetic acid, and even in ammonia, and in which the rudiments of cell-formations are already found; this mass gradually passes wholly into tubercle cells, of very different sizes, from the $\frac{1}{80}$th to $\frac{1}{400}$th of a line, and of different forms." Vogel further states that these cells are either rounded, or oval, or long, or drawn out, tailed, or string-like, irregular, &c., with very pale walls, with nuclei which are larger in the small cells, smaller in the larger; and that they often contain fat granules, or granules of dark pigment. The walls of these cells become more transparent, or wholly disappear by means of acetic acid, whilst their nuclei remain unchanged. Both the cells and the nuclei are destroyed by ammonia. Vogel, notwithstanding, agrees with Vetter in considering that, although the presence of cellular bodies is proved in tubercles, these bodies may be distinguished from the usual formative cytoblasts; the organic elements found in tubercles being rather the rudimentary portions or altered remains of other tissues, than independent bodies.

83. The individual corpuscles of tubercle are, according to Ruette, composed of an integument and a nucleus; and are rather larger than blood-globules. Bredow says that he could find no integument to the corpuscles. Scherer found the firmer or outer portion of tubercle to consist of a multitude of little granules and nuclei mixed with a few irregular larger cell-granules; but no fibrous structure, nor free fat corpuscles. The softened inner portion contained nuclei of granular corpuscles which were as large as the round nuclei of the more solid outer part. Gerber asserts that tubercles consist almost entirely of granules, from $\frac{1}{2000}$th to $\frac{1}{200}$th of a line in diameter; but that, with the granular matter, nucleoli, nuclei, or cells are mingled in a quantity in proportion to the amount of fibrin which the exuded fluid contains.

84. Mr. Gulliver states in his edition of Gerber, that tubercular matter consists "chiefly of irregular corpuscles and cells, with oblong and circular nuclei;" and that it is "void of regular structure, being composed of shapeless fragments, and a granular matter formed of minute spherules very variable in size." In Mr. Phillips' work he is quoted as follows:—"In the human subject, it appears to me that crude tubercular matter, from whatever organ obtained, differs as little in its microscopical, as in its general and chemical characters. When examined by the aid of the microscope crude tubercular matter can scarcely be said to present any regular structure, as it is merely made up of minutely granular matter, oily spherules, some shapeless albuminous flakes, or shreds, and a few irregular corpuscles; the latter are probably nothing but effete, or shrunken primary cells." (p. 41.)

85. M. Lebert remarks that tubercles present microscopical elements proper to themselves, and distinguishing them from all other morbid pro-

ducts. In this respect they obey the general law, that all existences which are really different pathologically, differ also in respect of molecular composition. Tubercles, according to M. LEBERT, contain a great quantity of molecular globules varying in diameter from $\frac{1}{1000}$th to $\frac{1}{800}$th of a line, a hyaline substance which unites their elements, and a species of corpuscle which gives them a peculiar character. These corpuscles are of irregular angular form, vary in diameter from $\frac{1}{200}$th to $\frac{1}{300}$th of a line, and generally present a well defined edge, Their interiors are yellowish, slightly opaline, and often contain molecular granules distributed through their substance: they never contain true nuclei, which are so common in cancerous globules, and so constant in those of pus. Acetic acid, which renders the latter transparent, and displays nuclei within them in a very distinct manner, renders the tuberculous corpuscles also more transparent, without disclosing true nuclei in them. If water be added to the tuberculous corpuscles to make them float, their form is seen to approach that of an irregularly polyhedral sphere, instead of being flattened like the globules of pus or cancer. They are numerous, and present so many super-imposed layers in the best microscopical preparations, that it is necessary to have observed them repeatedly, and with a clearly defining magnifying power of from 400 to 500 diameters, in order to acquire an accurate notion of their characters.

86. The ordinary element of tubercle, according to Dr. GLOVER, in whatever situation this deposit may occur, is the granular corpuscle. "Many tubercular masses are composed almost wholly of this matter, which varies in size, from about the bulk of a blood-globule to about, perhaps, $\frac{1}{10000}$th of an inch in diameter. These corpuscles are generally of a somewhat yellowish colour; and when magnified by the highest power (610 diameters), show, occasionally, spots in their substance, which may possibly, in some cases, be nuclei." Mixed with these, which he believes to be in some instances altered cells, in other cases new formations, there are the following elements: —1st. Epithelial scales, variously altered, observed in lung-tubercle; 2nd. Fat globules; 3rd. Crystals of salts; 4th. Portions of the destroyed tissues, which sometimes assume singular shapes; 5th. Cells, which also appear to belong to the old tissues; 6th. Large granular and corpuscular masses of the most irregular forms. The description of tubercle by Dr. J. HUGHES BENNETT has been adduced at another place. (See SCIRRHOUS AND OTHER GROWTHS, § 71.)

87. Microscopical examinations of tubercle and scrofulous matter have also been made by Mr. DALRYMPLE, and published by Mr. PHILLIPS, as follows: — "The whole material is composed of disintegrated tissue; granular molecules; irregular exudation corpuscles, in which the nucleolus is seldom to be recognised; and a considerable quantity of oil globules, which may be abstracted by boiling in æther, and recovered by evaporation on a plate of glass."

88. The following remarks of Mr. DALRYMPLE are *diagnostic of tubercular matter*, inasmuch as they distinguish this matter from the *pus-globule*, and from the exudation-corpuscle: — "In acute or chronic inflammation of the *glands, in otherwise healthy subjects*, in whom no particular morbid disposition exists, the *exudation corpuscle*, y what appears a law of vitality, proceeds to e development of a cyst around the nucleus cytoblast; and this nucleus even splits into t or more, and hence a *pus-globule* is formed. this point, however, the process stops, aud the p globule subsequently disintegrates, and is resol into granular and fluid matter. During development of the cell and fissure of the nucle a pus-globule may be said to be an organic vitalised body, deriving its means of increase fr the blastema around.

89. "The *exudation corpuscle*, however, is pable of a much higher degree of organisati and, under favourable circumstances, the c germ produces its cell; the cell elongates, either fibre or filament is produced, as in healing of a wound.

90. "In *scrofulous matter* it appears that exudation corpuscles do not possess even t feeble power which induces the further cha into pus, and therefore it passes from the nucleola cytoblast into an irregular granular body (di tegrated), the elements of which, by some furt chemico-vital process, resolve partially into oil fat globules." (p. 40.)

91. *C.* THE CHEMICAL COMPOSITION OF SCRO LOUS AND TUBERCULAR MATTER. — M. SIM remarks, that chemical analysis has hitherto thro very little light on the nature of *tubercle*, or the mode of its formation. A tubercular ma analysed by PREUSS, contained 19·5 of solid c stituents, and 80·5 of water, the former w composed of a substance resembling casein in relations towards acetic acid and heat, a fat c taining cholesterin, and a very small quantity salts. SCHERER, according to Dr. DAY, sta that crude pulmonary tubercle yielded little fat extractive matter, showing that the morbid proc was not far advanced. An ultimate analysis, af the most careful removal of salts and forei constituents, gave: —

Carbon	53·888	Which corresponds wit the Formula C 43, H 3 N 6, O 13.
Hydrogen	7·112	
Nitrogen	17·237	
Oxygen	21·767	

Hence tubercle in a crude state may be regard as *protein* (C 48, H 36, N 6, O 14), from whi five atoms of carbon, one of hydrogen, and one oxygen, have been removed. SCHERER has ma several other analyses of tubercles from differe parts of the body; but they differ as little as, a sometimes less than, the above from the compositi of protein. (See Dr. DAY's Transl. of SIMO *Animal Chemistry*, vol. ii. p. 480, &c.)

92. GUETERBOCK has also analysed tubercl from the neck, from the bronchi, and from t lungs; and he states that they contain, — 1 Albumen in small quantity; 2nd. Pyine differi from casein; 3rd. Phymatine, a species of osm zome, which, according to him, is proper tubercles, and which is soluble in water and alcohol, is precipitated by the acetate of lead, b not by galls, nor by the solution of the sulphate copper; 4th. Fatty matter, not only cholesteri but also saponifiable fat. As to Phymatine, principle which GUETERBOCK says is proper tubercles, its existence requires to be proved t other analyses. Tubercular matter has bee chemically examined by BOUDET, HECHT, ar

ıers ,but the analyses of Preuss and Scherer pear to be most satisfactory; and to them M. ;bert has given the preference.

93. ii. The Blood in Scrofula and Tu- rcles has been long considered popularly, and th much truth, to be of a poorer quality than healthy constitutions. Simon states, that e blood is deficient in solid constituents, es- cially in fibrin and in corpuscles. The mary causes are probably due to a deficient mation of chyle, and to the influence of a most healthy atmosphere. According to Dubois, the ood of scrofulous subjects coagulates slowly, e clot is small, soft, and diffluent; the serum thin, and often a reddish colour. Under the croscope, some of the corpuscles appear devoid colour at the edges only, some entirely colour- s. Their size is not materially changed, but ey appear flattened, spherical or cylindrical. ence he infers that there is a deficiency of the ts in the blood of scrofulous persons. Mr. hillips remarks that, in every case in which he amined the blood of scrofulous subjects, the agulum was relatively small, the serum large; e clot unusually soft, almost diffluent; in a few stances only, it was tolerably firm. In most ses the proportion of globules was considerably der the healthy standard. The fibrin had not nerally undergone much change. He states at there was in most instances a considerable crease in the proportion of albumen and of e salts, the latter being in some cases nearly uble.

94. The state of the blood now mentioned rtainly exists, as far as my own observation has tended, especially the deficiency of red globules d the increase of albumen. I have not found y diminution of the salts; but the fibrin has ried with the state of vascular action, an in- ease of this action and the association of lammatory action with the scrofulous or tuber- lar lesion augmenting the quantity of this nstituent. As external scrofula becomes more d more chronic, and as suppuration or ulcera- n continues, the blood becomes more watery d poor, the red globules diminish, and the clot more soft. These results are also observed ring the advanced stages of internal tubercles, shown more fully when treating of *Tubercular nsumption.* The changes in the blood are well scribed in Dr. Glover's work on Scrofula, to ich I refer the reader.

95. iii. The states of the Secretions and cretions in scrofulous and tuberculous per- ns have not been satisfactorily investigated; and less in protracted and in the most severe cases, ey probably do not present any very obvious anges from those usually observed even in althy persons.—(*a.*) The frequency of a fatty te of the liver in persons who have died of scrofu- us disease or of tubercular consumption, has been puted by some to a deficient secretion of bile, d to the circumstance of the *bile* containing a uch less quantity of its fatty constituents, which e not separated from the liver by means of its creting function. But the changes, whatever ey may be, which exist either in the liver, or the bile, or even in the chyle, are to be im- ted chiefly to the previous alterations of organic rvous energy, to the state of the blood, espe- lly in respect of the amount of red globules, and to the amount of function performed by the lungs.

96. Fischer and Disse contended, that scrofulous persons suffer from disordered states of the gastric secretions; and the existence of a specific scrofulous dyspepsia was not only asserted, but minutely described, by certain recent writers, who considered this supposition not merely a remarkable distinction, but as an important discovery. That the gastro-intestinal secretions should be changed more or less from the healthy condition throughout the course of scrofulous and tubercular affections, cannot be doubted. Organic nervous power, upon which secretion, assimilation, and nutrition are chiefly dependent, is more or less impaired in scrofulous constitutions; and hence the digestive and related functions must necessarily be co-ordinately disordered, whenever the usual causes of disorder of these functions are in operation. As organic nervous energy is more and more weakened, and as the blood becomes thinner, or poorer, or more watery, owing to the consequent impaired digestion and assimilation, the usual phenomena attending these states of disorder may be expected to appear from even the slightest causes.

97. (*b.*) The state of the *urine in scrofula* has been investigated by Canstatt, Disse, and Glover, but they have remarked no definite change in this excretion when the urinary organs are not especially implicated, and when the functions of the skin are not materially disturbed. When, however, these functions are either impaired, or arrested, or, on the other hand, much increased, the urine is generally vicariously changed accordingly, not merely in quantity, but also as respects its ingredients; much, in either respect, depending upon the nature and amount of the ingesta.

98. According to Simon, the urine of children of the scrofulous diathesis differs in the majority of cases from the normal state. It is usually pale, but becomes deeper coloured when there is vascular excitement. Its specific gravity is lower than in health, and it is often much more acid than the urine of children usually is. Schönlein states that the principal changes in the urine of scrofulous persons consist in the diminution of the nitrogenous constituents — the urea and uric acid, and in the appearance of the non-nitrogenous oxalic acid, and occasionally, but more rarely, of benzoic acid. The acids are frequently so abundant, that the urine, upon cooling, deposits copious sediments of the oxalates, and these sediments sometimes form renal and vesical calculi. The frequent occurrence of oxalate of lime or mulberry calculus in children is well known. Dr. Prout has remarked, that half the stone-cases occur before the age of full puberty.

99. iv. The Pathogenesis of Scrofula and Tuberculosis. — *A.* The operation of the causes above described, either singly or in succession, or more or less in combination, is manifestly such as tend *to weaken the organic nervous energy*, and thereby to depress the digestive, the assimilating, the nutritive, and consecutively the depurating or excreting functions. The organic nervous system actuates these several functions, and is itself influenced by the physical agents which perpetuate animal existence, — by external agents, and by the ingesta. The causes which have been now

considered, whether those acting on the parents of the scrofulous subject, or upon the scrofulous individual himself at a very early age, or even at later periods — whether external, or internal — whether hereditary, congenital, or acquired — have all a similar tendency, namely, directly to depress, or to exhaust organic nervous or vital power; and thereby to impair vital resistance, to prevent the processes of repair consequent upon morbid vascular action, and to arrest the formative or organising tendency of the exudations produced by this action. Not only is there a disposition to a dyscrasy — to a solution of vital cohesion, observable in parts the seat of scrofulosis, but there is also an absence of the formative effort in the fluids exuded by morbid actions in scrofulous constitutions. The state of vital power or endowment in the several tissues or organs of scrofulous persons, appears insufficient both for the healthy or sthenic actions or functions these parts should perform, and for the organisation of the fluids or matters effused from their vessels. Hence the changes which the exuded matters undergo, neither favour, nor are followed by, organisation even in its lower grades; and, most probably the fluid itself is exuded from the capillaries of a kind and in a state which indisposes it to organisation. It consequently undergoes changes independently of any formative tendency, these changes being chiefly those of increase by aggregation of the tubercular molecules, until the irritation produced by the morbid deposit affects the enclosing tissues, and thereby favours the progressive changes produced in this deposit, as mentioned above (§ 78.).

100. It must be manifest, that, admitting the more immediate and direct operation of the causes of scrofula on the organic nervous system, and through this system upon the functions which it actuates, the *blood* itself necessarily must be, sooner or later, or even from an early period of the action of these causes, most materially altered; and thereby become furnished with the elements of the morbid materials, or even with these materials themselves, which are deposited in certain parts in preference to others, owing to the states of organic nervous, or vital power in these parts. That the blood is actually so changed is not very demonstrable in many instances, especially early in scrofulosis, or where the scrofulous taint only exists; but that it is more or less changed, in the majority of instances, even in these, is made evident by careful inspection and by chemical analysis, the secretions and excretions ultimately becoming more and more altered. It has been repeatedly shown, that not only is organic nervous power more or less weakened, but the blood also is manifestly thinner, or poorer as respects the amount of red globules, and even otherwise altered. Thus the *organic nervous influence* in the first place, and *the circulating fluids* in the second place, are the *prime factors* of both the scrofulous taint, and of the more diseased grades of this taint, as manifested by external or internal tuberculosis.

101. *B. The origin and source of scrofula and tuberculosis* may be readily inferred from what has been advanced above as to their *causes*, and as to the *operation* of these on the organic nervous power, on the digestive and assimilative functions, and upon the blood and vascular system generally. When it is considered, that the state of the circulation in the capillaries, the changes of the bl in them, and the exudations which take pl from them, are controlled most remarkably the organic nervous influence, it will be admi that to this influence or power the primary mo change should be imputed; and that, in whate tissue or part this power is the most impaired most languidly exerted, or most depressed external or physical causes, or by internal inge or most affected by hurtful agents, in these tiss parts, or organs will this primary change nervous power affect the capillary circulation respects not only the state of the capilla themselves, but also as regards the condition the blood they contain, and of the exudati from them. Whilst, therefore, the *origin* of scrofulous taint may be ascribed to the org nervous system, and to its influence upon digestive and assimilating functions, the *sourc* the morbid deposit may be traced to the state the blood, and to the exudation which takes pl from the capillaries in the seat of lesion.

102. *C.* The *nature* of the changes constitut scrofula and tuberculosis, must be manifest from character of the causes which produce these chan primarily in the organic nervous system, consequently in the assimilating functions and the blood itself. These changes are, as resp this system, a state of depression, or of weakn or asthenia; as regards the assimilating functi a state of impairment or insufficient action; respects the blood, a deficiency of red partic and an increase of albumen; and as regards capillary circulation, a languid condition, amou ing to congestion in some organs or parts, varying in grades of passiveness, and occasion an exudation or deposit of the morbid matter tubercle in the tissues, whose capillaries are t more especially affected.

103. v. AS TO THE STATE OF VASCULAR ACT PRODUCING TUBERCLES, much discrepancy opinion exists. There are, however, three w ascertained facts connected with the origin these bodies, calculated to lead to an accur opinion on the subject:—1st. Their frequen simultaneous formation in different organs; 2 The very frequent absence of any apprecia symptoms of antecedent excitement, increas action, or congestion of the capillaries of the p in which they originate; — and 3rd, their v general origin in states of the frame remarka characterised by deficient vital energy and imperfect development; and consequently up *causes*, as shown above (§ 99. *et seq.*), which, respects both the parents and the offspring, depr or exhaust vital power and sthenic action, a impair the assimilating and nutritive functions.

104. *(a.) The presence of tubercles in several gans at the same time* has been explained by supp ing that the tubercular matter has been absorb from the original seat of its formation, introduc into the circulation, and re-secreted or deposit in the parenchyma of other organs, the case bei the same with tubercular matter as with pus. will not deny the possibility of this occurring; b there is no decisive proof of it. Besides, this c hold good only with regard to the consecuti formation of tubercles, and not in respect of th simultaneous occurrence in distant organs. would be more consistent with the close observ tion of the phenomena of their origin to refer t

r, and even the former mode of their produc-
to defective vitality of the capillaries, and to a
ified state of the exhaling function these ves-
are constantly performing in the different
ctures; this function being modified by the
ctive state of vital endowment of those vessels.
general diffusion of this primary morbid con-
n — this constitutional taint — will account
he simultaneous, as well as for the consecutive
tion of several organs; the varied conditions
e textures and organs occasioning the diversi-
which are met with in respect of frequency
ability of each, the succession of attacks, and
us other peculiarities occasionally met with.

05. (*b.*) *The Localisation, or the Origin of Tu-*
les locally, has been ascribed to inflammatory
n by several pathologists. M. **Broussais**
am. des Doct. Méd. T. i., prop. 168.) said
he had never seen tubercles in the lungs
out antecedent inflammation; and Dr. **Alison**,
ome very able papers published between
0 and 1830, supported a nearly similar doc-
. This enlightened physician concludes,
at scrofulous tubercles may be, and often
deposited in consequence of inflammatory
n; and therefore, that as, on the one hand,
fulous diseases may be, in many cases,
ented by applying the *tonic regimen* to persons
eeble constitution, but not yet affected with
al disease; so, on the other, they may also be
uently prevented by the early and prudent use
e *antiphlogistic remedies* in those in whom the
t inflammatory complaints so often preceding
have already appeared."

06. *In opposition to the inflammatory doctrine*
ubercles, M. **Bayle**, who has directed much
ntion to this formation in connection with pul-
ary consumption, has expressed himself very
dedly. He contends, that tubercles are never
effect of inflammatory action, not even in its
nic form; and M. **Laennec** observes, that
nsive observation proves, that the develop-
t of tubercles results from a general disposition
he frame, that it takes place without previous
mmation, and that when inflammatory action
xists with tubercles, it is generally posterior
em in date. Moreover, the simultaneous oc-
rence of tubercles in nearly all the organs in
body, is opposed to the doctrine of their origin
flammation. According to M. **Louis**, inflam-
ory action, in some cases, influences the pro-
tion of tubercles, and, in other cases, it
ns to take no part in their formation. He fur-
remarks, that inflammation and tubercles
sionally co-exist without being necessarily de-
dent on each other; and that tubercles may be
eloped in the lungs independently of inflam-
ory action of any grade, whether in the paren-
ma of the organ, or in the mucous membrane
he bronchi. A similar opinion has been pub-
ed by MM. **Leveillé** and **Rostan**. In
ition to the argument derived from the *post-*
tem appearances, I may state, that in no class
he human species are tubercles more frequently
with than in negroes and other dark varieties
he species, particularly when they are removed
a colder climate than that of which they are
igenous; and yet inflammatory diseases are
lom observed amongst them. Whoever has
occasion to observe the character of morbid
ons in these races, must have remarked their immunity from inflammation, and their general liability to diseases of a very opposite character, particularly to those attended with diminished vital energy, and to tubercular deposits.

107. MM. **Andral**, **Lombard**, **Cruveilheir**, **Becker**, and **Schroeder Van der Kolk**, entertain a doctrine intermediate between the foregoing — an opinion not far different from that espoused by Dr. **Alison**, but leaning less to the inflammatory doctrine of the disease. They, however, admit the occasional origin of tubercles in a state of inflammatory congestion of the capillaries, preceded and accompanied by a constitutional disposition to tubercular productions. M. **Cruveilhier**, in his conclusions from the experiments, wherein he produced, artificially, miliary tubercles, by injecting fluid mercury into the veins of dogs, considers that these bodies are formed in consequence of a stasis of the fluid in the capillaries followed by a morbid secretion.

108. The opinion offered by M. **Gendrin** appears accordant with extensive observation of the causes, phenomena, and results of tubercular disease in man and the lower animals, and agrees with the experience I have had of this disease, particularly at the Infirmary for Children. This able pathologist states, that tubercles, during the whole of their early stage, are entirely independent of every form of inflammation; and that it is not until they begin to soften that the tissue surrounding them begins to be inflamed, this tissue then secreting a fluid which aids in dissolving the dense matter composing them.

109. It may be inferred, from an intimate view of the tubercular formation, that it consists of an exudation of a matter essentially different from that which is produced by inflammatory action; and that it proceeds from a modified state of the exhalent process constantly existing in living structures, owing to a weakened state of the vital endowment of the capillaries in the seat of the disease. The coagulating lymph produced by inflammation affecting the healthy constitution is susceptible of organisation; the concrete matter forming the tubercular secretion is entirely insusceptible of this process, the changes which it undergoes being chiefly the result of decomposition, and of the admixture with it of the fluid exuded by the vessels of the tissue immediately surrounding it. Accompanying inflammation, of whatever grade, attacking the sound or untainted constitution, there is always a disposition to organisation of its products; but in tubercular disease an opposite tendency obtains, — the capillaries exude a fluid, undergoing changes in which this vital process has no share, and inducing irritation and disorganisation in the parts in contact with it. In the former state of disease, the vital endowment of the capillaries is exalted, and an emanation of it serves to organise the inflammatory products; in the latter this endowment is diminished, and insufficient to prevent either decomposition of the matters secreted by it, or disorganisation from the slightest causes of irritation.

110. As to the opinion which refers tubercles *to irritation in the organ* in which they are seated, little need be said, especially as the abettors of this doctrine have failed to define the meaning they attach to the word irritation, and even leave it uncertain whether they apply the term to the nerves, or the extreme vessels of the part, or to

both. Even those who confine the term to the extreme vessels, leave us to doubt whether the terminations of the arteries, or the radicles of the veins or of the lymphatics, are its seat, and to puzzle ourselves with conjectures as to in what particulars irritation of a capillary vessel differs from inflammation, or whether it differs at all or not. Taking it, however, for granted, that those who espouse the doctrine of irritation, mean by the term an excited state of the capillaries, giving rise to augmentation of their organic action, but falling short of acute inflammation, it may be remarked, that neither the symptoms by which this state is recognised during life, nor the effects it induces in the tissues, are altogether similar to those produced by tubercles. It is true that tubercles, when once they are formed, occasion irritation in the tissues surrounding them; but this is an effect, and certainly not a uniform cause, of their formation. It is possible, also, that irritation, in any of the acceptations of the word, may sometimes occasion the development of tubercles in an organ; but this result will never take place unless with the concurrence of other causes, many of them proper to the constitution of the individual, or at least pre-existent to irritation; for wherefore should tubercles result from this vaguely supposed state, rather than from any other of the numerous changes to which it is so generally supposed to give origin, if it were not because other pre-existent and concomitant influences caused tubercles to be formed in preference to any other morbid production or lesion

111. The arguments which have been here stated in opposition to the opinion that tubercles proceed from irritation of the capillaries in the part in which they are formed, apply with still greater force to the idea of their origin in inflammation. After every consideration I can give the subject, I would infer that tubercles originate in a modification of the nutrient and exhalent functions constantly going forward in the organic structures, owing to defective vitality of the capillaries; and that when irritation, or inflammation, or congestion occur, they are either accidental and concurrent causes, or effects resulting from the accumulation or decomposition of the morbid exhalation in the particular form constituting tubercular productions. But this local morbid condition is only a part of a more general constitutional vice, manifested not only by the organic nervous energy, but also by the digestive, assimilative, and circulating functions, and even by the state of the blood.

112. vi. Of the Identity of Scrofula and Tubercles. — This topic would not have required discussion, if several authors of repute had not disputed the identity of those morbid conditions, more especially Scharlan, Schönlein, Dr. Evans, Dr. Chapman, and Mr. Phillips. Dr. Glover has ably reviewed the arguments which these writers have urged in support of the differences between them. But the operation of similar causes, hereditary, parental, and exciting; the appearance of both forms in the same family, and even in the same individual; the same diathesis, constitution, and states of the blood and secretions, and a similar grade of vital endowment, of vital cohesion, and of vital resistance, characterising both diseased manifestations; the same tendency to dyscrasy, and the same indisposition to the healthy restoration of parts in both; and the same principles of treatment, and even the s
agents and means, being the most successful
the cure of both forms of lesion, are circ
stances which so manifestly show identity, tha
opposite doctrine cannot with due reason be
ported. The differences which have been ur
moreover, do not invalidate the doctrine of
identity of these states of disease; they h
reference merely to difference of seat, and
epochs of life during which the one is more pr
lent than the other.

113. But the great question, the solution of w
ought to put an end to all discussion, is this, -
the morbid structure of external scrofula iden
in its characters with that of internal scrofula
tuberculosis? or, in other words, Is the exte
manifestation of scrofula by enlarged lymph
glands the same in its minute structure as
internal manifestation of it by tubercular depo
Preliminary to the answer which I shall g
I should state that scrofula is a term which
be, and has been, given to a diathesis—to a co
tution—to a certain appearance, described al
(§ 5. *et seq.*), and which may exist wit
any manifest external or internal lesion — wit
any special disorder, although often accompa
by some internal affection usually denomin
scrofulous. Now, this external affection, what
it may be, most commonly, however, seated in
lymphatic glands, is, as respects the mo
change, the same as that found in other o
internal parts, no further differences being
served than such as necessarily result
difference of seat. Dr. Glover remarks (
others have stated the same, both before and
he wrote), that the only difference which he
been able to detect between tubercular ma
and the degenerated substance of scrofu
glands, is in the existence of a greater numb
bodies presenting the appearance of thick
and translucent or opaque cells in the latter
But the microscopic elements are in both insta
the same. The results of chemical analysis
point out the identity of the two kinds of for
tion. M. Lebert, whose researches into the
timate nature of scrofula and tuberculosis
most minute, patient, and trustworthy, states
the tubercular deposit in scrofulous lymph
glands is the same as in other organs (vo
p. 534.).

114. Canstatt remarks, that the material
physiological causes of scrofula and tubercle, t
progress, &c., scarcely leave a doubt of t
identity; nevertheless respect for those who
tertain a different opinion, suggests an inquiry
the force of their arguments: — *a*. They urge
difference of form between scrofulous format
and tubercle, the former being often indete
nate, the latter more rounded or provided wit
envelope. But this is chiefly owing to the st
ture of the tissue in which the deposit occurs.
some cases, the lymphatic glands present in t
interiors, cysts filled with tubercular matter, c
parable with isolated tubercles; and I may
that the differences, as respects the great tume
tion of scrofulous glands and of their surroun
tissues, depend chiefly upon the nature and st
ture of these glands, and upon their connecti
not only with the vascular system, but also
the lymphatic vessels belonging to them, and
the adjoining cellular tissue.

5. *b.* It has been asserted, that while scro- s glands may be injected, tubercles show no ls in their structure. But the injection of glands does not prove the injection of the cular deposit in them; this deposit, whether g place in them, or occurring elsewhere, without vessels, excepting such as belong tissue in which it is found.

6. *c.* The incurability of tubercular forma- in the lungs has been adduced as a proof ference between external scrofula and tuber- s. But tubercles, in the lungs or elsewhere, heal as well as the forms of external scrofula, according to similar processes. Scrofulous tions, like tubercle, may pass into calcareous s, or thus degenerate; or they may be thrown off ceration, or their suppuration and the deposit eparative tissue may be followed by cicatrisa- The chief circumstances which prevent in- tuberculosis from healing so frequently as xternal malady, are the causes inducing the r, the frequently continued operation of these s, the nature of the structures affected, the ant action of the atmosphere as respects culosis of the lungs, as well as the other s which often precede, accompany, or follow orbid formation.

7. *d.* It has been contended that, because ns below puberty are most frequently the cts of external scrofula, and those more ad- d in life are most subject to tubercular con- tion, therefore there is a difference between But, as I have shown above, tubercles occur at any age, however early, and are, in very common in young children, whilst ex- scrofula may also be developed at any age; may be added, that open external scrofula puberty does not prevent tubercular forma- n internal parts subsequently. Tubercles exist, in an early stage, both internally and ally in the scrofulous diathesis, and whilst rring causes may develope the external ma- the internal may remain latent, or be but fectly manifested, or may appear long sub- ntly, or even not at all, if the causes usually ining the development of this lesion are d. Of 312 scrofulous children, only 47 found without tubercles in the lungs. Lugol ks that scrofulous children have always tu- s in the lungs. This inference is too general; have seldom inspected the body of a child has died of a non-tubercular disease, and manifested the external signs of scrofula, ut finding internal tubercles in one or other of development.

3. *e.* It is almost unnecessary to pursue the t further; but one argument frequently urged t either form of the disease may run in fami- ithout the other form being met with. This ent is, however, pushed beyond the truth. an occurrence is not very frequent, nor are xemptions contended for either complete or . Portal considered both scrofula and is identical, yet he admitted that either may ansmitted in families in preference to the Dr. Holland remarks that "in the scro- temperament, even more than that of gout, ve a remarkable diversity in the forms of the e and the organs it attacks." I readily agree Dr. Glover in remarking that, in respect of pic, "on the one side all is clear, pathological and decided, founded on facts of essential relation; while on the other side we have doubtful assumptions, and at best non-essential relations."

119. vii. Diseases attack the Scrofulous Diathesis without being essentially Scrofulous or Tubercular, although more or less intimately allied to either.—Not only may several diseases attack the scrofulous diathesis without being essentially tubercular; but this diathesis may predispose to them, and render them more chronic and difficult of cure. Thus, while I believe in the identity of scrofula and tubercles, I consider the latter as a development or manifestation of the former, arising out of one or more of the causes above described; and further infer that various local affections, more or less resembling or allied to scrofula, may occur, either in delicate persons, especially in cachectic children, who are not of a scrofulous taint, or in those who are actually scrofulous, without being necessarily or actually scrofulous, or attended by external or internal tuberculosis.

120. 1st. *Various Affections are occasionally met with in delicate or cachectic subjects, which are not truly scrofulous in their nature*, but which, when occurring in this diathesis, are influenced by it, as stated hereafter (§ 125.). It is not uncommon to observe in delicate or cachectic children, chronic inflammations, especially of the periosteum or bones, to follow slight injuries, or other affections to follow slight causes, without any essential characteristic of being scrofulous. Various chronic affections of the skin, of the mucous membranes, or of the joints, or of the eyes, may also appear in these subjects, without presenting the scrofulous elements, although they most frequently do present them when occurring in the scrofulous diathesis.

121. 2nd. *Other Affections still more nearly allied to scrofula may take place in this diathesis*, and yet be without any very manifest tubercular formation. Parts may become inflamed, go on to suppuration or ulceration, and present no further scrofulous characteristic than the long duration of the disease and indisposition to cicatrisation. Caries of the bones, chronic ulceration of the skin, consequent upon eruptions, eczema, lupus, &c.; ozæna, various states of gastro-enteric irritation or inflammation, diseased follicular glands, prolonged leucorrhœa, chronic bronchitis, affections of the eyes and eyelids, flexures and other diseases of the spine, enlargement of the joints, softening of the structures, &c., are very common in the scrofulous diathesis, without being attended by tubercles; and although not strictly scrofulous, are more or less allied to it when occurring in this diathesis.

122. 3rd. *These affections, however, are often attended or followed by tuberculosis* either of adjoining glands or of internal viscera, especially in the scrofulous diathesis; the occurrence of these appearing to complicate, or to develope the tubercular deposit. On the other hand, the tuberculosis may have existed previously and been followed by either of those, which, in some instances, when allowed to proceed, or when accompanied by a discharge and by appropriate treatment, may supersede, or partially or altogether subdue, the tubercular malady.

123. The affections now mentioned, whether occurring in the scrofulous diathesis, without manifest external scrofula, or internal tuberculosis, or complicated with either external or internal scrofula, are most frequent and most obstinate in persons whose powers of life are constitutionally low or exhausted, and the vital cohesion or tone of the tissues are originally weak or otherwise impaired. They may occur, in this state of the frame, either independently of true scrofula or tuberculosis, or in an intimate association with tubercular deposits in some part or parts of the body — they may exist without tuberculosis, or they may be associated with it, although not necessarily depending upon it. They ought, therefore, not to be considered as varieties of scrofula, but should be separated from this affection; inasmuch as, although they are often met with in the scrofulous diathesis, they frequently also occur in weak constitutions or exhausted states of the frame, in which this taint, or any actual manifestation of tuberculosis does not exist.

124. viii. THE SCROFULOUS TAINT, OR TUBERCULAR CONSTITUTION, NECESSARILY PREDISPOSES TO, AND INFLUENCES THE COURSE AND TERMINATION OF, OTHER MALADIES. — However obvious and important this assertion may appear to many, and however frequent the observing and truly scientific physician may have had occasion to remark this influence, to regard its results, and to modify his practice accordingly, still the facts which this proposition comprises have too often been either altogether unrecognised or at least partly unheeded. The states of vital power and resistance throughout the frame, the conditions of the circulating and secreted fluids, and the vital cohesion of the tissues, of scrofulous and tubercular persons, are generally such as to predispose them to several maladies, and to modify the course and terminations of most of those which may afflict them.

125. *A. As respects the predisposition which this taint occasions*, it may be remarked that it is the most influential when no open or external manifestation of scrofulous disease has appeared; for when such disease is developed and is proceeding, internal or constitutional maladies are less apt to occur, or supervene only after the more energetic operation of their exciting causes. The external affection, especially when attended by a discharge, has often the effect of a derivant, and sometimes becomes a safety-valve to the economy in circumstances which might otherwise be attended by risk, as when exposed to the causes of endemic, epidemic, or constitutional disease. In other circumstances, especially when the morbid taint is present, without any active or developed external disease, the constitutional powers are too languid — too feeble, to resist the invasion of causes and the production of effects, which would have been successfully resisted by more powerful energies; and the causes of disease, especially such as are depressing and contaminating, would make more rapid, more marked, and more dangerous impressions and changes in the scrofulous constitution, than in any other. Experience furnishes many proofs of the truth of this position. Local injuries, such as bruises, contusions, concussions, the impression of cold, infectious and epidemic agents and influences, contagious and contaminating miasms and secretions, &c., are less successfully resisted by scrofulous persons tha others; and when the effect is produced by of these, or by other causes, it is generally more marked or more prolonged, and rem with greater difficulty. The full developme the predisposing and exciting causes of d which I have attempted under a different renders it unnecessary to remark further o topic, at this place, than to recal attention importance (see art. DISEASE, § 18. *et seq.*).

126. *B. The Course and Termination of Special States of Disease are very remarkab dified and aggravated by the scrofulous taint.*— That this is more especially the case in resp *Inflammations* is generally admitted; but is every reason to believe that the evil i confined to this class of diseases. As re inflammations, it may be remarked, that no are they rendered more chronic in the scro diathesis, although the acuteness, the severi the activity of these maladies, is seldom so as in the vigorous and healthy constitutio their consequences are more dangerous, b respects the changes produced in the stru affected, and as regards the state of the pr of inflammation. In the strumous diathesis ening, infiltration, tubercular deposition an organisation of the inflamed structures readil place; and restoration to the healthy condi either very slowly or imperfectly accomp The fluids effused are much less prone to a a state of partial or complete organisation in the healthy constitution, but they are disposed to undergo changes of a more inj nature — to assume a dirty curdy or chee appearance, or a tubercular character, become the nidus of further changes. It appear as if the products of inflammation strumous diathesis proceed from a lower gr vital action, than in healthy constitutions that, whilst these products in the latter cas more prone to organisation owing to a c degree of derived vital endowment, those res from scrofulous inflammatory action are mu prone to this change, owing to this endo being so much less as to be altogether insu for this end. The inflammatory produ scrofulous persons are thus not only differen those in healthy constitutions, even at the m of their formation, but they become still different after their exudation, owing to the absorption or exhalation of their more water stituents, to the aggregation of their album mineral and other elements, and to the cutive irritation they produce in the surrou or containing tissues.

127. (*b.*) In all *fevers* also, especially such malignant or infectious, softening of muco cellular parts, ulceration of the intestinal m surface and follicular glands, effusion from nal surface, and disorganisation from loss vital cohesion of the structure, especially in which are pressed upon, or are irritated by nal agents, more readily and more rema supervene in the scrofulous, than in the h constitution. In all acute and chronic infla tions or congestions of the *brain*, *lungs*, and *membranes*, reparation is delayed, more di or is imperfect; and either effusion, or tube depositions, with their various unfavourabl comitants and consequences, are much mo

upervene in the scrofulous than the healthy stitution.

28. (*c.*) The influence of scrofula is less mani- n aggravating the course of other diseases, than riginating many, both of a functional and of a ctural kind. All those maladies which pre- a tubercular character, and several of those h consist of adventitious formations, or chiefly teration or vitiation of the nutrition of a part, not only, in a great measure, proceed from diathesis, as regards some cases, but also be aggated or even altogether transformed as respects r instances. But it is unnecessary to pursue topic further at this place, as it, as well as se- allied topics, are more fully discussed in the les DEBILITY, DISEASE (§ 87. *et seq.*), IN- MATION, and in other parts of this work.

9. IX. THE ASSOCIATED ALTERATIONS AND PLICATIONS OF SCROFULA AND TUBERCLES. om what has been stated above, almost tissue or organ of the body may be the seat of culosis; but there is a very wide difference frequency of the occurrence of this lesion fferent organs or parts (§ 135.). I have , with respect to the *pathogenesis* of scrofu- r tuberculosis, that there are modifications ganic nervous power, of capillary vascular , and even of the blood itself, which are sary preludes to the alteration in the textures ally affected; the local change being chiefly cterised by congestion of the capillaries and udation or deposit from the blood, constituting bercular matter (§ 109.). External scrofula unequivocally presents itself in the form arged or diseased lymphatic glands; and as ts them, it has been asked by an able , Mr. PHILLIPS, "Is this state of the gland ined by the circulation within it of blood has undergone change, or is it independent blood? Does the blood fit the organ to the deposit, or does the organ fit itself? an important question, but of very difficult n. Important too, with reference to treat- because, if the action set up were purely means might be taken to change it and it unfit for the deposit. If the action depend pon a general contamination of the blood, omes it that all the lymphatic glands are ually affected? It is notorious that they t."

1. But the alteration of the blood here insisted only one part of the morbid condition, and, ects the succession of changes producing this on, a more or less advanced part. These s have already been stated (§§ 101. 109.), has been shown, that the constitutional s — the changes in the organic nervous in the capillary circulation, and in the blood onsecutively upon the state of assimilative n, are such as tend to predispose the lym- glands, as well as various other textures, erience these changes in a more manifest , especially upon the operation of various , whether constitutional or local, whether sant or irritant, and to favour the super- of further changes in the capillary circu- of these parts, and ultimately to produce dation in them of the materials constituting ercular deposit.

1. The cause or source of the swelling and s presented at an early stage by external scrofulous glands, has been a topic of discussion. This has been ascribed to increased vascularity in the first instance, and to the morbid exudation in the second. This is probably the case; but it is not so manifest, that the vascularity is owing to increased action: it is more probably the result of interrupted circulation — of congestion, not merely of the blood in the capillaries of the gland, but also of lymph in the proper lymphatic vessels of the organ, aided more or less by an exudation of molecules or tubercular materials or elements from the congested capillaries, which materials are incapable of organisation, and which, by their aggregation, become more and more manifest, as shown above (§ 109.). As these accumulate they often change the capillary congestion which partly occasions them, to inflammatory irritation, followed by the usual products of inflammatory action; and thus a state of simple congestion of the glands, induced in a constitution such as I have described, is converted, by the material exuded from the congested capillaries and by the irritation this material occasions, into a state of inflammatory congestion, with all the consequences of this state in its more chronic forms. It should not, however, be admitted that the swelling existing in these cases is altogether owing to the changes within the gland itself; for much of it arises from congestion, increased vascularity, and serous effusion in the cellular tissue surrounding the affected gland. The greater tendency also of the external glands to become enlarged and ultimately even inflamed, in connection with tubercular deposits in them, may be ascribed to the greater exposure of these glands to physical influences and agents, and to local or external irritants, affecting not merely their state of vital power and action, but modifying also the condition of the blood circulating through them.

132. A careful examination of a scrofulous cervical gland by Mr. DALRYMPLE is thus described in Mr. PHILLIPS's work:—"This enlarged gland appears to consist of a general parenchyma in a state of chronic inflammation, surrounding irregular masses of yellowish white matter, more immediately the subject of examination. In direct proximity to the edges of this white material, the blood-vessels are seen to be more enlarged and congested than elsewhere, and in some parts the capillaries are occluded with coagulated blood. The parenchyma, which at first sight appears healthy, is, on examination with high power, found to be infiltrated with exudation corpuscles, resembling lymph globules. The natural texture of the gland consists of its proper corpuscles, filamentous tissue, blood-vessels, lymphatics, and nerves. In this morbid specimen, everywhere is the filamentous tissue infiltrated, and its fibres separated by innumerable exudation corpuscles, and the proper corpuscles of the gland are similarly surrounded and imbedded. As the parenchyma is nearer to the whitish matter, so proportionally do the proper corpuscles of the gland become more indistinct, the filamentous tissue more obscure, the blood-vessels irregularly dilated and filled with red globules, and they at last disappear insensibly. The exudation corpuscles are more numerous, but irregular in size and shape, and interspersed with minutely granular matter." (p. 45.)

133. *A.* The *modifications and associations of scrofula and tuberculosis* are to be ascribed chiefly

to the pre-existence or association of various grades of capillary congestion, sometimes passing into chronic inflammatory irritation, in the seats of the tubercular exudation. But it may be asked whether or not this exudation ever occurs without these antecedent states of congestion or of inflammatory irritation? There is no sufficient reason to infer that this deposit may not take place without either of these alterations of local vascular action; for miliary tubercles and grey granulations are often found in tissues, the capillaries of which present no material alteration. It may, therefore, be inferred, that tuberculosis may appear — 1st, Independently of locally increased vascular or capillary action; 2ndly, Consequently upon capillary congestion; 3rdly, In connection with inflammatory irritation, or inflammatory congestion, of the part; and, 4thly, Where the inflammatory diathesis is associated with the scrofulous, or where tuberculosis is associated with inflammation of a sub-acute or chronic kind. Whilst, however, either of these states of local vascular action may precede or accompany the morbid deposit or exudation constituting tubercles, it is not improbable that this deposit as often becomes the cause, as shown above (§§ 110, 111.), of the vascular disorder, inducing such disorder where it has not previously existed, and increasing or developing it where it had already commenced.

134. *B. The Complications of Tuberculosis* are so diversified that a particular notice of them cannot be given at this place. It must be obvious, that the state of constitution described above to constitute the scrofulous diathesis, will favour the occurrence of various disorders, both without or independently of any tubercular deposit, and in more or less intimate association with it. It has been shown (§ 123. *et seq.*) that the scrofulous taint favours the occurrence of several diseases not actually scrofulous or tubercular, and that it modifies the course and termination of others; and various affections have been enumerated above (§§ 119—121.), as being met with in delicate constitutions, which are not scrofulous, in the scrofulous diathesis without evidence of tubercular deposits, and in this diathesis complicated with these deposits in one or more organs. A knowledge of such occurrences, either as now stated, or as particularly noticed above, is sufficient to suggest the chief indications of treatment which these associations will require in respect of their individual forms.

135. x. THE COMPARATIVE MANIFESTATIONS OF TUBERCULOSIS — *A.* AS TO THE COMPARATIVE FREQUENCY OF TUBERCULAR FORMATIONS IN THE DIFFERENT ORGANS OF THE ADULT BODY much interesting information has been adduced by MM. LOUIS, LOMBARD, and ANDRAL. — (*a*). The lungs hold the first place, in respect of frequent liability to the disease: next, the small intestines. M. LOUIS found (leaving the lungs out of the calculation) in 358 adult subjects, tubercles in the small intestines, in a *third* of them; — in the great intestines, in a *ninth*; — in the mesentric glands, in a *fourth*; — in the cervical glands, in a *tenth*; — in the lumbar glands, in a *twelfth*; — in the prostate, in a *thirteenth*; — in the spleen, in a *fourteenth*; — in the ovaries, in a *twentieth*; — in the kidneys, in a *fortieth*; — in the uterus, in *one case* of them only; — in the cerebrum, in *one case*; — in the cerebellum, in *one case*; — and in the ureter, only in *one case*. There was
count taken, in those cases, of the occurre
this production in the testicles or in the
which is not uncommon. Out of all of the
LOUIS found only one case in which tub
were found in different other organs without
ing in the lungs.

136. In one hundred *adult* subjects, Dr.
BARD found, not counting the lungs, tuberc
the intestines in 2 cases; — in the mesenteric g
in 19; — in the bronchial glands, in 9; —
cervical glands, in 7; — in the spleen, in 6
the lumbar glands, in 4; — in the sub-peri
cellular tissue, in 4, — in the maxillary glan
3; — in the glands of the anterior mediastinu
3; — in the sub-arachnoid cellular tissue, in
in the spinal chord, in 2; — in the false
branes of the pleura, in 2; — in those
peritoneum, in 2; — in the intercostal
cles, in 2; — in the ovaries, in 2; — and
parietes of the gall-bladder, in the liver,
of the pleura, posterior mediastinum, ve
ribs, omentum, uterus, prostate, sub-m
tissue of the bladder, cerebrum and cereb
medulla oblongata, kidneys, and vesiculæ
nales, *one each*.

137. M. ANDRAL states that his obser
as to the relative frequency of tubercles
different organs of the body, observe nea
same order as that indicated above, exc
that he has found, in more cases than M.
tubercles in other organs without detecting
in the lungs. He has also discovered them
false membranes of the pleura and periton
a greater proportion of cases than M. Lo
M. ANDRAL has found them in the interve
cartilages in one case; and he adds very in
ing information respecting the relative freq
of tubercles in the different organs of child

138. (*b.*) *Tubercles, in Children*, more freq
affect a number of organs at the same tim
in adults. They occur more commonly,
class of subjects, in other organs, without e
in the lungs. It will, moreover, be seen
the following results furnished by M. Lo
that the parts most commonly affected in
are not altogether those which are so in ch
In a hundred *young* subjects he found tu
in the bronchial glands, in 87 cases; —
lungs, in 73 cases (in 30 of which, but on
was affected, viz. the left in 13, and the ri
17 cases); — in the mesenteric glands, in 31
— in the spleen, in 25; — in the kidneys, in
in the intestines, in 9; — in the nervous cen
9; — in the cervical glands, in 7; — in the mem
of the brain, in 6; — in the pancreas, in 5
the gastro-hepatic glands, in 5; — in the
peritoneal cellular tissue, in 5; — in the spl
4; — in the inguinal glands, in 3; — in the c
tissue under the pleura, in 2; — in the
glands, in the sub-mucous tissue of the b
in the omentum, in the parietes of the
badder, and in the false membranes of the
one case each. It may be remarked that, i
hundred cases, tubercles were not found
liver in a single case; and in all the c
adults the liver contained tubercles in o
only.

139. M. PAPAVOINE found, in 50 child
which the seat of tubercles was ascertained
which they existed in the bronchial glands

e lungs;—26, in the cervical glands;—25, in nesenteric glands;—20, in the spleen;—17, in pleura;—14, in the liver;—12, in the small tines;—9, in the large bowels;—9, in the periım;—5, in the brain;—3, in the cerebellum;— the cerebral membranes; — 3, in the pericar-;—2, in the kidneys;—1 in the pancreas, 1 in ertebræ; 1 in the stomach. In 10 instances rcles were present in the bronchial glands out having been found in the lungs. The ive frequency of tubercles in the abdominal ns is very different in M. PAPAVOINE's from that furnished by M. LOMRARD. The e show that they are more frequent in the chial glands of children than in the lungs; t in adults the proportion is much greater in atter, than in the former. Besides, in this of subjects, they are seldom met with in glands without being observed in the lungs; hey are often found in adults, in the lungs out there being any in the glands.

0. *B.* AS TO THE RELATIVE FREQUENCY OF RCLES AT THE DIFFERENT PERIODS OF LIFE, out reference to the organs in which they eated, the following inferences may be ad-l:—1st. Tubercles are very rarely developed foetus; but several instances have occurred e, particularly in the lungs of those whose ers were suffering from phthisis during ion:—

1. 2nd. During the first months after birth, cles are likewise rare. In the lungs of an t (attended by Mr. NICHOLSON of Davies' t and myself) born of a mother far nced in consumption, affected with cough the moment of birth, and that died instantly profuse hæmorrhage from the lungs under months, the lungs were so studded with cles, many of them large and softened, as o collapse upon opening the thorax. Tu-es existed no where else. This state of e in so young a subject was rare, and the e of the result still rarer.

2. 3rd. From nine months to five or six , tubercles are very frequent. According . LOMBARD, tubercles are found in only one-ı of the children who die between the ages e and two; in two-sevenths of those between nd three; in four-sevenths of those who die een three and four years of age; and in -fourths of those who die between the ages ur and five years. From my experience at nfirmary for Children, I am of opinion, that OMBARD calculates the proportions as too in respect of children between the ages of and five, and too low in respect of those v two years. However, the results may somewhat between London and Paris. There be no doubt of the fact mentioned by this r, that at the age of four or five years a er number of organs are simultaneously ted with tubercles, than at either an earlier ter period of life. I believe that these rcles begin to form about the period of den- and weaning, the change which is then in the diet of infants, being the chief cause eir formation; and that the fatal effect most nonly does not occur until about the fourth h year.

13. 4th. From the sixth to the sixteenth year rcles are much less frequently met with, than from the third to the sixth, but they occur more frequently than under the age of two years. The results which I have stated in the preceding paragraphs differ much from those furnished by M. LOMBARD. But they are in many respects confirmed by the researches of M. PAPAVOINE made at the Hospital for sick Children, at Paris. This physician found, in 408 children under fourteen years of age affected with tubercles, 73, or $\frac{1}{5}$-$\frac{1}{2}$, under two years;—64, or $\frac{1}{6}$, from two to three years of age;—46, or $\frac{1}{9}$, from three to four;—35, or $\frac{1}{12}$, from four to five;—32, or $\frac{1}{13}$, from five to six;—29, or $\frac{1}{14}$, from six to seven;—24, or $\frac{1}{16}$, from seven to eight;—16, or $\frac{1}{25}$, from eight to nine;—18, or $\frac{1}{2,}$, from nine to ten;—12, or $\frac{1}{31}$, from ten to eleven;—24, or $\frac{1}{16}$, from eleven to twelve;—10, or $\frac{1}{41}$, from twelve to thirteen,—11, or $\frac{1}{40}$, from thirteen to fourteen; and 14 whose ages were not ascertained.

144. 5th. After puberty tubercles again become more frequent, but only as regards the lungs, the intestines, and some parts of the lymphatic system, especially the lungs. Does this increased frequency arise from the new source of exhaustion which comes into action in the devetopment of the genital organs? I think that it does. According to M. ANDRAL, males are particularly subject to tubercles between the ages of twenty-one and twenty-eight; whilst females are more subject to them before the age of twenty. After these periods, tubercles are much less frequently met with until from about the 38th to the 45th year in females, and from about the 40th to the 55th year in males, when a slight increase is again remarked, particularly in females.

145. *C.* AS TO THE COMPARATIVE LIABILITY OF THE SEXES, it has been generally admitted, that the female is more frequently the subject of tubercles than the male sex, and this certainly holds in respect of children. But according to the data furnished by M. LOMBARD, the difference of liability of adults is extremely small. He states, that in 52,857 persons who died of tubercles in the lungs, 26,124 were males, and 26,733 females. M. LOUIS, however, found the proportion of adult males to females affected, to be 70 to 92. M. PAPAVOINE considers the difference to be still greater between the two sexes, in children. According to the returns of the Registrar General the proportion of deaths by tubercular consumption is about 24 males to 28 females.

146. *D.* WITH REFERENCE TO THE OCCURRENCE OF TUBERCLES IN THE LOWER ANIMALS, M. ANDRAL observes, that "several animals have, in common with man, the tendency to tuberculous affections. Amongst the mammalia, animals using the most different kinds of food are equally subject to these affections — the carnivorous as well as the herbivorous. Amongst the carnivorous, however, there is one species, in which, though we frequently examine their bodies, genuine tubercles have never been discovered: I mean the canine species. Is this because the dog lives in freedom in a climate that agrees with him, and where he can enjoy exercise in proportion to his strength? And is it because the lion happens to be in opposite circumstances, that he dies in this climate affected with tubercles? Most of the animals in which we have proved the existence of this affection, are either transported from a hot to a cold climate, where they are deprived of liberty and

exercise (as is the case with monkeys and parrots), or confined in damp places, without sun, and almost without air (cows, pigs, house-rabbits), or exposed either to continual alternations of heat and cold, or to constrained and violent exercise, as the horse." The want of due ventilation, or a too frequently respired air, a too hot or close, or a too cold and humid atmosphere, and the close confinement so opposite to the habits of these animals, are not without their influences.

147. xi. Are Scrofula and Tuberculosis more prevalent now than formerly? This question hardly can be answered in the present state of knowledge, as the data on which rational speculation respecting it, either are altogether wanting, or are of so loose a kind as to prevent the possibility of arriving at a sound conclusion on the subject. Mr. Phillips has indeed entertained this topic, but with reference chiefly to external scrofula, or the "King's evil," as so denominated in former times. The principal data he has adduced are the loose reports of the bills of mortality of former years, and the numbers said to have received the royal touch during the reign of the second Charles. It is obvious that no conclusion can be drawn from these respecting the comparative prevalence of the several forms of tuberculosis in former and recent times. A careful consideration of the relative influence of the principal causes of scrofula in past ages and at the present day, may suggest vague ideas on the subject; but as certain of these causes were, perhaps, more influential formerly than now, whilst other were less so, and whilst some have even recently come into operation, others have nearly or altogether disappeared, the question must be viewed as not admitting of solution, however important the considerations which it involves.

148. IV. The Prevention of Scrofula and Tuberculosis. — It is obvious, that the *prevention of a constitutional taint*, which is not limited to the individual thus tainted, but which is very commonly propagated to his offspring, in some one or other of its forms or contingent effects, is much more important than even the cure of these effects when they come under the eye of the physician; and it is equally obvious, that the prevention consists in the avoidance of the causes producing this taint — these causes being fully exposed above (§ 13. *et seq.*), with the implied object of enabling the medical adviser, or whoever is concerned in the matter, carefully to avoid them — this avoidance having reference to the parent or parents, and to the offspring for successive generations. By no class of diseases are the misconduct, the imprudence, and the want of judgment of the parents more severely punished than by this — by none so distressingly, hopelessly, extensively, and successively, until the tainted race is almost or altogether extinguished. Instances illustrative of the misery — of the numerous miseries — resulting from the thoughtless, the ignorant, the worse than culpable intermarriages of scrofulous persons, or even by the marriage of a healthy person with one who is thus tainted, crowd upon my recollection, and are too common — too well known to every one who may read this — to require enumeration. The subject is sufficiently illustrated by the calm consideration of every thinking mind.

149. Several of the causes which I have discussed above, require only to be known t be guarded against, and certain of them may re ly be avoided by careful persons. Others cann be avoided by those most concerned, or wh re about to become their victims; but they ay be altogether removed by those who have he power of inflicting them. Richly endowed p lic institutions or schools may be so managed, nd have been so managed, as to become hot-bed or the generation of scrofulous or tuberculous dise s. The same remark often applies to private as ll as public schools, and not merely as respects od and clothing, but also as regards ventila n, exercise, light, sunshine, and purity of air. constitutions of the industrious poor are sacri d on the altar of gain, and governments lend aid to the immolation, that they may receiv unrighteous support of the priests of mamm perpetuating their power, their patronage, an aggrandisement of their satellites. The phy and moral ameliorations, which salutary mea would impart to those most in want of them, not be afforded out of the luxuries and patro which aristocratic governments bestow on supporters and themselves. The inevitable dencies of extreme taxation and of an imm national debt are to reduce the middle class the lowest, to render the poor still poorer, wretched and more debased, to augment the w and the influence of capitalists and contrac to render these last more dishonest and reaching; and, as the general result, to mul beyond calculation the chief sources from w scrofulous and tubercular maladies, the phy curses of society, derive their origins. D nesty, moreover, in professions, trades, and several relations of life, — the necessary c quence of the foregoing — is daily increasing leaving its victims physically and mentall duced, thereby favouring still more the inv of the most hopeless forms of the maladies u consideration. These are results which are nifest to the common-sense thinker, however may be controverted by political econom and by political and statistical haranguers, will prove or disprove whatever may suit arguments, their purposes, or their motives, even bring an array of figures and numbe their support, without caring for the accura the amounts which they thus imposingly mar

150. *The Hygeienic Treatment of Scro* should, however, not be limited to the ca avoidance of the causes above described, w ever this object can be attained; but be exte to the use of such rational means as may pre the full development of the scrofulous taint, of its consequences, in those who may evin in any grade, in childhood or infancy, and n particularly in the children of scrofulous par If this latter *indication* be carefully pursued, if judicious means be employed, much ma accomplished, especially if the tainted subjec early submitted to these measures. As resp the *infants* of scrofulous parents, hygeienic tr ment should be adopted as early as possible. the taint exist on the mother's side, a wet-n of healthy constitution, and suitable as to the s of her milk, should be procured; and if this impossible, ass-milk immediately upon be drawn from the animal, or goat's milk ma given. Recourse may otherwise be had to

essed through a bag containing suet, as ad-
by Dr. Paris. Great care, especially as
cts food and clothing, should be taken of the
at the periods of dentition and weaning. At
epochs, especially the latter, ass-milk, milk
d with suet—cod-liver oil, or sweet oil, on
surface of the milk — small doses of liquor
ssæ, or of Brandish's alkaline solution, or
e iodide of iron, in the syrup of sarza, espe-
y in older infants or children—salt-water
ng, the temperature being adapted to the
gth of the child—and warm flannel clothing
the whole body, are the most beneficial
ienic means.

1. The support of animal warmth, and the
al heat derived from a young healthy nurse,
ost beneficial to delicate, and more especially
ofulous infants, and the more so the younger
child. An emanation of organic nervous
r, as well as of warmth, may be furnished
this source to the delicate infant. The lower
als afford this protection to their young until
th is considerably advanced; and yet the
g animal which is most helpless in infancy,
requires this the most, is the oftenest de-
d of it, or is allowed to remain no longer in
osom of its nurse than when it is suckled.
ng the coldness or coolness of night, and
in a chamber much below the usual tem-
ure of the sitting apartment, the infant is
allowed to sleep in a cot altogether apart
the curtained and warmer bed of the nurse.

2. Change of air, or the migration from one
ity to another, according to the circumstances
e case, the age of the patient, and the season
e year; removal from crowded towns or
ions; residence near the sea-coast, in a tem-
e and dry air, and on a gravelly or sandy
sea-voyaging in some cases; sleeping in large
chambers; exercise in the open air, the en-
ent of light and sunshine during the waking
, and limiting sleep to the hours of darkness,
enerally of great service, especially in ad-
ed childhood, and during the progress to
rty. Cold-bathing, particularly sea-bathing,
ons of the surface, a generous diet, with a
roportion of animal food, and regular meals,
lso most beneficial in the early periods of
Whilst these means are pursued, the di-
e and assimilative functions should be pro-
l, whenever they are insufficiently performed,
tomachic and tonic aperients, as the com-
d decoction of aloes, with the compound
mixture, or the compound infusions of
an and senna; and the use of unnecessary
li or stimulating beverages, of pork and in-
tible meats, of sugar and saccharine sub-
e, should be avoided.

3. As puberty advances, the utmost care
d be exercised in all matters which may affect
exual feelings or desires. A proper superin-
nce of both sexes ought to be instituted, in
to prevent the tendency to masturbation,
h is greater amongst scrofulous constitutions,
s epoch of life, than in others; and which, if
ised at all, will certainly develope this di-
is into actual tubercular disease, especially
cular consumption. A careful supervision
ld also be exercised, after puberty, in order
revent attachments being formed between
ulous persons, or between an individual of
this diathesis and one who possesses a healthy constitution. This intention, however, will frequently fail; but where it is attempted amongst the well-informed classes, and the evils consequent upon the neglect of it are duly explained by members of the profession, it will receive attention, and the good results will ultimately become apparent.

154. V. The Medicinal Treatment of Scrofula and Tuberculosis.—The medicinal treatment of scrofula consists,—1st. In aiding the hygeienic or regimenal treatment above discussed, when the scrofulous taint is suspected or apparent, especially in early life;—and 2nd. In employing such medicinal agents as are most likely to arrest the progress of the mischief when scrofula or tuberculosis is more or less manifest. In the first case, medicines are chiefly brought in aid to hygeienic means; in the second, they are the principal agents, regimenal means being aids to their operation.

155. i. *In Scrofulous Cases devoid of any very manifest Local Lesion,* in connection with the hygeienic means now mentioned, various medicines possessing an alterative and tonic influence may be used. One of the earliest indications of scrofulous taint is furnished by the weak state of the digestive functions—a state evidently caused by the low condition of organic nervous power; and hence occur indigestion, flatulency, acidity of the prima via, irregular state of the bowels, torpid function of the liver, and consecutively a poor or thin state of the blood. Formerly small doses of blue pill, or of grey powder, with soda or other antacids were given for these, conjoined with stomachic aperients and tonics; and very frequently with marked benefit, which, however, was very often counteracted by the excessive use of sugar and saccharine substances, the injurious influence of these either being not known in these cases, or overlooked. This treatment, first advocated by the truly greatest name in medicine of his day—by Mr. Abernethy—was afterwards advocated by his pupil, Mr. Lloyd; and is still one of the best that can be adopted; and has been employed by myself in numerous cases with marked advantage and variously modified. Two grains of grey powder, with one or two of dry carbonate of soda, or four or five of magnesia, with rhubarb and powdered cascarilla or cinnamon, taken once or twice daily, according to the features of the case, were generally most beneficial.

156. In cases which present increased frequency of pulse, with or without the disorder of the digestive functions, the use of the above means, modified to meet the circumstances of the case, will be advantageously assisted by small doses of either the infusion or the decoction of cinchona, with the solution of the acetate of ammonia, sometimes with the ammonia in excess, and the sweet spirits of nitre; or the infusion of cinchona may be given, with moderate doses of the hydrochloric acid and hydrochloric ether. In cases where aperients are required, and when a pill may be taken, Plummer's pill may be given at night with soap; and the citrate of magnesia, or the phosphate of soda, in some pleasant vehicle in the morning.

157. On the other hand, when, with disorder of the digestive organs in scrofulous subjects,

there is more or less languor of the circulation and of the frame generally, Dr. Griffith's myrrh mixture — (one of the most valuable medicines in existence) — with the compound decoction of aloes, when the bowels require aid, sometimes with the addition of the solution, or of the carbonate, of potash and extract of conium, &c., will then be found most serviceable.

158. Since the introduction of *Iodine* into practice, there has been no other substance so generally employed as it has been, in some one or other of its preparations, and especially in the form of iodide of potassium. It has superseded the use of mercury even in the combinations mentioned above; and certainly when prescribed in small doses, as I have usually done since 1821, and in conjunction with the solution, or the carbonate of potash, with the mixture just mentioned, or with a tonic infusion, or with some preparation of sarza, it is a valuable remedy; but it is one that may prove injurious if it be given in too large or frequent doses, or insufficiently diluted, or if its effects are not carefully watched in all cases.

159. Where scrofula is suspected or manifest by its taint, rather than by developed disease, other means may be employed, either alone, or in aid of those already noticed, and one of the best, both as a nutrient and as an alterative, is the *Cod-liver oil.* When it is prescribed in full doses for the age of the patient, an alterative mercurial pill or powder may be taken occasionally at night (§ 155.), and an aperient in the morning, in order to promote the functions of the liver and to prevent biliary accumulations; and in cases where the debility is marked, and the surface is pallid and the structures flabby, the use of this oil should be aided by the preparations of iron, or it may be taken on the surface of water containing a few drops of the hydrochloric tincture of iron.

160. In cases of scrofulous taint conjoined with much debility, as well as in those presenting manifest external or internal tuberculosis, various modifications and combinations of the above means may be brought in aid of hygeienic measures. The alteratives may consist of a combination of mercury and of iodine, or of iodine and iron, with preparations of sarza, or with tonic infusions, according to the features of the case, and whilst these are being employed at suitable periods of the day, the cod-liver oil, or vegetable tonics, or bitters, may also be taken. But, in these, the several means, already advised, both for the prevention of the further development of the malady and as regimenal treatment, should not be neglected, according as the peculiarities of the case may suggest.

161. In some cases of external scrofula, when there was a languid circulation, more benefit has appeared to accrue from the internal use of the muriatic or nitric acid, or the nitro-muriatic acids, prescribed in an infusion of cinchona, than from any of the preparations of iodine; whilst in others, a course of two or three weeks of the former has been alternated with a similar course of the latter, with obvious benefit. In some instances also, the muriated tincture of iron, conjoined with an increased proportion of the acid, or with the hydrochloric æther, has been prescribed with the infusion or tincture of calumba or quassia, with even greater advantage than either of the preceding.

162. A combination of small doses o bichloride of mercury, with the compou simple tincture, or the decoction of cincho with the preparations of sarsaparilla, has bee recommended both for the scrofulous tain the more declared forms of tuberculosis; have frequently had recourse to it, in one or of these forms. In non-febrile cases, or a tonic is required, this combination is often nently beneficial; and a course of it is gen very advantageously followed, or alternate one of either of the preparations of iodi already advised (§§ 158. 160, 161.).

163. ii. The *Medicinal Treatment of the developed States of Tuberculosis* is not mate different from that already recommended; there is generally required a more appro application of the means already mentione well as of others about to be noticed, to states — to the particular forms and seats of t culosis. When the malady affects external as the lymphatic glands, the joints, the bones then the medicines above advised, more espe those last mentioned, will be found in general serviceable; and in these the cod-liver oi also be taken. When the mesenteric glands to be chiefly diseased, the preparations of i should be given in very small and much d doses; and this oil may also be brought to aid; frictions over the abdomen with oleag and stimulating liniments (*Form.* 306. 311.) additionally resorted to.

164. When the glands go on to suppur or when a discharge is furnished by the when external sores, fistulæ, &c. appear, strict attention should be paid to the dig and assimilative functions, and more espe to the states of the circulation and of the Not only should the former functions be or corrected as advised above (§§ 155, but the blood should be improved whene appears to be thin or poor in red globule means of the preparations of iron; and of the judicious use of the compound steel mi or of the iodide of iron in the syrup of sarz proved most beneficial in my practice. I scrofulous cases attended by suppuration o charge, there is a marked tendency to alte of the blood — to a state of anæmia, partic as respects the coloured globules; and these medicines are the more required. I cases also of open scrofulous sores, care shou taken to prevent as much as possible the acc the air to them; as the air not only injuri affects the diseased surface, but it also alter discharge from this surface, and renders it irritating. Local applications, therefore, in cases, should be employed with the view merely of removing the morbid action of the but also of completely excluding the air, a correcting the acrimony of the discharge.

165. When scrofula, in any of its open f attacks *females*, it is often *complicated* with a delay of the catamenia, especially about or after the period of puberty, or with irregular some kind, or an entire suppression of this e ation. In many instances an obstinate for leucorrhœa accompanies the catamenial diso and not infrequently the scrofulous, as well a sexual, disease has been induced or aggra by the baneful vice of masturbation. Due a

should be paid to this causation, and to this
id association, as due inquiries on the part of
hysician, and a careful supervision by the
ds of the patient, may be productive of ulti-
success in the treatment, which in general
ld be chiefly constitutional.

6. In some cases it will be found advantage-
to commence the treatment of scrofula, es-
lly when it is internal, or the glands are
ly implicated, and the tongue is loaded, with
art emetic, of sulphate of zinc, and to pro-
the emetic operation by means of the tepid
ion of chamomile flowers; and, having sub-
ently improved and promoted the secretions
xcretions by the alteratives and stomachic ape-
s already mentioned (§§ 155—157.), to enter
a course of either of the more energetic me-
es as advised above (§§160—162.). When the
ulous affection is seated in a gland, and has
on to suppuration and fluctuation, the in-
nents being thinned and purplish, there can
o doubt as to the propriety of procuring the
arge of the matter by a small incision of the
uments, and of afterwards protecting the
e from the air. In cases of this kind, as well
those attended by open sores, the state of the
titution, particularly as respects the blood,
ld receive attention; and the treatment ought
e especially directed to the improvement of
assimilative powers, and of the blood, when-
they are in fault, either by the means already
ed, or by the other vegetable or mineral
s generally in use.

7. Whenever any sexual disorder *complicates*
scrofulous taint, or any form of tuberculosis
65.), as will be frequently observed in prac-
meddling examinations, *per vaginam*, should
e instituted without sufficient reason. Most
ese disorders will yield to the treatment ad-
l for them severally, under their respective
s in this work, especially when conjoined
the medicines found most serviceable in
ulous and tubercular affections. Indeed the
ral indications and means of cure most appro-
e to the one class are very frequently suitable
e other; and this remark need not be limited
e constitutional treatment, but be extended
e local also.

8. After the operation of an *emetic*, when it
quired, the alvine secretions and excretions
t to be duly promoted by a combination of
achics or *tonics* with *aperients* and *alteratives*,
regard being also had to the diet and regimen
mmended above (§ 150. *et seq.*). As occasion
offer, the *mineral springs* and *baths* about to be
ced (§ 193. *et seq.*) may either be brought in aid
ther internal or constitutional remedies, or may
w the use of these latter, or even be alternated
them.

69. iii. Of the several Means recom-
ded for the Cure of Scrofula and Tu-
cles. — When a person possessed of common
e hears of the numerous spells, charms, in-
tations, superstitious rites, &c. so frequently
recourse to in former days for the cure of
fula, he considers them humiliating proofs of
credulity of the human mind, during ages
monly called dark, or only partially enlight-
d; and he is induced to form a comparison
veen those ages and present times, and to draw
rences which will probably be by no means in favour of the former. Superstitious and absurd notions and practices were no more then, than they are now, confined to the lower classes of society, or to the uninstructed mind: and however lowering they may appear to the dignity of human nature, however irrational and impossible the results imputed to them may seem to the thinking, however devoid of those connections which entitle the imputed causes to the credit of the reported effects, when any effect was even loosely observed, still greater absurdities, still more wonderful charms, more entrancing spells, more blind superstitions, and more gross impositions are credited, in this age of boasted civilisation, of scientific advancement, and of mechanical contrivance and invention, and more numerous instances of blind credulity are daily manifested, than in ages of the darkest and lowest mental abasement.

170. Everywhere — in all ranks and classes, in all professions, and even among those reputed to be instructed, or learned, or even embued with science — most absurd doctrines connected with the healing art, human impossibilities, the most ridiculous notions, the most extravagant assertions, are promulgated by knavish impostors, and believed in by credulous multitudes; the impudence of the former and the faith of the latter being the greater, the more devoid of truth these doctrines are, and the more they are opposed to good sense, to true science, and to honest dealing. When we find, as may be found at the present day, in the senate, in the hierarchy, in the judicial bench, — amongst those who govern the country, who interpret and administer the laws, who profess to direct the religious belief of the community, not merely believers in, but also propagators of, the most absurd medical doctrines and medical means — officious meddlers in what they are incapable of understanding — abettors of the knavery of mischievous quacks — can the decadence of true medical science be far off? What is neither honoured nor rewarded must necessarily cease to be sufficiently, ardently, and patiently cultivated. If the impertinencies of the ignorant, the impudence of the vulgar, the professions of the uneducated, are to be esteemed above the acquirements of the scientific and philosophic investigator, there must, at no remote period, be an end of the learning and science of those who shall hereafter assume the office and rank of physician.*

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* It is very generally believed that the patronage of quacks and quackeries — of impostors and of impositions — is to be imputed chiefly to ignorance; but this is only one of several sources to which it should be referred. Credulity, a tendency, even in the incredulous, to believe in whatever is confidently asserted, a disposition to admire whatever is unknown or unexplainable, the faith which many place in the impossible — the Catholic dogma — "Credo quià impossibile est" — have collectively and severally an influence on the minds of the majority — on those who will not take the trouble of looking closely into matters, or of thinking sufficiently for themselves, especially when they are either imperfectly or not at all acquainted with the natures and relations of such matters. It is not a little remarkable that, since the founding of the College of Physicians at the commencement of the 16th century, expressly with the view of preventing the injurious and irregular medical practices of the day, down to recent times, most of the quacks and quackeries, against which the College had to contend, were patronised by Bishops and dignitaries of the Church, and by persons of high rank, as sufficiently set forth in Goodall's history of the College.

It would appear, at the present day, as if the aberrations of the human mind, apparent in all classes and places, in matters connected with the disorders of the

171. *A. Superstitious practices* have been adopted for the cure of external scrofula since the earliest ages; and have been of various kinds, the oldest being more or less connected with pagan or religious rites, and the most recent with certain medical doctrines and quackeries which influence more or less the faith or confidence of the patient. It is not unlikely that scrofulous sores formed no small part of the external maladies, respecting which so ample a provision was made in the 13th, 14th, and 15th chapters of Leviticus, and for which the means were calculated no less to excite the faith and hopes of the patient, than to benefit the priests, who, in those ages and places of imperfect civilisation, conjoined the healing art with the priestly office. During the earlier epochs of Jewish history, both prophets and priests had recourse to sprinkling with oil and touching the diseased parts for the cure of external sores; and, before the introduction of Christianity into northern countries, the Druids or priests, whilst they undertook the treatment of these affections, most probably adopted the same or analogous means. PLINY, TACITUS, and SUETONIUS furnish some doubtful evidence of touching the sick having been resorted to, as one of the means of healing; and it would appear, from the Scandinavian Eddas and Sagas, and from some German and French writers in the seventeenth century, that the practice of healing external sores by the royal touch existed in the northern countries of Europe as early as the eleventh and twelfth centuries, and was very commonly adopted from those times until the middle of the eighteenth century.* When the age and other circumstances, in which external scrofula presents itself, are considered, it may be safely inferred, that a very large proportion of those who were thus touched recovered at indefinite periods after it was resorted to. The accession of puberty, the influence of the mind on the body, the change of living, of season, of air
and scene, and the journey, when this moc
healing was confided in, and various related
cumstances, combined to produce no mean c
tutional effects, and thereby to remove the
manifestation of the constitutional evil.
transfer of nervine influence from the healt
the sick, or any other mode of explanation w
the modern mesmerist adopts to account fo
effect, when effect was observed, could have
a small share, if any, in producing it; but, a
present day, mesmerism usurps the place o
royal touch, although with doubtful efficacy
less it brings to its aid all the accessories w
I have now mentioned, as well as many o
aiding more or less in producing a constitut
as well as a local change.

172. *B. The preparations of Iodine* are am
the most efficacious remedies which can be
scribed for scrofula, when judiciously adminis
and combined; but, when improperly empl
they may be most injurious. I have empl
them extensively both in public and private
tice from 1820 until the present time; and
generally commenced their exhibition in
doses, and often much diluted, always prefe
to give them very soon after a meal. The
parations of iodine I have preferred are, the i
of potassium, the ioduretted solution of the i
of potassium or the compound tincture of io
and the iodide of iron. The iodides of mer
are much more rarely indicated, and the iodi
sulphur is too irritating. The iodide of potassi
have often combined with the carbonate of po
or with liquor potassæ, or with BRANDISH'S
line solution, and sometimes also with pre
tions of cinchona, or of sarsaparilla, or with
or other of both. The iodide of iron shoul
given in syrup, especially the syrup of s
When scrofula is associated with syphilis,
the iodides of mercury may be given, or mer
may be prescribed night and morning, or ot
wise employed, whilst the preparations of io
are taken as just recommended.

173. During the exhibition of iodine in
form, especially if continued above a few d
the state and functions of the liver should be c
fully watched; for iodine may, by passing dire
into the portal circulation, excite, or even irri
the liver to a very injurious extent. The pr
rations of iodine may be employed externall
various ways, either to the part affected, o
means of local or general baths. When app
to the diseased gland or part, care should be ta
that they do not, by too great concentration,
vert congestion into inflammatory action, or ot
wise injuriously irritate the part. Baths contai
the iodide of potassium, with or without the
dition of sub-carbonate of potash, I have
found of much service, especially when brou
in aid of internal means. Iodine, even when
tiously prescribed, may disagree with some co
tutions. Its operation should therefore be caref
observed. It ought not to be too long emplo
without intermitting its use; and, during its e
bition, the urine should be examined and tes
not merely with respect to its acidity or alkalin
but also as to the presence of albumen; and if
latter appear, the use of the iodides should be
linquished.

174. *C. Mercurials.* — *Mercury*, in the for
calomel, *corrosive sublimate*, and *black sulph*

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body, were the humiliating inflictions of Providence on those to whom the professions are as a worldly craft, science as a matter of traffic, and learning as an occupation of the memory involving none of the higher manifestations of the mind. The history of human delusion, as to matters medical, and of the fashions which have successively engaged the weak and selfish, respecting the ailments of their debilitated frames, shows that, in an era of luxurious indulgence, of exhausting vices, and of enervating enjoyments, the impudent assertions of impostors have a more powerful influence on the minds and bodies thus emasculated, than the upright and rational advice of scientific and learned physicians. The victims of the former are either incapable of reasoning upon, or are too indolent to examine, the opinions and assertions which they practically adopt; and hence, of the several medical impostures of the present day, the most popular is that one which is the most extravagant in its pretensions, the most abounding in absurdity, and the most deficient in the least approach to truth. "*Probitas laudatur, et alget*" — honesty, however, is hardly praised; but dishonesty and assurance are more than praised — they are worshipped with a fervency equal to the extent of delusion they achieve — to the amount of their success — a success acquired only at the expense of human suffering, and by the sacrifice of human life, but worshipped nevertheless.

* During the seventeenth and eighteenth centuries, the seventh son of a seventh son, and still more the ninth son of a ninth son, divided the laurels with royalty for their success in curing scrofula by the touch; the odd numbers, as well as the rare occurrence of so prolific offsprings in succession, producing the cures as effectually as the high rank of the royal competitors. At the present day, the passes of the mesmerist profess to effect more than either the royal touch or the humbler ministrations of even the ninth son of a ninth son, wherever he may be found.

iop's mineral), was generally employed for scro- during the 17th and 18th centuries. MAYERNE, DEU, MARX, and others, prescribed it not only nally, but also to the scrofulous sores. HUFE- D resorted to mercurials with the belief that removed the scrofulous irritation by virtue law of the animal economy, that different s of irritation destroy each other, or, in other ls, that one kind of irritation removes, by rseding, the antecedent irritation. But in this ssumes two things, namely, 1st, that the mor- action consists of irritation; and 2nd, that it ny irritation may be removed by an irritant, er of which he nor any other one has proved. whilst HUFELAND and others recommended urials, even until they produced salivation in ore obstinate cases, others, with equal justice, ended, with MORTON and GIRTANNER, that were injurious when carried so far as to occasion salivation; and they were fortified in this by obvious impropriety of prescribing a debili- g medicine for a disease essentially of de- y.

5. At the present day, several other pre- tions of mercury have been resorted to, espe- y *mercury* with *chalk*, the *iodide* and *sub- e*, the *bromide* and *sub-bromide*, and the *te*, externally. I have employed several of , especially the iodides, with results similar to already mentioned in respect of iodine; but nercurial iodides require a careful observation eir effects. Mercury with chalk is an excel- alterative, and is often required to correct or ncrease the biliary functions. Of all the arations of mercury, the *corrosive sublimate* is inly the most beneficial; but it should be ribed in very small doses, and generally in nction with some preparation of sarza or of ona; and when thus exhibited, I have found nost equally efficacious with the preparations dine. It was much used by VAN SWIETEN, NSIDE, and their contemporaries. I have lly given it with the fluid compound extract, rup of sarsaparilla, or in the compound tinc- or decoction of cinchona. In the more ob- te cases, a course of the sublimate may be al- ted with a course of one of the iodides; and the bones are at all implicated, this plan will rally prove efficacious, especially when aided n appropriate diet and regimen.

6. *D. Preparations of Iron.*—Most of the pre- tions of iron may be given advantageously in ula, especially after morbid secretions and l accumulations have been evacuated. The arations which I have preferred are, the *ammo- rtrate*, the *potassio-tartrate*, the *ammonio-chlo-* the *saccharine carbonate*, the *iodide*, and the *ound mixture of iron*. Mention has already made of the iodide (§ 172.). The compound ure of iron is one of the most efficacious, and ve usually prescribed it with an additional tity of the carbonate of potash, or with solu- of potash, with extract of conium and liquo- The *sulphate* and *muriate of iron* were rally preferred by THILENIUS, THOMANN, and ELAND; and when the former can be taken in l, and when the latter is given in the form of incture of the sesquichloride, either of these is beneficial. These preparations are most ser- able where there is any tendency to anæmia lorosis, and not less so when scrofula is associated with hysteria or disorder of the catamenia in any form.

177. *E. Chlorides.* — (*a.*) *Chloride of Barium.* — Dr. ADAIR CRAWFORD first contended for the anti-scrofulous operation of the muriate of baryta, and in this he was supported by FERRIAR, THOMANN, PEARSON, BUCHOLTZ, WESTRUMB, HUFELAND, PINEL, ARMSTRONG, WENDELSTADT, VERDIER, &c. But CHAPMAN, PORTAL, JADELOT, and others, have not fully confirmed the opinions which were formerly entertained respecting it. The muriate of baryta had fallen into neglect for some time, its use having been superseded by medicines which were found more efficacious and less irritating to the stomach, when Dr. PIRONDI advised a more active employment of it. He prescribed six grains of the medicine in four ounces of water, and directed a table-spoonful to be taken every hour, excepting the hours before and after a meal. He increased the dose by six grains every day, until a drachm was given; and the patient was restricted to a vegetable diet and water. Having had some acquaintance with Dr. PIRONDI, I was induced to make a partial trial of this plan in a few cases, but I could not succeed in giving more than ten or twelve grains in the twenty-four hours, and then it was given more diluted than he advises. Its irritating effects on the stomach frequently prevented me from prescribing more than six or seven grains in the twenty-four hours. It appeared to be more efficacious when given in moderate doses, either soon after or with the meals, than when taken in larger doses in the intervals. According to Dr. GLOVER, who makes a very favourable mention of the chloride of barium in scrofula, the *bromide* and *iodide* of *barium* has the same physiological action with the chloride, the iodide, moreover, acting energetically on the uterine system.

178. (*b.*) *Chloride of calcium* was formerly much employed against scrofulous swellings and sores, and in similar states of solution to those in which the chloride of barium was prescribed. BEDDOES, ODIER, FRANK, and HUFELAND have made favourable mention of this substance. The last-named of these writers, however, considered it more irritating than the chloride of barium, and that it, therefore, should be used more cautiously. Dr. SIMMONS stated it to be inefficacious, and Mr. PHILLIPS seems to be of a nearly similar opinion. "FOURCROY and the Dutch physicians had much confidence in its power over scrofula. BIETT for many years made much use of this medicine in the treatment of the scrofulous patients of St. Louis, without observing those inconveniences which are frequently attendant upon the use of baryta in full doses. It is the base of the anti-scrofulous nostrum of NIEMANN. I have frequently used it in the following form: — a drachm of this chloride to twenty drachms of distilled water, of which a tea-spoonful was taken in milk two or three times a-day. I have carried the dose up to two tea-spoonsful, but not exceeded that dose. I am not satisfied that it has any evident action upon scrofulous glands, but it is more generally tolerated than the chloride of barium." (PHILLIPS, op. cit., p. 282.)

179. (*c.*) There are other *chlorides*, as the *chloride of potassium*, the *chloride of zinc*, &c., which, if judiciously employed, may act beneficially in scrofulous swellings and sores. The *chlorate of*

potass has been very frequently prescribed by me in this, and in other cachectic diseases since 1819, and I can recommend it as one of the substances most deserving adoption in scrofulous affections. Dr. **Glover** remarks that his experiments prove the *chloride of potassium* to be much more energetic than the corresponding compound of sodium, although not so powerful as the iodide of potassium. "There is scarcely a doubt but that the chlorides, bromides, and iodides of the same bases produce effects identically similar in kind, differing only in degree. The bromide of potassium is more powerful than the chloride, less active than the iodide. Not being so apt to occasion nausea as the latter substance, it may be used in cases where this might disagree."

180. *F.* Solutions of *chlorine—aqua chlorinei—* and chlorinated solutions of the alkalies have considerable influence in the more cachectic states of scrofula. Dr. **Glover** observes that the strongest analogy, in physiological and medicinal properties, exists between chlorine, bromine, and iodine; and that any one of these bodies is capable of producing the effects which can be obtained from another; but that the different forms in which we must use them give rise to differences in action. "Thus the very slight solubility of iodine almost precludes its use in watery solution; and the convenience with which solutions of *bromine* can be prepared renders this body peculiarly adapted to form lotions for external application." Mr. **Potter** and Dr. **Glover** have proved the utility of bromine used externally; eight or twelve minims of bromine being added to a pint or half a pint of water. I have directed one drachm of bromine to eight ounces of distilled water; and from five to twelve drops of this solution to be taken in any suitable vehicle internally; and from one to two drachms of the solution to eight ounces of water for external use.

181. *G. Alkalies* have long had a great reputation for the cure of tuberculosis and scrofula. They are much praised by **Hamilton**, **Blankard**, **Kirkland** and **Fodéré**, especially the carbonates, and the solution of potass. These are, however, much less efficacious than **Brandish**'s alkaline solution, which owes much of its efficacy to the lime which it contains. The alkalies should generally be conjoined with tonic or bitter infusions, or decoctions, with chalybeates, as in the mistura ferri composita, or with deobstruent extracts, as taraxacum, guaiacum, sarza, &c.; or they may be given in the form of common or medicated soap, in conjunction with these extracts, or with ammoniacum, myrrh, &c. I have frequently combined either of the carbonates, or the solution of potash, with the iodide of potassium with marked advantage. The aërated alkaline waters may be made the vehicle for several other medicines in the form of tincture; and, when the bowels are lax or irritable, or discharges from any of the mucous canals are troublesome, then lime water, or the aërated lime water taken either alone, or with milk, or with other medicines, which the circumstances of the case will indicate, will be of great service.

182. *H. Acids* have rarely been found of service in scrofulous swellings, although they have often been given in certain states of tuberculosis, especially when affecting the lungs, and sometimes with benefit. I have found, however, the *nitro-hydrochloric acids*, used internally or - ternally, or in both ways, of great service; d they may be employed either as the chief me s, or in aid of other remedies. They are most b - ficial when the functions of the liver are imperfe y performed, when the circulation is languid d weak, especially in the extremities, and when e hands or feet are cold. The *hydrochloric* d was recommended by **Ferriar** and **Joerd** s, and I have prescribed it in scrofulous affection u the decoction or infusion of cinchona with m h advantage. The nitro-hydrochloric acids ma e taken either alone or in bitter or tonic infusion

183. *I. Tonics* of various kinds have been v y generally recommended for external scrofu s affections, but not so frequently for internal tu - culosis as rational views of the nature of this ma y might have suggested. The preparations of - *chona* were much employed by **Whytt**, **Foth** - **gill**, **Northcote**, and **Fordyce**; and various - ter extracts and vegetable tonics by **Grosma** , **Hufeland** and others. The connection of s - fulous affections with debility, and with impe t digestion and assimilation, indicates the nece y of having recourse to this class of medicines ei r as the principal means of cure, or as adjuvant r as the vehicles, of other more specific reme s. A solution of *pepsin* has been recommended a tonic and promoter of digestion by Dr. **Ty** n **Smith**. He gives it a quarter of an hour a r every solid meal, and in larger quantity after - ner than at any other time.

184. *K. Cod-liver oil* and the *oil* from the live f *other species* of the same genus have been rece y much employed in the treatment of all forms of s - fula and tuberculosis. I have prescribed it s e its use was revived; and I have had numerous - casions of observing its beneficial effects, especi y when aided by such means as the peculiarities o e case should suggest. Its operation is not me y that of a nutrient, but it is also alterative, a t certainly produces more or less of a healing - fluence on ulcerated cavities or surfaces; t e effects being the more manifest, the more re t the oil, and the less it is subjected to clarifica n and other chemical manipulations. I have usu y found it most beneficial when taken on the sur e of diluted lemon-juice, or on lemonade, or on e surface of the infusion of orange-peel, with r without a few drops of the solution of potash, o f **Brandish**'s solution; or on water containi a few drops of the nitro-hydrochloric acids, or o e muriated tincture of iron. When there is m h cachexia, or inaction of the liver, or more or s anæmia, these modes of exhibition should e preferred.

185. *L. Burnt Sponge* had once consider e reputation for the cure of scrofula, and to th t was chiefly indebted to **Arnault de Villene** , **Astruc**, **Lane**, **Ring**, **Fodéré**, and **Hufel** . I have had no experience of its effects; but t it was entirely without effect I cannot beli , although the quantity of iodine it contains is y minute. The animal charcoal which was s formed might not have been entirely inefficaci , especially in correcting the contents of the - mentary canal; for which, indeed, powd d *charcoal* is extremely efficacious. **Lettson** a sagacious practitioner, often had recourse to b t sponge, and sometimes gave it with calomel.

186. *M. Various substances* have been empl d

e or less *empirically*, or without any clear s as to their operation, or as to the amount of ct which may be ascribed to them.—(*a.*) Of the efit which may be derived from *emetics* and *achic aperients*, as advised by Schmidt, Wei-D, and others, there can be no doubt, when scribed at the commencement of the treatment, when circumstances indicating their use are sent. Several other substances were also much ployed at different periods, and were probably altogether without benefit, particularly as al-tives and restoratives, thereby improving the stitutional powers. Amongst these *guaiacum*, *afras*, the decoction of *walnut-leaves*, *willow-k*, *hops*, *taraxacum*, *tussilago*, *cantharides*, *assa-ida*, *&c.*, held the most conspicuous places. Verius prescribed *gum ammoniacum*, both in-ally and externally; and I have seen much efit derived from the *balsam of Peru*; and, in er instances, from *capsicum* taken internally, from the external application of a weak in-ion of it to scrofulous sores. Dr. Tyler ith has recently recommended the exhibition *epsin* in order to promote the functions of the mach.

187. (*b.*) *Digitalis* was formerly much employed ernally against scrofulous and tubercular eases. M. Bayle (*Biblioth. Thérapeutique*, ii.) states that it was first prescribed by Van lmont; and subsequently by Haller and rwin, the latter of whom gave the powder in large doses as five or six grains thrice daily. is substance was used also externally, either the form of the infusion, or powder of the ves, and the internal and external uses were joined. I have no experience of the remedy scrofula, and I believe that is more likely to ve injurious than beneficial. The *walnut-ves* have lately been much recommended by . Negrier; but I agree with Dr. Glover in nsidering them as only slightly beneficial, as a ic, when the preparations of these leaves are d internally, and as an astringent when ap-ed externally, and as inferior to several other ics and alteratives usually adopted.

188. (*c.*) At the commencement of the last cen-y *tar-water* was very much vaunted for the cure every form of scrofula and tuberculosis, and some ars ago I prescribed it largely both internally, d externally in a stronger form, as a wash to rofulous sores; and from my experience of its ects I consider it one of the most efficacious eans which we possess, when aided by a suitable et and regimen. I also gave the pure Norwegian r in the form of pill by means of liquorice pow-r. Tar may be given more largely when made to pills with magnesia, but in this combination e pills often pass through the bowels without ing dissolved. In the more indolent states of rofulous sores, *creosote* may be substituted for r-water, but my experience leads me to prefer e latter. The tar may likewise be made into ills with powdered charcoal or other substances, r be taken in gelatine capsules. This medicine often very efficacious in the chronic cutaneous ruptions which occur in the scrofulous taint or ssociated with any of the forms of scrofula or berculosis.

189. (*d.*) During the 16th and 17th centuries, nd more recently, a medicine was much in vogue as n alterative and restorative, not only in scrofula, but also in many other maladies, under the appellation of the *infusion of a thousand flowers*. This consisted of an infusion, either warm or cold, of the recent dung of cows and bullocks feeding in open pastures. The only effect which this medicine could produce must be referred to the proportion of bile which it contained. That *ox-gall* is possessed of much efficacy, either alone, or properly combined, I have shown in various parts of this work, especially in promoting the digestive and assimilating processes. It is readily procured in the states of inspissation and extract. I have prescribed it in the form of pill since 1820, and it is now kept by most of the chemists in this city. It is most beneficially used as an adjunct to other appropriate means, especially in states of inaction of the liver, and when the bowels are weak and irritable.

190. (*e.*) Since the work of Stoerck on *Conium* appeared, this substance has had great reputation for the cure of scrofula; and, although it has received the commendations of Quarin, Rutty, and many others, I am at a loss to recognise its virtues. The same remark applies to *digitalis*, which has been prescribed by Menz, Darwin, and Hufeland. *Sulphur* in various states of combination is more deserving attention. I have often prescribed it in scrofulous affections, in conjunction with magnesia, powdered cascarilla, or aromatics and warm carminatives, with the view of promoting the cutaneous functions, which are often imperfectly performed, (and this object it attains more permanently than most other means,) and in order to promote the intestinal evacuations. *Camphor* was recommended internally by Copland, Lettsom, and Fodéré, and externally dissolved in olive oil; and in this form it may be applied with gentle friction or more permanently. *Sulphate of zinc* was praised by White, but it is much inferior to the sulphate, or other preparations of iron.

191. (*f.*) *Electricity* was long since recommended by Sigaud la Fond for scrofulous swellings, and its use has been recently revived; but in whatever manner this agent may be employed, either as electro-galvanism, or as electro-magnetism, or as shocks from the Leyden jar, or as sparks from the parts affected, it is appropriate only to the more indolent and atonic states, and when the parts furnish no signs of acute inflammatory action.

192. *N. Change of air* to the sea-side, in connection with sea-bathing, &c., has frequently a beneficial influence, and a considerable share of the benefit has been imputed to the sea-air. The amount of benefit has most probably been exaggerated, but I cannot think that it is without influence, especially when the body is duly protected from cold. Mr. Phillips thinks that change to the sea-coast exercises no greater influence on scrofula than change to any inland situation where the air is pure and dry. For young persons and scrofulous children change of air is always beneficial, and when this can be conjoined with the use of sea-water and sea-bathing, I believe the benefit to be augmented; and, for this purpose, especially to residents in the metropolis or other large towns, there are no places more salubrious, during the months of June, July, August, and September, than Lowestoft and its vicinity, and the Isle of Thanet.

193. (*a.*) *Sea and mineral waters* have always had a great reputation in the treatment of scrofulous and tubercular affections. Sea-water has been strongly recommended by **Russell**, **Kirkland**, **Tolberg**, and many others, both internally and externally; and of all waters it is certainly most generally appropriate and efficacious, if its use be judiciously directed. When it can be retained on the stomach, even in small quantity, it will generally be taken internally with benefit; and when the bowels are sluggish it is one of the best aperients that can be given. As a warm, tepid, shower, or cold bath, or used in washing or sponging the surface, it is also an excellent remedy. But when sea-bathing is adopted, especially for children, the period of immersion should be brief—short in proportion to their youth and the amount of debility; and, if alarm be caused by it, the shock should be avoided by substituting effusion on the surface by a sponge, or even by less alarming modes of employing salt-water. In some cases artificial sea-water may be used, or a solution of bay-salt, or this salt may be added to sea-water. Reaction should follow cold bathing, and when this is not manifested, either the period of immersion has been too protracted, or the means is too severe for the constitutional powers of the patient, and should not be persisted in.

194. (*b.*) *Several mineral waters* are used with great benefit, both internally and externally, for scrofulous affections; but they should be prescribed with strict reference to the states of nutrition, circulation, and assimilation, otherwise but little advantage will be derived from them. Where the assimilative functions are much impaired, and more or less of anæmia exists, the chalybeate mineral waters of this country should be preferred; and these may not only be taken internally, but also used externally as baths, as advised by **Lentin** and others. The several alkaline and sulphureous waters, as those of Bath, Harrowgate, Leamington, &c., are generally of service, especially when a deobstruent and alterative effect is required. Dr. **Glover** remarks that the mineral waters of Shap and Shotley, in the north of England, appear to be the best suited for scrofula, on account of the large quantity of alkaline and earthy muriates which they contain. Besides these, the mineral springs and the factitious waters of Carlsbad, Ems, Fachingen, Homberg, Kissingen, Seltzer, and of Barèges, Bonnes, Cauterets, Enghien, &c., have severally been recommended in scrofulous affections, and are more or less beneficial when judiciously employed, and aided by suitable medicines, diet, and regimen.

195. O. *Medicated baths* of various kinds have been recommended for external scrofula. Those containing the iodide of iron, or iodide of potassium with the sub-carbonate of potass, or small quantities of the sulphuret of potash, are the most beneficial. I have prescribed baths with the sub-carbonate of potash alone, and believed them to have been of service. It is manifest that these can be viewed merely as aids of internal remedies.

196. P. *The local treatment of scrofula* requires merely a few remarks; for if scrofulous glandular swellings receive an early attention, the internal or constitutional means described above, more especially the administration of the preparations and combinations of iodine, appropriately to the circumstances of the case, should be chiefly confided in. The treatment of scrofulous swellings s uld depend chiefly on the absence or presence increased heat and redness. If either or bo be present, very different means from those whi are indicated when they are absent, are required As long as the tumour continues devoid of redne of increased heat, or much tenderness, gentle fri ons with fresh olive-oil, to which small proportio of spirits of turpentine and camphor are added, or without a little soap, will generally be of se ce. The preparations of iodine, especially ointn ts, lotions, and tinctures of iodine, have been ch employed to the affected parts. But these s ld be sufficiently mild not to irritate the skin for when they are too strong, the irritation of th urface caused by them will extend to the rts underneath, and superinduce an inflamm on which might not otherwise have occurred. he iodine ointment of the Pharmacopœia is muc oo strong, and contains too large a proportio of iodine as respects that of the iodide of potas m and that of lard. I have much preferre he ointments prescribed in the **Appendix** (see *F m.* 766—770.); and even they should be cauti ly applied, so as to avoid irritation and pain. he swelling be painful, or if it be irritated b he friction, the compound tincture of iodine m be applied, more or less diluted, to the surface, o he lotions prescribed in the **Appendix** may be nployed (see *Form.* 671—673.), but the str er of these should be very much diluted.

197. When inflammatory action appears, e er in the surface of the swelling or in the subj nt parts, the more common applications for st ic inflammation are seldom of service, but, o he contrary, are often prejudicial. The existen o pain in the swollen part should not be view as always indicative of inflammation, for where ne former is most severe, the latter may not be esent. In these cases, the *unguentum io ii plumbi*, and the *unguentum iodinii opiatum*, i ie **Appendix** (*Form.* 768. 770.), are the most rviceable. I have also found the *unguent. calc lanos cum camphorâ* (*Form.* 757.) of use. se ointments should be rubbed gently over the rface, without exciting irritation. If increased at and redness continue nevertheless, warm d anodyne applications are frequently more b eficial. In these cases, either of the deobstr nt ointments in the **Appendix** (*Form.* 761, 7) may be tried, as there prescribed or more or ss diluted.

198. If the inflamed part goes on to *su ration*, an early outlet should be given to e matter, as its retention contaminates the tis es which surround it, and, extending in more n one direction, often gives rise to sinuses. e *ulceration* consequent on scrofulous suppura n generally requires not only much attention to e general health, by the means above described, t also a pure air, and suitable diet and regimen. n addition to these, gently stimulating applicati , consisting either of very weak ioduretted -ments or lotions, — of ointments containing ei r the balsam of Peru or a small proportion of e iodide of zinc, — of lotions containing a few d s of the tincture of capsicum, or of one of the c -rides, — will be used with benefit. The solut s of iodine recommended by **Lugol** to scrofu s ulcers are the following: —

	No. 1.	No. 2.	No. 3.
dine	2 grs.	3 grs.	4 grs.
dide of Potass.	4 grs.	6 grs.	8 grs.
istilled water	1 pound	1 pound	1 pound

se, commencing with the weakest, may be
l frequently, either as washes or lotions, or be
cted into scrofulous sinuses.

99. Q. *The diet and regimen* of scrofulous and
ercular subjects, whether *infants, children,* or
lts, are in every respect the same as above re-
mended (§§ 148—153.) for the *prevention and*
hygeienic treatment of scrofula and tuberculosis.
chief of these means are animal warmth and
able food during infancy; a pure, dry, mode-
ly warm and uncontaminated atmosphere; due
ilation of the apartments, especially of bed-
ns; change of air, sea-air, and voyaging; a
regulation and subjugation of the passions,
res, and imagination; a light, digestible, and
itious diet, avoiding stimulants or heating
erages; and regular exercise in the open air;
exposure to light and sunshine; early and re-
r hours for sleeping and waking, and for
ls; and attention to the states of all the secre-
s and excretions, — the cutaneous, intestinal,
urinary,—are the most conducive, not merely
e prevention of scrofula and tuberculosis, but
to the recovery of health in all the forms in
ch these states of disease manifest themselves.

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A
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VOL. III. — PART II.

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A

DICTIONARY

OF

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COMPRISING

GENERAL PATHOLOGY,

THE NATURE AND TREATMENT OF DISEASES,

MORBID STRUCTURES,

AND

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AND TO THE DIFFERENT EPOCHS OF LIFE.

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AND
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E WHOLE FORMING A LIBRARY OF PATHOLOGY AND PRACTICAL MEDICINE AND
A DIGEST OF MEDICAL LITERATURE.

BY JAMES COPLAND, M.D., F.R.S.

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS;
HONORARY MEMBER OF THE ROYAL ACADEMY OF SCIENCES OF SWEDEN;
OF THE AMERICAN PHILOSOPHICAL SOCIETY;
AND OF THE ROYAL ACADEMY OF MEDICINE OF BELGIUM;
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Our art, our strength, our fortitude require!
Of foes intestine what a numerous band
Against this little throb of life conspire!
Yet Science can elude their fatal ire
Awhile, and turn aside Death's level'd dart,
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And brace the nerves once more, and cheer the heart,
And yet a few soft nights and balmy days impart."

BEAT .

"Go, little book, from this my solitude;
I cast thee on the waters,—go thy ways;
And if, as I believe, thy vein be good,
The world will find thee after many days."

SOUTH .

A
DICTIONARY
OF
PRACTICAL MEDICINE.

Vol. III. Part II.

SURVY. — Synon.: *Scorbutus*, Sauvages, Vogel, Cullen, &c.: *Scorbutus Nauticus*, Young; — *Porphyra Nautica*, Good; — *Scharock, Skorbut*, Germ.; *Skiorbug*, Dan.; — *Scorbut*, Fr.; — *Scorbuto*, Ital.; — *Scorb, Scarock, Skörbut, Scorbie*, &c., Saxon, — hence *Scorbutus, Scurvy.*

Classif. — 4*th Class.* Cachectic Diseases; — 3*rd Order.* Impetiginous affections (Cullen); — 3*rd Class.* Sanguineous Diseases; — 4*th Order.* Cachexies (*Good*). Class. IV. Order IV. (*Author in Preface*).

. Defin. — *Lassitude, Debility, lowness of its, fœtor of the breath and sponginess of the ns, followed by livid sub-cutaneous patches and ts, especially on the lower extremities and roots he hair, and lastly, by spontaneous hæmorrhages m mucous canals, by contractions and pains of limbs, and superficial ulcers, &c., the disease ceeding from an alteration of the blood, caused unwholesome or insufficient food, and by the vation of fresh vegetables and fruit.*

There are few diseases which have excited, or ich deserve greater attention than scurvy, not y from medical men, but also from civil authoes and military and naval commanders. The y great prevalence and fatality of the disease ing the 15th, the 16th, the 17th, and the 18th turies, in many communities, in armies, and in ts, &c.; the causes, both of the prevalence and the mortality of it, being fully ascertained; the vention and the counteraction of these causes n being in a great measure in our power; and treatment in a very large proportion of cases mitting, especially when the causes are removed, a successful issue, are circumstances which imt both a social and a medical interest to this ease. If we refer to its remarkable prevalence former times, to the mortality produced by it, the nature of the causes of its diffusion and erity, it may be justly considered one of the st distressing and fatal pestilences to which the man species is liable.

Even whilst we contemplate the operation of causes which occasion this malady, the wretchedness and distress which precede the outbreak of it, and the extent of contamination of the circulating fluids, and the disorganisation of the several structures which characterise it; and even while we reflect on the numbers which are liable to suffer from these causes, we feel assured that it is in our power to prevent or to remedy these effects, if we be provided with the ascertained means, and if the causes admit of being removed. Unfortunately, however, these causes are not often removable, even when they are the results, as they often are, of human agency, and are produced by the cupidity and villany of man. Contractors may supply diseased or unwholesome food, both animal and farinaceous, to armies and fleets; and the examiners appointed to ascertain the soundness of provisions may collude with contractors to prevent the detection of the horrible crime until all means of prevention and of remedy are beyond reach. The evils thus produced on an extensive scale may, by similar agencies, be occasioned to a more limited extent in ships or in garrisons; and all preventive and medical means may, with little less culpability, be unprovided, or placed neglectfully beyond the possibility of obtaining them. We have only to refer to the history of our own country at the close of the 17th and the commencement of the 18th centuries, and to the results furnished by the wars in Ireland and in the Low Countries, and by the diseases in our armies and fleets at these periods, both for an estimate of the ravages of scurvy and its associated maladies, and for an account of the criminal agencies concerned in their production.

The comparatively rare occurrence of scurvy in this country, in its fleets and armies, and in its mercantile navy, during the last quarter of the 18th century and the first quarter of the present century, had in some degree diverted the attention of public authorities from the causes and the prevention of this very important, and, on many occasions, pestilential malady. As respects the fleets of this country, the favourable results observed during many years were attributable to due attention having been directed to the means of prevention — to the avoidance, as far as possible, of exposure to cold and humidity, to greater care in preserving the water in a pure state, to a more liberal supply, and to a more careful examination of provisions. Unfortunately, however, in very recent times, circumstances and causes favourable to the prevalence of the disease, especially in our armies in the East, occurred; and, notwithstanding the shorter duration of voyages of fleets and trading vessels, the want of attention in too many instances to prophylactic measures produced the usual bad consequences. As on almost every occasion for hygeienic measures, and in every disease, so in this, the most salutary and the most efficient means of prevention have been ascertained and promulgated by medical men, who, notwithstanding their admitted philanthropy, were not only unrewarded, but illiberally treated, by governments and by the public generally.

The causes of scurvy, and the means of preventing the evils produced by them, when the causes are neither very complicated nor very formidable, have been long ascertained, and have generally been rendered practically available. But, unfortunately, the nature and the sources of the causes have been such as often to preclude both prevention and cure; and the intensity and combination of causes have often not only spread the disease, but also imparted to it more malignant and more fatal characters. — The simpler states of scurvy, arising from less severe and more common causes, are converted into a most diffused and irremediable pestilence by increased intensity of the causes, especially by insufficient and unwholesome food, by foul waters, by overcrowding and imperfect ventilation, by cold and humidity, by excessive labour in trenches, fortifications and unhealthy localities, by despondency and want of sleep, more especially when armies, fleets, and besieged towns are subjected to these miseries. In these circumstances, amongst numerous cases of fully and rapidly developed scurvy, others closely allied to them in their nature, but even more fatal in their tendencies, especially scorbutic dysentery, putro-adynamic fever, and hospital gangrene, soon make their appearance, increase in numbers, and very remarkably augment the mortality. If the separation of the sick from the healthy, and if due ventilation be not enforced as soon as the occurrences take place, the malignancy and danger of these diseases are further increased by the generation of infectious emanations, which often remarkably accelerate a fatal issue. This is no overcharged picture, for whoever of those living at the middle of this century who have had an opportunity of observing the maladies produced in and by armies and besieged cities, &c., more especially on the continent of Europe, in the early part of the present century, must admit that it is impossible to portray the amount of suffering and of wretchedness, of disease and deaths proceeding from these causes. Similar results will follow these causes again, and whenever wars, unhealthy encampments, insufficiently supplied commissariats, the criminality of contractors, imperfect means of preventing and of curing disease, crowded and improperly placed hospitals, &c., combine to develope them; and they will appear to an extent and with a fatality co-ordinate with the intensity and the combination of these causes — causes which have been productive of a very much greater sacrifice of human lives, and with much greater sufferings, than all the battles d sieges which have been recorded.

2. I. HISTORICAL SKETCH.— Some writers he supposed, with SENNERTUS, MEAD, and MILM, that scurvy was known to the ancients, whilst oths have believed, with FRIEND, that there is nothg to be found in their writings to warrant this s-position. HIPPOCRATES, in mentioning enla-ment of the spleen — σπλὴν μέγας — notices t one symptom which is applicable to scurvy, d that is ulceration of the legs; and, in descrig Convolvulus Sanguineus — Εἰλεὸς αἱματίτης — e adduces the dark discoloration of the skin, e eruption of ulcers on the legs, and the difficult f walking, as more particularly distinguishing. But these remarks are insufficient to show that e was actually acquainted with true scurvy. It s been supposed that the disease, with which PL states the army of CÆSAR GERMANICUS to he been afflicted after a long encampment in G-many beyond the Rhine, near the sea-coast, d which was ascribed to the water which was dra, was that now under consideration. He sta, that "the teeth dropped out, and the knees bece paralytic. The physicians called the maly *Stomacace* and *Sceletyrbe*. They discovered a remedy against it, viz. *Herba Britannica*." W t this plant, of which PLINY adds a very short d imperfect description, actually was has not bn shown by his commentators. Subsequent ancit writers, not even the Arabians, have furnisd nothing in addition to what I have now adduc

3. The earliest account of scurvy is that gn by the Sieur JOINVILLE, as it appeared in 126 n the army of Louis IX. in Egypt, owing to e nature and scarcity of the food, and the scary of water. The next notice taken of it is y FABRICIUS, who states that it was very prevat and fatal in Misnia, during 1486. As sos long voyages were undertaken, scurvy apped in an unmistakeable form. During the voyaof VASCO DE GAMA, who first made the passage te East Indies, by the Cape of Good Hope, more n one hundred of his men out of one hundred and sy died of this malady. The History of Portugse discoveries, by W. LOPES DE CASTENNADA contas the relation of this voyage, which furnished e first account of this disease as it occurred at se

4. That scurvy was not then, nor for se time afterwards, known, is evident from the-count given by CARTIER of his second voyago Newfoundland in 1535. After mentioning e characteristic symptoms, he adds that, "abou e middle of February, of a hundred and ten pele there were not ten whole." "Eight were alry dead, and more than fifty sick, seemingly pasll hopes of recovery. This malady being unknowo us, the body of one of our men was opened to if by any means possible the occasion of it mighe discovered, and the rest of us preserved. B n such sort did the calamity increase, that te were not now above three sound men left. Twe-five of our best men died; and all the rest weo ill, that we thought they would never recr again. When it pleased God to send us the kn-ledge of a remedy for our health and recove" The remedy was a decoction of the leaves d bark of a tree, which was called by the na s *ameda* or *hamuda*, and which has been consid d to have been a species of spruce-fir.

5. Dr. LIND states, that the name of this dise

to be mentioned in the history of Saxony, by RI KRÜNTZ; and if so, he will be found the uthor now extant who calls it the scurvy. It t taken notice of by EURITIUS CORDUS in his *ologicon*, published in 1534, where it is ob- l that the herb chelidonium minus is called e Saxons *Schorbock rout*, being an excellent ly for that disease. In the year 1539 it is men- l by J. AGRICOLA in his *Medicina Herbaria* s MAGNUS, in his history of the northern us, published in 1555, observing what diseases eculiar to them, gives a long description of y, mentioning that it is vulgarly called *buck*, which is synonimous with the ca- ı of the Greeks. He refers it chiefly to the e of the food, and mentions, that the habitual absinthiated beverages is had recourse to in to prevent and to cure it. About this period reatises on the disease were published by EUS, ECTHIUS, WIERUS, and LANGIUS. TUS states, that the description by ECTHIUS contained in an epistle sent in 1541 to BURCHIUS, a physician in Utrecht. The ook published expressly on scurvy was by EUS, who remarks, in a reprint, that if he rst seen the accurate description by WIERUS, n should not have been published.

WIERUS states, that scurvy had been long ar to the inhabitants of the countries near the seas, and that he had never met with it in France, or Italy, nor in Asia or Africa. can be no doubt of the existence of scurvy northern countries of Europe from the ear- ges, although no account of it had appeared usly to the appearance of the works now men- ; and it is equally manifest that years of y, wars, sieges, &c., must have rendered it r less endemic, or even epidemic, in various and localities. During severe winters and spring, the food of the inhabitants of these ies, the dried and imperfectly-cured meats h, and the want of succulent and other ve- es, particularly in the countries adjoining ltic, and the Northern and German Oceans, ave occasioned a remarkable prevalence of alady, even although nature had provided vith the best preventives and means of cure, spruce-fir and numerous other anti-scor- plants and herbs, with which they abound. omparatively recent culture of succulent ve- es, an dmore especially of the potato, in these ies, accounts not only for the rarer appear- f this malady in these parts in recent times, so for the prevalence of it during earlier ages.

Of the four ships which sailed from Eng- he beginning of April, 1609, for the esta- ent of the East India Company, three were erely visited by scurvy as to have lost one-fourth of their crews when they arrived Cape of Good Hope. The commodore's as not attacked. This immunity arose from able-spoonfuls of lemon-juice having been daily to each of his men. Notwithstanding idence of the success of lemon-juice in pre- g scurvy,—evidence the most conclusive,— luable remedy and preventive was altoge- lighted for 150 years afterwards, although destroyed often one-half or three-fourths of ews of our fleets, and was more destructive armies than either battles or sieges, inde- ntly of the deaths it occasioned, both on land and at sea, in trading vessels. Sir R. HAWKINS states, in his observations on his voyage to the South Sea in 1593, that upwards of ten thousand mariners had died of scurvy under his own observation alone, during the twenty years that he had been at sea. (PURCHAS's *Collect. of Voyages*, vol. i. & iv.) Admiral HOSIER, who sailed in April, 1728, with seven ships of the line to the West Indies, buried his crews twice, and died broken-hearted in consequence. Lord ANSON's expedition, at the end of two years from its leaving England in 1740, had lost from this disease more than four-fifths of the number that sailed in it. The voyages of DRAKE, CAVENDISH, DAMPIER, BYRON, and of numerous other navigators, furnish similar details, and show how recklessly the lives of sailors were sacrificed.

8. But it was not only in fleets and single ships that scurvy was so destructive, but also in towns, fortifications, camps, and armies, and wherever the population was subjected to the causes which occasioned it in fleets. That scurvy was endemic, and also epidemic, in northern European countries, has been stated to be manifest from the early works on the disease, and from the nature of the food upon which their inhabitants subsisted. Owing to the difficulty of procuring fresh, succulent vegetables, and from their ignorance of the disease and of its several preventives and cures, the early frequenters of Hudson's Bay, of Newfoundland, and the coast of Labrador, were frequently almost altogether destroyed; and the early French settlers in Canada experienced so severe losses in winter and early spring from this disease, as almost to induce them to abandon the settlement.

9. Whilst sporadic cases of scurvy were of frequent occurrence, the ravages of the disease were often great in winter and spring, especially in years of scarcity, and in besieged towns or fortifications, and in armies. VANDER MYE states that, during the siege of Breda by the Spaniards in 1625, the garrison and inhabitants were grievously afflicted with this disease, 1608 soldiers having been attacked up to the fourth month of the siege, the numbers having increased daily until the place surrendered in June, after a siege of eight months. BACKSTROM has recorded that, in 1703, when Thorn in Prussia was besieged by the Swedes, 5000 of the garrison, besides many of the inhabitants, were carried off by scurvy during the five months' siege; the besiegers being altogether exempt from it. During the war between the Austrians and Turks in 1720, "when the Imperial army wintered in Hungary, many thousands of the common soldiers, but not one officer, were cut off by scurvy. Dr. KRAMER, physician to the army, being unacquainted with a remedy for it, requested a consultation of the College of Physicians at Vienna. Their advice was, however, of no avail; the disease, which broke out at the end of winter, continued until, at the approach of summer, the earth became covered with greens and vegetables." BACKSTROM (*Observat. circa Scorbutum*, &c., 1734) states, that both in the siege of Thorn and in the Imperial army, as soon as the former was raised, and vegetables and greens from the country were admitted into the town, and when the latter procured the same articles of food, the disease entirely disappeared. From these and other facts he concludes, that an

abstinence from recent vegetables is altogether and solely the cause of the distemper, and so these alone are its effectual remedies.

10. Dr. Nitzsch in 1747 gave a detailed account of the prevalence of scurvy in the Russian armies, especially at Wiburgh, and during the siege of Asoph, in 1736. At these and other places, the mortality was great during winter and spring, and was, as on most other occasions, ascribed to the unwholesome nature of the food, and the want of fresh succulent vegetables. In the spring of 1760, the British troops, forming the garrison of Quebec after its capture from the French, suffered so severely from cold, and the want of vegetables, that before the end of April, 1000 of them were dead of scurvy, and more than twice that number unfit for service. M. Fodéré states that scurvy was remarkably prevalent in the French army of the Alps in 1795; and Larrey says that, in 1801, during the siege of Alexandria, which was commenced in May and ended with August, 3500 scorbutic patients were received into the military hospitals of the city. During the war in Siam and Ava the Native and British troops suffered most severely from scurvy and scorbutic dysentery *, owing to causes which will be referred to in the sequel. In 1836, the troops in the province of Adelaide, near the Cape of Good Hope, also suffered severely from scurvy, although abundantly supplied with good fresh meat; but they had been long without fresh vegetables and fruit. Scurvy was seldom or never seen in Great Britain since the end of the last century, up to 1847, excepting in gaols and penitentiaries. In 1823 it appeared in the form of scorbutic dysentery in the Millbank penitentiary, owing to a poor and watery diet, without fresh or succulent vegetables; and, in 1836, 37, and 38, it occurred in several gaols, owing to the same causes, more especially to the privation of fresh succulent vegetables. During the early months of 1847, 48, and 49, scurvy has appeared in various parts of England, Scotland, and Ireland, owing chiefly to the potato-blight. The *Literary History* of this disease will more fully appear from the Bibliography and References appended to this article.

11. II. Description. — i. Of the *symptoms of scurvy*, the earliest are observed in the countenance. The face, as well as the rest of the surface, is pale and bloated. The carunculæ of the eyes and lips have a dirty or greenish hue. The expression of the features is depressed. The gums are swollen, spongy, soft, livid, and bleed on the slightest friction. The odour of the breath is offensive. The patient complains of lassitude and debility, frequently of pains in the lower extremities, resembling rheumatism. He is averse from any kind of exertion; and when he attempts to exert himself he complains of stiffness of the joints, feebleness of the limbs, of panting or breathlessness, and of extreme fatigue. The skin is dry and harsh, and it generally continues dry throughout the course of the malady. Sometimes it is rough, resembling the goose-skin appearance; but it is mor requently shining with patches, streaks or sp of a reddish brown, bluish, greenish, black or vid hue, resembling those following a severe b se. The size of these patches varies from a all point to that of a hand breadth, and it gen lly increases with the progress of the malady. he patches are first observed, and are most num us, on the legs and thighs; but they soon appe on the arms and trunk, and on the scalp; very ely on the face, which, however, assumes a ore dingy and bloated hue. The ankles swell ar the legs and feet become œdematous. In addit to these, the patient often complains of sl ing pains; and, if the disease have supervened on rheumatism or ague, these pains are more less severe, and are referred to the bones, to the ck, thorax, or joints. When the disease follows ue, obscure or irregular remissions or intermissi s of febrile symptoms are observable, and m or less enlargement, with pain in the region the spleen, is often detected. The above m be considered as the *first or early stage* of tl distemper.

12. These symptoms may continue a lon r or shorter time, or may be removed quickly an appropriate treatment; but otherwise the may remain stationary; or, if the cause continues, t increase in severity. The gums become more bid, more livid, and bleed from the slightest ich, and the breath remarkably offensive; the p ches on the surface of the body enlarge, incre e in number, and present a deeper and darker chymosed appearance. The pains are more seve and are accompanied with swellings of the ham stiffness and contractions of the knee-joints and kles, and often with a brawny-feel of the parts wing to effusion of lymph between the integume and aponeuroses, preventing the motion of t skin over the swollen parts. With the exuda n of lymph, red globules, &c. into the tissues, iefly into the connecting cellular tissue, and peric um, exudations of blood take place, giving rise t more or less marked *hæmorrhage* from mucous hals, especially from the nostrils, mouth, and wels, and from the vagina; much more rarely fr the bronchi, urinary organs, and stomach. T tendency to hæmorrhage increases with the p gress of the malady, and the loss of blood is n so great as to rapidly sink the vital powers the patient. In *this advanced stage*, the livid ches are generally associated with hard and inful swellings in various parts, particularly the lower extremities, and in the calves of th egs; and these often pass into superficial fungous cers. Old cicatrices frequently open afresh, a become the seats of foul scorbutic sores. Th teeth fall out; the gums present foul, livid, ongy ulcers. The respiration becomes rem ably short and hurried on the least exertion, d deliquium or faintness is apt to supervene The contractions of the joints, the œdema, ind tion, and pain of swollen parts, the discolour on of the patches, and the number of the ulcers e all more and more developed; and the debi and vital depression greater.

13. From the commencement of the ease the *alvine evacuations* are more or less dis ered. The stools are morbid; but, at first, they ar ot so remarkably so as to attract attention, and stiveness is then often experienced; but, as the seas

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* During 1827, the Directors of the East India Company allowed me to inspect the Regimental and other returns preserved in the India House, respecting the Causes, Nature, and Treatment of this disease as it occurred in the expedition to Ava, and of the Cholera then prevalent in India.

ances, they are not only much disordered, are much more frequent and very offensive. rhœa and colicky pains often supervene; with more or less attendant hæmorrhage, lly sink the patient at this stage. Under in circumstances, the disease passes into a of scorbutic dysentery, or dysentery and utus supervene upon each other, and thus me associated, as shown when treating of ENTERY (*see that art.* § 39. *et seq.*). The is scanty and high-coloured (see § 20.).

. The *pulse* is often little affected at an early ; but is more generally slower and feebler in health; but, in more advanced cases, or the malady is associated with some degree thenic or sub-inflammation in the seats of ef- n, the pulse is often remarkably frequent as well all or weak. When the pulse is slow and e, the patient is often chilly, the surface and the temperature of the body lower than ral. This state of the disease was called the *cold y* by the earlier writers. When much swell- and hardness, with pain, is occasioned by ef- n in the connecting cellular tissue, or even v the periosteum, the pulse is generally fre- t, varying from 100 to 120 in a minute, pro- y owing to some degree of inflammatory tion produced by the effused matters in these tions, as indicated by the great tenderness h always is present. This state of febrile ac- gave rise to the distinction of *hot scurvy* ac- ng to various authors.

. The *tongue* is generally clean and pale, but nonly broad, flabby, and indented at its edges e teeth. The insides of the cheeks and lips pallid, and contrast remarkably with the ap- ance of the gums. *Thirst* is not much com- ed of, unless in the more febrile state of the se, or when the supply of fluids is scanty. *appetite* is not impaired. It may be even er than in health; and digestion is not very festly impaired. *Sleep* is not deficient, unless far advanced stage, when wakefulness or dis- d sleep is experienced. The *mental faculties* ot impaired, although the spirits are generally or less dejected, and anxious; but towards al issue the patient becomes indifferent and d. The memory is generally unimpaired; he eye-sight is occasionally weakened.

. As the disease approaches an unfavour- issue the *breathing* becomes remarkably ent, and the *dyspnœa* extreme. The patient hs, and expectorates a frothy mucus, some- tinged with dark blood. The chest was rally every where resonant on percussion; espiratory murmur was loud and distinct; the sounds of the heart were loud and ex- ve, but unaccompanied by any morbid bruit cases examined by Dr. Budd. In the most nced states of scurvy not only may ulcers and ies or wounds which have healed up for y years break out afresh, but old and well- d fractures may become disunited. The ten- y to *swoon* in the most severe cases is some- s so great that the slightest motion, or the posture, or even any trifling exertion, may llowed by fatal syncope. It is stated in the unt of Lord Anson's voyage, that many of men, although confined to their hammocks, nd drank heartily, were cheerful, and talked much seeming vigour, and in a strong tone of voice; and yet, on their being the least moved, although it was only from one part of the ship to another, and that in their hammocks, they have immediately expired; and others who have confided in their seeming strength, and have resolved to get out of their hammocks, have died before they could reach the deck. And it was no uncommon thing for those who could do some kind of duty, and walk the deck, to drop down dead in an instant, on any endeavours to act with their utmost vigour.

17. Emaciation is not necessarily a phenomenon of the disease, unless there has actually been considerable privation of food; but it is occasionally observed, and anæmia is not infrequent. Dr. Budd observes that, although there is a remarkable tendency to the breaking out of old ulcers or wounds long previously healed, yet there is very little disposition to the occurrence of bed-sores from pressure. The separation of the epiphyses from bones has been mentioned by some writers, as having occurred in children attacked by this malady, but it has not been often observed in adults, or, if observed, not mentioned by many writers.

18. *Scorbutic ulcers* exude a thin, fœtid, sanious fluid, instead of pus. Their edges are of a livid colour, and as if puffed up; a coagulum soon forms on their surfaces, which is separated or wiped away with difficulty. The parts underneath it are soft, spongy, or putrid. When this coagulum is removed, the same change again occurs after a few hours, forming a soft, bloody, fungus, resembling boiled bullock's liver. This fungus exudation, Dr. Lind states, sometimes rises in a night's time to a great size, and, although cut off, in which case a plentiful hæmorrhage generally ensues, at the next dressing is as large as ever.

19. ii. The Chemical Analyses of the Blood and Urine in scurvy have been few, and even these unsatisfactory. It is manifest that the states of the blood and of the excretions in this disease will depend much upon the treatment adopted, and upon the time during which the treatment has preceded the analysis.—*A.* Simon's "Animal Chemistry" furnishes no information as to the *blood* in scurvy; but Dr. Day, in his additions to the work, states that Mr. Busk, in three well-marked cases of scurvy, found the composition of the blood as follows; comparing the scorbutic blood with the healthy according to his analysis of the latter:—

	1st Case.	2nd Case.	3rd Case.	4th. Heal. blood. (*Busk*).
Water - - -	849·9	835·9	846·2	788·8
Solid constituents -	150·1	164·1	153·8	211·2
Fibrin - - -	6·5	4·5	5 9	3·3
Albumen - -	84·0	76·6	74·2	67·2
Blood-corpuscles -	47·8	72·3	60·7	133·7
Salts - - -	9·5	11·5	10·9	6·8

Although the fibrin appears to be increased, its vital cohesion is evidently impaired; and the albumen is certainly altered in quality, although the alteration is not shown by chemical analysis.

20. *B.* The *urine* in scurvy is commonly of a dark, reddish brown, and sometimes of an almost black colour. Although it is slightly acid as it is evacuated, it very soon becomes alkaline, and emits a strong and disagreeable ammoniacal odour. Blood is often discharged with the urine, and the urine then assumes a dark reddish-brown colour, in consequence of the presence of hæmatoglobulin;

in this case it developes hydrosulphate of ammonia, and soon becomes putrid. Dr. Simon examined the urine in three cases of scurvy in Schönlein's clinical wards — two men and one woman. The urine was very similar in these three cases, in its physical characters. It was scanty, and of a deep, dark-brown colour; after standing a few hours it emitted a disagreeable ammoniacal odour. The three specimens resembled each other, and were found to approximate the chemical characters of the urine in typhus. The urea was less than in healthy urine, not exceeding 25 30ths of the solid residue. The fixed salts were diminished in the two male cases, being 14-18ths of the solid residue; but in the female they were 27, or a little above the normal average (25). The uric acid was slightly above the healthy standard in all, being from 1 to 3 of the solid residue.

21. iii. Appearances on Dissection. — Scurvy at the present day seldom proves fatal, unless in ships, or in besieged towns, where opportunities of minutely examining the bodies after death are rarely enjoyed; and the observations of early writers on this subject are generally devoid of precision, and the necessary details. The best account of the appearances after death has been furnished by Dr. Budd, from the cases which were brought to the *Dreadnought* Hospital Ship. He states, "The general inferences to be drawn from preceding facts are, that in the *inspection* of the bodies of persons who die of scurvy, the chief indications of that disease are met with in the colour of the skin, in the state of the gums, and in the presence of fibrinous effusions, and of ecchymoses, or effusions of blood. These effusions occur most frequently in the skin, in the subcutaneous cellular tissue, and between the muscles of the lower extremities, between the periosteum and bones of the lower extremities and of the jaws; and in the peritoneal coat, and in the muscular and mucous coats of the intestinal canal. The numerous traces of hæmorrhage observed in the coats of the intestines are in accordance with the frequency with which scorbutic persons pass blood by stool."

22. The slight effusions of blood between the periosteum and bone do not destroy the muscular connections between these parts, so that the latter does not generally present further alteration. Beyond a paleness of tissue, there is no change characteristic of scurvy observable in the brain. The organs of respiration, the heart and large blood-vessels, the glandular system and the bones, presented no remarkable changes in the cases inspected by Dr. Budd. His observations furnished him with no direct information respecting the *blood*, except that it is deficient in red particles; that it does not impart a stain to the lining membrane of the heart or vessels; and that it has not lost the property of coagulating. The change observed in the skin and in the complexion is to be ascribed to the alteration of the blood, and the hæmorrhages doubtless proceed, at least in part, also from this alteration. Former writers have noticed more or less of a fluid or dissolved condition of the blood, and a soft, flabby state of the *heart;* this latter change accounting for the swooning and fatal deliquium sometimes occurring in the more extreme cases. The *liver* has been found pale, or of a pale buff colour, or of a nutmeg appearance; and the *bile* in the gall-bladder of a pale or yellowish col r. The *spleen* is generally soft, of a plum colour, d often more or less enlarged. The *lungs* are so e- times œdematous, especially in their more dep l- ing parts. The *kidneys* and urinary pass es seldom present any change in the uncomplic d states of the disease.

23. According to the descriptions of Poup r, Lind, and others, the blood discharged from he mucous canals during life, as well as that foun n the cavities of the heart and vessels after de h, was remarkably altered, fluid, broken down, d presented more or less of a greenish-black e. The spleen was generally much enlarged, ar so soft as to break down on being handled. A e- sions often existed between the costal and pulm ic pleura, and sometimes dirty serous effusions found in the pleural cavities. Black, corru ed blood was generally effused between the mus es; or infiltrated between their fasciculi, and unde ne skin and periosteum; and the auricles wer e- markably distended by coagulated blood, in se who died suddenly. In young subjects the pi- physes were loosened from the shafts of the ng bones, and the ribs had separated from eir cartilages. In some, the glands of the mese ry were more or less enlarged. The kidneys re occasionally altered. The alterations foun in the bones, especially those now mentioned, st probably arose from the effusion of blood bet en the periosteum and osseous structure, and fro he consequent destruction of the vessels of the fo er which nourish the latter.

24. iv. Complications, &c. — Much of he diversity observed in the symptoms and ro- gress of scurvy, as well as in the appear es after death, depends upon the nature of he food, or of the privations causing the ma ly, and upon antecedent, concurrent, or inte ur- rent disease; for, as will be shown in the se el, although the privation of fresh vegetables nd fruit is mainly productive of it, still mu is owing to the food upon which the patient has en living up to the time of his attack and dur its progress. The diseases which commonly pr ede and favour the appearance of scurvy are ague nd remittent fevers, enlargement of the sple or liver, rheumatism, dysentery or chronic diar a; and either of these may complicate, in a m or less evident manner, the scorbutic state, espe lly in its more chronic form, or may appear an intercurrent malady. These complication are most apt to occur in warm or temperate cli es, and wherever malaria is present; and pro bly the association with rheumatism is most co on in colder regions and seasons. When th do appear they are readily recognised when the y- sician is alive to the probability of their so- ciation, and when the causes, on which ey chiefly depend, are observed to be in ope on. The supervention of scurvy upon ague, or on enlargements of the spleen, or upon affecti of the bowels, is not infrequent, especially i he winter and spring months, when fresh vege les and fruits have become scarce, and when ld, humidity, and these diseases have predispos he frame to this malady; and it was certainly ch more common in former ages, before po es came into general use.

25. *The complication of Scurvy with Dys ery* was the most prevalent and fatal disease ng

Burmese war, and was entirely owing to the ure of the food in connection with malaria and water. But it is unnecessary to add, at this e, to what I have stated when treating of the *ns and complications of* Dysentery (see § 39. *q.*)—Although *rheumatism* is undoubtedly in e cases, and at certain seasons, occasionally ciated with scurvy, still the pains, which are t commonly attendant upon the latter, are er to be imputed to the infiltrations of blood h take place between the muscular fasciculi under the periosteum, than to any rheumatic plication. A moderate attention to the matter be sufficient to distinguish the nature of the ; as well as the existence of enlargement of the n, and the connection of the disease with ague.

. Persons labouring under scurvy are very e, when exposed to cold and humidity, to ex- nce severe attacks of *pleurisy*, or of *pericarditis* *peripneumonia*, or of *bronchitis*, which may off the patient in a short time, without ma- ly influencing the symptoms of scurvy. In cases, the dyspnœa, cough, and difficulty of torating become urgent ; the expectoration ng with the state of pectoral disease, from a mucous frothy matter, to a dirty brown, or red, or sanious substance. Effusion into the al cavities, or effusion into the air-cells and bronchi, and splenification of the substance e lung, ultimately hasten or occasion a fatal In rarer instances changes in the *kidneys*, I have ascribed to cachectic inflammation e secreting structure of these organs (see Kidneys, § 80. *et seq.*) supervene, and, by rrassing the functions of these organs, super- e dropsy upon the scorbutic disease, and y occasion or accelerate an unfavourable ation.

III. Diagnosis.—Of the numerous writers preceded Lind, very few pointed out with ccuracy the diagnostic characters of scurvy, tinguished sufficiently between this disease *nalignant or putrid fevers.* In many cir- ances and on many occasions, some of which myself witnessed, it is difficult to determine the presence of scurvy or of putrid fever, t sight, or until a more patient and close ation has shown the difference, so insen- or gradually, in such circumstances, some ch I observed in Germany and France after st war, does the one malady approach the ters of the other. In Ireland, in 1847, to the failure of the potato-crop and gene- isery, scurvy was intimately associated with adynamic fever, and it was most difficult to uish between them, or to say which was the y malady. The same observations equally to *purpura*, which often arises from similar to those producing scurvy, and is more or less allied to, although generally distinguished scurvy, the more extreme points of differ- between the two having been laid hold of gnostic characters, whilst the closest resem- s have been kept out of view. It will be ust, more conducive, moreover, to accurate ogical views, and certainly tend more to option of sound indications and means of o look closely at diseases as they occur in e, to consider both alliances and differences, proceed in our treatment on the compre- e basis thereby furnished us.

28. Circumstances have occurred, and may occur again, in which certain of the causes of malignant fever, as a confined impure air, crowding of numbers into a small and ill-ventilated space, &c., have come into operation, in connection with the causes of scurvy, especially a deficiency or want of fresh vegetables and fruit, and have given rise either to the petechial or putro-adynamic form of fever, or to a state of febrile scurvy, or to a disease, in which the symptoms of either the one or the other predominated, according as the causes of either prevailed. In attempting to distinguish between these diseases, or to determine the existence of either, the discriminating physician will be guided by the slow and gradual, or the rapid accession of the symptoms; by the states of the skin, of the gums, and of the teeth; of the general surface, and particularly of the lower extremities; by the discolouration and other changes there observed; by the presence or absence of complete prostration and of other febrile phenomena; by the acuteness or intensity and duration of the malady; by the appetite and function of digestion; by the inability or capability of leaving the bed; and by the presence or absence of contractions of the lower extremities, or of hardness, swelling and livid patches or ulcers in these situations.

29. In distinguishing also between scurvy and *Purpura*, the presence or absence of the majority of the above symptoms, and more especially the states of the gums and teeth, the swellings, indurations, livid blotches, œdema of, or the fungous ulcers on, the extremities; the contractions of the joints; and various associated phenomena, will guide the physician to a correct diagnosis, and whilst they indicate with due precision the existence of either the one or the other, will at the same time point out the close alliance between both as to their causes and their natures. (See Purpura (§ 23.).

30. IV. The Prognosis of Scurvy. — Before the disease is advanced so far as to present contractions, indurated swellings or fungous ulcers on the extremities; or hæmorrhages from mucous canals; or swoonings upon assuming the erect posture or on slight exertion, a speedy recovery will generally follow the use of the means about to be recommended; but when the malady is thus far advanced, although the same means will often save the patient, they may also fail; and this unfavourable result is the more likely to ensue if, with these symptoms, the patient complains of dyspnœa, and oppression at the chest; if his respiration and pulse be very frequent; if there be any pulmonary, pleuritic or dysenteric complication; if dropsical effusions or albuminous urine supervene; if the spleen be much enlarged; and if hæmorrhages from the bowels be copious, then great danger may be apprehended, and with still greater reason, if the adoption of a suitable diet and remedies is not soon followed by any amendment.

31. In cases which present not the extreme symptoms characteristic of scurvy, and are nevertheless unamenable to the usual scorbutic remedies, some complication should be looked for and ascertained, as this most probably either retards or prevents the efficacy of such means, or the disease partakes, owing to the causes above noticed (§ 28.), more or less of the characters of putro-

adynamic or petechial fever — possesses the intermediate form already mentioned (§ 27.), and requires an appropriate method of treatment. I am persuaded, that the instances of scurvy which have been adduced of the failure of these remedies, have either been the severer, or pulmonic, pleuritic, pericardiac, dysenteric, or dropsical complications of the distemper, or those intermediate states of disease now alluded to.

32. V. Causes of Scurvy. — The causes of scurvy were only partially known until a comparatively recent period; for the disease was often ascribed to one only of the causes, and that a predisposing cause; and even now, when the chief causes have been duly recognised, others which either predispose the frame to their operation, or concur with them, and aid or determine their effects are too generally overlooked, and their influence in modifying the malady, or in delaying or preventing the beneficial operation of the means employed, is altogether neglected, or even unknown. It has been fully ascertained that several of the causes to which scurvy was formerly imputed are not really the exciting or efficient causes of this malady; but their influence as predisposing, concurring, or determining causes should not be denied, although they cannot take the highest rank in causation, or because they have been pushed from the position formerly assigned them, by others of much greater influence.

33. i. Predisposing causes. — Several of these causes were formerly believed to have had the chief share in the production of scurvy; but they are now more clearly proved to perform a less important part; but this part they fill in the causation not only of this malady, but also of dysentery, putro-adynamic fever, purpura, and probably of other diseases.—*A.* Much importance was attached formerly to living on *salt provisions*; and as this disease most frequently and certainly appeared in ships provisioned with salted meats chiefly, so it was inferred that these were the causes of its occurrence. That salted meats are not more productive of scurvy than fresh meats, or at least not much more so, is shown by the prevalence of the malady, in the spring of 1720, in an army which Kramer stated to have enjoyed an abundance of fresh meat at a low price; in the Russian armies, in 1736, which were similarly circumstanced; in the French prisoners, at the middle of last century, who had no salt provisions; and in the regiments at the Cape, in 1836, that enjoyed an abundance of fresh meat.

34. From these and other facts it may be inferred, that scurvy may appear even amongst those who have a sufficient supply of fresh meats, if there be a prolonged deficiency at the same time of succulent vegetables and fruits. Nevertheless, the question remains, are salted meats more favourable to the supervention of scurvy than fresh meats? I believe, after having paid some attention to the matter, that recently salted or uninjured salt meats, if they have been of a good and healthy description, and quite fresh when salted, are not materially more productive of scurvy than fresh meats; but whilst the quality of the latter is generally manifest, that of the former is not always so evident. The salted provisions supplied to ships have frequently been long cured, even before they are received on board, and are so often of the most inferior and unwholesome character, as to account in great measure fo he appearance of cachectic maladies in those ho live upon them. It was notorious, during Q en Anne's wars, that, owing chiefly to collusio between the heads of the commissariat or oth in power and the contractors, and even in ore recent times, that the salted provisions supp to the navy and army often consisted not o of long or imperfectly cured meats, but also the flesh of animals which had died of disease hat horse-flesh was often placed in casks of beef and that similar villanous acts were not confi no salted provisions, but extended also to th out and biscuits supplied to these services, b of these having been adulterated, and the tter mouldy and swarming in maggots and w vils. Owing to this cause, as shown by some n ical writers of the day, a much greater num r of human lives were lost from scurvy, sc utic dysentery, and putro-adynamic fever—by c ases caused by the unwholesomeness of the pro ions — than from all other diseases, and from aval and military actions, sieges, and other cause ombined.*

35. Not only were both salted and farin eous provisions frequently deleterious, but the pply also was insufficient to both army and na , up to the mutiny at the Nore, the causes of hich were generally misrepresented by those in wer, and misunderstood or glozed over by his ans. In times more recent, acts similar to th bove have been perpetrated in more places th one. The returns made to the Medical Boards ndia by the medical officers, and which are p rved at the India House, are full of complain ts to the unwholesome nature of the provisio supplied to the army in the Burmese war; e the rice having been either unripe or damage The remarkable prevalence of scorbutic dy tery, and low fever among the troops in that w was ascribed chiefly to this cause; the mortal continuing great until more wholesome pr sions were procured. But it was not only in th ublic services — in fleets, armies, and transport essels — that these enormities were practised, ding vessels, emigrant ships, &c., were someti , and are occasionally up to the present day, plied with the cheaper kinds of Irish provisions which are frequently of a similar kind to that a e described; and to this circumstance in part nd to others about to be noticed, should be ascr d the scurvy and fever so frequently breaking ut in ships after their provisions have been us sufficiently long to produce their effects. To e unwholesomeness and nature of the food, a to the state of the water, even independently of want of fresh vegetables and fruit, the diversity f characters presented by scurvy and fever ships armies, prisons, &c., is in great measu to be imputed, as well as the want of success treating these diseases by the more usual rem es, or by those more generally found efficacio under other circumstances,—the same causes n erely

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* From a tolerably extensive field of obse ion in various parts of Europe and within the tropic etween the years 1815 and 1819 inclusive, I can stat hat, of the various kinds of unwholesome cured meat ork is perhaps the most injurious: especially when i s been imperfectly salted, or too long kept; and, m particularly if it have been coarsely fed, or disease or not cured immediately upon being killed: scor ic and other forms of dysentery generally resulting.

isposing to these forms of disease, but ac- y producing them, and giving them their nctive features.

36. Much of the mischief observed in those had lived long on salt provisions was for- y, and still is, by many imputed to the salt hich these are cured, or at least to the state e provisions; and by others to the supposition salted meats are not so nutritious as fresh. when these provisions have been from the wholesome and good, have been salted while e fresh, and have not been afterwards kept so as to produce any sensible or unpleasant ge, they may then be considered as having no further share in the production of scurvy, although it should have appeared during the f such provisions, than that they have con- ted the chief or only food, to the neglect of articles requisite to correct the effects of so usive a diet, such as fresh vegetables and . On this subject, Dr. Budd justly re- s, that "the circumstances showing that y may prevail to a frightful extent among ns living solely on fresh meat; that persons from the nature of their occupations, are nually absorbing saline particles, are exempt scurvy; that scurvy is not brought on by the f sea-water, which may be drunk with im- ty, even by scorbutic people; and that the se may be prevented for any length of time rsons who subsist on salt provisions, and can adily cured, even in those who continue the of them, are sufficient to justify the con- on, that salt has no share whatever in pro- g it." (p. 65.) To this statement I would ly add, that the salt conceals, and partly cts, the sensibly noxious properties of pre- ly tainted, diseased, or otherwise unwhole- meats, and hence meats of this description, salted, are more readily, and perhaps less iously, partaken of, and, moreover, have not injurious nature made so manifest, or even cted, as if an attempt to use them in their state were made.

. *B.* Next to the state of *meat provisions*, that *rinaceous food* supplied to ships, armies, &c., as sposing to, or even as producing scurvy, may oticed. In various countries in the East, e little or no animal provision is used, scurvy evertheless appeared, and has been ascribed, sufficient reason, not so much to deficiency amount, as to the unwholesome nature, of ood, whether rice, Indian corn, &c., which have been damaged, unripe, mouldy, or too kept. The flour, biscuits and other farina- s articles, supplied by contract or otherwise e public services, and to trading vessels, were erly, on many occasions, similarly damaged unwholesome, or became so after having been for some time; and contributed their share rds the production of scurvy, fevers, and to visceral disease. That these articles of have actually been productive of these dies, was demonstrated by the occurrences he Burmese war; native Indian regiments sting entirely on rice and other farinaceous les, which in that war was more or less aged and unwholesome, having been uni- lly attacked with scurvy and scorbutic ntery.

. *C.* The *water* also, with which ships of war and trading vessels were supplied for long voyages, having been kept in wooden casks, the use of iron tanks for this purpose being of recent date, the water became offensive and unwholesome, on many occasions so much so as to be nauseous and to require the addition of spirits to prevent its more immediate ill effects. The effects of marsh water in causing bowel complaints and enlargements of the spleen and liver, are well known to many who have possessed powers of observation in connection with the requisite opportunities. But I can say from personal observation, that water, long kept in wooden casks, however well these casks may have been charred, as they sometimes are on their insides, become even more deleterious to health, and much more offensive to the senses than any water taken from marsh-grounds or land-tanks, much, however, depending upon the state of the water when filled into the casks. The greater attention now paid to the supply, state, and preservation of water in the public services, and in trading vessels, is one of the chief causes of the less frequent appearance of disease in them, and more especially of scurvy and allied maladies.

39. *D. Cold and humidity* have long been considered as very influential in favouring the occurrence of scurvy. That these causes are of some importance, I can assert, although Dr. Budd strongly doubts their influence. But he has not viewed them in a proper light. He remarks that "the merchant seamen who enter the port of London, affected with scurvy, come almost exclusively from Mauritius, India, Ceylon, or China; and have consequently been in no higher latitude than that of the Cape." But he overlooks the circumstance that those voyages are long, and that the men have been living long upon cured meats, without a due supply of fresh fruits and vegetables; whilst most other vessels arriving at the port of London have had short voyages, they coming from much nearer countries, and consequently a sufficient period for the development of scurvy in them has not elapsed. It is not, however, the cold and moisture depending upon climate, or even upon weather, that are so influential in favouring the development of scurvy, as the cold and humidity arising from daily, and even twice daily, washing and scrubbing the decks, formerly and even still so much in use, to the neglect of dry-scrubbing and cleansing. The evaporation from the wet decks during day and night, consequent upon frequent washings during fine and dry weather, and the wet and humidity of body-clothes, bed-clothes, and hammocks, produced by these washings, and during foul or stormy weather, are the forms of cold and humidity which, on ship-board, predispose to scurvy, and more directly produce the several forms of rheumatism, chiefly by suppressing the cutaneous functions, by reducing nervous power, and thereby causing the accumulation of those excrementitious matters, the retention of which occasions these maladies. All the most experienced writers on scurvy have remarked the suppression of the cutaneous functions previously to the appearance of, and during the progress of scurvy, and I have no doubt of the fact from my more limited observation.

40. *E. Impure air* has been considered by some writers as predisposing, more or less, to the appearance of scurvy. The testimony of Lind, Trotter,

and BLANE, most experienced physicians, is opposed to the opinion, that it has any influence either in the production, or on the course of this malady. That the influence is not very remarkable, may be admitted; but that this cause is not altogether without effect cannot be denied, especially in modifying or altogether changing the characters of the disease, when conjoined with those causes which more directly and commonly produce scurvy. It was observed in the American squadron, in 1846, that scurvy was most severe in vessels which were the worst ventilated.

41, *F. Several other diseases* predispose the frame to the appearance of scurvy; and although the predisposing influence has been attributed to the debility produced by those diseases, yet I believe that it is not the debility alone which predisposes, but more especially the nature of the malady. Agues, remittent fevers, enlargement of the spleen, and rheumatism, and previous disorder of the digestive organs, especially the former, have been generally considered by medical writers as more or less influential in the production of scurvy. The previously impaired assimilation and nutrition, and the consequent state of the blood, in connection with exhausted organic nervous energy, readily account for the readiness with which scurvy supervenes upon those maladies when its causes are in operation.

42. *G. The state of the mind* is influential both in predisposing to, and warding off scurvy; the depressing passions favouring the appearance, and the exciting emotions preventing or delaying the occurrence of the malady. Disappointed expectations; anxiety; hope deferred; longings to return to more desired scenes; prolonged confinement; a want of exciting, amusing, and exhilarating occupations; breathing the same kind of air, in the same locality; a monotonous and unexciting course of existence; losses of relations and friends, and extinction of those hopes or expectations which render privations endurable, — all have their influence in predisposing the body to scurvy or its allied states of cachexy.

43. *H. The seasons* have no small influence on the appearance of scurvy, but mainly in consequence of the privation of fresh vegetables and fruits, which is experienced chiefly during winter and spring; so that, in armies, as well as in fleets in, or departing from, cold or temperate countries, a deficient supply of those dietetic means of prevention is more likely to be experienced at those seasons than at any other. Suppressed perspiration, produced by the cold and humidity of these seasons, may also not be altogether uninfluential, as shown above (§ 39.), in favouring the evolution of this malady. In northern countries, where the inhabitants, the seamen, and the soldiers, live chiefly upon cured meat provisions, as salted and smoked meats, and dried fish, during winter and spring, and until the commencement of summer, when vegetables and fruits begin to appear, their constitutions have made considerable progress to the scorbutic diathesis; so that, when these preventive articles of diet cannot be obtained at this latter season, owing either to states of siege, and to the provisioning and other circumstances of armies or fleets, scurvy is then much more apt to break out in spring, and even in summer, than at other seasons.

44. *I.* The earlier writers on scurvy were inclined to ascribe a *contagious influence* to this di se, chiefly from the number attacked with it the same place and circumstances; but it was c rly shown that contagion had no share in prod ing it, by LIND and others, who wrote about th iddle and end of the last century, the causes in ing the malady being common to all affected b in the same locality. But although the dis e is actually uncontagious, it is by no means easonable to infer, that the putrid emanations m a number of persons in an advanced stage the disease, confined often in very limited spaces, her on board of ships, in the crowded hospitals o besieged town, or in crowded prisons, are no ltogether innocuous, or are not without some inf nce in predisposing the body to this or some lied malady, arising from the contamination the circulating fluids, and from the depression c ital or organic nervous power, by the accumula n of these emanations in the air which is respire or a longer or shorter time. Nor would it be probable that the emanations arising from a n ber of scorbutic patients, in places insufficiently ntilated, may convert the scorbutic malady in putrid, maculated, or putro-adynamic fever, into scorbutic dysentery, or even may more d ctly develope these diseases.

45. *K. Age and sex* have probably but li e influence on the production of scurvy, for it observed at all ages, and in both sexes; but re is no doubt that it occurs much more freque y in adults, or from early puberty until far ad ced age, than in children, and in males than in f les; chiefly in consequence of the greater expo e of adult males to the causes, owing to the c umstances in which they are liable to be place

46. ii. THE EXCITING CAUSES OF SCURV may be briefly stated to be the use, for a longer or rter period, of all kinds of animal meats, too l g or imperfectly cured or preserved; of dri or smoked, or tainted meats or fish; or moul old, damaged, diseased, or unripe farinaceous art es of food, to the exclusion of, or without possess the advantages of, fresh or succulent vegetab and fruits, or of other preventive articles of die r of medicine; more especially when the use the former kinds of food, and the want of the lat , are aided by one or more of the predisposing concurring causes already considered. That t want or neglect of those vegetable productions hich have been found so beneficial, both in pre ting and in curing scurvy, has a greater influe e in the production of the malady, than even t prolonged use of the several kinds of anima ood, however cured or preserved, has been pro l on various occasions. But it cannot be deni that damaged, tainted, or too-long-cured subs ces, — pork, the viscera and blood of the anim generally used for food, — the flesh of animals hich have died of disease, &c., are much more li y to occasion scurvy, and its various compli ons, than fresh and wholesome meats; althoug ven these last may be followed by the disease hen too long or exclusively used, and whe resh vegetables and fruits cannot be obtained.

47. Although I cannot admit that scur is to be ascribed entirely and always to the abs e or want of fresh succulent vegetables and fr , as articles of diet, as contended for by Dr. Bu , yet I will not deny that such a privation is th most common and exciting cause of the malady spe-

ly when no suitable means are employed—none
he numerous preventives about to be noticed
(54. *et seq.*) is had recourse to, in order to supply
deficiency, or to counteract the effects resulting
n the nature or state of the aliments. In this,
well as in other diseases, we cannot with pro-
ety ascribe the sole agency to one cause ; gene-
y more than one, frequently several, although
diversified amount of power, are concerned in
eloping the result, whether that result be simple,
nite, or specific, or whether it be complicated
e or less, or contingently associated.

8. iii. *The chief causes insisted on by writers
this disease*, were often approaches only to
truth ; but these approaches were some-
s so near, as to lead to judicious means of pre-
tion and cure, although certain subordinate
ncies were often overlooked. ECTHIUS, one
e earliest writers on scurvy, assigns as causes,
oss, unwholesome food of salt, dried, or semi-
id flesh and fish, pork, spoiled bread, stinking
er, &c." RONSSEUS ascribed the frequency of
vy in Holland to the diet and air, to eating
ntities of water-fowl, but chiefly to living on
first salted, then smoked and dried, and to
season and weather. WIERUS, who probably
ed cases of psoriasis as modifications of scurvy,
in this agreed with many who both preceded
followed him, more justly remarked the not
quent connection of scurvy with ague and
gnant forms of fever ; and, with sufficient rea-
ascribes this distemper "to unwholesome air,
chiefly to such bad or corrupt food as was
l in northern countries, and by their shipping,
stinking pork, smoked rancid bacon, mouldy
d, thick, feculent ale, bad water, melancholy
grief of mind, preceding fevers, the stoppage of
l evacuations, &c." DODONÆUS imputed the
vy in Brabant, in 1556, to the use of cor-
ed rye during a season of scarcity. ROSTOCK,
treatise published in 1589, remarks, that im-
water and bad air aid unwholesome food in
lucing scurvy, and states, that the disease is
mic in several northern countries, and that
butic mothers often there bear scorbutic chil-
, and often miscarry, or bring forth dead
ses. BRUNNER insists upon the influence of
p, marshy localities, and other sources of ma-
, in producing scurvy, and ascribes more to
nature of the bread used by the inhabitants of
e localities than previous writers. HORSTIUS
wise insists upon the influence of malaria, and
use of new ale, without hops or any other
r, in causing scurvy in various places in the
th of Germany. VANDER MYE notices, more
icularly than any previous writer, the influence
e emotions and passions of the mind in causing
in preventing scurvy, and adduces the effects
ccurrences which took place during the siege
reda, in support of his views. In this siege he
buted the disease chiefly to the general use of
spoiled, or musty rye, and to humidity ; but
r causes, both physical and moral, were also
peration. He adds, that "the distemper proved
t fatal to the English soldiers, as they very
y began to feed on dog's flesh, were in want of
beloved tobacco, and lay in the most wet or
p barracks. It was much less frequent among
Walloons and Flemings, they being more care-
and delicate in their diet, and having much
lesomer quarters. Amongst the French it was more rarely met with, owing to their being stationed in the driest part of the town, and to their more sprightly dispositions."

49. J. HARTMANN takes notice of the influence of mercury, and of mercurial courses, in predisposing to scurvy. In 1645, the medical faculty of Copenhagen published a consultation on the causes, prevention, and cure of the distemper, for the benefit of the poor of the country ; and in this meritorious production, the influence of cold, humidity, malaria, and of unwholesome water and beverages, is insisted upon, as aiding the effects produced by food such as that already mentioned. MARTIN LISTER, and many of preceding and contemporary writers, and subsequently COCKBURN, PITCAIRN, BOERHAAVE, and others down to the appearance of BACHSTROM's work, in 1734, agree in ascribing scurvy to the use of unwholesome food and water, or to those causes chiefly which had been mentioned by their predecessors. But the last-named author was the first to demonstrate that, however much the food and water used were concerned in occasioning scurvy, *abstinence from recent vegetables was the chief cause of the malady, and the use of these the chief prevention and cure.* Notwithstanding this very decided opinion, and the very conclusive evidence BACHSTROM furnished of its truth, the disease has been imputed by writers, down almost to the present day, rather to the prolonged use of cured provisions, than to the want of fresh vegetables and fruit. But it is unnecessary to pursue this part of the subject any further.

50. Dr. LIND states that scurvy most commonly occurred on land in persons who subsisted chiefly on dried, or smoked, or salted flesh or fish, and the unfermented farines ; or upon bread made of peas, or a composition of peas and oatmeal. KRAMER states that, in his time, this distemper appeared most frequently among those who lived altogether on boiled pulses, without any green vegetables or summer fruits. The occurrence of the disease among the Russian troops, whose chief food was rye-bread and meal, has been already noticed. Scurvy appeared among the inmates of a lunatic asylum in India, whose food consisted chiefly of rice and split peas ; and Mr. MACOLMSON mentions the occurrence of the distemper in the same country among prisoners kept on bread and water. That various kinds of bread, especially when long kept, will occasion scurvy, or at least not prevent it, I believe, when they are not accompanied with succulent vegetables or fruits. But something is also owing to insufficiency, as well as sameness of diet, to living in a state of confinement, to breathing the air of the same place or habitation, and to the duration of this state of confinement : for it has always been remarked, that when this latter cause has been concerned in producing the disease, the first cases have been those longest confined. It may also be noticed, that the influence of farinaceous food in occasioning scurvy, is great in proportion to the length of time the articles have been kept previously, or subsequent to their usual modes of preparation, and to their healthy, or ripe, or untainted condition when predared. And it should be recollected, that flour, if sound and fresh, is more likely to prove beneficial when baked or otherwise prepared, shortly before it is used, than when it has been made into bread or biscuits a long time previously.

51. The prevalence of scurvy during 1847 and 1848, in Ireland, Scotland, and some parts of England, was very generally ascribed to the failure of the potato-crop. But in some places in Scotland, Dr. Christison imputed the disease to the privation of milk — an opion which has been negatived by numerous observations of the prevalence of scurvy where the supply of milk was abundant.

52. VI. The Nature of Scurvy may be inferred, with tolerable accuracy, especially as respects every practical purpose, from what has been adduced. But it is obvious, that the numerous occurrences of the distemper, both on land and at sea, as described at least by the majority of the writers referred to in the *Bibliography*, were associated with the appearance of one or more of those maladies, of which I have pointed out the relations with scurvy (§ 27. *et seq.*); and that, with many cases of scurvy, both simple and complicated, others of a different nature, as psoriasis, and various chronic eruptions, also appeared. To these circumstances, — to the extended signification thus imparted to the name, as well as to the complications it actually manifested, — are to be ascribed the diversity of description, and the numerous and complicated subdivisions of the malady, contained in works upon it during the 17th and 18th centuries. Opinions as to the nature or proximate cause of scurvy were no less diversified, and even numerous. Without attempting to adduce these opinions in full, or to connect them with their authors, it may be briefly remarked, that they generally agreed with the pathological doctrines of the day in which they respectively appeared, and were assigned by their authors, without any satisfactory proofs—were mere suppositions, or, at best, inferences from loosely-observed phenomena. Whilst some writers imputed scurvy to an acid state of the blood, others ascribed it to an alkaline condition of this fluid, and some even, to make more sure of the fact, considered that acidity in certain cases, and alkalinity in others, were its actual causes, the predominance of either condition giving rise to the different forms of the malady. These views not proving satisfactory, especially to those who had opinions of their own to propose, the existence of a predominant saline condition of the blood was supposed and accredited by many. But the particular salt was never shown, some considering it to be an acrid salt, others a rancid salt, and so on. Then came a viscid state of the blood to be asserted, then a vitiated as well as a viscid condition, and even the existence of a putrid ferment in the blood to be inferred. More recent writers considered that a simple dyscrasis of the blood only existed; others, not content with the simplicity of this view, thought it necessary to impart to it some special property or chemical quality, and contended that the dyscrasy was acid; and some were positive as to the dyscrasy being alkaline. Lastly, we find the distemper referred to the existence of a dyscrasis produced by the evolution of an acid ferment in the blood; the chief reason for the existence of this ferment being that an alkaline ferment could not exist; but the particular acid was not shown.

53. The chemical pathologists of the present day have not thrown much more light upon this part of the subject than their predecessors, each of whom considered his opinion as good as the form believed their own to have been. Dr. Christiso supposes that scurvy arises from the want of veg table albumen or animal casein in the food; a Dr. Garrod believes that the malady is caus by the absence of potash, and that potatoes, a other antiscorbutics owe their virtues to the p ash they contain. Dr. Aldridge contends the influence which should be ascribed to a ficiency of phosphorus, sulphur, lime, and the kalies, in occasioning scurvy. That somethi may be owing—a part merely—to the causes c tended for by Dr. Aldridge is not improbable. I it is unnecessary to pursue this subject any furt than very briefly to state, that one of the most e dent changes from the healthy condition is sea in the blood; but that this change is probably the earliest in the procession of morbid phenome as it most certainly is not the only or the m advanced. That the change of the blood manifested by the sensible or physical propert as well as by the chemical constitution of this flu will readily be admitted; and that, in conseque of this change, the several solids of the body more or less affected, will also be conceded; I contend that these are not the only alteratio for the vital qualities of the blood itself are m or less altered, or rather impaired, — those v qualities which the blood derives from the orga nervous system, through the medium chiefl the vessels in which it circulates. That the org nervous system is early affected, either prima or through the medium of the blood, or in b modes, is shown, not merely by the functions, also by the vital cohesion and organization, of viscera and tissues which this system supplies vitally actuates. But it is immaterial whe this system or the blood be the part prim affected; for there can be no doubt that mo states of the chyle, occasioned either by the na and quality of the aliments, or by the defec certain elements consequent upon the want of requisite vegetable productions, or by both ca conjoined, will affect the assimilating funct both by impairing organic nervous power, an altering the constitution of the blood; the and gradual progress of these changes giving to all the structural, as well as functional al tions characterising the advanced stages o malady.

54. VII. The Prevention of Scurvy.—A efficacy of *limes*, *lemons*, *shaddocks*, *oranges*, *pomegranates*, in preventing scurvy, was know several of the earlier writers on the disease, o whom is quoted by Lind, in proof of the use made of these fruits by the Dutch seamen. F seus, Albertus, and other writers in the century, make particular mention of lemon oranges for the prevention and cure of sc Although particular and convincing proofs o efficacy of these were thus early furnished, not by the Dutch, but also by some of our own navigators, and subsequently by Admiral W and others, insufficient attention was paid t use of these fruits until the appearance o Lind's celebrated work on scurvy, at the m of the last century. Notwithstanding the evi so conclusively adduced by this able writer, means of preventing scurvy were nevert more or less neglected, or were left to the c or choice of commanders and others, unt

ts of BLANE, BLAIR, and TROTTER, towards end of that century, succeeded in procuring adoption of lime-juice for the naval service. lemon and lime-juice now supplied to the , is preserved by the addition of one part of ig brandy to ten of the juice. But when the can be procured, it is generally preferred, and ed, especially when it is actually required, much pleasure and relish.

5. *B.* Other *fruits*, particularly those of an *acid re*, and even the *sweet fruits* before they are are more or less efficacious in the prevention cure of scurvy. Dr. TROTTER states that, ng remarked that scorbutic slaves threw away *guavas*, while they used the green fruit, he re- d to try the effects of such. He selected nine oes, equally affected with scurvy. To three of he gave limes, to three green guavas, and to ripe guavas. They were served by himself; at the end of a week, those who were re- ted to the ripe fruit were nearly as before the riment, while the others were almost well. ODÉRÉ states, that the good effects of *unripe es* were very apparent in the scorbutic cases e French army of the Alps, in 1795. Sir J. NGLE recommended *apples* as a preventive in ; and Dr. TROTTER remarks that, "when BRIDPORT's fleet arrived at Spithead, in Sep- er, 1795, almost every man in the fleet was or less affected with scurvy. Large supplies egetables were provided; and lemon-juice scarce, in consequence of the previous great umption, fifty baskets of unripe apples were ured for the use of the fleet. The *Royal eign*, in particular, derived great benefit from ;" and the cure of the disease was every e most speedy. *Tamarinds*, and most of the lous fruits of warm and hot climates, are or less anti-scorbutic. When scurvy was alent among the troops at Rangoon, during urmese war of 1824, the *Phyllanthus emblica*, nola, which has a rich, acid taste, was em- ed as an anti-scorbutic with much benefit.

6. When BACHSTROM asserted, in 1734, that vy was the result of a more or less protracted ition of fresh vegetables and fruits, he stated at ame time both its prevention and its cure; although certain vegetables and fruits accom- ed these purposes more quickly and fully than s, all those which are edible possess more or f these beneficial properties. The writers of 6th century have generally noticed the popu- se of *scurvy-grass, brook-lime, water-cresses*, for the prevention and cure of this distemper. ucculent vegetables and plants comprised in rder *Cruciferæ*, are more or less efficacious, cially the *radish, horse-radish, turnip, carrot, ge*, &c.; and even such of these as are com- y only used when boiled, are most efficacious taken raw and fresh from the ground. Dr. very justly insists upon this circumstance, remarks that herbs in form of salads, are more icious than when boiled; and that their anti- utic properties are destroyed by drying, as n by KRAMER, and by the results observed the anti-scorbutic herbs sent from Vienna to rmy in Hungary. *Onions, garlic, leeks*, and *oes* are all very decidedly anti-scorbutic, and ese may be preserved for some time, they are beneficial for the provisioning of ships or es. The very general use of potatoes in modern times, partly accounts for the remarkably less prevalence of scurvy at the present day than formerly.

57. Most of the articles which are anti-scorbutic, may be preserved by *pickling*, especially by the pyroligneous acid or vinegar, and retain in a great degree their virtues. The immunity of Dutch vessels from scurvy has been ascribed by Dr. KERR and others to the use of *sour kroute;* and the health of the crew of the *Centurion*, during Captain COOK's voyage, was considered to have been owing to a liberal supply of this anti-scorbutic.* The quantity usually allowed of this substance was two pounds' weight to each man per week, besides a pound and a half, or two pounds, with every gallon of peas, for making soup.

58. There is no northern country where scurvy is generally endemic during winter, spring, and the early part of summer, that does not furnish a supply of anti-scorbutics, if duly recognised and preserved for these seasons. In Norway, Greenland, Iceland and Lapland they employ *scurvy-grass, sorrel*, and various other warm and acid herbs. Sir E. PARRY, in his first polar expedition, experienced the advantage of sorrel in the cases which occurred among his crews. He states that sorrel was preferred by the Esquimaux to scurvy-grass. He adopted also the advice of BACHSTROM and LIND, and raised small quantities of *mustard-and-cress* in his cabin, in small, shallow boxes, filled with mould, and placed along the stove-pipe; and as much of these were thus produced, although etiolated from want of light, as to prove beneficial to the scorbutic cases.

59. *C.* There is, perhaps, not any vegetable production more remarkably anti-scorbutic than the tribe of *firs*, especially the spruce-fir and common fir, and mountain-pine. MOELLENBROEK states, that when the Swedish army, at war with the Muscovites, were attacked with scurvy, Dr. ERBENIUS prescribed a *decoction of fir-tops*, by which the most deplorable cases were cured, and the rest of the troops protected from the distemper. Two squadrons of ships fitted out by Russia in 1736, were obliged to winter in Siberia, and their crews became affected with scurvy. After attempts to discover a remedy, the pines which grew plentifully on the adjoining mountains were hit upon; and by these all the men recovered in a few days (GMELIN, *Flor. Siber.*, p. 181.). Dr. LIND remarks, that pines and firs, as well as the shrub called the black spruce, have all analogous medicinal virtues, and great efficacy in the prevention and cure of this disease. "A simple decoction of the tops, cones, leaves, or even green bark and wood of these trees, is an excellent anti-scorbutic: but it becomes much more so when fermented, as in making spruce-beer, where the *molasses* contri-

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* Dr. KERR, in his able treatise on scurvy, remarks, that "Sour kroute or croute (*sauer kraut*, Germ.) is prepared by slicing the soundest and most solid cabbages in the way cucumbers are used in this country. In this state they are put into a barrel in layers, hand high, and over each is strewed a handful of salt and carraway seeds: in this manner it is rammed down, stratum supra stratum, till the barrel is full, when a cover is put over it, and it is pressed down with a heavy weight. After standing for some time in this state, it begins to ferment; and it is not until the fermentation has entirely subsided, that the head is fitted to it, and the barrel is finally shut up and prepared for use."—*Cyclop. of Prac. Med.* vol. iii. p. 691.

butes, by its diaphoretic quality, to make it a more suitable medicine. By carrying a few bags of spruce to sea, this wholesome drink may be prepared at any time. But when it cannot be had, the common fir-tops should be first boiled in water, and the decoction afterwards fermented with molasses, in the common method of making spruce-beer, to which a small quantity of wormwood and horse-radish root (which it is easy to preserve fresh at sea) may be added."

60. *Tar-water* was formerly strongly recommended as an anti-scorbutic; but the extravagant praises bestowed upon it at the commencement of the last century, greatly injured its just reputation. Dr. Lind still continued to uphold it; and many years ago, I had occasion to have recourse to it as a preventive, when placed in circumstances most likely to occasion this distemper, and when no other means could be obtained.* There are many reasons to believe, that all the *terebinthinates* are anti-scorbutic; and that, when the disease is attended by hæmorrhage, there is no substance so efficacious as the spirit of turpentine, when taken in small and repeated doses, in arresting the hæmorrhage, in restoring the tone of the extreme vessels, and removing the contractions of the joints. With this impression, I recommended Sir E. Parry to have a supply of this medicine in his last polar expedition; and he adopted the recommendation. The *anuda tree*, to which Cartier attributed the remarkably quick recovery of his crew, is considered by Lind to have been the leaves and tops of the American spruce; and it, as well as the other pines and firs, evidently owed much of its virtues to the terebinthinate principles it contained.

61. *D. Molasses* have been considered by Lind and others as anti-scorbutic; and Sir G. Blane states, that the ship in which it was first tried, was the only one in the squadron that was free from scurvy, which prevailed so much in the other ships, that, on their return to Portsmouth in August, 1780, 2400 men were sent to the hospital with this disease. Subsequently, molasses was served with rice to the men who were scorbutic, or threatened with scurvy, in Lord Howe's fleet; and the benefit derived from it was so great, that it was made for some time a regular article in the victualling of ships. Nevertheless, the malady was not entirely prevented; and in some vessels well supplied with it, scurvy prevailed to a great extent. Dr. Budd believes, that the anti-scorbutic properties of sugar-cane are greater than those of molasses; and that they are much impaired y the process employed in the manufacture of su. I consider this opinion to be correct, from wh I have observed in warm climates.

62. An anonymous work on scurvy, publis d in 1767, recommended the use of *wort*, or n infusion of malt, as an anti-scorbutic; and s substance was afterwards favourably noticed y Dr. Badenoch. Captain Cook employed it in e *Centurion*, and spoke highly of its efficacy. e took with him a large supply of malt, with w h to make wort; of this from one to three pints e given daily to each man. Sir G. Blane st s, that the fleet in the West Indies was supplied h the *essence of malt*; that it proved of service, t that its anti-scorbutic properties were inc derable. The process of extracting the ess e very probably impaired the properties posse d by the infusion.

63. *E. Various fermented liquors* have been d as anti-scorbutics, some of them from times im morial, in northern countries. In Norway, in e Feroe and Shetland Isles, the inhabitants h e, from the earliest ages, used, as their com n beverages or drink, two kinds of fermented liqu ; the one consisting of the fermented serum of t ter-milk, or of fermented butter-milk, the cas s matter being removed as the fermentation p ceeds; the other being an infusion of the bra r husks of oats and barley, that is fermented er the chief part of the farinaceous deposit from e infusion is removed. This deposit takes place u the infusion after this latter is poured off, or o r wise separated from the bran or husks. Th n fusion is then allowed to ferment, and the fa a ceous deposit is removed, and used as an artic of diet. These are very agreeable beverages, s pecially during the advanced stages of ir fermentation, and constitute the common dri of the inhabitants. They are the chief mean of averting scurvy in these parts, where fresh e tables are either scarce, or not to be obta d, during a great part of the year, and where ts are almost altogether wanting.

64. In all the continental countries bord g on the Baltic, and Northern and German oc s, *spruce-beer* is the most generally and most e a ciously used as a preventive of scurvy; vessels m Denmark, Sweden, Holland, Riga, Dantzic, c., being generally provided either with it or wit e essence of spruce, for their anti-scorbutic pr e ties. Spruce-beer is beneficial, not only fo e prevention and cure of scurvy, but also in e treatment of most fevers of a low type, ar of several cachectic diseases; in all of which I e, since the commencement of my practice, frequ ly prescribed it. As shown above (§ 59.), it y be readily prepared from the materials whic re easily procured, and as easily carried about. (er and *perry* are amongst the most decided i scorbutic beverages in use in this country, d were long ago shown to be very serviceabl y Sir J. Pringle and Dr. Lind. *Small-beer*, a state of brisk fermentation, is also anti-scor c, especially when a sufficient quantity of hops, of a vegetable bitter, has been added. Sir G. B e and others have made a favourable menti of *malt-liquors*, and I have seen them used wit d vantage, especially *porter*, when bottled and ll preserved.

65. The several kinds of *wine* are more c ss

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* The author of this work, in the winter of 1817 and 1818, was a passenger to England in a vessel, which was detained by bad weather at sea during thirteen weeks and four days, and which was provisioned and watered for seven or eight weeks only. He fortunately had laid in a small stock of articles for his own use; but, nevertheless, it was found necessary, after some time, to place every one on an abridged allowance of food and water. The meat provisions were altogether long salted, and were chiefly pork; the biscuit was coarse and mouldy. The water ultimately also was short in quantity, turbid, bluish, and most offensive. There fortunately was a very moderate supply of potatoes. During thirteen weeks no land had been seen, nor any other vessel communicated with. In this predicament —which, however, was not the only or the most dangerous one,— the author caused a small quantity of *tar* to be put into the water before it was used for drinking, and a little spirit was added. To these means, aided by a very moderate supply of potatoes, he attributed the preservation of the crew from scurvy and scorbutic dysentery, every person arriving in the Downs in good health notwithstanding the unwholesome supply of food and water, and the unfavourable season.

i-scorbutic; and they are rendered still more so the addition of vegetable bitters and aromatics, e particularly absinthium, calumba, cascarilla, ger, orange and lemon-peel, &c. It has been erved that scurvy was rare in French ships of in which the wines of their country were ed out to the crews. Sir G. BLANE, Dr. D, and Dr. BRYSON agree in reprobating the use pirituous liquors. There can be no doubt of injurious tendency of these when taken in ess, or habitually, or undiluted. But used in ll quantity, largely diluted, and added to the e common anti-scorbutic beverages, or to r vegetable infusions, they are decidedly eficial, both in the prevention and cure of the mper. There are various contingencies which r to voyagers, requiring a cautious and mode- recourse to one or other of these liquors; in circumstances threatening the outbreak of vy, the addition of a small quantity of either em to the means of prevention in common has a very beneficial influence upon the ts and constitution of those who thus abste- sly use them, and promotes the good effects of more efficacious anti-scorbutics, especially g exposures to cold and humidity.

6. *Vinegar* was early employed as an anti- butic, and our fleets were generally supplied it during the last century. Dr. LIND, Sir G LANE, Dr. TROTTER, and others, have shown the distemper prevailed in ships which were supplied with this article. Much, however, nds upon the kind of vinegar employed. The igneous acetic acid certainly possesses con- able anti-scorbutic properties; much appa- y depending upon the source and the prepara- f this article. Dr. BUDD remarks, that he has ved scurvy in ships well supplied with ar; but the disease, in its most aggravated has appeared amongst those crews which had gular allowance of this article.

. *F.* The *mineral acids* have been found but influential in the prevention and cure of y. Dr. LIND took twelve patients on board e *Salisbury*, at sea; their cases were quite r. They lay in one place, and the diet was ame for all of them. Two of them were ed a quart of *cyder* daily; two others took y-five drops of *elixir of vitriol* three times a two had two spoonfuls of *vinegar* thrice a and their food well acidulated with it; two put on a course of *sea-water*, about half having been given every day; two had each *ranges* and one *lemon* daily; and two had ze of a nutmeg, three times a day, of an *ary* made of *garlic*, *mustard-seed*, *rad. ra-* , *balsam of Peru*, and *myrrh;* using barley- , acidulated with *tamarinds*, for drink. The es and lemons were the most speedily bene- ; next to those the cyder: those who took the medicines were, at the end of a fortnight, in the same state as those who had taken only e electuary and cream of tartar as an aperient.

G. There are numerous medicines besides already mentioned, which are more or less in preventing as well as in curing scurvy. of the more *succulent* and *acidulous* vege- , plants, and fruits, especially when fresh, or ved by pyroligneous vinegar, are beneficial; any of them lose their anti-scorbutic virtues dried, and others when boiled. Of the medicines which may be used, and which are certainly occasionally serviceable, even when other means have failed, I may mention the *chlorate of potash*, *nitrate of potash*, *camphor*, the *chlorides*, *lime-water* and the *chloride of lime*, *chlorine*, *chlorinated water* and *chlorinated soda*, *sarsaparilla*, *serpentaria*, *sassafras*, *capsicum*, *taraxacum*, *guaiacum*, *mezereon*, *senega*, *elm-bark*, *dulcamara*, the several *balsams*, &c.; but these are severally only of use for certain modifications and complications of the malady.

69. It has been frequently supposed, and the supposition too often acted upon, that *fresh meat* is of itself sufficient to prevent or to cure scurvy when it breaks out in ships, and this opinion may supersede the opportunity of procuring fresh vegetables and fruits. Dr. BUDD states, that during the year in which he wrote on this disease, "the captain of a vessel trading to the Mauritius furnished his men, while they stayed at the island, with a plentiful supply of fresh beef, procured at considerable expense, but neglected to provide them with vegetables and limes which abound in the island. The consequence was, that scurvy broke out soon after they set sail, and before the ship arrived in this country one half the men before the mast had died of it, and the rest were disabled." (p. 77.)

70. *H.* It is not alone requisite to use the above means of prevention, as they may severally be possessed by individuals or communities, under circumstances which render the appearance of scurvy either probable or certain; but all the *predisposing and exciting causes* (§ 33. *et seq.*) *ought to be carefully avoided*, as far as this can be effected. I believe that no mean cause of the prevalence of scurvy in the navy, as well as in trading ships, was the habit, morning and evening, of washing the decks, thereby keeping in a constant state of humidity and evaporation, and the air either cold and humid, or close and humid, according to concomitant circumstances. This evil is partly abated by adopting dry scrubbing and similar means; but it still should be kept in recollection, as the adoption of it depends upon the knowledge or caprice of the captain, who in this, as well as in other matters connected with naval service, may, thus occasion an unhealthy state of air, an artificial malaria, the humidity favouring the concentration of emanation from the hold and other parts of the ship, and from the individuals confined during the night in a limited space and in a close air. Harassing duties, fatigue, and whatever lowers the general standard of health, or depresses the vital powers, ought also to be avoided.

71. *I.* Much, as will be seen from the above, depends upon the victualling of ships, especially those which proceed upon long voyages. The sailors should have a sufficient supply of cocoa, tea, coffee, fresh lemon-juice, sugar or molasses; and whilst spirituous liquors are allowed, in very moderate quantity, and only when wet or fatigued, they should either be withheld, or allowed in very small quantity only, when these exigencies do not exist. In circumstances tending to depress the mind, endeavours should be used to amuse and to excite it, in such ways as may the least tend to be followed by any depression. In these respects, as well as in others, the means adopted by Sir E. PARRY deserve both praise and adoption, as far as the latter is possible.

72. **VIII. Treatment of Scurvy.**— What has already been stated with reference to the *prevention* of scurvy, applies equally to the *treatment* of it, especially in its early stages, and less complicated or less severe states. But it is occasionally observed, that, owing either to the continued influence of certain causes which are overlooked, or cannot be removed, or to the presence of some complication, the disease resists the usual means of cure, and even those remedies which have generally been efficacious in the most severe cases. *Lime-juice*, and especially fresh *lemons* and *limes*, have been found the most efficacious means of cure in pure scurvy; but instances have been recorded very recently, in which lime-juice has failed. These instances of failure have, however, been adduced in too general terms, and without a sufficient and precise record of the several circumstances in which the failure occurred, or of the particulars in which the disease varied in its character from that usually observed. The distemper has commonly been stated to have been scurvy arising out of the usual causes; and lime-juice has been said to have been given without benefit; but no particulars are adduced as to the existence or non-existence of one or more of those predisposing and concurring causes described above (§ 33. *et seq.*), as not merely contributing to the production of the malady, but also actually perpetuating, modifying, or aggravating it, if they are allowed to continue in operation during the treatment. When lemons, limes, shaddocks, and oranges can be procured, they are preferable to other means; but, otherwise, the preserved lime-juice, or crystallised citric acid, should be substituted. In respect of the preserved juice, we have no adequate information as to the time it will retain its anti-scorbutic properties; for it is not unreasonable to infer, — indeed it has been proved — that, when this juice has been kept two or three years, as is not infrequently the case, it may have lost much of its virtues, the failure of it under such circumstances being sufficiently evident, without looking for the cause of failure in the nature of the disease itself, or in the inefficacy of the remedy.

73. One of our oldest English writers on scurvy, **John Woodall**, in his meritorious work entitled the "Surgeon's Mate,"— a name too vulgar to be noticed by doctors of modern manufacture,— observes that "we have many good things that heale the scurvy well on land, but the sea chirurgeon shall do little good at sea with them, neither will they endure. The use of the juyce of lemmons is a precious medicine, and well tried; being *sound and good*, let it have the chiefe place, for it well deserves it; the use whereof is: it is to be taken each morning, two or three spoonfulls, and fast after it two hours; and if you add one spoonful of *aqua vitæ* thereto, to a cold stomach, it is the better. Also, if you take a little thereof at night, it is good to mixe therewith sugar, or to take of the syrup thereof is not amisse." This good advice was given in 1636, and further insisted upon subsequently, by **Martin Lister**, **Dellon**, and many others; and yet when Lord **Anson** proceeded on his circumnavigation, no provision of the kind was made against scurvy; the prevention and cure of disease, and rewards for those who devote themselves to those laudable undertakings, never having been considered of any importance by British Governments, or, at l t, of very minor importance only; the aggran ement of party and family connections al ys absorbing and utterly annihilating considera ns of public justice and patriotism.

74. Since the works of **Lind**, **Trotter**, nd **Blane** established the reputation of lemon-j e, and acidulous fruits, for the cure of scurvy, t e, with the use of fresh succulent vegetables, ve been generally adopted. Nevertheless, er means have been resorted to, owing either t he failure of the lemon-juice, or to the form of, nd circumstances attending, the malady. The ler vegetable acids, and the mineral acids, have en found very remarkably inferior to the citric i he treatment of scurvy; but the amount of b fit which various kinds of salts, and the alkalin arbonates, are capable of affording, has not en ascertained, excepting in the single instan of nitre. Mr. **Patterson**, a naval surgeon, w ng in 1794, showed the good effects of a solut of *nitrate of potash* in *vinegar*. He advised ur ounces of nitre to be dissolved in a qua of vinegar, and gave half an ounce of this so on twice or thrice daily, and bathed the local res with it as often. He states, that "some pa nts cannot bear the solution without the additi of water, whilst others, without the least inc venience, bear it undiluted. The discharg by stool, or the presence of gripes or nausea, ide me with respect to increasing or diminishin the dose; but, at the same time, it is not a slig degree of nausea, colic, or diarrhœa that rend an alteration in the quantity of the medicine essary. To a great number of scorbutic pa nts, eight ounces of this strong solution, cont ing one ounce of nitre, have, in the course of th ay, as long as such a quantity was necessary, be administered to each with the greatest success. lso, large and frequently-repeated doses of this dicine have been given in cases of scorbut lysentery, and instead of increasing, I have a ays found it remove the disease."

75. Mr. **Cameron**, another experienced val surgeon, states, that having on several occ ons observed the excellent effects of a solut of nitre, as recommended by Mr. **Patters** in scurvy, he was induced to employ it wh the disease broke out among the prisoners on bo d of a convict-ship proceeding to Sydney in D ember, 1829, under his care. As soon as h ommenced the use of this solution, many ost hopeless cases began to improve rapidl and before one third of the voyage was accomp hed, the health of the sick improved so fast und the new treatment, that he did not think it nec ary to go into any port; and the general health the prisoners (216.), when they arrived at S ey, was much better than when they embar d in Ireland. Some of the cases manifested a ere pulmonary complication, but these also ecovered. Mr. **Cameron**'s preparation consi d of eight ounces of nitre, dissolved in sixty ou s of vinegar. Sometimes equal parts of vineg and lime-juice were used: a little sugar was ge ally added, to render it more palatable, and a fe ops of oil of peppermint, and a little alcoho An ounce of this solution was a dose; and fro hree to eight doses, according to the stage a severity of the disease, were given at equal int als, from six in the morning until eight at night

76. It has been contended by Dr. Stephens, t the state of the blood in scurvy indicates the eibition of the non-purgative salts, and not of als. His own experience appears not to have fnished him with sufficient evidence in this ntter. But I may mention, that in states of ease closely allied to scurvy, I have given, fn an early period of my practice, the *chlorate opotash*, as well as the *carbonates of soda* and *psh*, with very marked benefit. In obstinate or cplicated cases, or when the above means fail, aombination of these salts — of the nitrate and corate of potash, and the carbonate of soda or psh—may be tried; or the *chlorinated solutions olime* or *of soda*. When diarrhœa is present, *le-water* with milk, or small and frequent doses ohe *chloride of lime*, or of *creasote*, in any dulcent vehicle, may be of use; and when hæmrhages are present, small or moderate doses of t *terebinthinates*, or of the *spirits of turpentine** (69, 60.), should be exhibited in any suitable fn, or on the surface of spruce beer, when that berage can be procured.

7. When the disease is *complicated* with *prisy*, or with *congestive pneumonia*, the nitre, w lime-juice and camphor, will be found benefil; and epithems or embrocations applied to tl chest or over the seat of pain, consisting of the cpound camphor and turpentine liniments, will pe of essential service. When the disease is aciated with disease of the *spleen*, as often ours when it follows *intermittent* or *remittent frs*, the preparations of cinchona or quinine, of seentaria, guaiacum, &c., have frequently been fod of service. In these, as well as in complicons with *ague*, the remedies just mentioned sld be exhibited in decided or sufficient doses; oarious chalybeate preparations may be substitul, or given as circumstances may suggest. If tl functions of the *liver* be torpid, or if congestions ois organ or of the spleen be indicated, the *nitrohochloric acids* may be taken in weak solution, ae common drink, and the surface of the trunk, oe lower extremities sponged or bathed with the te or warm solution of these acids. In many cimstances of the disease, the compound decocti of *sarsaparilla*, or other preparations of this micine, will be taken with advantage; and seral of the substances mentioned above (§ 68. *e.*) will be beneficially conjoined with others, arding as circumstances arise.

8. During the course of scurvy, whether sile or complicated, the *bowels* are often more oess disordered. When *costiveness* occurs, it sld be removed by the less irritating but efficit means. The most appropriate, and the mt successful, is a solution either of the *citrate ofagnesia*, or of the *phosphate of soda*; or a sufficit quantity of *magnesia*, taken shortly before ebiting the lemon-juice or the solution of cic acid. In order to keep the bowels sufficitly open, and to procure a return of the futions of the skin, magnesia may be taken conjoined with the precipitated *sulphur* and a little powdered ginger, in repeated doses. If *diarrhœa* or *dysentery* supervene, the means already mentioned, or those advised in another place (see Dysentery, Scorbutic), should be employed. If the evacuations be very offensive, as well as frequent, lime-water with milk, or the chloride of lime, or powdered charcoal, or tar-water, or creasote, will be found very beneficial; and to either of these, the calumus aromaticus, or other similar substances, may be added. M. Brachet states, that he has cured several cases of scurvy with powdered carbon alone.

79. As the disease approaches to, or assumes the characters of *putro-adynamic* or *maculated fever*, as observed sometimes under circumstances favouring this occurrence, the remedies advised above (§ 68.) for the complication of the distemper with ague; and various antiseptics, especially those recommended for the treatment of putro-adynamic or typhoid fevers (see Fevers, § 585. *et seq.*), should be prescribed with due decision, and appropriately to the features of individual cases. In all the states or complications of scurvy, as in low states of fever, approaching in character to those of scurvy, an *expectant practice* is not only a most dangerous, but a fatal one. The medical journals of the day — the middle of the 19th century — teem with the histories of cases of low fever, in which the practice was either expectant or inappropriate, as far as the treatment is recorded; the *post-mortem* changes revealing the results, which, by the experienced and observing physician, may have generally been anticipated.

80. The *diet* and *regimen* during the course of the malady, constitute the chief part of the treatment, and, as such, have been sufficiently noticed, in respect both of the prevention and cure of the malady. A warm, dry, and pure air (avoiding exposure to cold and wet) and moderate mental excitement, amusement, &c., will contribute very remarkably to the removal, as well as to prevention of scurvy.

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* Very recently the spirits of turpentine has been recmended for hæmorrhages, as a new medicine for th class of diseases. I may mention, that, in a mem, with experiments on the use of this remedy in dise, published by me in 1821, in the *London Medical a Physical Journal*, it was strongly advised to be pcribed for all hæmorrhagic affections; and the same ace has been given for these affections, as well as for nuerous others, in this work.

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OUS and SYNOVIAL MEMBRANES.

NON. — *Membranes séreuses*, Fr.; — *Seröse* *üte, S. Ueberzüge, Wasser-haüte*, Germ.; — *mbranes Synoviales*, Fr.; — *Synovial-kap*- *ı, Synovial-haüte*, Germ.

CLASSIF. — See *art.* PERITONEUM, PLEURA, &c.

The *pathology* and *diseases* of *Serous* and *ial membranes* have been so fully considered e *articles* PERITONEUM, PLEURA, BRAIN, BRANES OF, that a description of the *organic es* presented by these membranes would be repetition of what has been already stated these heads. As respects these changes, er those consequent upon the several states ammation, or those arising from constitu- causes, or vice, and altogether independent of mation, I believe that they will be found to ore fully described, at the places now re- to, than anywhere else. Since these ar- were written, the very excellent works of ANSKY, and the able treatise of Dr. BRIN- on the pathology of serous and synovial ranes have appeared; but after attentively ng these, I find nothing that requires to be , at this place, by way of appendix to the s just enumerated. Indeed, there is one , or rather ultimate change, consequent, re instances, upon *chronic peritonitis chronic pleuritis*, lately seen by me in maladies, which is not noticed by either se writers, namely, the complete dege- on of the greater part of he organised tion, false membranes, or adhesions pro- by these diseases, as well as by chronic mation of the serous membrane of the marrow, into fat. This ultimate change, ed by me in these three situations, in old, or hronic cases of these maladies, appeared to be erely a far-advanced change, but also a tive one, admitting of a partial return of the ons of the parts adjoining (see *art.* PLEURA, 1).

2 The contractions also produced in cases of c inflammation of the peritoneum, described r. HODGKIN and myself, have also not been oned by these writers. (See *art.* PERITO- , § 116.)

3 It is almost unnecessary to state, that the c changes met with in the membranes y denominated *serous*, occur also in those only termed *synovial*, their intimate struc- being alike, although their connections are nt.

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SHOCK, VITAL or NERVOUS.

— SYNON. — *Sudden sinking of Vitality*; — *Vital Depression*; — *Nervous Shock*, — *Nervous Depression*, — *Fatal Sinking*, &c.

CLASSIF. — I. CLASS. I. ORDER (*Author*).

DEFINIT. — *Sudden or instantaneous depression of organic nervous, or vital power, often with more or less perturbation of body and mind, passing either into reaction, or into fatal sinking, occasioned by the nature, severity, or extent of injury, or by an overwhelming moral calamity.*

1. A *shock*, whether physical or moral, may present any grade of severity, from merely a slight but sudden depression of the vital functions, to the rapid extinction of these functions. From its slighter forms, the powers of life react sooner or later, especially when judiciously aided; but its more intense states are either removed with great difficulty, or they proceed, with various rates of celerity, to a fatal issue; the vital sinking increasing more or less rapidly, and extending from the organs more strictly vital to all other parts, — from the seat of injury to the solar ganglion, and thence to the heart, respiratory apparatus, brain, spinal chord, muscles, and senses, — until the functions of all are extinguished. *Vital shock* varies, not only in severity and fatal tendency, but also somewhat in its phenomena, according to the constitution and vital energies of the sufferer, and the nature of the cause.

2. Although the effects of shock have been recognised by most observing persons, even by the uneducated, yet they have received extremely little attention from medical men; they have not been noticed, either in medical or in surgical writings, excepting very casually in some surgical works; and I believe that they are now treated of for the first time in a systematic medical work.* It is necessary to distinguish *shock* from *concussion*; for although concussion, whether of the head or of the spine, is generally attended with more or less of vital shock, still concussion concerns chiefly the functions of either the brain, or spinal chord, or of both, according as the injury is directed to either or both of these quarters. The severity and danger of shock depends, not upon the amount of pain produced, but rather upon the suddenness and violence of the injury, relatively to the amount of vital resistance; for when a cannon-ball, or any other ball, carries off a limb, or does other fatal injury, pain is not produced, but the vital shock is extreme, the general depression,

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* The diseases of the CÆCUM and its *Appendix* were fully described, and their treatment pointed out in this work, long before they received any adequate attention elsewhere. Some years afterwards papers were published on that subject in the Transactions of the Medical and Chirurgical Society; and the learned author of these papers commenced with the veracious statement, that the subject had never engaged the attention of any previous writer, although the comprehensive article on the subject in this work is sufficiently extensive to make a small volume, and it was then in the hands of many thousand readers. It is to be hoped, that the present article may receive attention, but not quite similar attention, especially from Surgical readers, whom it more especially interests. "*Sic vos non vobis*," &c.

or vital sinking, often passing rapidly to dissolution.

3. Pain of itself rarely occasions, although it may accompany shock, and, when it does, it generally tends to diminish shock, and to develope reaction. Pain and shock are often associated in injuries and surgical operations; but the former is an endowment tending to the protection of life, to the counteraction of the effects of shock, and to the development of a salutary vital reaction. The severest or most prolonged pain does not occasion vital shock, but it causes vital exhaustion, sometimes even sleep. This was proved by the tortures of the rack in former times, and by the history of the most painful affections. When pain attends severe injuries and operations, the patient sinking more or less speedily, the result should be imputed to the influence of the shock on the constitution, and not to the pain, which is merely unavailing in counteracting the fatal result. This view of the subject, I am aware, is very different from what is generally taken; but a more intimate consideration of the phenomena, than has hitherto been entertained, will show its truth. The importance of this topic is remarkably heightened at the present day by the circumstance of anæsthetics being so generally employed during operations, and even during parturition; for if the view I now take be just, the shock to the constitution, or vital influence, by severe operations, or by a severe labour, will be increased by annihilating the preservative influence of pain; and the immediate, as well as the more remote effects of shock will be thereby more or less increased.

4. In the article, Poisons, I have shown the effects produced by the *inhalation of chloroform and æther* (§§ 615, 616.). It may be useful to view these effects in connection with those produced by dangerous or fatal injuries, and to contrast them as far as they admit of contrast. It will be seen, by observing the progressive effects of chloroform, that it paralyses sensibility, and subsequently, as its influence extends to the medulla oblongata, it more or less paralyses the respiratory functions, and ultimately the heart itself, if its inhalation be continued sufficiently long to produce this effect; the functions of the brain, of the medula oblongata, and of the ganglial system, being successively extinguished. The effects of fatal shock are similar as respects the sinking and extinction of the functions of these several organs, but they present a different order of procession, as will be more fully shown hereafter, the ganglial and cerebro-spinal functions being successively affected. Now, as the effects produced by the inhalation of chloroform are depressing as well as anæsthetic, and as shock is also depressing, although in a somewhat different manner, must it not be reasonable to infer, that the shock will be more severe and dangerous, cæteris paribus, during the influence or effects of chloroform, than when the frame is unaffected by this agent, and when pain exerts its influence, and developes a salutary vital resistance? In this matter, the ascertainment of truth is my object. I reason from my own observation, as far as it has extended, and I leave this part of my subject to those who have had, or may have, a more extensive experience of the phenomena to which these remarks apply.

5. Shock produces effects of various grades of severity, according to the health, or the s of depression or of excitement, the indiv may be in at the time of sustaining it. Th person of a powerful constitution is much affected by it than a delicate, nervous, or m cholic individual. A state of excitement, a passion, &c., to a certain extent, counterac effects, whilst fear, grief, or any of the depre passions, increase its effects. Even pre-ex disorder, or structural change, renders the fects more dangerous or severe, especially or change of the structure, or of the caviti valves, of the heart. These are importan cumstances as respects persons for whom s operations may be required, and should be k recollection when such operations are about determined on. Whilst the *severity* of sh thus influenced by constitution, tempera states of mind, and existing disorder or actu ganic disease, the *phenomena* constituting are also modified, by these circumstances, more or less remarkable manner. The inte as well as the modifications of the phenome shock, is very remarkably influenced, or ev great measure occasioned, by the state or a of alarm produced in the mind of the suffe the injury causing the shock; this is the mo markable in severe wounds and other injurie

6. From these considerations, it will be dily inferred, that the *symptoms* or *phenome shock* will vary more or less in different cas cording as one or several of these modifying are in operation; and that, whilst certain of may be wanting in some instances, the whol be differently grouped, or may appear in succession, in most cases.

7. I. Phenomena of Shock. — The *toms* of shock vary with the severity or int and nature of the *cause*, and the state or co tion of the recipient. — The *causes* of sho chiefly, 1st, contusions, bruises, blows, and cussions; and these vary in their effects, acc to their situation upon or near vital or imp organs, as when they are seated over or ne epigastrium, the cranium or neck, the join spine, &c. 2d. Gun-shot wounds, by large nerves, blood-vessels, or important v or joints, or large bones, are more or less in 3d. Penetrating or incised wounds, or su operations, implicating these or other parts. Simple or compound fractures, dislocations rations, or lacerated injuries of all kinds 5th. Mental alarm or terror, or shocks fro sudden or unexpected intelligence of losses o relations, of friends, of wealth, of honour, worldly consideration, or intense fear or dr some calamity. In many of the preceding of causes of shock, mental alarm or dread mental shock — greatly increases the effects physical shock upon the vitality of the fram especially on the manifestations of life i nervous system; so that in estimating the a of the latter, care should be taken not to ov the existence and intensity of the former — mental alarm or shock.

8. Now, although these several classes jury, with their frequent attendant, mental or shock, may be supposed to produce vari fects, yet such is not always the case; for so may be owing to the severity, as well as the of the cause, relatively to the state and co

of the sufferer, that the phenomena conse- t upon the one class may hardly vary from following the others. So much, however, en observed to depend upon the viscera and injured, and upon the loss of blood, and the int of that loss, as well as upon the intensity of al alarm, as to render it necessary to connect hock, and its intensity, with the nature and ity of the cause, or causes, which produced it. according to the cause, (1st) the shock may together and simply a vital one, as when it is uced by a violent blow on the epigastrium, sioning concussion of the solar ganglion; (2) or it may be associated with various nervous omena, as when a large nerve, or joint, or is lacerated or severely injured, and the pa- thereby greatly alarmed; (3rd) or it may be licated with, or rather characterised by, co- se sinking, as when the contusion, concussion, ow, affects the intimate organization and cir- ion of the brain; (4th) or it may be so asso- l with the sinking consequent upon losses of l, as not to be distinguished from this cause, ially when the injury is such as occasions both and hæmorrhage; or (5th) the alarm or may be entirely a mental one, or that con- g entirely of the sudden effects of extremely ssing emotions on the action of the heart, or e sudden and unexpected intelligence of dis- ng losses or events, whereby the nervous n is more or less shocked, the mental mani- ions disturbed, and the functions of the heart vital organs depressed and otherwise dis- ed.

It will thus be perceived, that the injuries *uses* occasioning shock may be divided into *asses*, and that the effects they produce may nt *five modified forms*; but although either se may result from either class of causes, lthough it is necessary to connect, our ob- ion of the phenomena, and our treatment ck, with the particular cause of it, it is still important, especially as regards the treat- to mark the particular form and modifica- equiring our aid.

(*a.*) The *simple* or more *vital states* of shock e so slight as to pass off in a few hours, or ere as to terminate fatally in a few minutes, ding to the intensity of the cause. This ef- ay be altogether independent of any hæmor- , and may result from a variety of causes. A t blow or contusion over or near the epigas- entre, may so paralyze the heart, as to pro- more or less sinking, not only of the action s organ, but of all the vital functions; the *oms* being chiefly feebleness, slowness, or irre- ty of the pulse; coldness and pallor of the general surface, and extremities; a dis- g feeling of sinking and anxiety; slow or lar respiration; sometimes cold perspiration, general tremor; and a sunken or collapsed of the countenance, terminating, more or pidly, in loss of pulse at the extremities and carotids, and in extinction of sensation, of eart's action, and of respiration. In some especially when the injury is less intense, or a large joint is very severely injured, or d, these symptoms may not be so intense, e of longer duration, and be attended by , as vomiting, singultus, or by restlessness, lings of alarm and anxiety at the epigastrium; and, according to the nature and severity of the cause, relatively to the state of the sufferer, these symptoms may lapse into fatal sinking, or be followed by imperfect efforts at reaction, or by delirium, or by reaction, terminating ultimately either in coma and death or in recovery, according to the constitution of the patient, and the treatment adopted.

11. (*b.*) With more or less of the above symptoms, others may supervene, or may be present from the first, more especially when a limb is carried away by a cannon-ball, or when it is lacerated extensively, or near to the trunk of the body, or when large blood-vessels or nerves are lacerated, or large joints are crushed. In these circumstances, as well as in others, especially in nervous and irritable temperaments, various *nervous symptoms*, especially mental alarm and restlessness; irregularity of the heart's action and of respiration; a terrified, as well as a sunk state of the countenance; delirium, terror, and incoherence; a general tremor and coldness; a remarkable and peculiar tremor or quivering of the injured limb, with a cold, wet, pallid, or leaden state of the surface of the limb, or parts adjoining, are more or less remarkable, and seldom terminate in a salutary reaction, unless in a few cases, which admit of surgical interference by amputation, &c. When severe injuries are inflicted upon any part of the abdominal cavity, a state of stupor or apathy, yellowness of the surface of the body, collapsed features, and fatal sinking, as already described (§ 10.), either appear from the first, or supervene upon the symptoms just enumerated. In most of these severe injuries, and especially those produced by fire-arms, the amount of pain is very small compared with the intensity of the shock; and even where the shock is the greatest, the pain may be the least, or may even be entirely absent. Indeed, in many cases, the pain precedes the occurrence of reaction, and even favours the development of this salutary effort of nature.

12. Although surgeons have neglected to treat specifically of *shock*, — a state which particularly concerns them, as respects both the period and the prudence of operating, and the effects of operations, — the subject has been briefly adverted to by many, and especially by Larrey, Guthrie, Copland Hutchison, Dupuytren, and Hennen. It falls not within the scope of this work, to notice the remarks they have offered respecting it; but what they have advanced — which is extremely little — will be readily found in the works of these celebrated surgeons.

13. (*c.*) Injuries may be received directly or indirectly by the brain or spinal marrow, so as to produce a form of shock, which has been generally termed *concussion of the brain*, or of the *spinal chord*, as either may be affected. In such cases, with more or less shock to vitality, or to the frame, there is a special shock sustained by these nervous centres, the minute or ultimate organization and circulation of these parts being so changed or affected, as to instantly arrest all the functions they perform. With the phenomena of shock, as manifested in its more simple form (§ 10.), unconscious fæcal and urinary evacuations, sometimes with vomitings, are also present. When the injury thus implicates the brain, or upper portion of the spinal chord, the annihilation of the functions of

those parts especially distinguishes the case, although the marked and often rapid sinking of the heart's action, or the paralysis of the respiratory muscles, further characterises it, either of these being the more immediate cause of dissolution.

14. (*d.*) Cases often occur in which the shock is heightened by, or complicated with, either *internal*, or *concealed*, or *open hæmorrhage*. In these, the symptoms of simple shock (§ 10.) are more or less manifest, with great pallor of the surface, often with coldness and tremor, sometimes with succussions, or shudderings, or vomitings, passing into deliquium, or fatal sinking, especially when attempting to sit up. The action of the heart then ceases, and with it respiration; the cerebral functions either being but slightly disturbed, unless shortly before death, or ceasing in a way not to be distinguished from the accession of sleep, excepting in the rapid failure of the pulse and respiration. In the less severe cases of this kind, reaction may supervene, and recovery take place, when the nature of the injury causing the shock and hæmorrhage, and the consequences of both, admit of this issue.

15. (*e.*) The *fifth form* of shock depends more or less on mental causes of an intensely depressing nature. The physical effect may be entirely owing to the mental cause, or partly owing to this cause, or to alarm or dread of dissolution in connection with a physical cause, as in cases of gun-shot or other wounds, severe injuries, operations, &c. In these latter cases, the causes are both physical and mental; and the phenomena present a mixed character, more or less of mental alarm or of nervous phenomena, such as are above noticed (§ 11.) being associated with physical depression, — the symptoms of either the *first* or the *second* of these forms predominating with fright, anxiety, or most manifest alarm and distress, or of absolute terror, or even delirium, sometimes, in females, with hysterical convulsions, prolonged faintness or catalepsy. In this form of shock, the strength of mind, the nervous energy, or force of character of the sufferer, modifies remarkably the amount or intensity, as well as the particular form or state, of the physical effect; for the same intensity of cause, which might make but slight impression on a person thus mentally constituted, or on one physically robust, might produce a very dangerous effect on a delicate, nervous, and susceptible individual; this effect being, moreover, often attended by faintness, convulsions, incoherence, &c. Mental shock is more especially depressing and dangerous to persons who are the subject of organic diseases of the heart, or brain — of the former particularly — death often immediately following it.

16. II. The Diagnosis and Prognosis of Shock require but little remark. — *A.* Of the *former*, it may be observed, that it is often difficult to determine whether or no a fatal result be owing to the immediate physical shock and mental alarm which an injury or operation produces, or to the consecutive effects on the frame, either by interrupting some important or vital function, or by contaminating the blood. True or simple shock is always instantly manifested on the cause producing it; it is generally attended by nearly all the symptoms already enumerated, by more or less mental alarm, and by a sensation of sinking and anxiety referred to the epigastrium and præcordia, sometimes vomitings, characterised by slight, or even effort, or with unconscious or involuntary eva tions, and an universal failure of all the functions. In some of the most severe case physical shock, instead of mental alarm, the either delirium, or stupor, or apathy.

17. *B.* The *Prognosis* depends entirely upo nature of the cause or injury, and the intensity c effect indicated by the symptoms. Great slow or weakness of the pulse; or great frequency feebleness, or irregularity; marked coldness, p or leaden hue of the surface; tremor, cold pers tions, vomitings, singultus; irregularity of the r ration; continual restlessness; a sensation of sir or of impending dissolution; delirium, apath stupor; involuntary evacuations; a jaundicec pearance of the surface; rapid failure of the p &c., are all very dangerous, and often fatal sy toms. When the phenomena are less severe, when the means employed are successfu bringing about a salutary reaction, or even i minishing the severity of those now mentic then hopes of recovery may be entertained. so much depends upon the nature and peculia of the case, upon the patient's feelings and nions as to the issue, which should always be considered, and upon the progress and cc gencies of the after-treatment, especially for plicated injuries, as hardly to admit of de laws of prognosis being assigned.

18. Many of the injuries which occasio vere shock, involve the questions, 1st, as t propriety of amputating a limb, or shatter torn stump; and, 2nd, as to the period at v this operation should be performed. The fi these questions has been satisfactorily consi by surgical writers; but the second has been a subject of discussion, many writers of exper taking different views of the matter. The ences of opinion, as well as of success, as re the period, after these injuries, at which the ration should be performed, have arisen fro want of due attention to the existence or existence of the more marked phenomena of at the time of performing the operation, and recourse having been too frequently had before these phenomena had subsided, or b the frame had recovered itself, either partia more fully, from the shock it had experienc before vital reaction had commenced; for, if hours be not allowed for this purpose, befo operation be attempted, the performance of rapidly upon the receipt of the injury may cc a state of shock, admitting of vital reactior a state of fatal sinking; or, if the vital en continue to sink more and more, during tl hours thus allowed for them to rally, no standing a recourse to rational means to thi an operation will only add to the patient' fering and accelerate the fatal issue.

19. III. Treatment of Shock. — *The ment of the more simple states* of physical (§ 10.) should be appropriate to the int or apparent danger of the symptoms. I *slighter forms*, warm diluents, the applicat external warmth, the allaying of mental al cheerful confidence evinced by the attendan a moderate recourse to gentle stimuli or re tives, such as camphor, ammonia, æther, & small doses, are generally all that may

d. But, in *severer* or *dangerous cases*, a more uous and a more liberal recourse to these s is absolutely necessary, and should be cond until indications of commencing reaction ır. In these, as well as in others of more nent danger, even an assiduous and a decided f these means may be insufficient to bring the desired effect; and others must be ght to their aid. In these cases, more espe-, the existence of mental alarm should be into account, and where it is inferred, — for y exist without being made apparent, — the nt should be assured and encouraged. In all of a severe and dangerous nature, and where ccasion admits of having recourse to the s, the patient should be placed in a bed prely well warmed, and two young persons, ding to the sex which may be proper, ought placed close to him, one on each side, without ntervening covering; and warmth should be oted by sufficient bed-clothes. In some ries, it has been customary to apply animal in a different way, namely, by the skins of ls, torn from their bodies instantly on their killed, and the internal surfaces applied ly to the patient's body, or even the opened s of the animals themselves, whilst still . I have seen these means employed, and nly with greater success than I expected. In of shock from blows or contusions on the nen, or near the epigastrium, these means are priate, and their success admits of rational nation.

. In some cases, a stimulating or medicated -bath may be tried, salt, mustard, &c., having added to the water. I do not, however, der these as efficacious as animal warmth ap- in either of the ways just mentioned; and I generally preferred to warm baths, as being efficacious, more immediate, and attended less trouble and fatigue, or exertion, on the of the patient, the application of flannels, g as dry as possible out of very warm water, freely sprinkled with spirits of turpentine, and ntly applied over the epigastrium and whole men, evaporation from them being prevented y cloths or oil-skin placed over them. These pithems should be continued or renewed un- action commences, when they, as well as the al means had recourse to, ought to be dis- nued, and the case subsequently treated ac- ng to its peculiar requirements.

. In those cases which present, from the e of the injury, more or less of the nerv- symptoms above noticed (§ 11.), various ne remedies, in addition to those already oned, may be employed. In these more ially, and sometimes in others, opium, in in states of combination particularly, is often vice. In conjunction with camphor, or with , or with ammonia and aromatics, it is a valuable remedy. When delirium is present, hor is required in full doses; whilst the addi- of opium, or of morphia, soothes the irri- ty, and allays the restlessness sometimes nt, and diminishes the mental alarm. But delirium occurs, its passage into coma d be dreaded, and opium and other narcotics d be used with caution, and only in com- on with camphor and other restoratives and pasmodics.

22. When the hæmorrhage caused by injuries is so great as to increase the vital sinking attendant on shock, and especially when it increases the alarm of the patient, means appropriate to the circumstances of the case should be taken to arrest it. Prolonged faintness, coldness of the surface, and slowness or irregularity of the pulse, require a decided use of the means already mentioned (§ 19. *et seq.*), aided by the exhibition of ammonia, wine, warm, strong coffee, the horizontal position, and the external application of warmth, as already advised (§ 20.). If vomitings accompany this or other states of shock, the hot epithems prescribed above should be assiduously employed; and especially if convulsions or spasms of any part be complained of. Effervescing draughts, with the ammonia in excess, with opium, camphor, ether, &c., may also be given, or pills containing creasote, opium, and aromatics.

23. The terror and mental alarm often increasing the physical shock in most cases of severe injury, should be combated by the confidence and encouragement of the medical attendants, by a recourse to opium, ammonia, ether, mulled wine, &c. The states of mental shock produced by sudden and alarming moral causes, may occasion so severe physical effects, as to require similar means to those already advised. Faintness, more or less prolonged or repeated, or hysterical convulsions, or spasms, or delirium, may complicate the physical depression, and require the exhibition of diffusive stimulants, conjoined with anti-spasmodics and anodynes. In cases of general shock, from concussion of the brain or spine, the internal use of stimuli may not be required, and it should at all times be administered with caution. The turpentine epithem (§ 20.) may, however, be applied along the spine, when it is the special seat of shock, or even around the cranium, when the concussion implicates the brain, and an enema may be administered containing assafœtida, with a moderate quantity of camphor. But a recourse to these, or other means, should depend much upon the states of the pulse, and of the sensorium, at the time.

24. The external or local means must be left to the judgment of the medical attendant. Cold applications ought not to be made to the seat of injury, as long as coldness of the surface, collapse of the features, and failure of the pulse exist. They will not only aggravate these symptoms, but also increase the anxiety, sinking, and pain at the epigastrium, and the general restlessness and distress. Warm fomentations, with a decoction of poppy-heads, especially if much pain be experienced, or warm embrocations containing some preparation of opium, will generally afford some relief.

25. The injury, especially those produced by gun-shots, severe compound fractures, lacerations, &c., may require the removal of the limb. In this case, if the phenomena of shock produced by the injury be severe, this operation should not be performed until the constitution shows indications of rallying, either by the efforts of nature, — owing to the vital resistance in less severe cases, — or by the means above recommended. A few hours should be allowed for this purpose, — often not more than two or three, — seldom more than eight or ten hours; for if, at the termination of this longer time, reaction has not commenced, and

more especially if the vital depression has increased, the additional shock produced by the operation may rapidly terminate life. It will be better, therefore, to persevere somewhat longer in the use of the means advised for rallying the powers of life, and to increase the doses of these means, always with due reference to the previous habits of the patient, than to attempt an operation which will be of no avail.

26. As soon as indications of *vital restoration*, or of *vascular reaction* appear, the means resorted to for attaining this end should be relinquished; and gentle diaphoretics be given with the view of equalising the circulation and removing internal congestions, which are apt to occur during the vital depression caused by the shock. If the reaction be such as is attedned by heat and dryness of skin, full or strong pulse, thirst, &c., cooling diaphoretics, purgatives, and even blood-letting, especially if the previous loss of blood has been inconsiderable, should be prescribed; and these should be aided by such local means, in cases of severe injury, as their nature may require.

27. The reaction following mental shocks, especially in nervous, susceptible, and delicate persons, and females, is apt to be followed by *delirium* or *fever*, sometimes by *phrenitis* and inflammation of the brain or its membranes, on either of which *coma* is liable to supervene, and similar consequences may follow concussions of the brain or spinal marrow; in such circumstances, the treatment recommended for these diseases, under their respective heads, should be adopted. (*See arts.* BRAIN and its MEMBRANES, INFLAMMATIONS of; also DELIRIUM, COMA, &c.)

28. In some instances, instead of either a salutary reaction or increased or inflammatory action of the nervous centres, or their membranes, the shock, whether mental or physical, degenerates into a low, incoherent, or muttering *delirium*, passing more or less rapidly into *coma* (§ 27.). In these circumstances, recovery rarely takes place; but, nevertheless, a strenuous recourse to the restorative means already mentioned, such as frequent doses of camphor, or ammonia, terebinthinate epithems on the scalp and epigastrium, stimulating enemata, &c., should not be neglected. (*See arts.* DELIRIUM and COMA.)

BIBLIOG. AND REFER.—I am not acquainted with any work or treatise on vital or nervous Shock, and but few writers notice it incidentally, far less describe it, or advise a treatment suitable to its several states. I have treated of Shock in this work, because I consider it a most important and dangerous affection implicating more or less the whole vital and animal functions, and hence, coming strictly within the province of the physician, as well as within that of the surgeon. When we consider that, of the numerous accidents and wounds which cause death, the greater proportion produce this effect by the severity and suddenness of the shock to the vitality of the frame, rather than by any interruption to the functions of the injured part, the interest of this subject will appear in its true light. The principal works in which it is incidentally mentioned are the following: — *Larrey*, Mém. de Chirurg. Militaire. 4 tomes, 8vo. Paris, 1812—17. — *G. Guthrie*, On Gun-shot Wounds of the Extremities, 3d ed. 8vo. Lond. 1827; and on Wounds and Injuries of the Abdomen and Pelvis, 8vo. Lond. 1847. — *J. Hennen*, Principles of Military Surgery, 2d ed. Edin. 8vo. 1820. — *A. Copland Hutchison*, Practical Observations in Surgery, 8vo. 2d ed. 1826; and Observations on the Period for Amputating in Gun-shot Wounds, 8vo. Lond. 1817. — *Dupuytren*, Leçons Orales de Chirug. Clin. t. ii. art. 7. t. iv. art. 7. et 14. — *S. Cooper*, Surgical Dictionary, 7th ed. 8vo. Lond. 1838, p. 650.

SKIN:—SYNON.—*Integuments; Integum*
Sac, or envelope of the frame; Cutis, Co
Derma; — die Haut, das Fell, Germ
Peau, Fr.

CLASSIF. — GENERAL and SPECIAL
THOLOGY — SYMPTOMATOLOGY.

1. I. FUNCTIONAL ALTERATIONS. — The
or integumental sac or covering of the body
charges more important functions than have
monly been imputed to it. I long ago,
more recently in various parts of this work, e
voured to prove, that the skin performs office
very high order in the œconomy; that throu
effete and excrementitious matters are carrie
of the blood, and that in this respect, as a
rating organ, it aids the functions of the kid
of the large bowels, and of the lungs; an im
ment of the functions of either of these being
attended by a vicarious increase of its actions
is thus an eliminating organ, contributing t
depuration of the blood, generally to an e
more or less intimately related to the amou
function performed by the other emunct
That the skin performs a vital action, consist
an insensible and a sensible exhalation the an
of either depending much upon the state o
atmosphere, is generally admitted. Increased
spiration may proceed from a variety of ca
and so may diminished transpiration, and e
in its more manifest states, is an important
cation of disorder. The insensible perspi
may become sensible, owing only to a mild, v
or humid state of the air; whilst the perspi
may not only be insensible, but this state of i
be much increased by more or less evaporati
the fluid in the skin by great dryness of the

2. *A*. When the halitus, or transpiration
skin exceeds the evaporation of it in the a
phere, sweat is formed; but, in addition t
substances contained in the perspiration, car
acid is also given out by it. In healthy pe
the skin exhales carbonic acid, nitrogen,
watery fluid containing small quantities of th
lowing substances: — 1st. Matters solubl
ether: traces of fat, sometimes including b
acid.—2d. Substances soluble in alcohol: al
lic extract, free lactic and acetic acids, chlor
sodium, lactates and acetates of potash and
lactate or hydrochlorate of ammonia.—3d.
stances soluble in water: watery extract, phos
of lime, and an alkaline sulphate.—4th. Subst
insoluble in water: desquamated epithelium
phosphate of lime with a little peroxyde of ir

3. Carbonic acid and nitrogen gases ar
haled in constant, but in varying propor
COLLARD DE MARTIGNY states, that the
exhaled in the greatest quantities after meal
violent exertion; and that vegetable food cau
excess of carbonic acid, and an animal di
excess of nitrogen. It may be regarded, wit
WARDS, that the physical exhalation of the s
pure water and these gases; and that the or
function of the skin is the elimination of the
substances. (§ 2.) The proportion and amo
these matters vary much in different races of
From several experiments, made many yea
on the Negro, I found that the gaseous exha
from the skin, as well as the solid matters
tained in the perspiration, especially the fo
was much greater in this, than in the white
and that the function of the skin in the forme

decidedly supplementary of that of respira- than in the latter. Indeed, the cutaneous ion of the negro race is of a much more edly eliminating nature, than that of the white

Besides the perspiration, the skin furnishes, eans of its sebaceous glands or follicles, a ance consisting of stearin, albumen, ex- ve matter with olein, phosphate of lime, &c. The eliminating function of the skin is sup- d or interrupted in many diseases, especially ammations, until suppuration commences, in arly stage of fevers, in scurvy, in diabetes, whilst it is more or less augmented in the ing stage of agues, in some adynamic forms er, in pestilential cholera, in acute rheuma- in the advanced stages of tubercular con- ion, in internal abscesses, and in other uative maladies.

B. The perspiration may be variously changed *lity* in several diseases, owing to the con- ation of the blood by some specific animal , or by the combinations of elements or ials which are usually, in health, eliminated the blood by the several emunctories, and , when either of these emunctories become ed in function, accumulate in the blood, re evacuated, in different combinations or , in the cutaneous exhalations. Thus the of rheumatic and gouty persons is generally whilst in putro-adynamic fever, and in , it has a putrid odour. The perspiration of s affected with itch, is said to emit a mouldy , and that of syphilitic patients has a sweet STARK states, that the sweat of scrofulous s resembles the odour of sour beer. The ration of persons labouring under small-pox sles, or pestilential cholera, or scarlet fever, n so peculiar in each of these maladies, as to o the recognition of the disease by its scent On entering a house in which cholera was t, I have recognised the malady by the odour effluvium from the patient before I have im. The sweat is not only abundant, but presents an urinous odour, in suppressions of or other obstructions of the urinary organs.

7 *The lactic acid*, which is the usual free acid perspiration, is generally much increased in rheumatism and gout, especially the former. ROUT found free *acetic acid* in the sweat of a in hectic fever. STARK says, that lactic increased in the perspiration during scro- ickets, and various cutaneous eruptions; th it and acetic acid exist in the sweat of s during their confinements, and even during g. The putrid sweat in adynamic fevers ly contains *ammonia*. The *saline ingredients* perspiration may be much increased. Dr. r observed the skin of a man in dropsy d with a white crust of chloride of sodium n abundant sweat. In cases of gout, of y concretions and urinary obstructions, the ty of phosphate of lime, and of other salts, is r less augmented.

8 C. The foregoing consists only of an increase *normal constituents* of the perspiration; but *al constituents* may be present. ANSELMINO TARK assert, that *albumen* may exist in the in rheumatic fever, in putrid, gastric, and diseases. *Blood* has been seen in the pers- n in scurvy, and in putrid and yellow fevers. *Uric acid* and *urate of soda* have been found in the sweat of persons suffering from gout and urinary calculi. *Bilin* and *biliphœin* have been found in the perspiration of jaundiced persons, and sometimes in those labouring under low, bilious, remittent fevers. This secretion has, in rare instances, been seen variously coloured, owing to the existence of certain colouring matters, as cyanurin, &c. *Fat* has been found in the sweat in some colliquative maladies.

9. Various *substances, foreign to the œconomy*, may have been taken into the body and appear in the perspiration, especially sulphur, mercury, iodine and its combinations, indigo, saffron, assafœtida, camphor, &c. But as regards these and various other substances which are carried into the circulation, and eliminated from it by the emunctories, it is difficult to determine, unless by well-planned experiments, how much of this elimination is performed by the skin, or by the pulmonary exhalation, or by the kidneys.

10. II. ALTERATIONS OF APPEARANCE AND STRUCTURE.—i. The *temperature* of the skin varies much in disease, and somewhat in different constitutions and temperaments. It is generally *below* the healthy standard in scurvy, in some states of chronic rheumatism, in paralysis especially in anæsthetic paralysis, and in pestilential cholera most remarkably. The temperature is very much *increased* in the early stages of most fevers, especially in those characterised by augmented vascular action, and when transpiration from the skin is much diminished, or altogether suppressed. In these cases, more especially in ardent fever and inflammations, and in some states of malignant fever, the skin is not only hot, but it also conveys the sensation of an acrid or burning heat, even above that which the actual rise of temperature should impart. In all inflammations and acute diseases, the heat of skin is increased, especially when the perspiratory functions are interrupted. The temperature of the skin is also greater than natural, when the blood is loaded with excrementitial elements, owing to diminished elimination by the kidneys, bowels, and skin, and more especially when the accumulation of these elements in the blood is attended by febrile or increased vascular action. It is also sometimes increased shortly before dissolution, probably owing to this state of the blood.

11. ii. *The colour of the skin* is variously changed in disease, and this change may be general, or in large patches, streaks, or in small spots or points. The change may consist either in absence of colour, or uncommon pallor, or in a deepening of the tint. All changes of colour arise from the quantity and quality of the blood circulating in the vessels of the cutis vera; or, in the opinion of ROKITANSKY, from the state of the epidermis, especially its inner, or Malpighian layer, from some change in its cells, or from some unusual pigment in them.

12. *A. Pallor* of the skin is owing either to excessive loss of blood, to exhausting maladies, or to the chronic deficiency of red globules, observed in spontaneous anæmia, and some states of dropsy. The pallor may be associated with a slightly greenish or etiolated hue, as in chlorosis. It arises, in rare instances, from a congenital deficiency of pigment in the dark races, as observed in Albinoes, or from an acquired defect of this

kind. This latter change — achroma — may occur in all races, is generally limited in extent, or consists of a number of spots, of various sizes, that gradually spread.

13. *B. Yellowishness* of the skin is one of the most common alterations of colour. The shade may be very pale or very deep, or the yellow may be mixed with green; and even a dark greenish hue may predominate. These shades of colour occur in the different states of jaundice, and are most frequently owing to biliary obstructions occasioned by disease of the liver, or gall-bladder, or of the gall-ducts. Various tints, varying from yellow to yellowish green, to a yellowish blue, seldom uniform in all places, or continuing of the same depth or shade, are observed in the courses of pestilential yellow fever, or hæmagastric fever, when the blood becomes much altered, and resemble the discolourations caused by contusions. This change occurs in large blotches, patches, streaks, &c., and is not limited to any one part of the body.

14. *C. A dark, sallow,* or *muddied aspect* of the skin is observed at an early stage of typhoid or adynamic fevers, and this appearance often increases as the disease advances. It is owing chiefly to the state of the blood produced by defective oxyganization, or by imperfect depuration by the emunctories. A hue resembling this, but deeper, or inclining to brown, or to brownish yellow, seems to be owing to the deposit in the epidermis of a pigment. It occurs most frequently in spots or in patches or streaks, very rarely over the whole surface. I have observed it in spots and patches in a lady, who many years previously was the subject of jaundice. The uniform embrowning of the skin, by exposure to the sun, the spotted stains or freckles — ephelis, and the liver-spots, connected with disorders of the biliary apparatus, or of the uterine functions, are modifications in the colouring matters retained by the epidermis. Rokitansky remarks, that the skin sometimes becomes dark, when, with neglect of it and indulgence in alcohol, are combined infiltration of the liver with fat, and a tallowy state of the sub-cutaneous layer of fat. The skin in this case feels fatty, soft, and velvety, like that of a negro; its colour proceeds from the deposition of a pigment, containing fat, in the deepest layer of the epidermis, — a fact of much interest, owing to the association it evinces.

15. *D. Redness* of the skin occurs in so diversified forms, and with so numerous shades of yellow, blue, brown, livid, copper or bronze colour, &c., as to elude precise description, unless in affections and alterations of which these colours are pathognomonic. Of the several congestions, inflammations, impetiginous, exanthematous, chronic and specific eruptions, these colours are severally characteristic. The redness passes into blue, or bluish yellow, even to black, after exudations of blood into the cutaneous tissue; as in the sugillations, ecchymosis, vibices, petechiæ, &c. of scurvy, purpura, maculated and malignant fevers.

16. *E. Blueness* of the skin is the characteristic of cyanosis, which is more or less general, although somewhat deeper in parts which are delicate and vascular, and in the extremities. When it is limited to particular parts, it is usually the result of congestion, or of cold. A transient blueness of various parts of the surface has been remarked in rare instances by Otto: but in small patches or spots this discolouration is not infrequent. A *deep leaden*, or bluish tint, attends the collapse of pestilential cholera, but it is deeper on some parts than in others, especially shortly before dissolution. It also appears, in a slighter degree, in the face and extremities, in threatened asphyxia from congestive pneumonia, general bronchitis, hydrothorax, and from congestion of the lungs. A leaden tint, approaching to bronze, is sometimes produced in the skin by the protracted use of nitrate of silver, and remains permanent, or nearly so, during life.

17. *F.* A *blackish tint* is sometimes observed in aged cachectic persons, especially in the lower limbs, and extends over large portions of the skin. It has been called melasma, and is different from melanosis. Lighter shades of black, passing into a tawny, dirty grey, leaden hue, &c., are sometimes observed in connection with various acute and chronic diseases, characterised by extreme cachexia and dyscrasis of the blood and of the solids, especially pestilential and malignant maladies, scurvy, cancer, &c.

18. iii. *The texture of the skin* is often remarkably affected; and changes of texture are sometimes attended and followed by alteration of colour. *A. Anæmia* of the integuments is observed chiefly in universal anæmia, but it may affect the integuments of the extremities only. The skin is always pallid when anæmied; and the pallor presents a waxen hue when the skin is delicate, and the tissues beneath are fat or œdematous.

19. *B. Congestion* of the skin is observed after death in the most depending parts. It is seen in some adynamic or malignant diseases, occasioning lividity, dark-redness, or a bluish or blackish tint, and is most manifest in parts most remote from the heart, and when mechanical obstructions of the circulation exist.

20. *C. The exudations of blood,* or small, circumscribed hæmorrhages, into the tissues of the skin, forming small spots or larger patches, or sometimes streaks, observed in purpura, in scurvy, and in petechial fevers, have been ascribed by Rokitansky to a higher degree of congestion of the organ; but however greatly these changes may be owing to the cause to which he imputes it solely, they depend more on impaired irritability of the extreme capillaries, on diminished vital cohesion of the tissues composing the skin, and on dyscrasis and other changes in the blood itself. (*See art.* Hæmorrhage, §§ 14—19.)

21. *D. Inflammations* very frequently attack one or more of the tissues composing the skin. They are sometimes idiopathic and substantive diseases, especially when produced by external or physical causes; but they are more frequently symptomatic, or caused by morbid conditions of the circulating fluids, arising from a superabundance of excrementitial elements and materials in the blood, or from a specific animal miasm or poison. Most of the chronic eruptions, or inflammations, depend upon morbid states of the blood, caused by impaired depuration by the kidneys, liver, or bowels, or by the skin itself. Some of the inflammations may also appear as a morbid reflection on the skin of disordered actions of important internal viscera. Inflammations of the skin are either limited to spots or to patches, more or less numerous, or diffused over large tracts. They sometimes are seated only, or chiefly, in the

nal layer and papillæ, as in *erythema* ; and hers, the deeper layer, and the whole thickness of the corium, are affected, as in *phlegmonous* nmation. From these forms, there are nuus transitions and associated changes, acng as one or more of the layers or tissues osing the integuments, or as the subjacent lar tissues, are implicated, and as the disease extend in spots or patches, or become more ss diffused. Inflammations of the skin, whether ematous, exanthematous, impetiginous, phlegous, furuncular, gangrenous or ulcerative, or , chronic or specific, have been so fully deed in the numerous articles or heads to which severally belong, that I cannot devote further to their special consideration, more particuas there is nothing of importance which I add to what has already been advanced cting them individually.

E. *Adventitious growths* in the skin have described chiefly in respect of their internal acters, and often commence in the subjacent lar tissue. — *a. Molluscum simplex*, or soft, like growths, attached by a pedicle, consists of ular dilatations of the corium, and contains lar tissue, and sometimes also fat. — *b.* *hy excrescences*, which often form on the , are composed of a luxuriant growth, or hyophy, of the corium, and of cellular tissue. — *c. Condylomata* commonly form about the ns of generation and the arms, especially in the ous membrane of the former. They are either or more or less firm ; and in their form they either broad, or rounded, or pointed. They often attached by a pedicle, their extremities nbling a mulberry, a cauliflower, or a cock's . They are composed of an investing layer pithelium, and of newly-formed cellular e. They originate in the corium, where they deep root. With these, ROKITANSKY bes, that certain tumours regarded as syphiloid, Radesyge, &c., may be connected.

d. Fatty tumours are most frequently conal, but they are sometimes developed at later ds of life. One only may exist, or there be several on different parts of the body. are rounded, often truncated, and attached pedicle, and they sometimes reach a very conable size. They consist of a prolongation of as if protruded by an inclosed lobule of fat, h is continuous, by a sort of pedicle, with ubcutaneous, adipose stratum. The epidercovering them is sometimes dark-coloured, g to the pigment it contains, and hair occally grows upon them. When congenital, it ten associated with nævus in other parts of kin.

e. Fibrous tissue occurs in the skin after ated or chronic attacks of inflammation, and e cicatrices after burns and other injuries. alteration termed *cheloid* by ALIBERT, is ected with the fibrous ; for it appears to conf a fibrous callus, and with that appearance xternal cicatrix-like aspect corresponds. RoNSKY describes this latter alteration, — the oid — as consisting of several varieties, — of a le hardness or callosity of the skin ; or of a somewhat raised, or a depressed hardness; or cord-like hardness, and of a white, or pale, or colour. In either form, it may terminate in e or red elevated lines or processes. It is of inconsiderable extent, and occurs, for the most part singly, at the upper part of the trunk, on the extremities, or on the face. It rarely exists in large numbers, and it seldom ulcerates; when it does so, it becomes indolent and difficult to heal. It is generally connected with constitutional disorder, but it is not truly cancerous.

26. *f. Bony deposits* are extremely rare in the skin. ROKITANSKY once found a bony plate, which was oval, yellowish, hard, and rugged, of the size of a half-crown, in the substance of a scar on the trunk. It corresponded precisely with the osseous deposits occurring in fibrous exudations on serous membranes.

27. *g. Vascular nævi—teleangiectasis*—are generally congenital. They sometimes form deep or bluish red stains, of various sizes and shapes ; occasionally red tumours, resembling cherries, strawberries, or mulberries, and often present a transient swelling, — *erectile* or *splenoid tumours* of some authors. They also commence, in rare instances, after birth, or at later periods, and are at first, or even subsequently, not malignant; but they may, in the cancerous diathesis, be converted into malignant growths — into a fungus hæmatodes cutis.

28. *h. Melasma*, or the blackish discolourations observed chiefly in aged, decrepit, and cachectic persons, occurs either diffused in parts of the surface of the body, especially the lower extremities, rarely over the whole surface, or concentrated in small raised spots, or berry-like tumours, on the trunk or face. In the former, the colouring matter is diffused on the surface of the cutis; in the latter, in the substance of the cutis also. Melasma should not be confounded with melanosis, the cancer melanodes.

29. *i. Tubercle.*—It is doubtful whether or no true tuberculosis affects the skin in a way corresponding to that observed in mucous, serous, and parenchymatous structures. Tubercles, however, appear in ulcers affecting the cutaneous expansions of scrofulous persons, but most frequently in a softened form, or in that of puriform tubercular matter. An ulcerative softening of the skin, in connection with tubercular deposits in the subcutaneous cellular tissue, or in lymphatic glands, is a common occurrence.

30. *k. Cysts* do not occur in the cutis vera ; but the sebaceous glands often degenerate into cysts of considerable size. Cysts also form in the subjacent cellular tissue, and become closely connected with the skin. These, as well as morbidly-enlarged sebaceous follicles, commonly contain cholosterine. This substance has also been met with as a stratum on the surface of open ulcers of the skin.

31. *l. Cancer* and cancerous ulceration are often met with on the skin. When cancer commences in the subcutaneous or glandular tissues, particularly the mammæ and lymphatic glands, it generally soon implicates the skin, and becomes, from an early period, very closely connected with the cutis. But cancer often also originates in the skin, in the form either of fibrous or scirrhous cancer, or of medullary cancer.

32. *(a.) Fibrous cancer* of the skin generally assumes the form of a tuberculated or rounded nodule, sometimes flattened, or even depressed, below the surface of the skin, and forming an umbilicated fossa. It is generally single, about

the size of a hempseed, pea, or small nut, firmly fixed, and as hard as cartilage. Sometimes it is smooth and shining externally, occasionally covered by a hard, laminated crust of cuticle, and often darker than the surface around. It occurs chiefly on the face, lips, and nose, but occasionally on other parts of the body. It is commonly the primary cancerous growth, and often the first of a series of cancerous formations in different organs. In some instances it reaches a considerable size, growing into a tuberous mass, projecting beyond the skin. (Rokitansky.)

33. (*b.*) The *medullary kind* is usually a secondary formation, and consequent upon large cancerous growths, which first appear just beneath the skin, or which involve the subcutaneous structure first, and then the skin itself. In either case it grows in the skin in isolated or confluent nodules near the primary mass. It sometimes also appears in the skin, after it has been localised in one or more organs. The nodules which it forms in the cutis are mostly numerous, and about the size of peas or hazel-nuts; they are scattered over the body, especially over the trunk, and generally near similar growths in the subcutaneous cellular tissue. In the case of a boy, about 14 years of age, for whom I was consulted, I counted upwards of twenty thus disseminated. It is characterised as a whitish, or whitish red growth, which is sometimes tolerably firm and lardaceous, or medullary, and occasionally looser, softer, and resembling cerebral substance, or even much softer and diffluent; and it often grows to a considerable size. It may also contain black pigment, and thus constitute *cancer melanodes* of the skin. The layer of skin above the nodule becomes stretched, and shining or transparent, or rough from the loss of its epidermis. Sometimes the elementary particles of the disease are deposited in vascular *nævi*, or, as the deposition takes place, the vessels of the part are excessively developed, and a cancerous structure, of uncommon vascularity, is the result, or *fungus hæmatodes* of the skin. Rokitansky considers *chimney-sweepers' cancer*, and Alibert's *eburnated cancer of the skin*, as special varieties of this disease.

34. *α. Chimney-sweepers' cancer* appears to be medullary. It begins in the scrotum as a tolerably firm, small nodule, or warty excrescence, which after some time becomes red, excoriated, moist, and covered by a cortex of thickened cuticle. The papillæ beneath enlarge, and the whole becomes an ulcer, with irregular, hard, and raised edges. Fresh nodules form around the original one, undergo the same changes, and enlarge the disease superficially. The nodules are developed into fungous cauliflower excrescences, and the disease extends deeply, until the dartos, the tunica vaginalis, and testicle are successively implicated, and the gland itself ulcerates, while the adjoining lymphatic glands and vas deferens degenerate up to the abdominal cavity.

35. *β. Eburnated cutaneous cancer* is a secondary degeneration of the cutis over a subcutaneous scirrhous mass. The skin is white, glistening, indurated, partially transparent, and immoveable, over the firm or hard mass. This change of the skin evidently belongs to the fibrous form of cancer, as it is always connected with the subjacent scirrhus. *Cancerous ulceration* supervenes, at a sooner or later period, upon all the forms of
cutaneous cancer, and generally proceeds as I h
described when treating of Cancer. (*See t*
art. § 11. *et seq.*)

36. *m. Parasites.*—Several kinds of *pediculi*
found on the skin, especially on parts covered
hair; and the *acarus scabiei*, and probably ot
species of the genus acarus, occur on, and
eruptions of, the skin. Various fungi also e
in certain chronic eruptions on the cutis, as
cases of *tinea favosa*, and *sycosis*. The s
cutaneous cellular tissue not infrequently lod
the *filiaria medinensis*, especially in certain
mates, as the western coast of Africa, &c.

37. III. The Sebaceous Glands, or follicles,
their ducts, are often the seats of various disord
and in many of the affections of the skin, anc
some of the exanthemata, especially small-pox
measles, they are especially implicated. But t
are more manifestly the seat of disorder, when
accumulation of thin secretion takes place
them, owing to an impaired power of discharg
it, or of throwing it off, or to obstruction of t
ducts. In the former state, or impaired powe
excretion, the duct is enlarged, and filled with
accumulated secretion, forming what has b
termed *maggots*. In the latter state, the secre
accumulates in the follicular sac itself, and
duces a rounded tumour, from the size of a mi
seed to that of a hazel-nut, or even larger.
matter thus accumulated consists of a whi
substance, of a pulpy consistence, viscid like
and resembling adipocire. In many cases
very offensive in its odour, and irritating to
containing tissues, thereby producing inflam
tion, as in acne, sycosis, &c. Calcareous de
sits, and even horny excrescences, may e
originate in those glands in very rare instan
The secretions of the sebaceous follicles ma
either deficient in quantity, altered in quality
excessive in amount; and, in either case, occa
a more or less manifest disorder of the functio
the skin. In the *first* of these conditions,
skin will be dry and harsh; in the *second*, the
halation from it will be more or less offensi
and in the *third*, it will be unctuous, humid,
often also offensive to the smell.

38. IV. The Cuticle and Nails partake in
veral of the diseases of the skin.—(*a.*) The *cu*
is sometimes very thin and delicate through
owing to original formation, but more freque
only in parts, especially in those where it has b
recently thrown off. It is much more freque
formed in excess; and then either its outer la
are separated in the form of bran, scales, scur
laminæ, or it accumulates and adheres, produ
callosities, corns, or crusts, of various forms
sizes, occasioning more or less uneasiness, or p
of the subjacent parts.

39. *a.* The *colour* of the skin partly reside
the deeper layers of the cuticle, which may
tain a yellowish, brownish, or a black pigm
distinguishing, when congenital and general,
ticular races or individuals. But the colou
may be acquired, and limited to particular s
or parts, or be more or less diffused, and indi
disorders of important internal organs, or a cacl
tic condition of the whole œconomy. It is alwa
excess, in a remarkable degree, in congenital n
A complete absence of the colouring matte
congenital in albinoismus, and is acquired
achroma or vitiligo. The former may be gen

tial ; the latter is always partial at first, but become more general.

β. The epidermis is often drier and harsher iatural, it is rarely more moist. It presents mer states in various cutaneous diseases, in it is either thrown off in the form of scales, ccumulates, and occasions cracks or fissures, ing through it into the cutis. Accumulation epidermis, or of the cells composing this ire, is often simultaneous with, if not the uence of, excessive development of the e of the cutis. The morbid results of these ions are one or other of the following: — *allosity*, tyloma, or simple accumulation of moid cells, in the form of strata, succes- formed underneath, the more recently pro- extruding the older ; — 2d. *Corn*, or clavus, mscribed callus, projecting into the corium, casioning more or less pain ; — 3d. *Crusts*, or scutiform accumulations of laminæ of d epidermis, presented by the scaly erup- — 4th. *Horny growths* proceed either from ised portion of skin, or from a sebaceous ; and are met with generally on the scalp, e usually single, much more rarely two or ire observed. They are of various dimen- from half an inch to several inches in length, thick as, or thicker than, a finger ; straight, ved, or crooked ; attached by a broad base, a dark colour. They have been observed e cases to be regularly shed at intervals ; hen removed, they are reproduced, if the i of skin producing them be not destroyed.

(*b.*) The *nails* often present the peculiarities ed by the parents, or evince hereditary cha- . Their growth may be excessive or defi- or they may be misshapen or thick, twisted, ved. They may be everted or inverted ; or e excessive in length, or much shortened. on is often observed in psoriasis, when ing, thickening, and induration are often tent with it. The nails are then disco- , and are also drier and more brittle than l. Incurvation of the nails, sometimes with tion, is common in tubercular consumption. iost deformed states of the nails are ob- in connection with the scaly eruptions. ie articles on these eruptions, and that on air.)

V. Classification of the Diseases of, ffecting the Skin. — The arrangement ases of the skin must necessarily be con- ial. All disorders of the animal œconomy, ther functional or structural, whether lo- constitutional, whether internal or external, e insensibly into those more intimately allied i in situation, in the nature of the tissues af- in constitutional disturbance, and in the local neral characters of the affection ; and present stant lines of demarcation by which they can curately separated from those which they resemble. Morbid actions, even in their isible and palpable forms, evince none of ialterable features characterising the pro- of the vegetable and animal kingdoms. products belong to distinct genera and spe- nd each consists of a specific being ; but l actions are incalculably diversified, and varying, passing insensibly, and more or apidly, into as varying states of visible , and ultimately into not merely manifest but also palpable organic changes, when the earlier phases or grades of morbid action are not arrested by vital resistance, or by the aid of medicine.

43. Of the more or less *artificial classifications* of diseases of the skin, furnished by Plenck, Willan, Bateman, Plumbe, Rayer, Wilson, and others; or of the *natural arrangements* attempted by Alibert and Paget, most of the former being modifications of the classification of Plenck or Willan, it is unnecessary to take particular notice. An artificial arrangement involves frequent repetitions when treating of this class of diseases,—presents as unvarying distinctions what are continually undergoing changes, and are neither peculiar nor constant,—and insufficiently recognises constitutional disturbances, specific taints, and contaminating causes. Natural classifications, whilst they are based on natural alliances arising out of constitutional conditions, and specific causes or contaminating influences, retain those visible or palpable distinctions which actually exist, and present them for the purposes of diagnosis and of rational treatment. The artificial plan comprises, under the same order, eruptions which require the most opposite indications and means of cure; whilst the natural arrangement associates those maladies in one family or order, for which the same indications and remedies are found most beneficial. Without entirely neglecting the classifications of Alibert and Paget, the following has been devised with a much stricter adhesion to constitutional and natural alliances than these writers have shown, and with a due recognition of the causes, contaminating characters, and ultimate changes, which distinguish these diseases individually, and which connect each group and family with those preceding or following it. The reader will perceive, by comparing the following arrangement with those of the authors above mentioned, in what it differs, as well as in what it agrees with them.

44. Order, Family, or Natural Group I. Dyschromata — *Maculæ.* — Changes of colour, or excess or deficiency of the colouring matter of the skin, occurring congenitally, or at any period of life, generally in spots or large patches, and frequently connected with slight disorder of the digestive organs, or of the general health.

45. Genus i.—Pannus—Ephelis, — *Chloasma.* — Consisting of spots, patches, &c., of various forms, of a darker or deeper hue of the skin, owing to increase of its colouring matter, occurring at any period of life. — *Spec.*: 1st. *P. lenticularis ;* — 2d. *P. hepaticus ;* — 3d. *P. melaneus ;* 4th. *P. carateus.* (*See art.* Ephelis.)

46. Genus ii. — Achroma. — White spots or patches scattered over the skin, or limited to a part, the decolouration being remarkable, and often attended by temporarily impaired sensibility, owing to deficient or interrupted arterial circulation, when the extremities are its seat. — *Spec.*: — 1st. *A. Vitiligo* ; — 2d. *A. Congeniale.*

47. Order II. Dermatites — D. simplices — Eczemata — *Eczematosæ.* — Inflammations of the skin, attended by redness, itching, stinging, slight swelling, or an eruption of papulæ, vesicles, bullæ, pustules, or tubercles ; often being of local origin, but much more frequently depending upon disorder of the digestive and eliminating organs, and consecutively of the circulating fluids ; and observing either an acute, or sub-acute, or

chronic course. They are not limited to any part of the cutaneous expansions; they may affect one or more of the cutaneous tissues, or even extend, more or less, to the subjacent cellular substance; and they are not contagious.

48. Genus i. — Erythema. — Superficial redness, varying in extent, with slight elevation, terminating in furfuration and desquamation, or, in cachectic habits, from neglect of cleanliness, or improper treatment, in excoriation or ulceration. — *Spec.:* 1st. *E. spontaneum;* — 2d. *E. endemicum;* — 3d. *E. epidemicum;* — 4th. *E. Intertrigo;* — 5th. *E. Paratrimma;* — 6th. *E. Pernio;* — 7th. *E. per Adustionem.* (*See art.* Erythema.)

49. Genus ii.—Roseola—*Rose-Rash.*—Rose-coloured, irregular, and slightly elevated patches of the skin, transient and not papular; passing into deeper roseate hues as they disappear, generally preceded or attended by slight fever, or gastro-intestinal disorder.—*Spec.:* 1st. *R. æstiva;* — 2d. *R. autumnalis;* — 3d. *R. annulata;* — 4th. *R. infantilis;* — 5th. *R. symptomatica vel associata* — of small-pox, of cow-pox, of fever; of gout, of the consecutive fever of pestilential cholera. (*See art.* Rose-Rash.)

50. Genus iii. — Urticaria. — An eruption of irregular, prominent patches or wheals, of various sizes, generally transient, and attended by burning, tingling, and itching, and by slight fever and disorder of the digestive functions. — *Spec.:* 1st. *U. febrilis;* — 2d. *U. evanida;* — 3d. *U. tuberosa.*

51. Genus iv. Lichen — *Licheniasis.* — An eruption of clustered or irregularly-disseminated papulæ, attended by itching, stinging, &c., and slight febrile disturbance, or gastro-intestinal disorder, terminating in desquamation, and liable to recur. — *Spec.:* 1st. *L. simplex;* — 2d. *L. Strophulus;* — 3d. *L. agrius, vel L. tropicus.* (*See art.* Lichen.)

52. Genus v. — Prurigo. — A papular eruption, the papulæ being larger than those of lichen, of nearly the colour of the skin, generally appearing on the outer surface of the limb, attended by burning and intolerable itching, &c. — *Spec.:* 1st. *P. mitis;* — 2d. *P. formicans;* — 3d. *P. senilis.* (*See art.* Prurigo.)

53. Genus vi. — Eczema. — An eruption of minute vesicles, crowded together, non-contagious, and terminating by the absorption or evaporation of a thin fluid, or by excoriations, with serous exudations, concreting into crusts. — *Spec.:* 1st. *E. simplex;*—2d. *E. rubrum;*—3d. *E. impetiginodes;* — 4th. *E. mercuriale.* (*See* Eczema.)

54. Genus vii. — Herpes. — An eruption of vesicles, distinctly but irregularly clustered, upon inflamed bases, extending beyond the margins of the clusters, attended by tingling, concreting into lamellar scabs. — *Spec.:* 1st. *H. phlyctenodes;* — 2d. *H. circinnatus;* — 3d. *H. Zoster;* — 4th. *H. præputialis;* — 5th. *H. Iris.* (*See art.* Herpetic Eruptions.)

55. Genus viii. — Bullæ. — An elevation of the epidermis by an effusion of serum, often passing into a sero-puriform fluid, into large vesicles or blebs, which are generally round or oval, have a broad base, and vary in size from that of a pea to that of an egg. — *Spec.:* 1st. *Pemphigus;* — 2d. *Rupia.* (*See arts.* Bullæ, Pemphigus, and Rupia.)

56. Genus ix. — Ecthyma. — An eruption of phlyzaceous pustules, always distinct, seated a hard, inflamed base, and followed by dark sc, leaving slight cicatrices or red stains, which appear after some time. — *Spec.:* 1st. *E. acut*, *vel E. vulgare;* — 2d. *E. chronicum, vel cachecticum.* (*See art.* Ecthyma.)

57. Genus x. — Impetigo — *Mellitagr* — The eruption of psydraceous pustules, comm y grouped in clusters, sometimes distinct, and fo ing yellowish, rough incrustations; attendec y itching, but by little or no fever. — *Spec.:* t. *I. simplex;* — 2d. *I. favosa, vel Porrigo fav* ; — 3d. *I. eczematosa;* 4th. *I. rodens.* (*See* t. Impetiginous Affections)

58. Genus xi. — Acne — *Varus* — *Ao dermatitis.* — A pustular affection, appea g chiefly about the period of puberty in both se , occurring as small, isolated pustules, with h , deep-red bases, leaving circumscribed, indo t, and hard tumours, and seated chiefly in the s ceous follicles, most frequently of the face, r ; shoulders, and breast. — *Spec.:* 1st. *A. sim* ; — 2d. *A. indurata;* — 3d. *A. rosacea.* (*See* t. Acne.)

59. Genus xii.—Furunculus.— Inflamm on limited superficially, but extending to all the neous tissues and subjacent cellular subst e, forming a hard, conical tumour, of a dull re lour, varying from the size of a pea to that pigeon's egg, terminating in suppuration, wit he evacuation of a membranous slough, or o membrane that inclosed the matter. — *Spec.* st. *F. vulgaris;* — 2d. *F. asthenicus;* — 3d. *Ho lum,* or *Stye.*

60. Genus xiii. — Carbunculus. — Cir scribed, hard, round, and painful swelling, s ed in the cellular tissue of the skin and the sub neous tissue; at first of a livid red colour, wards black, or of a deep livid hue in the cen or throughout, and covered by lenticular vesi s; terminating in gangrene or sloughing. — 1st. *C. sporadicus;* — 2d. *C. endemicus;* — *C. symptomaticus.* (*See art.* Furuncular E tions.)

61. Order. III.—Squamosæ—*Dermatites mosæ—D. serpiginosæ— D. chronicæ—Serpi es.* — Chronic affections characterised by the pr tion, on the surface of the skin, of inorganic, nated scales, of a whitish grey colour, dry, fr le, and slightly elevated above the skin, which re red and dry when the scales fall off. The generally slowly developed, spread, and cor ue for months, or even for many years. They a ot contagious.

62. Genus i. — Pityriasis. — A supe ial affection, implicating chiefly the cuticle, ch terised by a copious desquamation and re al of this tissue, and, although it may appear o ny part, affecting chiefly parts covered by ha — *Spec.:* 1st. *P. Capitis;* — 2d. *P. Palpebra m;* — 3d. *P. Labiorum;* — 4th. *P. palmar et plantaris;* — 5th. *P. præputialis et puden is;* — 6th. *P. versicolor;* — 7th. *P. nigra.* (*Se* rt. Pityriasis.)

63. Genus ii. — Psoriasis. — *Lepria.* — Patches of chronic inflammation of the skin th slight elevations changing into scales, — th of *psoriasis* being of different sizes, with irre lar margins, and the centres not depressed; th of *Lepriasis* being more or less rounded, sl tly depressed in their centres, and their margins ed

reddish. — *Spec.:* 1st. *Psoriasis guttata ;* —
P. diffusa ; — 3d. *P. inveterata ;* — 4th.
epræformis — *Lepriasis.* (*See arts.* Psori-
ınd Lepriasis.)

Order IV. — Hæmatodes — *Sanguineous*
ations. — Infiltrations of blood in the cuta-
and subcutaneous tissues, generally without
est elevation of the surface, owing to im-
l vital cohesion of these tissues, and of their
aries, and to alteration of the blood.

Genus i. — Purpura. — Small, distinct,
e specks or patches in the skin, attended by
or and debility, generally without fever. —
: 1st. *P. simplex ;* — 2d. *P. hæmorrhagica ;*
. *P. urticans ;* — 4th. *P. symptomatica vel*
ata — of exanthematous and continued fevers.
ee art. Purpura.)

Genus ii. — Scorbutus. — The appear-
of patches or blotches of a livid, reddish, or
ish hue, chiefly on the lower limbs, with
ng and bleeding of the gums, great debility,
ains, and contractions of the lower extremi-
&c. — *Spec.:* 1st. *S. sine Febre ;* — 2d. *S.*
is. (*See art.* Scurvy.)

Genus iii. — Petechiæ — *Ecchymoses.* —
spots, generally of a reddish colour, but
livid, violet, or blackish, scattered over the
e of the skin, sometimes resembling flea-
or small freckles, remaining a longer or
r time, varying from an imperceptible point
size of a hempseed, occurring with or with-
ever, but most frequently in the advanced
of adynamic fever. — *Spec.* 1st. *P. primariæ,*
sine Febre ; — 2d. *P. secundariæ.*

Order V. — Exanthemata — Febres
thematicæ — Dermatites Exanthema-
— Eruptions of various kinds, preceded by
of specific natures and fixed durations, the
ons being generally also of determinate
ons, spreading by infection and contagion,
both—by specific contaminating miasms,
imal poisons, and generally affecting the
omy only once. (*See arts.* Exanthematous
ses and Infection.)

Genus i. — Rubeola — Morbilli — *Mea-*
- Fever, with frequent sneezing, coryza,
ss of the eyes, lachrymation, followed gene-
on the fourth day by a crimson rash,
ting of stigmatised dots, slightly elevated,
e face, neck, breast, and trunk, usually
amating on the seventh, occurring fre-
ly epidemically, spreading by infection,
ffecting the system only once. — *Spec.:* 1st.
ulgaris ; — 2d. *R. complicata ;* — 3d. *R.*
na ; — 4th. *R. sine Catarrho ;* — 5th. *R.*
xanthemate. (*See art.* Measles.)

Genus ii. — Scarlatina — *Febris Scar-*
sa. — A continued fever, on the second or
day of which, a scarlet efflorescence gene-
appears on the fauces, face, and neck,
ling over the body, terminating in des-
ations from the fifth to the seventh day,
ently attended by affection of the kidneys,
ollowed by dropsy; often occurring epide-
ly, propagated by infection, and attacking
ystem only once. — *Spec.:* 1st. *Scarlatina*
num. — *Var.: a. S. simplex ;* — *b. S. angi-*
— *c. S. maligna ;* — *d. S. sine Exanthemate ;*
S. latens. (*See art.* Scarlet Fever.) *Spec.:*
Scarlatina rheumatica, vel S. r. epidemica (*see art.* Scarlatina Rheumatica) ; — 3d. *Scarlatina Equi*, vel S. Equi epidemica ;* — 4th. *Scarlatina Canis.*

71. Genus iii. — Febris Exanthematica — *Typhus* — *Typhus exanthematicus.* — Typhoid, low, or adynamic fever, attended by stupor, vertigo, confusion of ideas, delirium, or typhomania; by a reddish, papillar eruption on the trunk of the body and limbs; propagated by infection, appearing epidemically, and seldom affecting the system a second time. — *Spec.:* 1st. *F. Typhoides ;* — 2d. *Typhus contagiosus.* (*See art.* Fever, Typhoid and Typhus, § 485. *et seq.*)

72. Genus iv. — Variola — Small-Pox. — Fever, commencing with shivering, and, after forty-eight hours, or three days, attended by an eruption of red points, passing successively into pimples, acuminated vesicles, flattened and umbilicated vesicles, pustules, and hard brown scabs; ceasing on the development of the eruption, and returning when the eruption has reached its acme, or from the eighth to the eleventh day; the falling off of the scabs, from the twelfth to the twenty-fourth day, leaving behind them dark pits or marks; highly contagious, and affecting the system only once. — *Spec.* 1st. *Variola Hominum.* — *Var.: a. V. discreta ;* — *b. V. confluens ;* — *c. V. sine Variolis.* — *Spec.* 2d. *Variola Animalium.* — *Var.: a. V. vaccina ;* — *b. V. ovilis, vel Clavus.* — *Spec.* 3d. *V. varioloidea, vel Variola Hominis anomala.* (*See arts.* Small-Pox and Vaccination.)

73. Genus v. — Varicella — *Chicken-pox.* — an eruption of semi-transparent, glabrous vesicles, with red margins, following and attended by a slight attack of fever; the vesicles seldom passing into suppuration, but breaking on the third or forth day, concreting into small puckered scabs, and leaving no cicatrices; affecting a person only once. — *Spec.:* 1st. *V. lentiformis ;* — 2d. *V. coniformis ;* — 3d. *V. globularis.* (*See art.* Chicken-Pox.)

74. Genus vi. — Miliaria — *Sudamina.* — An eruption of whitish or pale reddish vesicles, the size of a millet-seed, in the course of severe infectious fever; the vesicles being distinct, containing a serous fluid, of a whitish, or reddish, or purplish hue, bursting in two or three days, and terminating in a scurfy desquamation. — *Spec.:* 1st. *M. simplex ;* — 2d. *M. abnormis.* (*See art.* Miliary Eruptions.)

75. Genus vii. — Erysipelas. — Asthenic inflammation of the integuments, consequent upon febrile disorder and a morbid state of the blood, affecting the skin or scalp more or less extensively, with a diffused swelling disposed to spread, propa-

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* I have lately had reasons, indeed evidence, for the following inferences: — 1st, That Scarlatina was originally a disease of the horse; and that it formerly occurred, and has even recently occurred, epidemically, or as an epizooty among horses; 2d, That it was communicated in comparatively modern times from horses to man; 3d, That it may be, and has been communicated also to the dog.

Whilst this article was passing through the press, and after the preceding part of this note was printed, Mr. Percival, Veterinary Surgeon to the 1st Regiment of Life Guards, and author of the very able and well-known work on the Diseases of the Horse, kindly furnished me with additional evidence in support of the opinion I have stated at this place, and when treating of Scarlet Fever. (*See that article*, §§ 90., &c.) Mr. Percival also referred me to the second volume of his work, where Scarlatina in the Horse is mentioned.

gated by infection when circumstances favour the operation of the poisonous miasm. — *Spec.:* 1st. *E. simplex;* — 2d. *E. complicatum.* (*See art.* ERYSIPELAS.*)

76. ORDER VII. — DERMATITES CONTAGIOSÆ — D. SPECIFICÆ CONTAGIOSÆ — AISCHRODES — *Eruptiones contagiosæ — Contaminating Eruptions.* — Eruptions propagated by direct or mediate contact, of indeterminate, but generally prolonged duration, often contaminating the whole frame; and certain of them tending to fatal terminations.

77. GENUS i. — SCABIES — *Itch.* — An eruption of distinct, slightly acuminated vesicles, attended by constant itching; the eruption varying in character, but often concealing a parasite or *acarus,* either causing, or produced by it, unattended by constitutional disturbance. — *Spec.* 1st. *S. Hominis;* — *Var.: a. S. H. vesicularis;* — *b. S. papuliformis;* — *c. S. lymphatica;* — *d. S. purulenta;* — *e. S. cachectica.* — *Spec.* 2d. *Scabies Canis.* (*See art.* ITCH.)

78. GENUS ii. — SYCOSIS — *Mentagra.* — A pustular eruption of a pale yellow colour, seated chiefly in the hairy parts of the face, as the chin, upper lip, cheeks, &c., affecting the hair follicles and connected tissues, bursting in the course of some days, and producing brownish crusts, which after one or two weeks leave indolent purplish tubercles; the pustules being renewed in different parts, thus continuing for an indeterminate period, and apparently propagated by a parasitic plant, or cryptogamic formations. — *Var.:* 1st. *S. simplex;* — 2d. *S. contagiosum.* (*See art.* SYCOSIS.)

79. GENUS iii. — FAVUS — TINEA — *T. maligna — Porrigo — Ring-Worm.* — A specific chronic inflammation, seated chiefly in the hair-follicles, exuding a peculiar yellowish substance, which accumulates and forms a cup around the base of each hair, the aggregation of a number of these resembling the cells of a honey-comb. The hair of the diseased follicles is altered, imperfectly nourished, and falls out; and if the disease be not arrested, the subjacent tissues become affected. This contaminating eruption is usually seated in the scalp, sometimes extending to the face, neck, and other parts of the body, and is communicable to any part of the skin. — *Var.:* 1st. *F. dispersus;* — 2d. *F. confertus.* (*See art.* TINEA.)

80. GENUS iv. — PUSTULA MALIGNA — *Contagious Anthrax.* — A large vesicle filled with a sanious fluid, seated over a lenticular induration, which is speedily surrounded by an erysipelatous areolar swelling, which soon becomes gangrenous, and contaminates the circulating fluids; caused by the contact of a septic animal poison, and communicable from person to person, and from the lower animals to man. — *Spec.:* 1st. *P. M. Hominis;* — 2d. *P. M. Animalium.* (*See art.* PUSTULE, MALIGNANT.)

81. GENUS v. — GLANDERS † — FARCY — *Farcy-Glanders.* — Fever of a low and malignant character, attended by chancry sores of the n
brane of the nose, and a profuse, offensive
charge, and by pustular eruptions, or tuberc
gangrenous ulcers, in various parts of the cutan
surface, produced by the contact of the poiso
matter. — *Spec.:* 1st. *Simple Acute Glanders*
2d. *Acute Farcy Glanders;* — 3d. *Simple Ch*
Glanders; — 4th. *Chronic Farcy Glanders.*
art. GLANDERS.)

82. GENUS vi. — SYPHILIS — *Syph*
Eruptions — Venereal Eruptions. — A
temper contracted, generally by impure
tact, and characterised, externally, by co
coloured spots, or by pustules, vegetations,
crescences, ulcerations, swellings, tumours
imposthumes; internally, by pains in the bon
periosteum, or by caries. — *Spec.* 1st. *S. ecz*
tosæ. — *Var.: a. lenticularis;* — *b. papul*
c. vesicularis; — *d. pustularis;* — *e. tub*
laris. — *Spec.* 2d. *S. squamosa.* — *Var.: a.*
prosa; — *Psoriasis.* — *Spec.* 3d. *S. vegetan*
Var.: a. verrucosa; — *b. Condyloma;*
Cauliflora; — *d. Frambœsia;* — *e. Crista-C*
— *Spec.* 4th. *S. exulcerans.* — *Var.: a.*
piginosa; — *b. fissata;* — *c. excavata.* (*See*
SYPHILITIC AFFECTIONS.)

83. GENUS vii. — MYCOSIS. — A conta
disease, consisting of fungous excrescences
curring chiefly on the face, hairy scalp, or
the organs of generation, resembling a mull
or strawberry, exuding a yellowish, fœtid,
viscous humour, sometimes forming tumo
considerable size, and often attended by pai
the bones, by hoarseness, coryza, or ozœn
ceration of the tonsils, &c. — *Spec.:* 1st
Frambesioides, Frambœsia; — 2d. *M. Mollus*
Amboyna-pox; — 3d. *M. syphiloides, Sibbens,*

84. ORDER VIII. — LEPRODES — *Le*
Eruptions. — Morbid degenerations of the
depending upon constitutional vice, attende
diminution of the sensibility of the diseased
face, by general hypertrophy of the cuta
tissues, by originating in endemic influences
bad food, insensibly and slowly, and by their
prolonged duration and hopeless cure.

85. GENUS i. — LEPRA TUBERCULOSA —
PROSY — *Leprosy of the middle ages — Lepra*
bræorum. — Dusky-red or livid tubercle
various sizes, on the face, ears, and extremiti
rugous and thickened state of the skin, imp
sensibility and falling out of the hair, excepti
the scalp; hoarse or altered voice, and oz
terminating in ulcerations of the affected su
and extreme fœtor; the distemper being
hereditary, and even contagious by means o
matter discharged from the sores. — *Spec.*
Lepra Taurica — the Leprosy of the Crime
2d. *L. anæsthesiaca;* — 3d. *L. Hebræoru*
Jewish or Egyptian Leprosy. (*See art.* LEPR .)

86. GENUS ii. — RADESYGE. — Lassitude,
por, and heaviness of the limbs, stiffness
pains of the joints; a pale, bloated, leade
reddish appearance of the face, hoarseness o
voice, ozæna; a rugous, scaly, and callous st
the skin, especially in parts, followed by cr
furrows, tuberculous callosities, and ulce
Spec.: 1st. *R. vulgaris;* — 2d. *R. scorbutica*

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* The several forms and states of complication manifested by *Erysipelas* are fully described, in the article referred to, as they have been observed in many countries and climates by the author, and during different epidemic constitutions.

† This malignant and contaminating distemper is generated in horses from crowding, and from breathing a contaminated or foul air, and is communicated from them to man. There is great reason to believe, that most, if not all the maladies comprised under this order, have originated in some of the lower animals, and
extended, with various modifications, to man; an
improbably small-pox has had a similar origin a
as scarlet fever, as already mentioned.

. GENUS iii. — ELEPHANTIA — *Elephantiasis e Arabians.* — Hardness, lividity, and great faction of one or both limbs, or of the scro- owing to great thickening of the cutaneous subcutaneous tissues, with an irregular, gla- , or scaly state of the surface; endemic ly in warm countries. — *Spec.:* 1st. *E. vul-* ; — 2d. *E. tuberosa*; — 3d. *E. Scrotatis.* *art.* ELEPHANTIASIS.)

. GENUS iv. — PELLAGRA. — An endemic iereditary malady, characterised by thicken- caly excoriation, cracks, and deep fissures of parts of the skin exposed to the sun or air; led by general cachexia, by burning pains in unk and limbs, by disorder of the digestive is and nervous system; at first appearing prolonged intervals, afterwards being more nued, and often fatal. — *Spec.:* 1st. *P. nensis*; — 2d. *P. Asturiensis.* (*See art.* AGRA.)

. GENUS v. — ICHTHYOSIS. — Morbid enlarge- of the papillæ of the skin, and thickening of læ of the epidermis, either in parts, or more or enerally, presenting irregular compartments resembling the scales of fish. — *Spec.:* 1st. *redituris*; — 2d. *T. papillaris*; — 3d. *I. s.* (*See art.* ICHTHYOSIS.)

. ORDER IX. — CANCRODES — *Cancerous mpers.* — Cancerous diseases of the skin are cterised by their slow and insidious attack; ieir prolonged duration; by their foul ul- on and lancinating pains; by their resistance eatment, and by their general return to ad- g or remote parts, after removal by excision: lepend on a peculiar diathesis, which is often itary.

GENUS i. — LUPUS — *Cancer Lupus*, Sau- .—A disease of all the tissues of a portion of in, chiefly of the face, implicating also the cent cellular substance; of remarkably slow ess and long duration; always extending superficially or in depth, with a stinging ion of heat; passing into ichorous and slow denic ulceration, and destroying the textures ich it extends.—*Spec.:* 1st. *L. superficialis*; *L. phagedænicus*; — 3d. *L. non-exedens inosus.* (The different species of Lupus he connecting links between the *leprous* and *ncerous* diseases of the skin. *See art.* LU-

GENUS ii. — CARCINUS. — An alteration the tissues of the skin and subjacent cellular generally commencing as a small, hard, nt tumour, with itching or stinging; passing pungent or lancinating pains, and often ed or followed by ichorous and slow ulcer- and by general contamination of the frame. c.: 1st. *C. scirrhosus*, — *Carcinoma*; — 2d. *rucosus* (Chimney-Sweeps' Cancer): — 3d. *edullaris*; — 4th. *C. melanæus*; — 5th. *C. ←xus.* (*See arts.* CANCER and SCIRRHOUS THER TUMOURS.)

GENUS iii. — KELIS. — A prominent, hard scence, sometimes cylindrical, sometimes or square, flattened in the centre and ele- at the margin, projecting roots into the — *Spec.:* 1st. *R. genuina*; — 2d. *R. spu-*

ORDER X. — HETEROMORPHÆA. — Al- ns of the skin, cuticle, or nails, not comprised the foregoing, nor referable to changes or morbid actions similar to, or allied with, those which characterise the preceding groups.

95. GENUS i. — NÆVUS — *Vascular Nævi — Moles.* — A congenital alteration of a portion of the skin, consisting either of a convoluted congeries of capillary vessels, more or less elevated, in the form of a small vascular tumour, above the surface, or of a more diffused and dark or livid-coloured patch, or of a warty, hairy, or discoloured elevation or excrescence. — *Spec.:* 1st. *N. vascularis circumscriptus*; —2d. *N. vascularis diffusus*; — 3d. *N. non-vascularis*; — 4th. *N. pilosus.*

96. GENUS ii. — VERRUCA — *Warts.* — A very circumscribed, hard, excrescence, sessile or pedunculated, sometimes moveable, sometimes more fixed, of nearly the same colour as the skin, its surface being rugged, horny, or hard, and not susceptible of inflammation, although the cutaneous papillæ to which it is attached is more than usually vascular. — *Spec.:* 1st. *V. vulgaris*; — 2d. *V. Acrochordon.*

97. GENUS iii. — TYLOSIS — *Corns* — Circumscribed, dry, hard, lamellated callosities, owing to hypertrophy of the cuticle from pressure, which drives the altered structure inwards upon the subjacent tissues, developed chiefly on the toes. — *Spec.:* 1st. *T. indurata*; — 2d. *T. gomphosa*; — 3d. *T. bulbosa.*

98. GENUS iv. — ONYGOSIS. — Inflammation with swelling, redness, and pain of the matrix of the nail, causing malformation, induration, eversion, or inversion of the nail. — *Spec.:* 1st. *O. acuta*; — 2d. *O. chronica*; — 3d. *O. cum Inversione*; — 4th. *O. cum Eversione*; — 5th. *O. complicata vel associata.* (Often associated with *Psoriasis* and *Lepriasis*, which see § 23.)

99. Having exhibited what may be considered a strictly *natural grouping* or *classification* of the changes, appearing either primarily in the tissues of the skin, or contemporaneously with, or consecutively upon, febrile and constitutional diseases, it will be seen that the local connections, the symptomatic relations, and the more prominent features and alliances of these changes, are brought more completely and more accurately under view. And it will be more clearly perceived, that these affections of the skin, so difficult to arrange, and so generally considered and treated as local alterations merely, are more or less important manifestations, in the cutaneous tissues, of disordered or diseased conditions of one or more of the vital functions, — of the organic nervous influence or energy, of the digestive and assimilating functions, of the depurating or eliminating functions, and, consequently, of the circulating fluids, and of the constitution or frame in general. Thus, a natural arrangement of cutaneous affections directs the attention more entirely to the relations, and constitutional and visceral dependencies, of these affections, and leads to rational and successful methods of cure; most of the affections grouped under the same order manifesting such morbid relations and connections, as require similar indications and means for each.

100. As *artificial arrangements of cutaneous diseases* have been so commonly received, and as they tend to facilitate diagnosis, I shall conclude this subject by giving the improved modification of the classification of WILLAN, by M. RAYER; the arrangement of WILLAN being itself only a modification of that originally published by PLENCK.

TABLE.

- **DIVISION I.** Diseases of the Skin.
  - **CHAPTER I.** Inflammatory Affections, distributed according to the Number and Form of their elementary Lesions.
    - **SECTION I.** Having a single elementary Form.
      - 1. EXANTHEMATA.—Erythema, Erysipel beola, Roseola, Scarlatina, Urticaria ficial Exanthemata.
      - 2. BULLÆ. — Pemphigus, Rupia; A Bullæ — Blisters, Ampullæ.
      - 3. VESICULÆ. — Herpes, Eczema, Hydra Scabies, Miliaris sudatoria (*suette mi* Sudamina; Artificial Vesicles.
      - 4. PUSTULÆ. — Variola, Varicella, V Vaccinella, Acne, Rosacea, Sycosis, Im Favus, Ecthyma; Artificial Pustules.
      - 5. FURUNCULI. — Hordeolum, Furuncul thrax.
      - 6. GANGRENÆ. — Anthracion vel Pustu ligna, Anthrax Pestis.
      - 7. PAPULÆ. — Strophulus, Lichen, P Artificial Papulæ.
      - 8. SQUAMÆ. — Pityriasis, Psoriasis, Lep lagra; Artificial Squamæ.
      - 9. TUBERCULA. — Lupus, Scrofula, C Elephantiasis Græcorum; Artificial cles.
    - **SECTION II.** Having several elementary Forms.
      - 1. SYPHILIS.
        - Exanthematica, Vesiculosa, Pu Squamosa, Pa Tuberculosa, tiva.
      - 2. AMBUSTIO.
        - Exanthematica, Gangrenosa.
      - 3. PERNIO.
        - Exanthematica, Gangrenosa.
  - **CHAPTER II.** Peculiar States of the Skin not referable to Inflammation.
    - ANEMIÆ.
    - CONGESTUS SANGUINEI.
    - HÆMORRHAGIÆ.
      - Purpura (Petech bices, Ecchymos matorrhagia).
  - **CHAPTER III.** Morbid States of the secreting Functions of the Skin.
    - PERSPIRATIONIS Ephidrosis.
    - EPIDERMIDIS Exfoliatio.
  - **CHAPTER IV.** Neuroses of the Skin.
    - Anæsthesia, Hyperæsthesia.
  - **CHAPTER V.** Faulty Structure, or unusual States of one or other of the Elements of the Skin.
    - PIGMENTI (Achromata; Dyschromata).
      - Albinismus seu pathia, Nigrities lis, Lentigo, Ch Melasma, Næv mentarius, Colo leus, Color sub Artificial Dis tions.
    - HYPERTROPHIÆ.
      - Papillarum et Epidermidis.
        - Ichthyosis, Verru ducta cornea, T
      - Vasorum Cutis.
        - Phlebectasia, An sia capillaris, araneus flamme Tumor vasculari
      - Corii, Membranæ cellularis subcutaneæ, et Telæ adiposæ.
        - Cheloidea, Tum rii, Elephantias bica, Andrum, darthoræ, Ba Leg, &c.
    - GANGRÆNA SIMPLEX.
    - CICATRICES.
    - DEFECTUS CONGENITUS CUTIS.
    - EXTENSIO VEL RELAXATIO INSOLITA CUTIS.
  - **CHAPTER VI.** Degenerations.
    - DEGENERATIONES FIBROSÆ.
    - MELANOSIS.
    - DEGENERATIONES TUBERCULOSÆ.
- **DIVISION II.** Alterations of the Dependencies of the Skin.
  - **CHAPTER I.** Special Diseases of the Sebaceous Follicles.
    - Secretio aucta, Vermes sebacei, Levatio follicularis, Tumor folli Calculi Folliculorum.
  - **CHAPTER II.** Special Diseases of the Piliferous Follicles.
    - Atrophia, Defectus congenitus Pilorum, Pili supernumerarii; mentum insolitum Pilorum, Coactio Pilorum, Alopecia, C Plica.
  - **CHAPTER III.** Special Diseases of the Unguial Matrices and Alterations of the Nails.
    - Onychia, Vicia Confirmationis et Structuræ Unguium; Ecc subunguialis; Incrementum insolitum Unguium; Situs ins Ficus; Defædatio, Degeneratio; Productio et Reproductio,
- **DIVISION III.** Foreign Bodies on the Surface, under, or in the Substance of the Skin.
  - Parasitic Insects infecting the Skin of Man.
    - Pediculi; Pulices; Acarus Scabiei; Filiaria medinensis; Œ

1. I may further add the arrangement pro- l by Professor J. H. BENNETT, of Edinburgh. xcludes from the orders *Exanthemata* and *ulæ* the diseases characterised by excessive , as being essentially febrile. From the order *ulæ* he also removes miliaria and varicella, for nilar reason; and he expunges the order *e* altogether. With some other alterations, sting chiefly of reductions of genera to the of species, he assigns the following as his fication of skin-affections. It will be seen t is a modification, with several omissions, of rrangement generally adopted *of diseases of in*; whilst in that which I have given above, ve comprised also the principal of those lies which generally also *affect or implicate in* in a more or less obvious manner:—

i. *Exanthemata.*
  Erythema.
  Roseola.
  Urticaria.
ii. *Vesiculæ.*
  Eczema.
  Herpes.
  Scabies.
  Pemphigus.
iii. *Pustulæ.*
  Impetigo.
  Ecthyma.
  Acne.
  Rupia.
v. *Papulæ.*
  Lichen.
  Prurigo.
v. *Squamæ.*
  Psoriasis.
  Pityriasis.
  Icthyosis.
ORD. vi. *Tuberculæ.*
  Lepra tuberculosa.
  Lupus.
  Molluscum.
ORD. vii. *Maculæ.*
  Lentigo.
  Ephelides.
  Nævi.
  Purpura.
ORD. viii. *Dermatozoa.*
  Entozoon folliculorum.
  Acarus.
  Pediculus.
ORD. ix. *Dermatophytæ.*
  Porrigophyte (Favus).
  Mentagraphyte (Mentagra).

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SLEEP AND SLEEPLESSNESS. — CLASSIF.: — GENERAL PATHOLOGY—SYMPTOMATOLOGY — THERAPEUTICS.

1. DEFINIT. — i. SLEEP. — *The suspension of sensation and voluntary motion, occurring at periodic intervals, continuing for some hours, then terminating spontaneously, or by some irritation or excitement, being indispensable to the due discharge of all the sensory, intellectual, and voluntary functions.*

ii. SLEEPLESSNESS. — *The non-recurrence of this periodic suspension of sensation and voluntary motion, or the imperfect or interrupted recurrence of it, as a symptom of disease, or as the chief manifestation of disease.*

2. I. SLEEP is necessary to the due discharge of the sensory, intellectual, and voluntary functions, for any considerable period; and if that period be much prolonged beyond eighteen or twenty hours, even during states of excitement or anxiety, an overpowering disposition to sleep is experienced; although powerful constitutions, on trying occasions, may continue awake for much longer periods. The organic functions, or those functions which are actuated by the organic, nervous, or ganglial system, and which consist chiefly of digestion, assimilation, circulation, nutrition, and secretion — all these functions, commonly termed involuntary—require not the suspension or repose constituting sleep, which, if extended to them, would soon terminate life. But these functions are performed — at least, some of them —with less activity during this period. Sleep is not only indispensably requisite to the adequate discharge of the functions performed by the cerebro-spinal nervous system, but is also necessary to the due nutrition of this system — to the due
supply of the waste of nervous power, and e
intimate nervous organisation, required fo
healthy performance of the functions of thi
tem. Whilst the ganglial nervous system, c
one hand, discharges its functions throug
media of the several organs actuated by it a
continuously, and without marked repo
waste of substance or structure, the cerebro-
nervous system, on the other hand, demanc
riodic or alternate repose and action, in or
insure its healthy function and organisation,
prevent excessive exhaustion and waste.

3. The restoration of cerebro-spinal ne
power consequent upon sleep has been, by
physiologists, attributed to the due nutrition
cerebro-spinal organs during this period, as
as to the suspension of exhaustion and wast
restoration and nutrition being requisite in p
tion to the antecedent waste, which, if no
restored, successively increases until the in
organisation of these nervous centres ultimate
dergoes irreparable and tangible change. In
age and during manhood, the voluntary a
and mental exertion may be continued
comparatively long periods without exhausti
nutrition, or the restoration of the nervous e
diture, is then more rapid and complete t
advanced or old age; whereas, at this age
efforts, especially such as are of a very exha
nature, are followed by a more prolonged
more urgent want of repose; and if repose
obtained, disease, or even disorganisation,
especially inflammation, in the earlier epo
life, and apoplexy and paralysis in advance
may speedily supervene. Thus we observ
when, in advanced life, mental exertion,
fatigue, or venereal indulgences are carried t
the disposition to sleep is most urgent, and,
required repose be not obtained, the risk fro
supervention of these maladies becomes gre

4. The seat of consciousness, or of active
tion, has been long since supposed by some
to be different from that of the mental fac
and it has been believed that, whilst the for
in the central and basilar parts of the brai
latter are to be referred to the convolutions
hemispheres. During sleep, therefore, the
central parts, the seats of sensation, are alto
inactive, or incapable of feeling or perceivi
pressions made upon the senses, and thenc
veyed to those parts, unless the impression
strong as to rouse them to a state of activit
whilst sleep consists of the inaction or re
these parts, and of the hemispheric convolut
well, when sleep is complete or profound,
profound form of sleep consists of a less co
state of inaction of both the hemispheric co
tions and the central cerebral structures.
latter, or imperfect state of sleep comprises
rous phases or grades from that attended by
tinct *dreams*, through the various states of
ing, until the half-waking and half-sleepin
is reached.

5. During *dreaming*, the structures o
brain more especially concerned in the
manifestations are not completely or enti
a state of repose, nor can it be admitted
the seats of conscious sensation are also
pletely or profoundly inactive, otherwise th
mer manifestations could not be perceiv
remembered by the latter. It will be, the

orrect to view the several portions of the oncerned in sensation, mental manifesta- nd volition, as not completely, although r less, inactive during sleep, unless the be very deep, and altogether without ; for, more frequently, especially when the are distinct, and are recollected upon ing from sleep, certain parts of the brain e more or less active, repose not being uni- and complete. Dreaming during sleep in may be rendered more vivid and remark- y the excitement of the brain during the mental or physical exertions of the day, or nature of the food or drink, or by disorders digestive functions, the imagination and ng powers being either partially or actively ed, and the results of these being remem- when waking. This partial or irregular of the hemispheric portions of the brain sleep is often still more strongly manifested the imperfect sleep of fever, and is even ed more or less audibly and actively; uggestions, conceptions, and unconnected onstituting dreams in health, passing into r less manifest delirium in states of disease. arious grades of sleep and of dreaming may ther occasionally or habitually during the y health of the individual; and thus, during various grades or phases of delirium, into sopor, lethargy, and coma, may occur, states of nervous power and of the circu- ay favour their appearance.

uring sleep, especially when it is not pro- he sensorium may be influenced in various o as to give rise to changes of position, to conceptions, and even to acts, without a us perception of them. An uneasy posi- the muscular sense, may occasion during complete change of position, — a person rn from one side to the other, without onscious of either the cause or the act of . In this case, the uneasiness influences sorium, or induces an unconscious sensa- fficient to give rise to a similarly uncon- olition productive of the act, but there is eption of it. During dreaming, the con- of numerous occurrences, circumstances, s, passes through the mind with greater or idity, and generally in a very incongruous onnected manner. The various processes ght which had engaged the waking brain en partially renewed or suggested during r while the mind is unconscious of impres- the senses, frequently in singular forms, inconceivable rapidity, or in disjointed or ble states; these suggestions or conceptions however, sufficiently strong, in many cases, e conscious sensation, so far, at least, as to ally remembered on waking.

hese suggestions seldom amount to perfect tions, but are loose and unconnected, gene- intly entertained, and soon extinguished. re the results of imperfect or disordered f repose of the parts of the brain more es- y concerned in the mental processes. They cur without any excitement or stimulus of ses, or of parts distant from the brain, as ions merely of anterior processes of thought cts, in partial or newly-combined and bi- rms, without any circumstance which can t for their appearance; and they may assume the most lively characters, and be attended by more or less correct reasoning, and by the highest flights of imagination. But in some instances, they may be referred, with great accuracy, to antecedent occurrences, occupations, or mental processes, of which they are the imperfect or distorted remains or apparitions, although sometimes the most lively or intense, but also the most incongruous conceptions. In other cases they are excited by local impressions, or irritants, or changes which sympathetically affect the brain, so as to give rise to those conceptions which constitute dreams, or even to acts, which those conceptions occasion. Thus the irritation of the bladder may give rise, during sleep, to conceptions connected with micturition, and this act may even follow without waking, although it generally immediately terminates the sleep. Thus, also, irritation of the vesiculæ seminales produces lascivious dreams, and not infrequently is followed by seminal emission. Various internal excitants, moreover, or external agents, acting during sleep, may be followed by dreams having a more or less obvious connection with the causes which produced them; the impressions made by such agents calling up certain related, although incongruous or disjointed conceptions in the sensorium.

8. The conceptions arising in the manner now explained, — either with or without any obvious excitant or physical cause, — may be so slight and evanescent as hardly to be remembered upon awaking, and as not to occasion any change of position, or any act implying volition, of either a conscious or unconscious kind. But not infrequently the conceptions formed during sleep, when lively or active, give rise to volition, and are followed by acts. The individual acts the dream, or performs the conception passing through his mind, without being so conscious of his act as to remember it when he awakes, or when the functions of sense and perception are fully restored. This constitutes *somnambulism*, or sleep-walking, a state of partial or imperfect sleep, which has been sufficiently noticed, in respect of its nature and relations, when treating of *the pathology of* PARALYSIS (see § 193. *et seq.*).

9. *Sleep*, that it may be refreshing and restorative to both body and mind, should, 1st., take place at a stated and proper hour, and after stated intervals; — 2d., continue for a certain period of time, without being prolonged much beyond that time; — 3d., be aided by the necessary preparations to secure ease of position, and to prevent disturbance of the vital and animal functions. When sleep is obtained without these precautions, — when it occurs at unseasonable hours, — when it is broken or unusually shortened, — when it is taken on a loaded stomach, or after the ingurgitation of heating or stimulating beverages, — when the position of the body is unusual, cramped, or uneasy, — when the stomach or bowels are distended by flatulence, or irritated by acidity, — then it is either disturbed or unsound, unrefreshing, — the body and mind are left on waking either languid or torpid, and the requisite exertions or engagements of the following day are entered upon with disrelish, and are soon productive of fatigue.

10. To secure refreshing sleep, a sufficiently early and a punctual period of retiring to repose should be adopted, after having spent a reasonable period in the open air, chiefly in exercise suited to

the state and constitution of the individual. The diet should be digestible and moderate in quantity, and such as will not favour flatulency or acidity. Repose ought not be taken for some hours after a full meal; and the place in which it should be sought ought to be airy and dry, the temperature being not above 70° of Fahr. or below 55°. The bed should be firm and moderately elastic, slightly elevated towards the head, and the clothes, both above and under the person, sufficiently warm and light. All the day-clothes should be taken off. The chamber ought to be large and airy, and light and noise excluded. If air be not sufficiently renewed in the sleeping apartment, sleep becomes feverish or restless, and the individual awakes unrefreshed and uncomfortable.

11. The *amount* of sleep should vary with the age, the occupation, the constitution, and the habits of the individual. During infancy and childhood, prolonged periods of sleep are required for the nutrition of the nervous masses and the growth of the body. Infants sleep the greater part of the twenty-four hours. Children require twelve or fourteen hours; older children, or those from eight years until fourteen or fifteen, about ten hours. From commencing puberty until full growth, or from twenty-five to thirty, eight hours are sufficient. After this age, the duration of sleep should range from six to eight hours, according to the occupations or exertions, mental or physical, of the individual.

12. *The causes of sleep* are not only the fatigue, the exhaustion, and the periodicity characterising all our sensorial actions and manifestations already insisted upon as requiring restoration and reinforcement of nervous power during the periods of repose, but also various states and phenomena which act more or less on the sensorium of those who are either incapable, or not in a situation, of having recourse to those mental or physical operations which more certainly conduce to repose. The entire *absence* of sensorial impressions, or the *monotonous repetition* of such impressions, will frequently occasion sleep, as occurs when listening to a drawling, monotonous reader or preacher, or to distant sounds of unvarying loudness. Persons who have become accustomed to sleep, notwithstanding the continuance of sounds which would keep the unaccustomed awake, frequently cannot sleep when deprived of these sounds, or when removed to perfect stillness, or when they are within the reach of sounds of a different intensity or key. Friction of various parts, especially in nervous or susceptible persons, prolonged combing of the hair, monotonous sounds of any kind, continued and gentle motions of the body in the same directions, rapid transport of the body backwards, or with the back placed towards the place where the body is carried, as when thus seated in a carriage, or on a railway, and directing the mind to uninteresting objects or matters, severally induce sleep, especially when other circumstances concur in causing this effect. There are, moreover, other causes which produce sleep, and which may be viewed as pathological, inasmuch as they are more or less morbid in their consequences or nature: they require merely enumeration. Venereal excesses may occasion sleep, lethargy, or sopor, especially in the aged; extreme exhaustion of the organic nervous and cerebro-spinal energies;
a plethoric state of the brain, or of the v
system generally; the superabundance of
mentitious materials in the blood, or an im
oxidation of this fluid; the administration
cotising substances; and various related
affections induce sleep, either excessive
spects its continuance, or of a disordered o
freshing kind (see *art.* Coma and Letharg

13. *The accession of sleep* is very differen
ferent persons, or when sleep supervenes na
and healthily, and when it is induced arti
or assumes more or less of a disordered cha
Healthy sleep may occur either suddenly
dually. Disordered sleep is generally slo
partial in its accession. The sensorium gr
loses its control over the current of the
which becomes unconnected and incong
and in this state of transition, — of half s
and half waking, — a dreamy, or even a d
existence is passed for a longer or shorter
until an entire loss of sensibility of external
— a more complete torpor of the sensorial
the brain, — supervenes, and sounder slee
duced. The disposition to, and indispositio
sleep are very much in the power of the
dual, for, by abstracting the mind from all
of sense, and from the suggestions or ide
excite, by ceasing every phase or mode
tion, and by ceasing to think upon or res
any topic requiring mental exertion, or ca
to occasion mental excitement, or by direc
attention to, and fixing it on, a single,
resting, unexciting, or simple object, and e
the thoughts with no other, the sensoriu
soon lapse into that state of torpor produ
sleep.

14. The accession of sleep is often *atte*
various morbid phenomena, especially in
predisposed or subject to any nervous, or
dic, or paralytic affection. These consist
of startings, twitchings, contractions, or
of one or more limbs or muscles; of conv
and spasmodic laryngeal disorders, or cr
children; of epileptic fits, more or less co
or merely slight or partial, and even of
mental and spectral illusions. Any of th
going may occur upon the accession of sle
before sleep has become complete, or imm
upon falling asleep; or during the com
ment of sleep, when sensation is partially
denly excited by any excitant, or disturbin

15. *Awakening* from sleep may be either
or gradual. The healthy and sufficientl
and prolonged sleep terminates spontaneou
immediately, leaving the person who has
it refreshed and active; or if it be termin
impressions made upon the senses, the
pressions produce this effect readily an
pletely, — an effect not observed from the
the sleep is of that morbid kind which cor
lethargy, stupor, sopor, or coma, in its
morbid grades. Disordered, unsound, or
cient sleep generally passes into that state
sleeping and waking noticed above (§ 4
according to the circumstances causing th
der or unsoundness, is attended by the dre
even by the delirious states of temporary e
just mentioned, until stronger impressions
organs of sense, or diminished torpor of the
rium, — the increased activity of the sens
conscious portions of the brain, — are follo

storation of the several manifestations or
ns of this organ.
Sleep may be excessive.— 1st. As respects
ation. — 2d. As regards its profound cha-
and the difficulty of arousing the person
; and 3d. In the frequency of its recur-
These are diseased states, and either
to one or other of those described under
ds COMA and LETHARGY, or generally pass
e or other of them, if not soon arrested by
nent appropriate to the exciting and patho-
causes which occasion them. Too pro-
or prolonged sleep should always excite
ns of a disposition to, or the actual pre-
f, cerebral congestion, owing either to
exhaustion, or to a morbid state of the
circulation, or to an interrupted return of
om the brain, occasioned by pulmonary or
engorgements, or to a morbid state of the
self. To one or other of these morbid
ns, excessive or deep sleep, especially
mounting to lethargy or sopor, may be
, the existence of either condition, or of
an one, generally becoming manifest upon
l examination of the case.
I. SLEEPLESSNESS — *Wakefulness* — 'A-
—*Insomnia*—*Pervigilium*— is a symptom
se, but it sometimes is also a forerunner of
st forms of disease, or occurs before any
vious disorder can be recognised. An in-
d sleep, or a more or less incomplete form
fulness — states of partial sleeplessness —
cur in consequence of too varied or too
states of mental occupation, or of the use
us beverages, or indigestible articles of
ar the period of repose, which prevent the
n of sleep, as green tea, coffee, &c. But
is not induced by any of these causes, and
hen the wakefulness occasioned by them
lete, it should be considered as a most
nt symptom, and its pathological cause
be carefully investigated. *Wakefulness*
either *partial* or *complete:* the former may
equent as to be habitual, or merely occa-
the latter cannot be of long continuance
being followed by dangerous disease.
. *Partial or incomplete sleeplessness* is of
t occurrence, especially in persons whose
re much and anxiously engaged, or whose
ions subject them to great mental exertion,
vicissitudes of fortune. It may likewise
e unreasonable indulgence of grief, severe
f any kind, and the numerous vexations
ppointments of life. When it is continued
for a long period, it may superinduce
disease of the brain, or of the heart, or
her organ, as the cause of the wakefulness
rate upon the frame; the nature of the
ving a more or less special influence upon
e brain, heart, lungs, liver, &c., according
susceptibility or predisposition of these
Partial insomnia is often occasioned by
with too many clothes on the bed, or by
of curtains to the bed, and to the closeness
ich they are drawn, or by an insufficient
of the air in the sleeping-chamber. These
especially the breathing of an impure or
taminated air, induces a febrile state, at-
y headache, restlessness, and more or less
e pervigilium, the tongue and mouth being
l clammy in the morning, and the person unrefreshed, or even much more fatigued and disordered than when repose was sought.

19. Partial sleeplessness has always a most intimate relation to the states of morbid action, and, according to these states, is attended by peculiar features. The sleeplessness may be occasioned, or the sleep may be broken, interrupted, or unsound, by indigestion, flatulence, or acidity of the stomach or bowels, or it may be disturbed by cramps or spasms of various muscles. This association is often observed in gouty and dyspeptic persons: the irritation of the prima via by flatus, acidity, or undigested articles, disorders the ganglionic nerves, and, through the medium of them, disturbs the sleep, excites the brain and spinal chord, the irritation thus extended to these centres being, in some cases, reflected from them to one or more of the muscles of voluntary motion, occasioning spasm or cramp. When wakefulness proceeds from the disordered digestion consequent upon indigestible articles of food, or upon an overloaded stomach, there is not merely more or less restlessness, but also often a feeling of oppression, a disposition to sleep, which, when it takes place, is generally attended by disturbing or fearful dreams, or by the nightmare, the individual waking up in fright, with a dry mouth and excited pulse.

20. When this state of sleeplessness is occasioned by mental exertion, or by continued mental rumination, when retiring to rest, on the subjects which have just before engaged the mind, whether these subjects be abstract or emotional, — whether they be intricate or difficult in their nature, or calculated to perpetuate anxiety or distress, — then feverishness, headache, restlessness, thirst, &c., are apt to occur, and to render sleep, when it at last takes place, unquiet, disturbed by dreams, and unrefreshing. In some cases of this kind, more especially, the person often dreams aloud, and, in rare instances, particularly when there is much nervous susceptibility and mental activity, he *acts his dream,* and evinces a more or less complete state of *somnambulism,* or *sleep-walking.* A youth, whom I knew, was much engaged in becoming an accomplished player on the flute; his dreams had frequent reference to this study, and he often disturbed the family by his performances on this instrument during his sleep. I was called one night to a young lady, who had disturbed and alarmed her relations by walking through more than one of her apartments in her night-dress, singing some songs she had been recently practising. And another young lady, whom I saw on this account, sometimes left her chamber in her sleeping-dress, and sat down to the piano in another room and performed some pieces of music which she had been learning. Females, who are somnambulists, generally first evince this disorder either at the period of puberty, previously to, or about, the accession of the catamenia, or where this discharge is interrupted or otherwise deranged.

21. Persons labouring under disease of the substance or valves of the heart, are subject not only to imperfect and disturbed sleep, but also to fearful dreams; and if they fall asleep in an uneasy position, or on the left side, in some cases, they generally waken up soon after from a fearful dream, as falling from a precipice, drowning, &c.; their dreams being more pleasant when the position is more comfortable. The same phenomena

are often observed in dyspeptic subjects, when the stomach or colon is distended by flatus; for, when the individual lies on the left side, the weight of the body presses on it, whilst the liver presses on the stomach and colon, and the flatulent distension of these pushes the diaphragm upon the heart, and embarrasses the circulation through this organ.

22. There are very few chronic diseases of which partial wakefulness is not a symptom; but it is more especially distressing in atonic gout, rheumatism, affections of the skin, and disorders of the urinary organs. Anomalous states of hysteria, the several forms of dyspepsia, and derangements of the functions of digestion, are, as well as the foregoing, attended by partial wakefulness, or by a disturbed, insufficient, and unrefreshing sleep. Certain beverages and articles of diet may be the chief cause; and when these are relinquished, the sleep becomes more sound. Tea, especially green tea, coffee, and spirituous liquors, often occasion wakefulness; and a full meal of animal food, especially of pork, late in the day, often causes either restlessness, loss of sleep, or disturbing dreams. It would be unprofitable, as it is unnecessary, further to notice the contingent occurrence of want of sleep in chronic diseases, as it is very generally observed and readily accounted for.

23. ii. *Complete sleeplessness* is often a most important symptom of disease, and when it occurs without any manifest physical disorder to account for its existence, it should be viewed as the forerunner of dangerous disease, particularly of the brain. Complete wakefulness, even for many nights, is generally attendant upon nervous and other fevers of a continued type, upon inflammations of the brain, and upon inflammatory affections of an acute character. It also attends the eruptive fevers, rheumatic fevers, the gouty paroxysm, painful and spasmodic maladies, and pestilential distempers. When it is continued for many nights and days, vital power and resistance become exhausted, and delirium, followed by coma, is very apt to supervene. All acute diseases attended by febrile excitement or increased vascular action, especially towards or during the night, are characterised by a more or less complete insomnia; and when the febrile action subsides, then sleep returns, the occurrence of sleep often proving critical of these diseases (see *art.* CRISIS).

24. When insomnia is not followed by sound repose after a long continuance, it often passes into a state of half-sleeping and half-waking, in which the ideas of the patient are rapid, unconnected, and otherwise disordered, and generally expressed aloud, or in a low key. He dreams aloud in this half-conscious condition; or becomes more obviously delirious. The slighter forms of this delirium have usually been called wanderings of the mind; and at first they appear only occasionally, or during the night merely; but when they are not soon followed by composed sleep, are apt to be more continued, more fully developed, and to pass ultimately into sopor or coma.

25. If wakefulness is unattended by any very manifest disorder, or even by slight disorder, or such as appears insufficient to account for it, some serious disease of the brain should be viewed as impending, although a considerable time may elapse before the advent of it. In these cases, the
symptoms more especially connected wit
nervous systems should be carefully investi
in connection with the occupation, habits,
of living, arrangements for sleeping, venti
&c. The temperature of the head, action
carotid arteries, the functions of sense, and
of digestion, assimilation and excretion, ou
be carefully examined, and a treatment, bas
the report thereby obtained, should be ad
A dignitary of the church consulted me fo
longed insomnia. He evinced no other dis
Palsy, or apoplexy, or coma was dreade
the treatment was directed accordingly.
soon very much better, and continued so f
or three years, during which time I did
him; but at the termination of it he was
with apoplexy, at a great distance from L
and died in a few hours. An eminent ph
and author was afflicted with insomnia, he
wards became insane. A patient to whom
called had long been subject to wakefulnes
was afterwards attacked with phrenitis.

26. Pervigilium is not infrequent *in*
females, after their confinements, especiall
they breathe a close or impure air, or whe
have experienced hæmorrhagic or exhausti
charges. It may pass gradually, or eve
denly, into delirium or mania, if not arre
an appropriate method of cure. I have bee
to several cases of this kind, where the d
was aggravated by a treatment diametrica
posite to what ought to have been adopt
which, when adopted, speedily cured the
This is a most important affection in the pu
state, and should, even when attended
other manifest disorder, receive constant at
and suggest the most decided and app
means of cure, — appropriate, however,
various circumstances which occasion it,
several associations in which it is presente
and to the maladies of which it is either t
cursor or the attendant.

27. Insomnia is sometimes met with i
and even in older children: in them it sh
viewed either as the precursor of serious dis
as caused by some latent or undeveloped
condition. It not infrequently precedes or
disease of the membranes or substance
brain, especially tubercular deposits in the
or softening of the latter, before serous e
take place to any considerable amount;
companies the earlier and more latent st
these lesions.

28. iii. *The treatment of insomnia* sh
altogether based upon those *indications*
which the disease of which insomnia is
matic, or of which it is the precursor, sh
tionally suggest. It is owing chiefly to a
of this principle, that means, directed mo
cularly to this symptom, either fail of pr
their intended effects, or even often greatl
vate this particular disorder. In all
insomnia, attention should be directed to
temperament, habit of body, modes of l
diathesis or morbid tendencies of the pati
fore measures should be prescribed for t
der; and these measures ought to be es
devised against the disease on which the
ness depends. A principal indication is to
the several causes, remote, external, physi
pathological, which occasion it, more part

ect a close or contaminated air ; to reduce
nperature of the apartment, when it is high,
e quantity or warmth of the bed-clothes ; to
all the excitants of the senses ; to abstract
nd from all exciting, harassing, or engaging
ts, and to direct it to such as are unin-
g or unexciting — to one simple unim-
topic; and to remove or counteract the
l conditions, of which this is a symptom or
ent consequence. In both young and aged
ts, but especially in the dyspeptic and
the accumulations of disordered secretions
cretions, — of fæcal or contaminating mat-
of flatus, of acid or saburral materials, —
ded state of the stomach or bowels, are apt
place, and require free evacuation and cor-
by laxatives, conjoined with antacids and
ents. The existence of a plethoric state of
cular system, or of engorgement of the liver
rtal system, should suggest a repeated re-
to purgatives, deobstruents, and alkaline
ations.

When there is actual fulness of the cerebral
, or cerebral congestion, then local vascular
ons, purgatives, derivatives, the shower-
varm stimulating pediluvia, &c., should be
bed; and, if the insomnia appears to be
by increased vascular action, or by febrile
ance towards night, or by augmented deter-
n of blood to the brain, antimonial pre-
ns, or other diaphoretics, conjoined with
, &c., will generally procure sleep, whilst
es, exhibited in such cases, would only ag-
the disorder, induce headache, and increase
r of the digestive functions.

Anodynes and narcotics should not be ex-
in cases of either incomplete or prolonged
lness, until general plethora or local con-
s be removed by the means now suggested,
l morbid secretions, excretions, and fæcal
ulations have been completely evacuated.
ey are important means after these ends
een attained, and when this disorder occurs
ous, hysterical, or irritable temperaments ;
it follows copious losses of blood, or ex-
g discharges, and when it is thus met with
puerperal state. In these circumstances,
oice of the agent should depend upon the
rities of the case, upon the existence or non-
ce of anæmia, and upon the evidence as to
rity or richness of the blood, and as to the
of the several emunctories. When there
mia, or great debility or nervous suscep-
, the preparations of opium, or of hop, or of
e, or of poppy, with those of iron, or the
le bitters and the alkaline sub-carbonates,
nerally be of service; but all narcotics in
ses should be given two or three hours be-
e desired period of their operation, more
larly opiates; and in order to secure their
and to prevent headache, sickness, or
isorder in the morning, they should be com-
vith aromatics and alkalies. In some cases,
be preferable to administer the narcotic in
ble enema or suppository ; or the odour of
be inhaled during respiration, by lying
he head on a pillow containing a narcotic
ce, as hops, &c.

When sleep is disturbed by cramps, night-
frightful dreams, &c., the bed should be
d towards the head, and acidity of the prima via and costiveness ought to be prevented by magnesia, either alone or with sulphur, or with an antimonial preparation ; and food should not be taken for several hours before retiring to rest. Persons who are subject to partial wakefulness, or to troublesome dreams, or to sleep-walking, should be submitted to the curative means now advised, adapting these, however, to the peculiarities of each case. Due exercise in the open air, attention to the digestive functions, and a common-sense regulation of the moral manifestations and physical powers, will generally aid the effects of appropriate medical treatment. In all cases, the use of substances or beverages which are liable to disturb the digestive functions, to occasion heartburn or flatulence, or to excite the nervous system, more especially during the advanced hours of the afternoon or evening, the reading of exciting writings late in the evening, and reading in bed, more particularly, should be avoided ; and, if wakefulness or disturbed sleep occur in persons who are addicted to these practices, it should, in great measure at least, be attributed to them, and the relinquishment of them ought to be insisted on.

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SMALL-POX. — Synon.—*Euphlogia*, Rhazes ; —*Variola*, Sydenham, Boerhaave, Sauvages, &c. ; — *Pestis variolosa ;* — *Febris variolosa*, Hoffmann, Vogel, &c. ; — *Synochus Variola*, Young ; — *Synochus variolosus*, Crichton ; — *Emphyesis Variola*, Good ; —*Petite Vérole*, Fr. ; — *Pocken*, *Blattern*, *Kinderblattern*, *Kindspocken*, Germ. ; — *Vajuolo*, Ital. ; — *Viruela*, Span. ; — *The Pox*, Scot. ; — *Small-pox*, Engl.

Classif. : — 1st. Class, Febrile Diseases ; 3d. *Order*, Eruptive Fevers (*Cullen*). — 3d. Class, Diseases of the Sanguineous Function ; 3d. *Order*, Eruptive Fevers (*Good*). — III. Class. III. Order (*Author, in Preface*).

1. Definit. — *Small-pox is the product, and is productive, of a morbid poison or miasm, which, after a period, developes fever, followed by an eruption on the surface of the body, passing through the stages of pimple, vesicle, pustule, and scab, with other concomitant or succeeding affections ; the disease running a determinate course, leaving marks in the seats of eruption, and removing from the constitution the susceptibility of another attack.*

2. I. Historical Sketch. — The term *variola* is probably of monkish origin, it being the diminutive of *varus*, a pimple. The term *pock* is of Saxon origin, and signifies a bag or pouch. The epithets *petite* in France, and *small* in England, were added soon after the appearance of syphilis, or the grand or great pox, in Europe, in 1498. In Scotland the word pox is still used without the prefix.

3. Dr. Hahn endeavoured to prove, early in the last century, that the Greeks and Romans were acquainted with small-pox; and, much more recently, Dr. Willan and Dr. Baron have followed in the same track. Rhazes, who was the first accurately to describe this malady, was also the first to refer to the writings of Galen, in proof of its having been known to the Greeks; but, as Dr. Greenhill has shown in his able notes to his admirable translation of Rhazes, the *ἴονθος* of Galen was not small-pox, but the *acne* of modern authors. Mr. Moore has striven to show that small-pox was known in China and Hindostan, even before the time of Hippocrates. Dr. Gregory remarks, that he is incredulous of this having been the fact, and that he "is borne out in this scepticism by the opinions of Dr. Friend, Dr. Mead, and many other physicians of great learning, and equally indefatigable in research." It is not, however, improbable, that the disease may have appeared or prevailed in China and other adjoining countries very long before it was known in Arabia or Syria, and that it may have taken even a much longer period to have extended from the former to the latter countries than it took to reach the western parts of Europe.

4. That small-pox was not known to either Greek or Arabian writers early in the 6th century, is manifest from the circumstance of no mention having been made of it in the work of Alexander Trallianus, in which all the diseases then known are briefly described. Dr. Gregory, in his very excellent work on "Eruptive Fevers," remarks, that "the first notice of a disease which looks like small-pox, is to be found in a chapter of Procopius, 'De Bello Persico' (lib. ii. c. 22.), where he describes a dreadful pestilence which began at Pelusium in Egypt, about the year 544." But I cannot agree with this view; for Procopius states that malady to have been attended by buboes and carbuncles, which, with the other particulars mentioned by him, point rather to the plague than to small-pox. Dr. Gregory, however, adds, that whether this "disease was small-pox or not may be doubted; but certainly within a short time afterwards very unequivocal traces of small-pox are to be met with in the countries bordering on the Red Sea, for we read of caliphs and caliph's daughters being pitted." (*Op. Cit.*, p. 35.)

5. It cannot be doubted that small-pox had prevailed and been well known in Arabian and adjoining countries, and even in the western parts of Europe, some centuries before Rhazes described it at the commencement of the 10th century; and probably it was even much earlier known in China, or in some eastern countries, than in these. Mr. Bruce, the celebrated traveller, believed that the first epidemic of small-pox of which any notice can be found, occurred in 522. Mead says that, according to an Arabian manuscript, in the library of Leyden, this malady
appeared for the first time in 572, the year
birth of Mahomet, in Arabia, where it was
duced by an Abyssinian army. Marius, bis
Avenches, remarks in the second volume
"*Historia Francorum Scriptorum*," &c., tha
isted in Europe two years before this date, ar
it ravaged France and Italy. Marius, wh
the second council of Maçon, held in 585,
positively, in his chronicle, that in 570, "
validus cum profluvio ventris et variolis, I
Galliamque valde afflixit;" that it ceased fo
years, and reappeared in 580 in the same f
in 570. He adds, that Dagobert and C
bert, sons of king Chilperic and Fredec
died of this malady; that the wife of Go
king of Burgundy, was also attacked in 58
that, feeling her dissolution near, she accus
two physicians, Nicolas and Donat, of
poisoned her, and requested their execution,
was carried into effect over her tomb.

6. M. Monfalcon states, that Ahron,
sician of Alexandria, at the commencem
the 7th century, first mentioned the sym
the different varieties, and the treatment of
pox; and that, in 640, during the reign
caliph Omar, when the irruption of the A
Saracens into Egypt took place, the dise
peared in so destructive a manner, as t
many contemporary writers to suppose tha
a new pestilence. It appears to have ex
during the 7th century to all the countries
the Saracenic conquerors carried their arm

7. Although Rhazes was the first to w
pressly and fully on small-pox, he does n
tend to have been the first who had notice
he gives extracts from the works of Ahr
elder Mesue, and the elder Serapion, in
mention is made of it. This malady wa
wards noticed by Avicenna, Hali-Abb
other Arabian authors. It appears to have
England towards the close of the 9th cent
even earlier. After or during the Crusad
spread of the malady appeared more exten
then prevailed in most of the temperate c
of Europe. Bernard Gordon, professor
dicine at Montpellier, in 1285, notices
quency and fatality of the disease in Fra
that time; but it does not appear to have
early known in Norway, Lapland, an
very northern countries; the coldness a
ness of the air probably retarding its pro
them. Dr. Gregory states that the word
is to be found in several Latin manuscript
British Museum of dates decidedly prior
It should not be overlooked that the con
nature of small-pox was admitted by
Arabian and other early writers.

8. From Europe, small-pox was carried
the Atlantic to Mexico, which it devast
1527, and spread from thence, with fearf
lence, throughout the American continent
ravages of small-pox were especially great
the tropics, and still are most remarkably s
dark-skinned races, as sufficiently demonst
my own observation. From the earliest no
the malady, until the appearance of the
of Sydenham, there is little to mention in
tory of its progress, prevalences, or tre
further than that it was the most genera
fused, the most frequently epidemic, th
fatal, and the worst treated, of all known

ers. The heating or sweating regimen had grually reached its acme when SYDENHAM apeed. He not only accurately described this disse, but distinguished it from measles, and refoed the treatment of it. BOERHAAVE and VAN SwTEN adopted and carried out the views of SyENHAM, and demonstrated the extension of thmalady by means of a specific miasm or virus alo.

The *inoculation*, or artificial production, of thdisease was then only brought into notice in Eupe, although it had been practised in various cotries for ages previously. We have no inforation as to the period when this resource was fir adopted, or as to the circumstances which suested it. It is by no means improbable, that thwell-known contagious nature of small-pox, thgreater severity of the disease in childhood an infancy than in adult age, the admitted liaity of all to be infected, the immunity from a cond attack, and the desire generally felt ofaving what was inevitable undergone as ea in life as possible, may have suggested to th exercising the healing art the experiment of arcially communicating the disease, when prevang in a mild form, to children and those exsed to its infection, in order to secure an immity from it in after-life; and it is equally babe that those considerations influenced many inore countries than one, and at different eras. Tl obvious advantages which resulted must have leo the diffusion and the continuance of the prtice. VOLTAIRE, writing as early as 1727 in faur of inoculation, remarks, that the females of Cassia and Georgia were, from times immemoriin the habit of communicating the small-pox toeir children at as early an age as six months, bymaking an incision in the arm, and by inserting inhis incision the contents of a pustule taken fr another child. M. MONFALCON states, that inulation was practised from remote antiquity in Aca, especially on the coasts of Barbary, in Cna, Hindostan, Egypt, Armenia, Tartary, in Gece, and even in Wales and some parts of the W of England, and in Auvergne and Perigord inrance. He does not, however, give the authori for this statement. BARTHOLIN, who wrote abut the middle of the 17th century, states that inulation had been long used in some parts of Dmark. MONFALCON remarks, that it was emplied for the first time in Constantinople in 163, and BRUCE, the celebrated traveller, says th it had been practised for ages in Nubia. Dr. EIMONI, Mr. KENNEDY, and Dr. PYLARINI, in 14 and 1715, made the profession in England auainted with it, but no attention was paid to it, ul Lady MARY WORTLEY MONTAGUE had her so inoculated at Constantinople in 1717, and hdaughter in 1721 in England. After successful trs upon six condemned criminals in Newgate, th Princess of Wales submitted successfully h own daughters to the new process in 1722. VTAIRE, in 1727, was the first writer in France tirect popular opinion in favour of inoculation. H observations on the subject may even now be rd with interest. He remarks, that most of the 2000 who died of small-pox in Paris in 1720, wld have been saved if inoculation had been thn introduced.

0. The first ten years of the career of inoculon in this country, Dr. GREGORY observes, were singularly unfortunate. It fell into bad hands; it was tried on the worst possible subjects, and practised in the most injudicious manner. The consequence was that it soon fell into disrepute. The pulpit, too, sounded the alarm; and conducted as inoculation then was, it was a questionable improvement. A new era in this practice arose in 1746. The Small-pox Hospital was founded for the extension of inoculation among the poor. In 1754, the College of Physicians put forth a strong recommendation of the practice, and MEAD and DE LA CONDAMINE wrote treatises in favour of it. In 1763, the practice was especially adopted by Mr. R. SUTTON and his two sons, who inoculated with great skill and success. "In 1775, a dispensary was opened in London for the gratuitous inoculation of the poor at their own houses; but the institution failed, chiefly through the opposition of Mr. DIMSDALE, who had succeeded the SUTTONS, and fully equalled them in popularity and success. The Small-pox Hospital then took up the plan of promiscuous inoculation, which was carried on, to an immense extent, between the years 1790 and 1800. In 1798, Dr. JENNER announced the discovery of vaccination. In May, 1808, the inoculation of out-patients was discontinued at the Small-pox Hospital. In June, 1822, inoculation was discontinued to in-patients. On the 23d July, 1840, the practice of inoculation, the introduction of which has conferred immortality on the name of Lady MARY W. MONTAGUE, which had been sanctioned by the College of Physicians, which had saved the lives of many thousands during the greater part of the preceding century, was declared illegal by the English parliament. All offenders were to be sent to prison; and it was even provided that any attempt to produce small-pox by inoculation, even though unsuccessful, including, of course, the testing of vaccinated subjects, was an offence at law." (*Op. Cit.*, p. 39.)

11. II. DESCRIPTION OF NATURAL SMALL-POX. — This malady presents several forms, depending chiefly on its grades of severity, these grades arising from the intensity or concentration of the infecting miasm; from the susceptibility, constitution, or habit of body, of the person infected; and from the extent to which vital organs or surfaces are affected by the morbid actions developed by the morbific leaven. The state of the eruption more especially fixes our attention, inasmuch as it disorders the functions of an important organ, as it is a suppurative inflammation of a surface which induces serious sympathies in the œconomy, as it is an indication of the state and character of the vital powers, of the vascular action, and even of the blood itself; and as it most visibly and tangibly manifests the form or variety of the disease, suggesting not merely the diagnosis and prognosis, but also the indications of cure. As respects the *eruption*, therefore, it may be *distinct*, *corymbose*, *semi-confluent*, or *confluent*, according to the number, grouping, or distribution of the pustules; it may also be superficial, cellular, limited to the cutaneous surface, or extended more or less to the mucous membranes, especially at the outlets of canals; it may, moreover, be papular, vesicular, pustular, ichorous, scorbutic, or sanious, or purplish, or even blackish, according to the changes taking place in it. As regards the *type* or *character* of the attendant fever, small-pox may

be *benignant, synochoid, petechial, malignant* or *putro-adynamic*. It may also be *simple* throughout its course, and it may be more or less *complicated*, or associated with a prominent affection of one or more important internal parts or vital organs, developed during the progress of the malady. As will be rendered more apparent in the sequel, there is in general an intimate dependence of the state and appearance of the eruption upon the type and character of the fever, and of this latter upon the organic functions and the conditions of the blood. Whatever may be the form which the disease may assume, or however varied the associations of the states now enumerated may appear, small-pox presents certain stages which more particularly mark its course. These stagse have been divided into, 1st., that of incubation; 2d., that of invasion; 3d., that of eruption; 4th. that of suppuration; and 5th, that of exsiccation, But some authors have distinguished only three, namely, 1st., incubation; 2d., maturation, and 3d., decline. The stages may be divided into, 1st., the *latent, precursory*, or *incubative*; 2d., the *febrile*, or *the primary fever*; 3d., the *period of eruption and development*; 4th, the *maturative* or *suppurative stage*, or the *period of secondary fever, desiccation, and decline.*

12. i. DISTINCT, BENIGN, or SIMPLE SMALL-POX. — This form of the disease is very frequently met with in healthy constitutions, favoured by a pure air. It was that most frequently produced by inoculation, when this mode of communicating the disease was permitted. Between it, however, and the confluent, no very precise demarcation can be assigned, as the corymbose and the semi-confluent are mere approaches to this more severe form. In the distinct or benign states of small-pox, there is no serious depression of the vital power, or contamination of the fluids or solids, or dangerous affection of internal or vital organs, which more or less prominently mark the confluent and typhoid forms of the malady. The distinct small-pox presents in general the regular procession of the stages just distinguished,

13. *A. The period of latency* or *incubation*, — the *precursory stage*, — in small-pox, or the time which elapses from the inhalation of the infecting miasm, or the morbific leaven, until the appearance of the primary fever has been ascertained with considerable precision on numerous occasions. In cases of inoculation, the duration of the stage is rendered apparent. But in natural small-pox it is very commonly a matter of doubt. Dr. GREGORY, who has directed his attention to this topic, states that a large accumulation of facts enables him to fix this period at about twelve days, and that the extremes may be stated at ten and sixteen days. It has been, however, contended by several writers, that circumstances may occasion much longer or much shorter periods of incubation than are here assigned; and my own observation tends to confirm this opinion. A concentrated effluvium or miasm from the infected; a severe and prevalent epidemic; a very susceptible, weak, or cachectic habit of body; great fear of the disease, or dread of infection; a warm, humid, and close atmosphere; and the respiration of air, loaded with emanations from a number of small-pox cases, may somewhat shorten this period, and hasten the next or eruptive. On the other hand, various circumstances may prolong this stage, and retard the appearance of the next, especially a v dose of the poison; strong health and insusc bility of the patient; a dry, cold, and pure sta the air, or residence in a dry and bracing loca In the former circumstances, the period of inc tion may possibly be shortened to seven or days, and in the latter it may be prolonged to twenty or twenty-one days; but of these treme ranges Dr. GREGORY very strongly do ten and sixteen days being the extremes accor to his observation. The inoculated disease nishes a more determinate duration, whic generally from seven to nine days.

14. The first days of this period are passed without much, or obvious disorder; in other cases, some symptoms are experier indicating a state of impaired health, espec languor, lassitude, or malaise. When the dis is infected by a miasm floating in the air, or nating from the sick, the patient sometimes periences, at the time, an unpleasant and pec odour, generally attended by a feeling of sick giddiness, and of impending disease. When feeling is strong, it is often accompanied by a of alarm or dread, which seems to shorten stage and to hasten on the next, and eve render the malady more severe.

15. *B. The febrile stage, or that of invasio the primary fever*,—supervenes upon the prece period; or from the ninth to the thirteenth from the time of infection, or from the sevent eighth day from inoculation, the patient experie rigors, followed or attended by febrile sympt especially acceleration of pulse, heat of skin, in the loins and limbs, restlessness, scanty high-coloured urine, nausea, vomiting, &c., In some cases, the *rigors* and *heats* alternate some time, or during the first day; but the generally soon follow on the former. On second day the fever is attended by *nausea vomiting*, and great depression, with tenderne the epigastrium on pressure, and anxiety at the cordia. The lassitude and torpor are often acc panied, in adults, with somnolency, headache sweats; and in children, with faintness, sink or even with convulsions, or eclampsia. throughout the body, more especially in the h back, loins, and limbs, is always experienced, the pain at the epigastrium is often so severe a to admit of the least pressure, or even the we of the bedclothes. In some cases, the head is attended by stupor or delirium, especiall adults; and in children, by sopor, or epile convulsions; in these, the face is hot and flus and the carotid and temporal arteries beat stron the *tout-ensemble* of the symptoms indicating vascular reaction. SYDENHAM remarks when children, especially after dentition, seized with convulsions during the primary f it is a sign of the speedy appearance of the e tion; so that supposing the convulsions to place over night, a kindly small-pox may expected to appear in the morning.

16. In other cases, excessive prostration, faintness or syncope, extreme anxiety at the cordia, oppression at the chest, frequent sigh and even dyspnœa, pallid countenance, coldne the extremities, and feeble pulse, usher in febrile stage, and take the place of rigors or cl or follow immediately upon them. These sympt are indications of the depressing influence of

ious miasm on the organic functions, and of ability of the vital energies to react suffi- y, or to develope a state of healthy action. ese cases, a confluent state of the disease, or d adynamia may be expected, with pul- ry congestion, &c. One of the other of the ing groups of symptoms generally usher in uptive fever, and although neither of them e considered as evidence of the nature of the ent malady, still, the previous good health of atient, the suddenness or severity of the e, the prevalence of variola in the vicinity, or exposure to infection, even although vac- on or previous small-pox should have been gone, ought to be viewed as very strong tions of the disease. Dr. Gregory justly ks, that the fact of prior vaccination should hrow the physician off his guard, for the tory fever is just as severe after vaccination is in the unvaccinated.

. C. *The period of eruption and development.* rty-eight hours elapse from the rigors to rst appearance of eruption. The period is less, but it may be protracted by weakness nstitution to seventy-two hours, and the full opment of the eruption over the whole sur- may even occupy three days. Generally, ver, the eruption appears on the third or h day of the fever. During this fever, be- the more prominent symptoms above men- d, stridor of the teeth in children, with sopor, ry common; and in adults, a peculiar and odour, with sleeplessness, dryness of the fau- nd turbid state of the urine. The pulse is much ased in frequency, and is either soft, or broad ompressible. The febrile symptoms more or abate in the morning, and increase towards ing.

. Minute papulæ, sensibly elevated above general surface, or plane of the skin, show selves, at first on the face, forehead, and s, especially on the sides of the nose, upper nd chin; then on the neck and breast, and wards, on the limbs and trunk. When the læ are numerous, their first appearance is at- d by tension and slight pruritus; and, upon ng the fingers over the skin with some firm- the papulæ are felt to be not merely super- , but based in the cutis vera. The eruption y commences in the lower extremities. Some- two or three large papulæ precede the ral eruption, and advance to the state of le, before the surface is extensively occupied. papulæ are "generally not thrown together usedly and without order, but are arranged in ps of three or five. Crescents and circles be traced very distinctly, when the eruption t too copious. This constitutes an important nostic between variola and varicella." In most s, the eruption affords great relief to the ral constitutional disturbance. The fever es, the sickness subsides, and the pains of the , loins, and limbs moderate, or altogether e.

9. *The development* of the papulæ commences the evolution of the eruption and the sub- nce of the fever, which precedes and evolves eruption. But during this period, although the r abates, more or less remarkably, especially e benign, or distinct form of the distemper, it rarely ceases altogether, or disappears without returning more or less slightly in the evening. When the eruption is abundant, or the temperament of the patient is irritable or sanguineous, the mitigation of the fever is less remarkable; and, if the eruption has been delayed, or is confluent, or if the disease be complicated by some internal congestion or prominent affection, the febrile action may be continued during the development and maturation of the eruption with but little abatement, and generally in a typhoid, adynamic or even putro-adynamic form or type.

20. The number of the pustules vary according to the severity of the case — from three or four to some thousands, appearing first on the face, neck and upper extremities, then on the trunk, and lastly on the lower extremities, and changing from the state of papulæ, or vari, to that of vesicle and of pustule in succession. When the eruption is fully out over the body, and the pustules on the face begin to maturate, or about the eighth day from the commencement of the eruptive fever, the whole face, head, and neck become somewhat swollen, particularly the eyelids, which are often so distended as to close the eyes; and the swollen parts are painful when touched, and even throb. This intumescence lasts about three days, the spaces between the pustules appearing inflamed, or of a deep red, or damask rose colour: the closer this resemblance, the milder, generally, is the subsequent disease. Nearly one fifth of the number of pustules appear on the face; and according to Sydenham, the danger is in proportion to the number of pustules on the face, those on the other parts of the body hardly influencing the event. This, however, is not altogether the case, for the danger chiefly arises from the *tertiary* effects of the poison, or those produced upon vital or internal parts; the *secondary* effects being the cutaneous eruption.

21. *D. The suppurative or maturative stage,— the period of secondary fever and desiccation.*— With the intumescence of the face, the fever, which had remitted, returns, and the secondary fever commences. In cases of ordinary severity, the return of the fever is marked by a considerable increase of heat of surface, by a frequent pulse, and by slight delirium, from which the patient is easily roused. In favourable cases, the swelling of the face, the redness of the intervening spaces, and the secondary fever, having continued from the eighth to the eleventh day, subside, and the pustules, now fully ripe, burst and discharge a thin yellow matter, which concretes into crusts that fall off on the fourteenth or fifteenth day from the commencement of rigors, and the disease terminates, leaving the surface underneath the crusts depressed and of a pale lake colour. If the disease be of greater severity, hæmaturia, hæmoptysis, oppression in the chest, or a hard dry cough, may be complained of, with severe headache or pains in the loins or limbs, and more marked delirium, or even sopor; these more severe symptoms, however, generally subsiding on the eleventh or twelfth day.

22. When the symptoms assume an unfavourable aspect or threaten a fatal issue, then the face, which ought to have been intumescent on the eighth day, remains without any fulness or swelling; and the spaces between the pustules, instead of being red or inflamed, as seen in the favourable cases, are pale and white. Sydenham says that

the pustules look red and continue elevated even after death; and the sweat, which was free up to this day, suddenly ceases. At this critical period, the secondary fever, instead of presenting more or less of a sthenic character, may assume either a typhoid or an asthenic or a sinking form. When the secondary fever presents a typhoid type, the tongue becomes brown and dry, the pulse very frequent, and delirium soon appears, and often quickly passes into sopor or coma. In the rapidly sinking form, the patient may appear as suddenly overwhelmed by the depressing influence of the morbid poison, the pulse being hardly increased in frequency, the heat of the body natural, and the intellect unimpaired. Dr. R. Williams remarks, that the first case he saw of this kind, he could not help assuring the patient "that his symptoms were favourable; but he shook his head, and, perhaps from an inward feeling that his fate was sealed, affirmed that to survive were impossible, and he died a few hours afterwards." (*On Morbid Poisons*, p. 228.) Such cases are, however, rare in the discrete small-pox, but they are much more frequent in the confluent (see §§ 33. *et seq.*), and result from the influence of the poisoned and contaminated blood on the organic nervous system and heart. These cases very closely resemble, in all respects excepting the eruption, the character and termination of the putro-adynamic form of *fever* (which see §§ 472. *et seq.*).

23. In the more severe cases of the discrete or distinct small-pox, the morbid poison acts not only on the skin, but also on the mucous membrane of the eyes, throat, and mouth, occasioning an eruption, often somewhat pustular, in these parts. This additional affection does not appear to aggravate the fever, at least not materially, but it occasions more or less inconvenience. The eruption in the mouth and throat causes hoarseness, soreness of throat, and difficulty of swallowing. When the eruption extends to the conjunctiva or cornea it is often not attended by much pain; but when the swelling of the eyelids has subsided, the extent of mischief which sometimes takes place, especially when the cornea is implicated, is then discovered. The mucous surfaces are, however, not so much or so generally affected in the discrete as in the confluent form of the distemper (§§ 39. *et seq.*).

24. At this period a peculiar faint and sickly odour, particularly when the eruption is copious, emanates from the patient. Sometimes, especially in females and persons of a delicate and scrofulous habit of body, the secondary fever is accompanied with a very tender state of the general surface; but it is a very favourable sign. Recovery may be retarded by weakness of habit, by cold, and by the presence or development of the scrofulous taint. An ecthymatous eruption may also occupy the surface, or the skin may be left dry and scaly, or the scabs may be adherent. These phenomena are chiefly owing to the form of secondary fever, in connection with the habit of body, &c.

25. *E. Of the progress and appearance of the discrete eruption.* — The affection of the skin being generally present, whilst that of the mucous membranes is often wanting, especially in milder cases, the cutaneous eruption requires especial attention. The *eruption* runs a course of eleven or twelve days, in discrete small-pox, from the very first appearance of it until its termination; and, in its progress, is at first tubercular or papular, then vesicular, afterwards pustular, and lastly, it sca and falls off. The first, or papular, lasts abo two days; the second, or vesicular, occupies fo days; the third, or pustular, or suppurative, la three days; and the desiccative lasts three da more. The form and progress of the eruption is d ferent in the confluent, in the verrucose small-po and in variola after vaccination. The eruption first consists of a number of minute pimples or p pulæ, which feel like minute tubercles in the tr skin, when the fingers glide firmly over the surfa and are about the size of a pin's head. They a more or less numerous, but distinct from one an ther, and hardly salient. On the third, or close of t second day, a minute vesicle forms on the apex each pimple or papula, which, as it fills, is bou down or depressed in its centre, or umbilicate and contains a clear whey-coloured fluid. O the approach of suppuration or maturation, t cuticle covering the vesicle loses its transparen and becomes white and opaque. About t fourth or fifth day of the eruption, a red are appears around the base of each vesicle, an shortly afterwards, the central *bride*, causing t umbilication of the vesicle, ruptures, and t vesicle becomes pustular, enlarges, and fills, a assumes a somewhat conical or acuminat form. From the fifth to the eighth day of t eruption, the pustule maturates, when the surfa becomes rough and yellow, and the cuti breaking, allows a portion of the contents to oo out. In the interval from the eighth till t eleventh day, the pustule secretes the pecul viscid matter which concretes and forms the sca This scab desiccates, and is detached betwe the eleventh and fourteenth day, leaving t cutis, which it covered, of a reddish brow which lasts many weeks; but if the pustule h so penetrated, as to cause ulceration of the r mucosum, it leaves a permanent depression or p The cicatrix which is formed after these b rowing pustules is usually white.

26. *F. The internal structure of the variolo pimple and pustule* has attracted the attentio first, of Cotugno in Italy, and afterwards John Hunter, Adams, Bousquet, Gendr Judd, Petzholdt, and others. Dr. Grego has given the following account of the organi tion of the variolous pustule: — "Inflammati begins at the spot called the phlyctidium. seat is in the cutis vera. From the central poi or stigma, the inflammatory action proceeds radiation to the surface, penetrating to a grea or less depth in different cases. Beneath the e dermis, and constituting the greater part of t phlyctidium, is formed a substance or disc, of t consistence of pulp or thick mucus. This is n considered as any part of the skin altered by d ease, but as a product of a specific action of t vessels. John Hunter and Adams called it t variolous slough. At the height of suppurati this substance is swollen, and moist like a spon The floor of each phlyctidium presents the pap lated structure of the skin, elevated and mark with fissures. The vesicle is divided, like t substance of an orange or poppy-head, into n merous cells — twelve or more. It is multi cular. A filament of cellular tissue binds dow the central portion of cuticle to the lower surfa of the phlyctidium, and gives to the vesicle, in early stages, that umbilicated form — that c

ression of its centre which, though not peculiar o the variolous eruption, is so striking a diagnostic nark between it and genuine varicella. The luids, lymph and pus, which at different periods istend its cells, destroy at length the filamentous ttachment of the stigma to the cuticle, and that vhich was at first a depressed or umbilicated esicle becomes at last an acuminated pustule. t bursts, discharging a well-formed purulent natter, of a yellowish colour and creamy conistence." *

27. The inflammation of the phlyctidium is atended by a specific or erythematous inflammation, alled the areola, extending to some distance eyond the margin of the vesicle. The exact tint f this areola should always be carefully noted as idicative of important local and constitutional ates. On the subsidence of this inflammatory reola, the ripened pustules, having burst and disharged their contents, are succeeded by scabs, hich dry up and fall off, in a healthy constituon, in four or five days. In very mild cases, hen the process of pustulation is not fully gone rough, many of the vesicles shrivel, and form nly imperfect, scaly crusts. On the lower extremities, this premature desiccation of the vesicles is often very general.

28. In severe cases, the inflammation of the corion does not cease with the completion of the pustulating process. Portions of the cutis vera are then actually destroyed and slough away, the skin presenting the appearance of pits or fossæ, with a clarety hue, when cicatrization is at length completed. The dark tint wears off in the course of three or four months, but the depressions are permanent. From the great vascularity of the face, and from the exposure of it to light and air during the progress of the eruption there is always a more severe effect and disfigurement produced by the disease in this situation, than in any other part of the surface of the body.

29. ii. MODIFICATIONS OF DISCRETE OR BENIGN SMALL-POX. — *A. Verrucose Small-pox — Variola verrucosa. — V. cornea. — Horn-pock, &c.* This mild, mitigated, or modified form was well described by VAN SWIETEN. Its symptoms are similar to those of the preceding form, but are much milder. The primary fever is often little more than a febricula, and the pustules seldom exceed one or two hundred. These, indeed, seldom reach a pustular state, but, having passed through that of tubercle or papula into that of vesicle, on the sixth day, or even sooner, desiccate, shrivel up, and crust. This form is so mild, that the secondary fever is not manifested, and consequently is wanting; convalescence commencing on the eighth day of the eruption.

30. *B. Variola discreta siliquosa.*—When there are empty vesicles between the pustular pimples, or when the pus of the pustular pimples has been absorbed, so that they are left empty, the disease has been named *discrete siliquose small-pox*. When the eruption continues *vesicular*, instead of being pustular, the disease has been called *discrete crystalline small-pox*. When vesicular pimples appear in the interstices between the pustules, this modification has been named *discrete vesicular small-pox*. In these varieties the symptoms are generally mild, and the eruptive fever generally slight or moderate, and the secondary fever is either wanting or mild; the duration of the disease being rarely prolonged, but often somewhat shortened.

31. *C. Small-pox without the eruption.—Variola sine Eruptione.*—Variola presents, in the more severe cases, the fever, the cutaneous eruption, the affection of the mucous membranes, and the internal complications, hereafter to be described. In the more mild or benign cases, it consists only of the fever and the eruption; but, in both classes of cases, there is a *primary* and *secondary* fever. In small-pox the fever is remarkable, and distinguished from all other fevers by its remission at the end of four days, or when the eruption has come out, and by its return after a remission of four days, or about the end of the eighth day in the discrete, and about the eleventh day in the confluent small-pox. But cases sometimes occur, especially where the pustules are few, or their maturation is rapid or abridged, in which the secondary fever is either very slight or altogether wanting; and other cases are met with, much more rarely, where neither the eruption, nor the secondary fever, is detected; and yet there can be no doubt of infection having taken place, and of the system being protected from another attack. In those, however, the primary fever has

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* The following descriptions further illustrate this pic: — BOUSQUET says that the pustule has its seat the true skin, and that the epidermis is not thickened. n removing, however, the epidermis, which is easily tached, we discover a white, opaque, smooth surface, hich is a layer of lymph deposited from its adherent rface, and on removing this "disc," the interior of e pustule is seen divided by many concentric radii into number of divisions or cells, each filled with fluid, but t communicating. This interior arrangement, BOUUET compares to a cut orange, or pomegranate, while endrin says, it resembles that of a spice box. The pression at the centre on the *umbilication* is occaoned by a portion of cellular tissue which binds down e cuticle, and is slow to undergo the process of ramolsement by which it ultimately ruptures. The deription of the pustule by Mr. JUDD, who appears to ve examined the formation of the small-pox pustule th great care, is, in some respects, different. For he tes, "that in the small-pox pustule, circles of vesls enlarge and project from the cutis vera, and they crete a thin serum, which gradually raises a ring of e cuticula externa from the rete mucosum, and disnding it, forms a vesicle, without, except in some lent confluent cases, breaking up the attachment in e centre between the cutis rete and the cuticle. Hence e vesicle is bound down at that spot, and hence it has epressed summit. The degree of inflammation suddnly increases, and a thick coagulable lymph is then rown out that at once consolidates, and forms a thin t plate like a cymbal, but with a small hole left ough its centre, from the coagulation taking place und the before-mentioned thread-like attachment of cuticle. Now, about the time when the fever and lammation are again increased, called the secondary er, and pus being secreted, it elevates the lately deibed cymbal, or plate, and causes it to divide the stule horizontally, into an upper and lower cell, and progressive distension at times breaks up the reining attachment between the cuticle and cutis. The stules become opaque; for the pus passes through the e in the plate, or septum, and blends with the lymph serum above. The lower part of the pustule is comted by an extremely thickened state of the rete muum, which forms a raised lip or cup around; and, in st instances, the pustule may be stripped off with the icle and rete, still leaving the cutis entire. But the is vera has frequently a slight depression left from eration at the base of the cup, and occasionally a ule of the cutis projects into its centre, to which the d of attachment from the cuticle still adheres.

After the incrustation has separated, and the erupis gone, a stain with a depression, is commonly left he centre of the rete mucosum, occasioned by a zone ed vessels remaining long distended, both in the iopean and in the European. In the former it is k and permanent, except when the cutis vera has n penetrated; whilst in the latter the marks are and transitory, unless, indeed, when ulceration has etrated the cutis, in which case, in them, also, the are white and permanent in the European."

taken place, but without inducing the usual eruption. Sydenham, Lentin, Pelargus, Dubousis, Du Bourg, Frank, and others have observed, during the epidemic prevalence of small-pox, that some few persons who have not previously had the disease, nor been vaccinated, have been seized with all the symptoms of the primary variolous fever, and which having subsided without any eruption having appeared, they have afterwards been found unsusceptible of the disease.

32. Sydenham, De Violante, Crosse, and some other writers above referred to, have remarked that cases have occurred, during the periods when small-pox was raging, which have been attended by petechiæ, bloody-urine, or by purple spots and low fever, and have terminated fatally. These cases were viewed by them as small-pox without the eruption the severity of the internal complication, or the state of the habit of body and of constitutional powers preventing the due and regular evolution of the disease on the surface. It is by no means unreasonable to suppose, that analogous phenomena to those which I have described in respect of *scarlet fever* (see that disease § 26. *et seq.*), may also occur during the prevalence of epidemic small-pox; and that, owing to a predominant affection of the kidneys, or to depressed vital power, the eruption is either not developed on the surface, or very imperfectly, or in such manner as remarked by these and other writers. In cases where the kidneys are thus severely and early implicated, especially so as to arrest their excreting functions, not only are the usual phenomena and progress of the distemper interrupted, but a fatal issue soon takes place.

33. iii. Symptoms of Confluent Small-pox. — This state of the distemper commences generally with symptoms similar to those of the distinct variola, but more severe. The primary fever is usually attended by more sickness and vomiting; by severe pain in the loins, head, and limbs; by greater heat of surface; by more considerable and continued delirium; and, in children, especially in the evening, or just before the eruption, by eclampsia or convulsions. The fever is not only more intense than in the discrete variola, but it is also of shorter duration; the eruption appearing somewhat earlier, or generally on the third day, sometimes at the end of forty-eight hours from the rigors, but rarely later than the third day. The sooner the eruption appears, the more confluent, generally, does it become. Sometimes it is preceded by extensive erythematous inflammation, and the papulæ come out irregularly, or in small clusters, or resemble the measles, and are more prominent than in the distinct variola.

34. The eruption is followed by a less complete remission of the primary fever than in the discrete small-pox, the pulse continuing frequent and soft, the tongue white, and the skin more or less hot, especially in the evening or night, when, also, delirium often recurs. Salivation, which seldom is seen in the distinct, excepting in the more severe cases of that form, very generally occurs in the third stage of the confluent distemper — during the period of development, beginning either with the eruption, or a day or two afterwards. The salivary discharge is at first thin and abundant, resembling that produced by mercury; but it becomes thick and viscid about the eighth day of the eruption; and, in very severe cases, it either ceases for a day or two and t
returns, or it disappears altogether. Adults
more liable to salivation than children; but d
rhœa more frequently occurs in the latter,
often becomes profuse, or continues during
disease. The eruption is more or less modi
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in the discrete form. Owing to their greater n
ber and contiguity, they run into each other
become confluent; sometimes forming irreg
blisters or bullæ, varying from the diameter
fourpence or sixpence to that of a half-crown.

35. These symptoms may not vary materi
until the eighth day of the eruption, or eleve
of the fever, when the stage of secondary fe
commences, and greatly increases the severit
symptoms and danger of the malady. Prev
to this period, the confluent malady seldom
dangers life unless hæmaturia, or suppressio
urine, or hæmoptoë, or congestive pneumo
or general bronchitis, &c., supervene, or the
racter of the pustules, or other signs, indicat
very contaminated state of the circulation.
and after the eleventh day, especially on that
and on the fourteenth, the seventeenth, or
twenty-first day, according to Sydenham
R. Williams, the patient is often brough
such an extremity, that it is equally uncer
whether he may live or die. He is first en
gered on the eleventh day by a high fever,
tended by great restlessness or delirium, o
other symptoms, which usually prove fatal
less controlled or prevented by treatment. I
outlive this day, the fourteenth and sevente
are to be dreaded, for distressing restless
with more or less of the unfavourable sympt
about to be noticed, are liable to come on
to become aggravated, between the eleventh
fourteenth days, and to place him in the
imminent jeopardy.

36. The most dangerous symptoms in the
vanced stage of the distemper, or appearing
or during the secondary fever, are, the abs
of the usual redness in the intermediate spa
the non-intumescence of the face; the dist
tion of petechiæ in the interstices, or a
spot, hardly so large as a pin's head, in the c
of each pustule, or the partial filling of the
tules with a dark ichorous matter, or a d
sition to gangrene in the larger vesicles;
pression of the salivation; cough, with hæmop
suppression of urine, or hæmaturia; the sig
congestive pneumonia or bronchitis on pe
sion and auscultation, more especially if atte
by lividity of the lips, face, or extremities,
cating the affection of both lungs, which is
rally the case; a brown or dry tongue; great
lessness, or a continued delirium, coma, or s
unconscious evacuations; exudations of a da
ichorous blood from the mucous canals,
From certain of these, particularly those
mentioned, recovery may take place whe
treatment is judicious and energetic, but the
valescence is long, and its progress is ofte
layed by ulcerations of the cornea, or general
nic ophthalmia causing blindness; by pu
depositions in the joints, or ulcerations or er
of the cartilages, producing lameness; by
terminating in deafness; by abscesses in v

rters, and by suppuration of the subcutaneous ular tissue, causing cicatrices and alterations of features. (*See the Complications, &c.*, § 42.)

7. The disease may assume a *semi-confluent n*, or one intermediate between the discrete and confluent. This form is generally *superficial*, ough not always or necessarily so, and much frequently implicates the sub-cutaneous cellu- issue than the confluent. When thus superfi- , whether semi-confluent or confluent, the erup- passes through its regular stages, but the in- mation does not extend deeper than the cutis a.. This superficial confluent form appears in the accinated and sometimes in the vaccinated; and pustules over the whole body maturate equally regularly, pursuing their usual course, and upying the full time to their termination or ccation. "This form of the disease was well wn before the days of JENNER, and is not to be founded with the confluent small-pox, as modi- by vaccination." (GREGORY.) It takes either same time to maturate as the distinct, namely, en days, or an intermediate period between the rete and the confluent, videlicet, about eight s, the confluent generally requiring nine or n ten.

38. iv. VARIOLA AFTER VACCINATION. — The nptoms of this form of the disease may vary h the time which has elapsed from vaccina- n, but in the majority of cases they are the ne as those characterising the variola verrucosa, the horn-pock (§ 29.), or that very mild or igated form which maturates in five or six s, or in a shorter period. I have seen, on seve- occasions, and even described, as early as 1823 *Lond. Med. Repos.*, vol. xxi.), small-pox it affected the members of the same family at erent periods after vaccination; and in the mger persons, or those who had been vac- ated only ten or eleven years, the primary er produced an eruption which was merely ular, or hardly vesicular, whilst in the older, in those who had been vaccinated a longer iod, the primary fever was more severe, and the ption either vesicular and verrucose, or pustu- in a distinct or even confluent form; the erity and fully-developed state of the disease ng generally in proportion to the length of time ich had elapsed from vaccination. In the mer class of cases, the disease is thus more or s modified, and the secondary fever, either ht or absent; but in the latter, or pustular, the dification is either slight or hardly apparent, secondary fever being more or less severe. I ve, moreover, seen cases, after undoubted vac- ation, having been effected from thirty to forty rs previously, that presented the most malig- nt states of the confluent disease, the pustules turating imperfectly or slowly, or being filled h a black ichorous matter, the distemper pre- ting the characters described when treating of *tro-adynamic fever.* (*See art.* FEVER, §§ 472. *seq.*)

39. III. THE COMPLICATIONS OF SMALL-POX. — In a large proportion of confluent, and in some ni-confluent cases, the *mucous surfaces* are re or less implicated in the progress of the lady. The parts to which the air has ready ess are most frequently affected, as the nose, uth, trachea, &c.; but other parts covered by cous membranes are also attacked, as the œsophagus, stomach, intestines, &c.; this *mucous complication* has been well described by Dr. GREGORY. The eruption appearing on these surfaces is sometimes distinct, but more frequently confluent. Numerous white points appear on the tongue, palate, velum pendulum, and pharynx. Hoarseness or alteration of voice indicates that the same or similar changes extend to the mucous surface of the larynx and trachea; and the pain in swallowing shows that the pharynx and œsophagus are also affected, especially in severe cases. In these especially, a cough, which is at first dry, tearing, or clangous, is present with more or less dyspnœa and oppression in the chest. As the malady progresses, the cough becomes more loose, but sometimes also more suffocative, and about the seventh or eighth day expectoration is more or less abundant, frothy, and viscid, containing some whitish specks. This affection of the respiratory surfaces often evidently increases, and extends over a larger surface; and constitutes a peculiar or specific form of acute *laryngo-tracheal bronchitis*, which may exist either singly or separately, or be associated with a *congestive pneumonia*, or superinduce this latter. When once this complication is present, and more especially when it is thus severely extended, most dangerous results are then generally observed. It is apt to occur in the most severe cases, or where the constitutional powers are weak, and the febrile symptoms present more or less adynamia. In these circumstances, this complication is the more liable to extend downwards; and, from the trachea, it is prone to advance to the bronchi of both lungs; the *bronchitis*, or the *pneumonia*, or the *broncho-pneumonia*, thus superinduced, being not only asthenic or congestive, but generally double, or implicating both sides; hence the severity, the rapidity, and the fatality of the results.

40. Even when the complication is limited to the mouth, throat, and larynx, or proceeds no further than the trachea, the œdema or swelling of the sub-mucous tissues may be so great, particularly about the seventh or eighth day, as to impede the free access of air to the lungs, and the same consequences ensue, especially in respect of the blood, as follow the extension of the complication to the bronchi and lungs. In either case, the blood does not undergo the requisite changes in the lungs, — it is no longer, or only imperfectly, oxidised or arterialised, and the following phenomena supervene: — The vesicles are flat, or, at least, do not acuminate, their contents are dark or ichorous, and the areolæ which surround them on the trunk and face are dark, or claret-coloured. Sometimes the surface presents a dark, erysipelatous appearance, attended by large watery blebs, or bullæ, from which an ichorous fluid escapes. On the succeeding day the tongue swells, and, with the lips and gums, exhibits a purplish hue; the extremities and nails become livid; low, muttering delirium is present; and either restlessness, anxiety, and dyspnœa succeed, or coma, distended bladder, or relaxation of the sphincters, takes place, and death soon afterwards supervenes.

41. The *digestive mucous surface* has presented changes more or less nearly approaching the pustular character, according to the accounts furnished by RIVERIUS, BRENDEL, WRISBERG, BLANE, and many others, and these have been

met with on the œsophagus, stomach, and small and large intestines. But the changes there observed, whether eruptive or pustular, have not been described with sufficient precision. Granting it to have presented somewhat of an eruptive appearance, it could not, however, have been pustular; for the nature of the tissues,—the structure of the parts, — admits not of a pustular formation. It is much more probable that, in the course of this as well as of other eruptive fevers, the glandular structures of the digestive canal become more particularly implicated, the morbid state of the blood exciting a special affection of these structures in the course of their functions, which have a very strict reference to the conditions of this fluid. In the most malignant or putro-adynamic state of this distemper, I have observed, especially in the dark races, the exudation of a dark, dissolved, or sanguineo-ichorous matter from one or several of the mucous canals, at an advanced stage of the distemper; an occurrence also observed in, and described when treating of, *putro-adynamic fever* and *hæmogastric pestilence*, and resulting from changes of a similar nature. In these, the alteration of the blood, and the loss of tone in the capillary circulation, admit of the exudation of blood from those parts or tissues especially, which, owing either to previous affection, or to loss of vital cohesion, are most prone to experience this change. (*See art.* HÆMORRHAGE, §§ 13. *et seq.*)

42. *B. The sub-cutaneous cellular tissue* is often implicated differently from, and even more seriously than, that which has been already cursorily noticed (§ 36.). In the discrete form, this tissue is rarely affected, but in the confluent or semi-confluent, and in the variety which Dr. GREGORY calls irregular or corymbose, the morbid action often extends deeper than the skin, and invades the cellular substance either partially or to a very considerable extent. According to this limitation or extension, the integuments are swollen and tense. When the scalp is affected, it becomes remarkably swollen, and resembles erysipelas of this part, excepting that it is attended or followed by a diffuse or confluent pustulation, or a succession of small abscesses. The salivation already described (§ 34.) is often accompanied with great swelling, more or less diffused, in the throat and neck. In some instances the tongue is involved; and when a diffused inflammation of the neck and throat thus extends to the tongue, an unfavourable issue then soon follows.

43. The cellular tissue in various other parts, especially where pressure is experienced, or where the vital cohesion of the tissue is the weakest, often becomes the seat of an asthenic inflammation, particularly in the more severe or malignant confluent cases. The sacrum, back, hips, elbows, scrotum, legs, and various other parts, may be the seats of boils or carbuncles, or of sphacelation. This change is most apt to appear during the secondary fever. Dr. GREGORY remarks, that he saw, at the Small-pox Hospital, an exact counterpart of the pestilential bubo and carbuncle in the groin of a small-pox patient. The face always suffers in these cases very severely; and if recovery takes place, it is not only pitted, but also seamed and scored by the cicatrizations consequent on the inflammation of the subjacent cellular tissue. Dr. GREGORY states, what I have also often noticed, that the disposition to su tion of parts affected during the secondary f small-pox, appears to be universal and alm controllable. In some few cases, the larger fill with purulent matter. Of the gangrene so often occurs in the severe cases of var may be remarked, that attempts should be to prevent it, by attention and proper r and regimen, for in such cases it is often ir or aggravated by the absence of these, esp when the patient breathes an air rendered i by putrid animal emanations, or contamina being too frequently respired, or breathed many persons.

44. C. *Ophthalmia* is a frequent and mo portant complication of small-pox. It ha unjustly stated, that the inflammation tissues of the eye is attended by the forma pustules on the cornea and conjunctiva. although these tissues are very susceptible inflammatory states complicating this malad cannot admit of pustular formations. W flammation implicates the eye, it may eit limited to the conjunctiva, or extend deep even affect the whole organ. It is most d to take place when the changes in the ski the natural functions of this surface, and with the secondary fever, there is a manifest mination of the circulation, or some intern plication. The ophthalmia of variola may only prominent local affection, or it may b ciated with others of an important or mo gerous nature. Dr. GREGORY remarks, th thalmia commencing on the tenth day of the sometimes advances so rapidly, that in fort hours the whole eyeball is irrecoverably i The whole eye may even be converted into o abscess. "More usually, the inflammatic into some one of its less violent and more f consequences. An ulcer forms at the out of the cornea, by which the aqueous h escapes, or at which a staphylomatous pro of the iris takes place; or the aqueous hum comes clouded, or specks form on the from which blindness, more or less comp permanent, results. Many things concur to it almost certain that the affection of the small-pox is connected with some altered co of the blood, and the retention of the vitiate ters which ought to have been eliminated." there can be no doubt; for, as I have shown rious parts of this work, the depression of nervous power, and the contamination blood, superinduce all the complications of in the advanced course of both continue eruptive fever, and of other maladies impair functions of excreting and depurating orga

45. *D.* It must be manifest that the *circ fluids are more or less contaminated* by the of small-pox, whether that poison be con cated by the mucous or by the cutaneous s This contamination must necessarily exist cases of the malady, but in a very inappr amount in slight and benign cases; the e on the skin being its more prominent Where, however, the vitiation is greater, pecially where the eliminating or excreting imperfectly discharge their functions, or vital power is much depressed by eith primary or secondary operation of the pois circulating fluids, and particularly the blo

me very remarkably and even sensibly altered. is alteration is manifested in various ways, but re especially in the advanced course of the lady; although it may be perceptible from the nmencement of the primary fever. It is, howr, more frequently noticed when the eruption ears, or at a later period, or when the eruption roceeding to maturation. It is this contamiion of the blood which, when more fully connmated, imparts the character of malignancy of putro-adynamia to the distemper. This ation of the circulating fluids is rendered appat, 1st., by the state of the blood when drawn n a vein; 2d., by the change in the appeare of the eruption; 3rd., by the hue of the face in the spaces between the pustules, and by lividity of the lips, tongue, and extremities; , by the petechiæ, vibices, or ecchymoses, innixed with the variolous papulæ or vesicles; , by the filling of the vesicles with a bloody ter, or with a dark ichor, or even with dark, olved blood; 6th, by the passive hæmorrhages ch occur from the mouth, or nose, bowels, or rinary organs, or from the vagina, or from two nore of these outlets.

6. *a.* The more visible changes in the *blood* wn from a vein are similar to those which I e described when treating of the *pathology of* BLOOD (*see* §§ 125. *et seq.*), and consist chiefly npaired crasis of the crassamentum, or a loose, tinous portion covering the black and hardly erent portion of the coagulum. The altera- is often still more manifest in the blood red out from one or more of the mucous als, this fluid appearing as partially dissolved, , or ichorous, and being incapable of coagug. — *b.* The *eruption* has at first a dingy or aspect; and as it proceeds to imperfect mation, the vesicles fill only partially with a dised bloody serum, or with a matter containing blood-globules changed to a blackish or vnish hue; and the vesicles are intermingled petechiæ, &c., already mentioned. — *c.* The *ral appearances* of these cases is often peculiar, they are the most distressing and frightful matations of disease which can present themselves ur observation. The expression of the counnce is most anxious. The tumefaction of, and tion on, the face; the exudations of blood the mouth and nostrils; the closed, livid, tumid eye-lids; the discharges from under , or from the eruption; the swollen, soft-, livid, or blackened hue of the general sur-; the ichorous or bloody exudations from the ary and genital organs and bowels, — all bine to impress the mind with an idea of a lence, exceeding in severity, and frightfulness s aspect, both the plague and yellow fever; to suggest the idea of a general dissolution or efaction of the structures, even before life has its departure, — a dissolution which has aly partially taken place, in so far as that the es have actually lost a very large share of usual vital cohesion, and have entered upon ges identical with those which appear soon death.

. The appearances now described are but y observed in the variola of the *white races;* have met with them in a few cases, and in two ree instances the patients had been vaccinated y years previously. This malignant form of the malady was of more frequent occurrence formerly — before the introduction of inoculation and vaccination—than now, and was more common in some epidemic visitations of the distemper than in others. It was called by older writers, the *variolæ nigræ*, or black small-pox; and is, even now, the not uncommon form of the disease amongst the *dark races*, especially the *Negro*, and particularly when the distemper spreads by the respiration of miasms from the infected. When the adult female is the subject of this state of the malady, a most depressing or exhausting menorrhagia is apt to take place. I attended, some years ago, with Dr. GREGORY, a lady who was carried off by this form of small-pox. She had been vaccinated about thirty years previously, but she nevertheless presented the appearances just described. In this case, as in the following, mentioned by this physician in his work, the functions of the brain were not disturbed. "In February, 1842," Dr. G. remarks, "I saw, in consultation with Dr. L. STEWART, a lady in small-pox, whose whole body was the colour of indigo, and whom I at first believed was a native of Africa. She conversed with me in the most tranquil manner, and died a few hours afterwards, proving that the nervous system is not necessarily, nor is it even usually, implicated in the petechial form of small-pox" (*Op. Cit.*, p. 52.) • This exemption of the brain from disturbance is very often met with in other malignant fevers, more especially in putro-adynamic fever, in malignant puerperal fever, in the hæmagastric pestilence, in plague and pestilential cholera, — maladies in which the circulating fluids are most signally vitiated. Dr. GREGORY has remarked, what I have reason to believe to be correct, namely, that death may take place in consequence of this remarkable condition of the blood, before any unequivocal signs of small-pox are developed, and has adduced two instances in which this appears to have occurred. Under common circumstances, the malignant or petechial form of variola exhibits an abundant confluent eruption, but this never makes much progress towards maturation. "Nature apparently gives up the struggle as hopeless. The patient is carried off very unexpectedly, perhaps on the fourth day, or from that to the sixth." But I have seen such cases sometimes protracted to the seventh or eighth day.

48. *E.* The *brain and nervous system* are often prominently affected in small-pox. This may occur at any age. Children are seized with convulsions on the accession either of the primary fever, or of the secondary fever; or they grind their teeth, roll their heads, scream, and squint. On these, inflammatory action, effusion, &c., supervene; or these changes have already taken place, to some extent, and occasioned these symptoms. In such cases, death very generally follows, either during an attack of eclampsia or convulsions, or with the usual signs of cerebral congestion and effusion. In older children and adults, the accession of the cerebral complication is attended by delirium of a violent or maniacal form — the *delirium ferox*. In some cases, the delirium is owing more to irritability of temperament, or peculiarity of constitution, than to inflammatory action; and in others, the nervous symptoms are attended by great depression of spirits, and by an inclination to commit suicide.

49. Dr. Gregory remarks, that "*a peculiar nervous affection* often supervenes on the tenth day, when the skin is extensively occupied by the confluent eruption, without nervous complication. It is identical with that which is familiar to surgeons as the consequence of extensive burns and scalds. General tremors, low delirium, a quick and tremulous pulse, a dry tongue, collapse of the features, cold extremities, and subsultus tendinum, are the symptoms of this nervous complication, and the precursors of a fatal event." (*Op. Cit.*, p. 51.) This is an accurate description of the unfavourable termination of a large proportion of confluent cases, as observed in weak constitutions, when the vital resistance is insufficient to oppose the depressing tendency of the distemper, or when the powers of life have not been sufficiently supported, or when support has failed to be efficacious. It is of great importance to recognise the accession of this state of sinking of vital power, in order to have a chance of opposing it with success.

50. *F.* Certain of the *bronchial and pulmonary complications* have been already noticed (§§ 36, 40.), especially such as arise from, or depend upon the contamination of the blood. But it is not unusual to observe a state of *bronchial irritation*, or *inflammatory action*, from the commencement of the febrile state, especially during the winter season. It may accompany the progress of the malady, without being materially increased, or without inducing a more violent form of the distemper. Frequently, however, and more especially in warm climates, or in the *dark races*, who have migrated to cold or temperate regions, the bronchitis extends generally to both lungs, and often to the substance of the lungs also, thus developing a form of congestive *broncho-pneumonia* (§ 39.). Sometimes associated with bronchitis, or with pneumonia, or occurring independently of either of these, *pleurisy* supervenes, and constitutes a most dangerous complication of variola. It has been noticed as follows by the able author just mentioned: — "Variolous pleurisy occurs between the twelfth and twentieth day. It is a peracute form of inflammation, remarkable for its sudden invasion, rapid progress, and invariable termination by empyema. The symptoms are very unequivocal: intense pain of the side, a hard or wiry pulse, shortness of breathing, great anxiety of countenance, a peculiarly pungent heat, and dry state of the surface, betoken but too forcibly the state of the pleura, even without stethoscopic aid. Blood-letting is almost powerless in this state of the disease. Death usually happens on the third, or, at farthest, fourth day from the invasion of thoracic symptoms." (*Op. Cit.*, p. 54.)

51. *Variolous pleurisy*, whether occurring as a complication or as a sequela, is not confined to the confluent, or any other form of small-pox. It may appear in the distinct or mild variety, or in the varioloid or modified disease, and in these forms it may be traced to exposure to a current of air, or to some other cause; and it may take place, especially when thus produced, at any stage of the malady. When it supervenes during the confluent distemper, and at the far-advanced stage, as just now described, it may justly be ascribed, as Dr. Gregory has inferred, to the morbid condition of the blood at this stage, — a cause which sufficiently accounts for the rapid progress and fatal issue of the complication. The variolous pleurisy, however, may not only be acute, or attended by very sensible indications of its existence, but also *latent*, until the consequent empyema or effusion has produced very manifest effects upon the respiration and blood.

52. *G.* The *heart, pericardium*, and blood-*vessels* are more frequently affected in a more prominent manner than has been generally supposed. — (*a.*) The *endocardium* and *pericardium*, either or both, may be implicated in the progress of the more severe forms of variola, owing to the alteration of the blood, produced either primarily by the variolous poison, or, secondarily, by the absorption of a portion of the matter formed in the pustules, and by interrupted excretion; but, however induced, this complication is rapidly fatal, often without any other symptom than sudden sinking, and rarely with either pain or palpitation; more frequently with sudden anxiety and sense of dissolution.

53. (*b.*) That the internal surface of the blood-*vessels become asthenically inflamed*, as an advanced complication or sequela of small-pox, has been on several occasions witnessed by me in the infirmary for children since 1820; but I believe not so frequently as the endocardium and pericardium. The veins are certainly oftener implicated than the arteries, or, at least, more sensibly so, especially when the affection of the former gives rise to obstruction of the circulation through them. But, as I attempted to show many years ago, *asthenic phlebitis* may supervene in the progress of malignant distempers, and fail of producing lymph from their internal membrane capable of coagulating; the product of the morbid action being a fluid exudation, which passes into and mingles with the blood circulating through the inflamed vessels, thus contaminating, or poisoning more fatally, the blood, heart, and blood-vessels.

54. *G.* The *purulent collections*, also met with within the capsules of joints, are rare complications or sequelæ of small-pox, yet they are not so rarely met with as to permit being overlooked. These deposits may be referred to the same series of changes, especially as regards the circulation, as have been noticed, and even fully discussed, with reference even to small-pox, when treating of purulent formations. (*See art.* Abscess, § 7. *et seq.*)

55. *H. Abdominal complications* are less frequent than the thoracic affections now passed under review. They are nevertheless sometimes met with, especially during the epidemic prevalence of the distemper; and oftener in some epidemics than in others. This circumstance is not always readily explained; although in some cases it may be referred to modes of living previously to, or at the period of infection, or to the water, or other peculiarities of the locality, or to the place of residence. — (*a.*) The most common of this class of complications are *diarrhœa* and *dysenteric affections*, sometimes leaving behind them, when convalescence has so far proceeded, disease of the mesenteric glands, with emaciation and atrophy, as a sequela of the malady. Children, in unhealthy localities, are not infrequently affected by a mucous diarrhœa, or even with tenesmus and other symptoms of dysentery, in both the discrete and confluent forms of small-pox; the risk from this association being increased according to its severity.

few instances, blood is passed with, or inter-
gled with the stools to an amount which tends
lly to sink the patient. If the stools be
ely streaked with blood, the risk is less; but
these may indicate great danger.

(b.) Pain in the region of the *kidneys*, symp-
of congestion of these organs, and *hæma-*
, are not uncommon in the severe states of the
mper, and are always to be viewed as most
vourable occurrences, especially if the urine
anty or suppressed. In cases of hæmaturia,
ource of the sanguineous exudation has not
accurately determined, but there is reason to
that it is the secreting structure of the
ys; and that these organs are more fre-
tly and seriously implicated in severe cases of
listemper than is commonly supposed. I do
say that they are so generally or so dan-
sly involved as in scarlatina, but this symp-
in connection with remarkable scantiness of
cretion, and an almost complete suppression
ine, have been remarked by myself and
sufficiently often to attract a more particular
ion to the function of the kidneys during the
of the malady, and to the appearances
xhibit in fatal cases, than has hitherto been
ed to them. It must be manifest, that even
tial impairment of the excreting offices of
rgans, at any period of small-pox, must ne-
ly render the blood more and more vitiated,
uperinduce various other dangerous or fatal
in vital organs, as I have fully shown
treating of *scarlet fever*. (See that *art.*,
et seq.)

I. Other complications may occur, on rare
ons, in the course of variola, but they are
eldom detected during life, and more rarely
for, or disclosed, on dissection. I shall
ention a few of those which have been no-
and which should be kept in recollection
our dealings with this distemper: the pre-
of *intestinal worms*, which often aggravate
aracter of the disease, and which are often
ged at an advanced stage of the most severe
tal cases; signs of inflammation, or con-
, or of functional disorder, of the *liver* or of
endages, various changes in these parts
detected after death; intumescence of the
and softening of this organ in fatal cases;
other of the several forms of *erypsipelus*, or
e or asthenic inflammation of the cellular
inflammation of the *urinary bladder*, and
ions of blood from the inner surface of this
; and a similar affection, with an imperfect
ment of pustules, vesicles, or papulæ, on
æ valvæ and *vagina*; this last being very
t, and very troublesome in some cases.

ii. SMALL-POX MAY COEXIST WITH OTHER
C OR EXANTHEMATOUS MALADIES.—This is
occurrence, but one which should not be
ked.—(*a.*) *Measles* coexist with variola more
tly, perhaps, than with any of the exanthe-
This combination has been observed, both
ers running their normal course, and unin-
g each other, by DIEMERBROECK, DE HAEN,
, TRACEY, KING, DELAGARDE, JONES, and
MANGET says that measles delays the sup-
of small-pox, when both coexist; and
LER states, what is very surprising if it be
mely, that he saw a case in which the
of small-pox broke out on one side, and that of measles on the other side.—(*b.*) *Scarlet fever* has also been seen coexisting with variola, both distempers pursuing their regular courses, by JENSENIUS, MALFATTI, KRÜGELSTEIN, MARSON, BARNES, and DESSESSARZ. Dr. GREGORY informs me, that he has seen, at the Small-pox Hospital, many unequivocal cases of the concurrence of small-pox and scarlatina anginosa; and that variola and cow-pox may coexist, as HOLM and others have contended. DESSESSARZ, who has paid much attention to the coexistence of variola with other specific diseases, mentions this concurrence of variola with *syphilis* and with *hooping-cough*, this latter delaying the eruption of variola, according to his observation. When vaccina and variola coexist, they may both run their usual course, or the one or other be more or less modified in aspect and progress.

59. iii. VARIOLA IN THE PREGNANT AND PUERPERAL STATES AND IN THE FŒTUS.—When a pregnant woman is seized with small-pox, abortion or premature labour may or may not take place, and the disease may or may not be communicated by the mother to the fœtus. Much depends upon the mild or the severe character of the distemper. If the disease be not very severe, the mother may not abort, and the fœtus may not be infected; but if the distemper be severe, confluent, or malignant, abortion takes place, as in nearly all instances of other malignant or pestilential maladies; the fœtus being dead, and furnishing proofs of its having contracted the malady. The communication of variola to the *fœtus* has been observed by H. AUGENIUS, FERNELIUS, DERHAM, FORESTUS, MEAD, MAURICEAU, KITE, MORTIMER, WRIGHT, FLINDERS, WATSON, DIMSDALE, HUNTER, LYNN, TURNBULL, PEARSON, and HAYGARTH. Dr. GREGORY remarks, that it does not necessarily happen that a pregnant woman, taking small-pox, conveys the disease to the child; several instances to the contrary have occurred at the Small-pox Hospital. An opinion was entertained by Dr. MEAD (but erroneously), that where a woman undergoes small-pox without aborting, the infant would remain through life unsusceptible, having, in fact, passed through the disease in utero. Dr. JENNER has detailed two cases, which prove very satisfactorily that a fœtus in utero may contract small-pox, provided the mother be exposed to the contagion, although she herself does not take it. "An infant, born under these circumstances, sickened for the small-pox five days after birth, and twelve from exposure to contagion." (*Op. Cit.*, p. 751.) In several collections fœtuses are preserved whose skins are covered with variolous eruptions. The earliest period of fœtal life at which Dr. GREGORY ever saw traces of variolous eruption is four months.*

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* The following abstract is taken chiefly from the American edition of Dr. GREGORY's work on "*Eruptive Fevers.*" Dr. MITCHELL (*Amer. Jour. of Med. Science*, vol. vii., p. 555.) adduces the case of a mother, who bore the marks of small-pox, with which she was affected in childhood, and whose infant was born in an apparently healthy state, but exhibited symptoms of variola three days after birth, and nine days after birth the pustules were in a state of complete maturity. M. DENEUX (*Ibid.*, vol. xi., p. 499.) instances the case of a woman who had been vaccinated and never had small-pox, but who bore an infant covered at birth with confluent small-pox in the eleventh or twelfth day of the eruption. Dr. C. GUOLI (*Ibid*, vol. iv., *new series*, p. 485.) states, that a child was born in June, 1841, covered with pustules of

60. When a pregnant woman is seized with small-pox so severely as to place her life in jeopardy, she aborts, the fœtus being generally dead; and the mother very rarely recovers. The abortion probably favours this event, especia i it be attended by much sanguineous disch e but this event has taken place with equal ra it where this discharge has been most remar bl small, or altogether wanting, as in a case wh lately attended with Mr. BARNWELL. The m issue is observed in respect of other dang ou maladies, especially low fevers, scarlatina, me les and the several malignant and pestilential di m pers. When small-pox is caught shortly or delivery, so that the fœtus is born before th dis ease has proceeded its full course, the fœ i generally infected, and the distemper assum i the mother a most severe and complicated o on fluent form, recovery seldom taking place. I av seen several cases of variola in the pue era state, infection having taken place before co ne ment, but I have met with only one in whi th disease presented a mild form.

61. iv. OF THE CHARACTERS OF THE LOCA AF FECTION AND OF THE FEVER.—*A.* The *local ch ges* whether external, as evinced by the varying on dition of the eruption, or internal, and consti ing the contingent complications of the malady pre sent every phase or gradation of inflamm ory action, from the most slight to the most sor ganising, from the sthenic to the most ast nic or that most rapidly passing into the diss tion of structure.

62. *B.* The *type of fever*, whether of th ush ering in the disease, or of that developi the suppuration or maturation, also varies in res ct o power and vital resistance, — as respects or ganic nervous energy and the states of the rcu lation and circulating fluids, — from that hich may be viewed as inflammatory, until it sin into the most malignant and pestilential, pass , in different cases, through every intermediate ype form, or phase; the local changes always p ent ing a more or less intimate relation to the s e o character of the febrile commotion. Never less however numerous the forms or states, either f the local changes or of the constitutional distur nce this distemper, more remarkably even th any other specific disease, preserves all its speci pro perties unaltered and unalterable, elabora the same poisonous miasm and virus, and propag es it kind through innumerable generations, hou changing or even modifying any of its featur The same now as it was twelve centuries ago, it s los none of its qualities or attributes, and gai d no new property. We observe it now as it s ob served from the earliest periods of its histor with the same remarkable modifications in both e lo cal changes and the constitutional disturba , the slightest and most benign form of morbid tion and the most pestilential; each form, and e h in termediate phase appearing in the same ep mic in the same locality, and in the same fam , the distemper, nevertheless, preserving its spec na ture and identity.

63. The very remarkable modification va riola now described are to be imputed — ., t vaccination; 2d., to inoculation; 3d., to i ction by the mucous surfaces, and especially the respiratory passages; 3d., to the dose or th uan tity of the poison which has infected the fra par

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variola. The pustules were at their height on the second day after birth, and maturated on the fifth; but the child died on the ninth day after birth. The mother had been vaccinated when an infant, and had escaped small-pox. M. GERARDIN (*Ibid.*, vol. vi., N. S., p. 210.) reported to the French Academy of Medicine, in 1842, an instance of a child born with the eruption in a state of suppuration; but no mention is made of the mother in this case. Dr. JOSLIN (*Ibid.*, vol. v., N. S., p. 249.) met with a case of small-pox in the fœtus, in New York, in 1842. The fœtus had on its body about 170 regularly-formed pustules, apparently such as they are from eight to ten days after the attack. The child lived only a quarter of an hour. The infection had been received by the mother just thirty days previous to the birth of the child. She was exposed but once to a single case, at the very commencement of the eruption, and for a single day. She had been vaccinated in early childhood, and the operation had been repeated on the day of exposure by Dr. JOSLIN himself, but without effect. M. DAPAUL (*Bullet. de Thérap.*, 30th April, 1849) saw a case of transmission of variola from a mother to her child, which had numerous pustules at birth. The mother had visited a person with the disease a short time before, without taking it. A case occurred in the Maternity Hospital, in Paris, in which the face, scalp, and different parts were covered with the pustules of small-pox at birth, though the mother retained the marks of vaccination, and had never had the small-pox. About ten days before, she had seen a patient at La Pitié, near another with small-pox (*Lancet*, 18th Feb., 1843, p. 741.). Dr. MEAD (*Works*, ch. iv., p. 253.) has recorded an instance in which a woman was delivered of a dead child at the full time, covered with variolous pustules. She formerly had the disease, and was attending her husband with it, when delivery took place. Dr. LEBERT (*Bullet. de Thérap.*, 30th April, 1849) exhibited to the Biological Society of Paris, a fœtus about four months old, whose body was covered with pustules of variola. The mother had the disease slightly, and aborted during her convalescence. Dr. KING (*New York Med. & Surg. Journ.*, April, 1840, p. 292.) mentions the birth of a living child at seven months, covered with umbilicated pustules, the mother having entirely recovered, and presenting at the time of its birth no evidences of the eruption, excepting the red spots succeeding the scabs; the child having been born twenty-one days after she was first attacked, or seventeen days after the appearance of the eruption. Dr. L. V. BELL (*Amer. Journ. of Med. Scien.*, May, 1836) adduces an instance of a lady who had confluent variola at the seventh month of pregnancy, and escaped without abortion, — a rare circumstance in confluent small-pox. At the expiration of her full term, she was delivered of a healthy child, whose abdomen and thighs were marked with decided small-pox pittings, and who was unsusceptible of the vaccine disease. VAN SWIETEN (*Commentaria*, vol. v., p. 8.) records, amongst several others, a similar case to the last; the child was born at the full time, with pits of small-pox, the disease having been transmitted to the fœtus through its mother, who had herself undergone the disease. Dr. HOSACK (*Med. Essays*, vol. ii., p. 111., & vol. iii., p. 473.) refers to numerous other instances, recorded by authors, of the communication of variola to the fœtus in utero.

"It will be found, on examination of the preceding and of other cases, that the communication of variola to the *fœtus in utero* has occurred after vaccination of the mother in infancy, and after her revaccination on the day of her exposure, and also after variola, both naturally and by inoculation. It has also taken place when the mother is yet suffering from the disease, and after she has passed through it years previously, and when she herself escapes entirely.

"The fœtus may be infected by absorption of the virus through the mother, without her experiencing any effect from it; or the disease may be transmitted directly by inoculation of the mother, and may be communicated any time from the fourth month (and perhaps earlier) to the full time. The fœtus may be thrown off in three or four days after cessation of motion, or may be retained for three or four weeks.

"The child may be covered with eruption at birth, and this eruption may present itself in different stages of its progress in different cases, even up to the eleventh or twelfth day of the eruption, or may not appear until three or four, or even seven days after birth. It may also be born at full time, with pits left by the disease some weeks previously."

The child either falls a victim to the disease at once, or lingers for only a few days; but it has been born healthy at the full time, with marks of previous disease; and it has survived when the disea in mild form, has appeared after birth. On this, d al other topics connected with variola, the a rable Commentaries of VAN SWIETEN on the Aph ms o BOERHAAVE will be studied with advantage.

larly by these passages, relatively to the vital er and resistance of the patient; 4th, to the titutional power, habit of body, diathesis, tem- ment, and health of the patient; 5th, to his , or to the variety of his species; 6th, to his es of living, mental power, and moral cou- ; 7th, to the physical agents which surround influence him, especially the conditions of the sphere in respect of temperature and hu- ty, of purity and requisite renewal,—in short, e various circumstances which I have pointed in full detail, when treating of the several s and sources of pestilences, with reference to removal and avoidance (*see art.* PESTILENCES, ECTION FROM); and, 8th, to the character or e of the prevailing epidemic constitution.

. According to the influence of these, either or in various combinations, the disease es a mild, or a distinct, or a severe, or a confluent, or a confluent, or a complicated, or lignant form, the primary and consecutive developing these several states, or at least ating, conformably with them, and with reference to them individually, either a , or mild, or an inflammatory, or an adyna- or asthenic, or a putro-adynamic, or a nant character, the appearance of the erup- eing one of the chief indications of the type racter of the fever. Certain of the modifying nces now enumerated may require a brief k. The first four mentioned manifestly need nment.

The *race*, or the *variety of the species*, to the patient belongs, is of the greatest im- ce in modifying the distemper. The white specially that inhabiting northern and tem- climates, experiences a much milder and, frequently, a discrete form than the dark particularly the Negro. Amongst the latter the disease more commonly assumes a con- or malignant form, and is the most dan- pestilence which can overtake them. It is n what the hæmogastric pestilence is to the eans when they migrate to the hot countries and when that pestilence is epidemic. st the dark races this pestilence is compa- mild, but most fatal amongst the white whilst the very opposite obtains in respect ll-pox. As to this, I speak from personal ation. There is nothing which can be con- more pestilential than I have seen small- en it has seized upon a Negro town or nity: the general malignancy of the dis- , the desertion of the afflicted by the healthy ve not passed through the disease, and the trid or decomposed and hideous appear- f those who are yet alive, but nevertheless much of the characters of structural disso- cannot fail of making a never-to-be-forgotten ion on the observer.

The state of the atmosphere is also very ial in forming the general character of ox. In dry, pure, and moderately cold or tes of the air, this distemper is much and less prevalent than in hot seasons, and id and still states of the atmosphere. In es enjoying the former atmospheric condi- he malady is less generally and severely c than in warm countries, where the latter ns obtain; there are, however, frequent ns to this law that probably are dependent upon the unknown nature of epidemic constitutions; but this topic, and others connected with it, will be considered more fully in the sequel. (§§ 93. *et seq.*)

67. The form or character of the malady thus depending upon the circumstances now mentioned, and modified as above described, must, in the present state of our knowledge, be viewed as the result of agencies which tend either to resist or to limit the susceptibility and the poisonous properties of the miasm or virus which produces it on the one hand, or to increase that susceptibility, or to develope the injurious operation of these poisonous properties on the other. We observe, 1st., that a previous attack, with very rare exceptions, destroys the susceptibility of a second infection; 2d., that vaccination produces a similar effect, but for a certain time only, at least in many instances; 3d., that the mode of communicating the malady, which is the best calculated to secure the introduction of the smallest possible quantity of the poison into the system capable of infecting it, is the safest and best, namely, inoculation; 4th, that whatever tends to promote the excreting functions, to depurate the blood, to resist the contamination of the fluids, and to support the vital powers, also favours the production of a mild or discrete form of the malady; 5th, whatever has a contrary tendency — whatever occasions contamination of the blood, as a foul, close, or frequently-respired air, and interruption of one or more of those functions, by means of which effete or injurious elements are eliminated from the blood — developes a severe, a complicated, or a confluent and malignant form of small-pox; and, 6th, whatever reduces vital power and resistance at the period of infection, and favours the reception of a large dose of the poisonous miasm into the lungs, as in cases of infection by respiring the morbid emanation directly or closely from the sick, relatively to the susceptibility of the individual, generally gives rise to the dangerous varieties of the distemper just mentioned.

68. v. APPEARANCES ON DISSECTION. — The changes which more especially belong to small-pox are those observed in the skin and mucous surfaces. Those of the skin require no remark. The rare exception, however, of death occurring either before the eruption has appeared, or at a later period, when the amount of internal disease, or the poisoned state of the blood, has prevented the evolution of the eruption, should be kept in recollection. The pharynx, larynx, and trachea generally display more or less disease, especially in cases which have proved fatal from the seventh to the tenth day. The mucous membrane of these parts appears covered with viscid, puriform matter, more or less copious, and of a brownish or greyish colour. Underneath this, the membrane is generally found congested, softened, thickened, and pulpy; and in the more malignant cases it is black and sloughy, and exhales an offensive odour. Congestion, softening, discolouration, &c., with a muco-puriform or sanguineo-puriform exudation, may often be traced down the trachea, and thence to the bronchial ramifications to a greater or less extent. The lungs frequently evince congestive or inflammatory appearances, or rather such changes as may be referred to a congestive pneumonia, or this associated with bronchitis, or an alteration approaching in appearance to that of

splenisation, with or without a puriform infiltration. The pleura is often inflamed, but it presents no changes different from those which are often seen in asthenic inflammations of serous membranes, occurring in the course of other exanthematous and adynamic fevers. As in these, so in this, the inflammatory affection is attended by injection, softening and thickening of the membrane, with an exudation of lymph forming a layer varying very much in thickness and density. These changes extend more or less to one or even to both sides; the cavity of the pleura also containing much sero-puriform fluid resembling a dirty whey, or a mixture of milk or cream and water.

69. It was believed by many that, in the dangerous states of small-pox, a pustular eruption took place in various portions of the digestive canal; and there can be no doubt of considerable alteration being observed in this quarter. These alterations may have assumed a papular or vesicular form, or one approaching the appearance of pustules, when the follicular glands of the digestive surface were chiefly inflamed. These changes have been remarked in the œsophagus, in the stomach, and in the small and large intestines. Dr. GREGORY remarks, that "much discussion has taken place regarding the occurrence of variolous pustules on the gastro-enteric mucous membrane. COTUGNO, WRISBERG, REIL, and others, who have paid great attention to the subject, concur in opinion that this structure is not capable of developing them. Sir G. BLANE, again, reports a case where this membrane presented the appearance of ulcerated spots, which he compared to variolous pustules. The experience furnished by the Small-pox Hospital is in favour of the old doctrine. Inflamed, enlarged, and ulcerated follicles, with petechial patches, may indeed be noticed in a few cases; but such changes are in all respects the same with those observable in typhoid fevers." I have seen ecchymoses with or without those alterations, in the digestive mucous surface, and in the internal surface of the urinary bladder, but much more rarely in this latter situation. The kidneys are often congested, and the internal surface of the pelvis of the kidneys is also congested, softened, and discoloured. But these appearances, as well as those observed in the brain and its membranes, in the spleen, liver, and biliary organs, are very much the same as those seen in fatal cases of the other exanthemata, and of low or malignant fevers.

70. IV. DIAGNOSIS OF SMALL-POX. — It is not easy, and, indeed, seldom even possible, to distinguish the primary fever of variola from that of the other exanthemtaa, or even from the commencement of continued fever. In children, however, there is a more frequent occurrence of convulsions, more sudden and severe vomiting, and pain at the epigastrium, than in these; and in adults the muscular and other pains are more severe. — (*a.*) The fever of *measles* is more generally attended by cough and watering of the eyes than that of variola; and the eruption is about twenty-four hours later in the former than in the latter. The papulæ of small-pox are firmer and deeper seated than those of measles, which are superficial, and do not give so knobby or so granular a sensation to the touch as those of the former, which implicate the cutis vera.

71. (*b.*) *Febrile lichen* may be confounded with small-pox; but the interval between the occurrence of rigor and the appearance of eruption is much shorter in the former, generally about twenty-four hours, or half the time of that of the latter. The eruption of variola generally appears first on the face, whilst that of lichen takes place uniformly over the head and trunk, is superficial and devoid of the granular feel to the touch which belongs to variola. (*See art.* LICHEN.)

72. (*c.*) A form of *secondary syphilis* sometimes occurs, in which the eruption over the face and trunk is very similar to distinct small-pox, and passes through the grades of papulæ, vesicles and pustules. It is, however, generally preceded by little, or by a slighter fever, and the eruption is much more tedious in its development than that of variola; the pustules do not maturate, or proceed simultaneously, but irregularly, or in successive crops. The general aspect of the patient and the history of the case, will farther assist the diagnosis.

73. (*d.*) The diagnosis between *variola* and *varicella* has been fully discussed, and the distinct natures of these have been shown at another place; but independently of various other points of difference, the impossibility of inoculating the latter, the occurrence of it after cow-pox, and even after small-pox, and the absence from varicella of the deep-seated granular sensation to the touch and of the umbilicated vesicle, characteristic of the variolous eruption, sufficiently distinguish the one from the other.* (*See art.* CHICKEN-POX, 2, 10, 11.)

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* The following remarks respecting the distinct nature of *Chicken-pox* and *Small-pox*, contained in Dr. GREGORY's excellent work, already referred to, deserve perusal, and quite agree with my own observations. "The first thing I observe in varicella is the eruption of vesicles of the size of a split pea, being simple elevations of the cuticle, or minute blisters. The parts chiefly occupied by the eruption are the back and scalp. The face is not so universally the seat of eruption as in variola; nevertheless, at times, the face is extensively occupied. The vesicles vary in shape; Dr. WILLAN, [illegible] minuteness, wishes to distinguish three kinds — the lenticular, the conoidal, and globate. I cannot [illegible] these distinctions myself. The vesicles are surrounded by [illegible] superficial and narrow areola. They appear in successive crops for two or three days. While the new vesicles are forming, the old ones shrivel and dry up. On perforating the vesicles, a clear lymph, scarcely at all mucilaginous, escapes, and the cuticle falls to the level of the surrounding skin. There is no tumour, no varus. If the vesicles remain unbroken for twenty-four hours, the contained fluid becomes slightly opaque. They are very itchy, and when rubbed, a degree of superficial inflammation may succeed, sufficient to convert the lymph into an imperfect pus. The scabs of varicella are very small, and as the lymph is wanting in mucilaginous quality, they are granular. The desiccation is very rapid, and in six days the complaint completes the whole circle of its phases. No constitutional symptoms of [illegible] importance are present. The complaint often shows itself in schools, and runs through all the young members of [illegible] family. It is manifestly infectious and epidemic.

Varicella almost exclusively attacks children, [illegible] is very rarely seen in adults. "It is taken indiscriminately by those who have and those who have not been vaccinated. It is now nearly always taken *after* vaccination. Whether it was taken equally after inoculation of small-pox I cannot tell from my own experience, but I have the authority of the late Sir HENRY HALFORD for saying that it was. These general considerations are of themselves sufficient to decide the question of non-identity. But we examine the subject still more closely we find that the organization of the varicelloid vesicle differs from that of the variolous; there is no umbilication, no central depression, no slough. There is simply elevation of the cuticle, of irregular and undetermined arrangement. Here we see no groupings into threes, or fives — no crescentic or circular figures formed. Everything in varicella is hurried forward — the incubation, the eruption, the desiccation."

'4. V. THE PROGNOSIS OF SMALL-POX is tole- ly manifest from what has been already stated. circumstances enumerated above as modifying aggravating the fever of small-pox (§§ 63. *et*), increase also the *danger* of the distemper; but following more especially tend to this: — 1st. quantity and confluence of the eruption. 2d. state of the circulating fluids. 3d. The presence nature of the complications, especially those he respiratory organs and nervous centres. 4th. age, habit of body, and temperament of the ent. 5th. The circumstances and influences er which the patient is placed; and 6th. The on, temperature, and epidemic constitution in ch the disease occurs.

5. *a.* A *confluent form* of the malady should, when proceeding favourably, be viewed with rust; for, in children, a fit of convulsion may ur, and carry off the patient; and in adults the d may become contaminated to an extent in- patible with the continuance of life; or the ndary fever may further implicate vital parts. e vesicles on the trunk and extremities be flat, a claret-coloured or livid areola, "while the tion on the face is white and pasty, no reasonable hope of recovery can be entertained." An excessive quantity of eruption always tends to depress vitality, to vitiate the blood, and to favour the occurrence of internal complications, which concur with these to destroy life. On the other hand, if the pustules on the extremities acuminate, and exhibit a crimson areola, a good ground of hope is furnished.

76. *b.* The *contamination of the fluids*, as shown by the hue of the surface, the colour of the lips, tongue, and gums, so far as they can show it; by the appearance of the vesicles; by the state of the evacuations; and by whatever indicates a tendency to putrescency, or a partially dissolved state of the blood and depressed organic nervous influence, is extremely dangerous. Petechiæ, ecchymosis, gangrenous, or sloughing, sores; hæmorrhages from mucous canals, the blood being dark, dissolved, or ichorous; menorrhagia, or hæmaturia; the vesicles being filled with a dark, bloody, or ichorous matter; purulent depositions in the joints, &c., are generally fatal indications.

77. *c.* The occurrence of any of the *pulmonary complications* mentioned above; cough or hoarseness at an early period of the disease; hæmoptysis at a more advanced stage; bronchitis, or congestive pneumonia, or asthenic pleuritis, especially when either extends to both sides, are extremely unfavourable. The appearance, also, of an abundant or confluent eruption in the puerperal states, and particularly soon after parturition, is always attended by the utmost danger.

78. *d.* The state of the *nervous system* is most important in the diagnosis. Continued delirium, or prolonged want of sleep, restlessness, moaning, despondency, or an inward persuasion of death, or an apathetic condition, or unconcern as to the result, so frequently observed in pestilential maladies, suppression of urine, sopor, lethargy or coma, leipothymia, or a tendency to faint upon raising the head from the pillow, or attempting to sit up, are severally dangerous or fatal symptoms.

79. *e.* The *age* of the patient is of much importance in the diagnosis, especially in confluent and semi-confluent cases. Dr. GREGORY remarks, that "the extremes of life are those on which small-pox always falls the heaviest. Persons above 40 years of age seldom recover even from the semi-confluent small-pox. Children are in danger from an amount of eruption that can scarcely be called semi-confluent. In both, the processes of maturation and cicatrisation are attended by great exhaustion of nervous power, the result of which is often the setting up of acute inflammation in an internal organ essential to life — either the brain, the larynx, or the lungs. The most favourable age for taking small-pox is from the seventh to the fourteenth year, when the powers of life and reproduction are in their fullest vigour."

80. *f.* The *habit of body and diathesis* have considerable influence on the result. A plethoric habit of body, a sanguine, a melancholic, a leucophlegmatic, or a bilious temperament, constitutional asthenia or debility, and a scrofulous diathesis, are more or less aggravating circumstances, as respects either the severity of the disease, and abundance or confluence of the eruption, or the complication and sequelæ of the malady.

81. *g.* The circumstances which indicate a *favourable issue* are, a discrete form of the disease

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here is a form of Small-pox which, in some of its ires, and from its mildness, may be mistaken for ella; "and physicians in former times, looking only he general, and neglecting the minute anatomical acters of the eruption, have thought proper to con- the two diseases. By way of distinction we will the one *varicella vera;* the other, *variola varicel-* s. In the true varicella there is little or no premo- y fever. In the variola varicelloides there are at least -eight hours of preceding febrile disturbance. In varicella vera there are no hard vari or tubercles. he varicelloid form of variola, tuberculous ele- ns of the skin are distinctly perceptible. In the les of the one there are no central depressions, in the r central depressions exist." In true varicella the s quickly fall off, and rarely leave any pits. Can ella be communicated by inoculation? "Dr. WIL- entertained the belief that it can; but his experi- ts are few (two or three only), and these few, to my l, very unsatisfactory. Since his time, Mr. BRYCE, ore extended and more careful investigation, has set question at rest. He states that he has inoculated the fluid of varicella vera, at all periods of the dis- and at all seasons of the year, children who had r undergone either small-pox or cow-pox, and yet he had never been successful in producing from it r variola or varicella. Since the date of BRYCE's riments (1816), I know of none on the inoculation ricella."

hat, then, are the arguments which can be brought ard in support of the doctrine of the identity of l-pox and chicken-pox? I have adduced the argu- ts which have been urged by Dr. THOMSON, and rs in favour of this doctrine, and I have answered seriatim in another place (*see art.* CHICKEN-POX, , 3. 10, 11.); but, nevertheless, it is interesting to what further Dr. GREGORY has stated as to this . Dr. THOMSON's great argument is, "that varicella ents itself when variola prevails, and never without. ce," says he, "we may deduce the probability that contagion is operating, not two." The answer to this at the facts are incorrectly stated. Varicella fre- tly prevails without variola. Dr. MOHL has shown most satisfactorily from the experience of the Copen- n epidemics. From 1809 to 1823, Chicken-pox was ally observed at Copenhagen without accompanying la; since 1823 both diseases have prevailed epidemic- but the physicians could always trace their sources, his convinced them that the generating miasms were nct. Besides, the doctrine goes for nothing if it can own, as has been shown over and over again, that children take varicella after cow-pox, and others pox after varicella, while sometimes both diseases be seen going through their phases at the same . "It cannot be doubted for one moment, after ing the details of this controversy in the works of THOMSON and elsewhere, that a very large propor- of the cases of alleged secondary or recurrent small- are really cases of genuine lymphatic varicella aken for small-pox;" or, I may add, that the sup- d first attack of variola was merely that of varicella.

the absence of any symptom of complication; a natural tone of the voice, and freedom from cough and hoarseness; an age between six and twenty-six; the occurrence of the malady at a cool, dry season, and under other favourable influences, as respects air, ventilation, and healthiness of position.

82. *h.* Much, however, depends upon the state of the patient before the accession of the malady, upon the influences in operation during the treatment, upon the measures which have been employed at the commencement of the distemper, or during its earlier stages; upon the purity of the air, and the ventilation of the patient's apartment; upon his nursing, and the noninterference of friends; upon the character of the prevailing epidemic, or of the reigning epidemic constitution; and upon various subordinate circumstances and unexpected contingencies.

83. VI. The Causes of Death from small-pox are, 1st., during the first week, or prior to the maturation of the eruption, the poisonous influence of the variolous miasm or virus on the blood, and the consecutive effects of the poison on the organic nerves and nervous centres; 2d., during the second week the greater number of deaths occur, and the most common cause is asphyxia, or consecutive vitiation, and interrupted oxidation of the blood, owing to the prominent affection of the respiratory passages, or of the lungs, or to sup ession or interruption of the urinary excretion; d., during the third week, or when secondary ver has advanced, death may be produced by eff on on the brain, or by effusion in the pleura, or i he pericardium, or by the complications which casion it in the second week; or by gangrenou destruction of some portion of the integuments th, during the fourth, or following week, death ay result from erysipelas, or from some other co plication or sequela of the distemper. The foll ng table, furnished by Dr. Gregory, exhibit he days on which 168 cases of small-pox ere fatal at the Small-pox Hospital in 1828–29 nd proves that no importance can be attach to critical days in this distemper:—

Days.	Fatal Cases.	Days.	Fatal Cases.	Days.	F l C s.
3d.	1	13th.	11	24th.	
4th.	5	14th.	5	25th.	
5th.	10	15th.	7	27th.	
6th.	5	16th.	5	28th.	
7th.	11	17th.	3	29th.	
8th.	27	18th.	3	31st.	
9th.	15	19th.	1	32d.	
10th.	14	20th.	2	35th.	
11th.	16	21st.	3	38th.	
12th.	11	23d.	1	39th.	

Table exhibiting the total Number of persons having Small-pox, admitted into the Small-pox os-pital of London, in the Years from 1841 to 1850, inclusive, with the Proportion of Cases adu ed *after Vaccination*, and the Mortality in each Class respectively.

Years.	Total Admissions of Persons having Small-Pox.	Deaths.	Per Centage of Deaths.	Total of Persons vaccinated with Cicatrices.	Deaths.	Per Centage of Deaths.	Total of Persons unprotected, including the Vaccinated without Scars.	Deaths.	Per Centage of Deaths.	Per Centage of Admissions after Vaccination with Scars.	Person professing to have had Small-pox previously	Deaths among Ditto.
1841	342	74		151	10		191	64		44	2	1
1842	141	34		62	4		79	30		44	1	0
1843	149	27		69	0		80	27		46	2	0
1844	643	151		312	24		331	127		50	3	2
1845	367	79		217	13		150	66		60	3	0
1846	147	29		77	5		70	24		52	2	0
1847	450	81		230	17		220	64		51	8	3
1848	686	168		365	38		321	130		53	4	2
1849	190	33		115	11		75	22		60	4	0
1850	307	5 8		155	8		152	50		50	1	0
Total in 10 Years.	3422	734	22	1753*	130	7	1669 †	604	36	51	30 ‡	8

84. VII. Causes of Small-pox. — i. From the earliest accounts of small-pox to the days of Boerhaave, variola was considered to owe its origin to the same causes, with certain unknown modifications, which give rise to other epidemic maladies, aided by infection and contagion. It was thus believed that small-pox might be generated *de novo*, from some defect or vice in one or more of t six non-naturals, — air, aliment, the secretions, ercise, sleep, and mental emotions, but that en thus produced it would spread by infection. I nhaave was the first to contend that this do ne was incorrect, and that small-pox was in all ses the product of a specific miasm or poison, de ed from the same malady. "He acknowledge at the miasm must originally have sprung from me fortuitous combination of common causes nd that what had happened once might h en again, but he held that this contingency wa mprobable, and might safely be excluded fror ur reasonings."

85. It is impossible to say, with any deg of confidence, in what source, or in what combir on of causes, or under what influences, the pois us miasm first constituting and afterwards p pe-

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* Nearly the whole of these 1753 cases were above the age of fifteen years.

† Many of the persons alleging to have been *vaccinated*, but not showing cicatrices, were doubtless duly vaccinated; but to distinguish such cases from the others was impossible.

‡ N. B. The persons professing to have had small-pox at some former period, sometimes announced themselves to have been inoculated, sometimes to have had the casual small-pox, but in no one instance was there any corroborating evidence of the truth of the statement. These cases, therefore, are included in the third column of "*persons unprotected.*"

iting the disease was produced. There is some ison, however, to infer, from what we know of origin of certain distempers, and of the cominicability of them from the lower animals to n, and from the proofs of the causes, and of s communication of these distempers, furnished the old historians, as shown in the articles IDEMIC INFLUENCE (§§ 12. *et seq.*) and INTION (§§ 4. *et seq.*), and by modern pathoical and other writers, that this malady, as well they, originated in the lower animals, and ended from them to the human species by intion or contagion. However this may be, there no proof that the disease appears or becomes demic, after longer or shorter intervals, owing certain combinations of causes or influences, ducing it *de novo*. On the contrary, there is ry reason to infer, that it is perpetuated by miasms, or effluvium, or virus, which spreads y infecting the healthy, either directly, or inditly by the media of substances — of *fomites* — ich preserve, for longer or shorter periods, and s propagate the poisonous agent (*see art.* INTION, §§ 16. *et seq.*); and that this distemper been thus perpetuated since its first appearance he 6th century. Instances are constantly ocring of either single cases, or of the outbreak of eral or of many cases, without proofs of anteent infection or contagion having been obed, especially as respects the earliest cases. t as regards these, all the preceding circumces or occurrences may not be known, or n may not admit of recognition; and as respects ny of these, the same or similar circumstances y have taken place to those which occurred in following case adduced by Dr. GREGORY:— hild took the small-pox, in the country, under umstances which seemed to exclude all suspin of infection. She had never left the house several weeks; the few neighbours who had ed were free from sickness, and no small-pox sted in the neighbourhood. During her conescence, a looking-glass being put into her ds, she immediately said, "My face is exactly that of the child at the door, from whom I ght the beads." On inquiry, it was found that e pedlars had passed through the village, and t the child had been to the door, although she never left the house. Had this child died, or n an inattentive observer, the origin of this ck of variola must have remained for ever sterious.

6. When we consider the facts connected with *ction*, as I have shown in that article, and the g periods during which the infectious miasm y be retained by fomites without losing its spec character and operation, and connect this h the numerous substances which may thus ome the media of infection, and with the many asions on which one or other of these media y have come within the sphere of our senses, hout our recollection or knowledge, — and, reover, when the long period which elapses m the moment of exposure to infection to the nifestation of the distemper is taken into acnt, the frequent difficulty or impossibility of ounting for the infection cannot be a matter of nder. The poisonous miasm of small-pox is en out from all the mucous, cutaneous, and reting surfaces,—especially the lungs and skin, the exhalations, the secretions, the excretions, the matters in the vesicles and pustules, and the scabs, all contain this poisonous material, with all its specific characters; and this material attaches itself to many dissimilar substances, especially to the bed clothes, body-clothes, woollen and cotton articles, &c. These when wrapped up, or in any way excluded from the free action of the air, retain the specific miasm for a very long but indeterminate time, and give out this miasm when opened up and exposed to the air.

87. The length of time during which fomites will retain the infectious miasm, with all its properties unimpaired, has not been ascertained; but there is reason to believe that, when they are excluded from the air, this miasm may be preserved for many months, or even for some years. The stages of the distemper during which the infectious emanation is most abundant and noxious, have been variously estimated, but without any accurate data. There is every reason to infer that the disease may be communicated by respiring the air containing the morbid effluvium from the commencement of the eruptive fever; and it may be admitted, that the infectious miasm is most powerful or concentrated when it is most manifest to the sense of smell. The dried crusts of the pustules, or scabs, not only also possess a contagious quality, but also retain this quality for a very long time, especially when shut up from the atmosphere, or undecomposed; and the dead body possesses also the power of infection, both by the effluvium which it exhales, and by the matter in the pustules. How long this power continues after death, has not been determined with precision, but it may last from a week to a fortnight, according to the exposure of the body to the air, and to the temperature and humidity of the atmosphere.

88. The distance at which the infectious property may be exerted, has been variously estimated by Dr. HAYGARTH and others. Some suppose that the sphere of infection does not extend further than a few feet, whilst others contend that it may extend to many hundred feet. An American physician informed Dr. HAYGARTH, that the infectious effluvium crossed a river 1500 feet wide, and affected ten out of twelve carpenters at work on the other side. The sphere of infection mainly depends upon the state of the atmosphere, and the existing epidemic constitution: a still, warm, humid, and impure air extending the sphere of infection; and a cool, dry, and pure air, and free ventilation, circumscribing this sphere, by diluting and dissipating the poisonous miasm.

89. It is obviously of importance to ascertain what degree of cold and heat, or what proportion or amount of chlorine gas, or of the chlorides in solution, is capable of destroying the poisonous miasm or virus contained in fomites, in order that these agents may be employed in disinfecting bed and body clothes; but our knowledge of the disinfecting powers of these agents, although considerable, requires much greater precision than it at present possesses. There is, however, sufficient reason to believe, that a temperature of about 200°, or somewhat above this range, is sufficient to destroy the infectious property, and that these chemical agents produce a similar result in moderately concentrated solutions.

90. During the last century, and even at the commencement of the present, a singular notion as

to the origin of small-pox, and as to the possibility of the entire extirpation of the distemper, was promulgated, and even entertained by some respectable writers, namely, that small-pox was generated *de novo* in infants by the blood of the mother left in the portion of the umbilical chord, attached to the fœtus on tying the chord—that the fluids remaining in this portion of the chord being absorbed by the fœtal vessels, thereby contaminated the blood and frame of the infant, and thus developed anew the distemper under consideration, independently of infection or contagion received from any other source. It was therefore recommended by these writers, in order to prevent the generation of the distemper, and ultimately to procure its entire extirpation, that the portion of the chord attached to the fœtus should be thoroughly emulged, and the fluids pressed out of it, upon securing it at delivery. That small-pox neither originated in this source, nor can be extirpated or prevented by any method of managing this operation, will not be disputed at the present day, however great importance may be attached to it in other respects.

91. ii. *The causes predisposing to, or increasing, the susceptibility of the infection of small-pox* are not wanting in importance.—*A. A very early age* has much influence in predisposing to this distemper. It has been admitted by Dr. Haygarth and other writers, that the greatest mortality by small-pox takes place in the early periods of life. In 1795 (before the introduction of vaccination), it was computed that, in Chester, nearly half the deaths among children below ten years of age was due to small-pox. From the data furnished by Mr. Farr's first and second reports, it appears that out of every hundred who died of small-pox in England, seventy-five were below the age of five years. Of 9,762 persons, who died of this disease in England, in 1837 and 1838, there were 7,340 under the age of five years; 1,668 between the ages of five and fifteen years; 528 between fifteen and thirty; 210 between thirty and seventy; and 16 upwards of seventy years of age. Of 2,285 persons who died of small-pox in London in 1840 and 1841, 2,060 were under fifteen years of age. During the last quarter of the last century (from 1775 to 1800), that is, prior to the discovery of vaccination, the proportion of the mortality by small-pox to the total mortality, was as 8 to 100 in London; and it was probably the same throughout the country. From the commencement of the present century, the proportion has varied much, rising in years when small-pox was prevalent, as in 1838, as high as this, and in other years falling far below it.

92. The susceptibility of infection exists in all persons who have not had the disease, and who have not been vaccinated, but in various degrees: it is greatest in infancy and childhood, and least in advanced age. Dr. Gregory, however, thinks that this greater mortality from small-pox does not depend upon a greater susceptibility of infection, but because the disease is usually contracted on the first exposure to the infectious miasm. There can be no doubt of this being the case, but it is chiefly owing to the susceptibility being so remarkable at this age. Numerous exceptions have, however, been remarked to this general susceptibility. Both before and after the introduction of inoculation, many persons were frequently exp ed to infection without experiencing the disease; nd this circumstance, which is common to all n-fectious and pestilential maladies, was most i o-rantly urged by non-contagionists as an argu nt against the existence of an infectious prope y; they either not adverting to, or concealing he fact, that many of those who thus appeared te unsusceptible of infection, had the disease com u-nicated to them by inoculation. "A lady, in 1 4, was successfully inoculated for small-pox at he age of 83, and lived several years afterw s. She had brought up a large family, most of w m she had attended in attacks of small-pox, but d never taken it herself." I shall have to sho in another place, that the susceptibility whicl in vaccinated persons, is destroyed for some y s, returns with advancing age, and becomes gr er as life advances.

93. *B.* The several causes which predis se the system to the infection of other pestile al maladies, have a similar effect in spreading sr l-pox. Of these the most manifest are diathes or peculiarity of constitution; humid and warm a-sons and states of the air; a close and stagna or impure atmosphere; fear of infection; an end ic or epidemic constitution, favourable to the f-fusion or operation of the poison; arrival m a pure and healthy air into a locality in whicl e malady is prevalent; and the constitution o e Negro and dark races.—*a.* A delicate confo a-tion and susceptibility of the nervous syste a scrofulous or other diathesis existing in fam es, and exhaustion or depression by previous di se or other causes, either predispose the fram to infection, or render the malady more sever — *b.* A high range of temperature*, especially en conjoined with humidity, stillness, and im i-ties, arising from animal or vegetable deco o-sition, both predispose the frames of those ho are subjected to these causes, and concentrat he poisonous miasm emanating from the sick, d spread this miasm in a wider sphere.—*c.* Fe of being attacked, by depressing vital power, lay e body more open to the invasion, as in all er pestilential maladies.—*d.* There is somet g in the state of the stationary epidemic con u-tion which certainly influences variola and er epidemic distempers, and which we are ur le to demonstrate otherwise than in the chara rs of its results; but although the epidemic p a-lence of small-pox may be limited to a parti ar place, or extended over a whole country, e er in cold seasons or weather, or in warm se ns and countries, yet it is most severely and g e-rally prevalent in these latter circumstance — *e.* The constitution of the dark races evinc a remarkable susceptibility of variolous infec n. The destructive epidemics which have occu d in warm climates, and in the western worl l-

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* Boerhaave, one of the ablest illustrators of th a-thology of small-pox, states, "Est ut plurimum e c-micus, verno tempore primo incipiens, æstate cres s, languens autumno, hyeme sequente fere cedens, re iterum eodem ordine rediturus." The truth of thi as shown in the course of the Norwich epidemic of 9, when a few cases only were observed in the prec g winter, and the greatest prevalence and mortality re in June and July. Small-pox was introduced als to the town of Lynn at the commencement of this yea it did not spread with rapidity until summer. A know ze of this circumstance induces the native inoculators i e East to inoculate the small-pox in the cool season.

istrate this fact. Although in many of these uch may be attributed to the high range of temerature, humidity, and other concurring causes, evertheless much more should be assigned to eculiarity of constitution, as evinced by the remarkable prevalence and fatality of the distemper hen introduced into America among the natives f all climates and localities in that quarter of the lobe.

94. *C.* There are certain circumstances, *apart rom vaccination,* which influence not merely the usceptibility, but also the character of the alady. Those just mentioned (§§ 91. *et seq.*), hilst they increase the former, have generally a ery remarkable influence in augmenting the uantity of the eruption and the severity and alignancy of the distemper. — *a.* The character f the case generating the infection has no influence pon that produced by it, whether the infection as taken place through the medium of the ungs, or by inoculation; a discrete case may occasion a confluent or malignant one, or this latter he former. This may arise from the susceptibility, or constitution, or diathesis of the infected, r from the quantity or concentration of the poison nhaled in a tainted atmosphere. The general ildness of the distemper, when inoculated, may e the result of the small quantity of the poison which may be administered in this way. — *b.* The est state of health, or vigor of constitution, may avour the occurrence of infection, but it will also avour the appearance of a mild form of the isease; whilst unhealthy or cachectic states of he frame, or some pre-existing disorder, may diminish the disposition to be attacked, and yet may ender the distemper more severe or malignant when the infection is once produced. — *c.* Certain hysical and other influences or circumstances ay concur with the first manifestation of disorder o render variola mild, or discrete, or confluent, or alignant. Some of these, especially high temperature and impurity of the air, have been aleady noticed (§ 93.), as tending to aggravate he malady. Whatever determines the circulation o the surface, as warm baths, cordials, a heating egimen, too many bed-clothes, stimulating diaphoretics, a plethoric habit of body, and external ritants, increase the quantity, or favour the confluence, of the eruption; whilst a cool, dry air, arge and well-ventilated apartments, a cooling egimen, and active purgatives taken during the latent period, or at the commencement of the primary fever, diminish the quantity of eruption, etermine the circulation from the external surace and lower febrile action. Vascular plethora, specially if accompanied with more or less excrementitial accumulations, favour not merely a confluent or malignant form of the distemper, but any of the complications described above (§§ 44. *t seq.*). Extreme debility, weakness of constitution, and anæmia, delay the eruption, and impress he malady with a nervous or asthenic character.

95. *F. Epidemic visitations* of small-pox observe several of the same laws as govern the ecurrence of other epidemic pestilences: — 1st. They return to a locality after a varying number f years, the intervening years presenting merely few cases. This may, in some measure, be owing to the numbers of susceptible or unprotected cases having become, after many years, o numerous, as to furnish a sufficient supply to an epidemic outbreak; the straggling or few cases usually met with readily extending the infection to the accumulated mass of susceptible persons, as soon as states of air and other influences concur to predispose their constitutions to this result.

96. 2d. These visitations are characterised by greater severity, and are attended by a greater mortality, than when the disease occurs in solitary instances, or when it does not assume an epidemic prevalence: this may be owing to aërial or other causes having predisposed the constitution of susceptible or unprotected persons to severer attacks, and partly also to more concentrated states of the poisonous miasm conveyed by the air from the sick to the healthy. It is thus not uncommon to find persons who have been exposed to the infection of small-pox on ordinary occasions without being attacked, who nevertheless are seized by the disease in the severest form when it is epidemic.

97. 3d. Small-pox epidemics, like others, have a more or less gradual increase, and, when they reach their height, a gradual decrease. The rapidity of progress towards their height and their disappearance necessarily depend upon the population of districts where they break out, upon the numbers of susceptible persons, upon the communications, direct or indirect, between the sick and healthy, upon the observance of segregation, upon the rapidity with which the susceptible are infected, and upon the prevalence of the atmospheric, and other concurring influences to the formation of an epidemic constitution, either in a limited locality or in a more extended sphere.

98. 4th. Small-pox differs from other pestilences, inasmuch as that it may be propagated at all seasons of the year, and in very different atmospheric conditions, although with varying grades of rapidity and prevalence; whereas other infectious pestilences, as I have shown when treating of these, require certain ranges of temperature for their epidemic prevalence, or even for their contingent or possible communication. But small-pox, like scarlet fever and measles, although favoured more or less by temperature and season as these are, may prevail at any season in temperate countries, and more especially in the British Isles, yet the more general and most severe epidemics appear during warm seasons, or when a high temperature and much moisture in the air favour predisposition of constitution and the concentration of the poison. This compatibility of infection with any season and range of temperature incidental to temperate countries, accounts for the circumstance of small-pox, as well as scarlet fever and measles, being a domiciliated malady in these countries, although occurring after longer or shorter intervals in epidemic forms of prevalence and severity, as the numbers of unprotected persons become increased, or as the protection of vaccination wears out.

99. 5th. Epidemic small-pox may be local, owing to local circumstances and influences, as occurred in Norwich in 1819, when, between the months of May and October, about 530 persons died of the distemper within the limits of the bills of mortality, which do not include several parishes in the immediate neighbourhood, where it also prevailed. The limited occurrence of small-pox epidemics is often owing to the combination of morbid influences existing in the locality thus visited. In

Norwich and other places, as Edinburgh, Glasgow, Lynn, Liverpool, &c., where such epidemics appeared, many, if not all the elements of an epidemic constitution already existed, and favoured the spread of the distemper either from isolated cases, or from an introduced infection or fomites.

100. 6th. Not only may persons be seized with small-pox, during its epidemic prevalence, who had previously escaped, although exposed to infection (§§ 95. *et seq.*), but also persons who have been vaccinated, and who, after long periods, have been revaccinated, and even inoculated with small-pox, without effect, may on such an occasion be attacked by variola. This was observed by Mr. Crosse in the Norwich epidemic of 1819, when the protective influence of vaccination may be presumed to have been greater than now, a shorter period having elapsed in most cases since the process was adopted. The small-pox thus following vaccination, after periods of different durations, but generally upwards of seven or eight years, although more or less modified, and commonly modified in proportion to the shortness of the period which had elapsed from vaccination, cannot be mistaken for any other eruptive disease, for, independently of the character of the eruption, inoculation with the matter from the vesicles of the modified malady has produced regular small-pox in the unprotected, as was shown by Mr. Crosse and others. It is chiefly during small-pox epidemics that the protective influence of vaccination is tested, and it is then that the amount and duration of this protection, in connection with proofs of an efficient and healthy vaccination, can be duly estimated. (*See art.* Vaccination.)

101. 7th. As I demonstrated with respect to scarlet fever, when epidemic, that that malady sometimes presented a most dangerous form, in which there was no eruption, and sometimes even no sore throat (*see* Scarlet Fever, §§ 26. *et seq.*), so it has been observed that an analogous form of small-pox occurs in some severe epidemics, especially in places where all the elements of epidemic severity concur to produce great malignancy. Thus it is recorded by Mr. Crosse, in his history of the Norwich epidemic of 1819, that a number of cases of fever with petechiæ, but without any variolous eruption, appeared in May, June, and July, when the epidemic was at the worst, and all terminated fatally. The victims were mostly children, enfeebled by scrofula, or some other disease; and as several were thus seized, whilst others in the same family were suffering from small-pox, and as no case of this kind occurred in any one who had previously gone through small-pox, Mr. Crosse ascribed (and, in my opinion, very justly) every case of it to the variolous infection.

102. 8th. Before the introduction of inoculation into Europe, and when variola appeared only in its natural form, the epidemics of it which occasionally appeared, especially when the numbers of the unprotected, by a previous attack, became greatly increased, were often most destructive and pestilential. The outbreaks of small-pox in London in former times frequently carried off several thousand persons in a few months. In 1720, upwards of 20,000 persons were said to have died of it in Paris; and Horstius states that the epidemic visitations of variola "aliquandò adeò sævæ et malignæ sunt, ut instar veræ et legitimæ trucis
pestis in omnem ætatem et sexum grassentu
fervirant cum multorum jacturâ et perditione
and that, in 1614, it ravaged most of the count
of Europe more destructively than the plag
"in summâ nulli parcentes regioni, unius anni c
riculo totam Europam seriatim visitârunt at
enormiter depopulârunt." It may readily be c
ceived that, when the distemper appeared in a
trict or city, after an absence of many years, w
the greater number of the inhabitants were unp
tected, its spread would be rapid and its rava
great. The mortality in the epidemics which
curred previously to the introduction of inoculat
must have been very great, when we consider
efficient and concurrent elements of epidemic p
valence and fatality which every where existed
those times, and the nature of the treatment ge
rally adopted. Even in recent times, the prop
tion of deaths to the number attacked by natu
small-pox in several epidemic visitations of
distemper has varied from one in six to one
four.

103. 9th. *The possibility of persons being attac*
by small-pox a second time has been contended
by many, and doubted by others, as Mead,
berden, Monro, De Haen, &c. De la Con
mine estimated second attacks as one in ten th
sand. Whilst admitting the possibility of a seco
attack, I doubt if its occurrence be even so
quent as here estimated. It is only when
disease is epidemic, and the exposure to the
fectious miasm has been prolonged, or the pois
has been concentrated in the respired air, tha
may occur. Dr. Gregory states that very f
persons ever present themselves at the Sm
pox Hospital who have affirmed that they h
previously undergone the disease; and of the
few, but a very small fraction can stand the t
of rigid scrutiny. In one of the last cases t
occurred, the medical man who witnessed
first seizure had misgivings as to the true nat
of the case. No instance is recorded of the sa
person having been admitted twice at the Sma
pox Hospital. As to second attacks of vario
there are several sources of error. Sometimes t
first attack is incorrectly reported, sometimes
second. The same medical man very rarely
seen both attacks. Chicken-pox is very frequen
mistaken for variola, and even psora, ecthym
and even pustular syphilis, have given origin
mistakes. The case of recurring variola whi
made the greatest noise was that of Louis X
who died of small-pox in 1774, at the age of 6
after having, as it is alleged, undergone that d
ease casually in 1724, when 14 years of age. B
the physicians who attended him in this fi
attack were not agreed as to its having be
small-pox; and it was known that he was abro
and well six or seven days after the eruption w
out, further evincing the non-variolous nature
the attack. I therefore agree with Dr. Grego
in believing that the primary disorder which
majesty had was varicella.

104. VIII. Of the Inoculation of Small-po
— Inoculation having been abolished by Act
Parliament, and the end held in view havi
been more satisfactorily obtained, as generally su
posed, by having recourse to vaccination, it m
appear unnecessary to many to make inoc
lation of small-pox a topic of discussion at th
time. Yet when all the evidence connected wi

he comparative merits of inoculation and vacciation in temperate and warm climates, and in ifferent races of the species, is duly considered, ome notice of this still not unimportant topic hould not be omitted. At the time of my writing his, just half a century has elapsed since the iscovery and introduction of vaccination; and fter a quarter of a century of most transcenental laudation of the measure, with merely ccasional whisperings of doubt, and after another uarter of a century of reverberated encomiums rom well-paid vaccination boards, raised with a iew of overbearing the increasing murmurings f disbelief among those who observe and think for hemselves, the middle of the 19th century finds the ajority of the profession, in all latitudes and heispheres, doubtful as to the preponderance of dvantages, present and prospective, to be obtained ither from inoculation or from vaccination. In 823, I stated in the *London Medical Repository* see the Refer., &c.), from evidence which had ome before me in families which had suffered in umbers from small-pox, that the protection aforded by vaccination was impaired by years, and ore out in twelve or fourteen years, or in a longer r shorter time, according to diathesis, &c. — that accinated persons were liable to small-pox, in a ore or less modified form, after some years, say ine or eleven; in a mild but distinct and fully eveloped form in from twelve to fifteen years, nd to the usual states of the distemper, according o diathesis, to exposure to infection and epidemic revalence, after this more advanced age. What as then predicted has since been so generally ulfilled, that revaccination has been adopted in any places, and has often failed, natural smallox having notwithstanding appeared in the revacinated, — both in those in whom the measure appeared to have succeeded, and in those in whom it iled.

105. Thus half a century has brought us to the osition that we are doubtful which to prefer, — accination, with its present benefits and its fuure contingent dangers, or inoculation, with its ossible present dangers and its future advantages. f there were no other considerations, but these hich could be seriously raised in connection with e inoculation of variola, I should, for my own art, and after a due consideration of the subject in s various bearings, be at no loss which to select or those for whom I feel the interest connected ith the nearest relationship; but there is the ontingent and not improbable diffusion of the ariolous poison to the unprotected by inoculation o be taken into account; and there is obedience lso to the laws, which is the duty of every good itizen, and is strictly observed by every wellducated physician, although systematically disrearded and trespassed by pretenders and irregular edical practitioners. Another half century, the nd of the 19th century, will, I fear, find the hysician no longer in doubt as to which he will hoose, even in this climate, as he no longer can e in doubt in India and other parts of the East, nd as respects the dark races, unless he be inuenced by authority and prejudice, — influences hich are equally unworthy the high position in hich his profession places him in the estimation f those whose opinions alone deserve respect and onsideration.

106. *Inoculation of small-pox* is the artificial insertion, beneath the cuticle, or in a wound or puncture, or the application on an abraded surface, of a person not previously attacked by small-pox, of a minute portion of the virus formed in the vesicles or pustules of one labouring under the malady. By this mode of communicating the malady, the system is generally infected by the smallest quantity of the poison capable of producing this effect. In the East, inoculation has been practised successfully, and in a rational manner, from a remote period — as remote as the history of the disease carries us. The following arguments have been adduced in favour of it, and previously to the discovery of vaccination powerfully recommended it; and even now they should be calmly weighed against the advantages of vaccination, as far as these have been yet ascertained, and as they may be valued prospectively.

107. (*a.*) All persons not protected by an attack of small-pox are liable to be seized with this distemper at any period of life, in every circumstance in which they be placed, and on any occasion. It therefore behoves them to obtain this protection as early as may be consistent with a safe and efficient recourse to it. Now this protection was formerly inoculation; more recently, and at present, the only legal protection is vaccination. The former communicated a milder form of the same disease as a certain protection; the latter transmits an affection, of a slight and by no means dangerous nature in itself, which is somewhat similar in certain respects, and which has the virtue of preventing an attack of small-pox for some years, and of rendering such attack milder in grade, and modified in character, for an indefinite period; this protection, however, is not durable, but terminates after an indefinite number of years; in some instances entirely exhausting itself, and leaving those who may consider themselves protected open to either a mild and modified, or a confluent, severe, or even fatal attack of the malady.

108. (*b.*) The individual and collective evils resulting from the infection of natural small-pox, whether appearing in scattered or rare cases, or breaking out with pestilential prevalence, are well known. The history of small-pox epidemics, as observed in communities furnishing numbers of unprotected persons, sufficiently demonstrates the devastation which followed the entire want of any protecting power, before the introduction of inoculation into Europe. When this protection was introduced, its influence was manifest, not only in respect of the persons who had recourse to it, but also as regarded the community, in diminishing the frequency and fatality of epidemic small-pox, and in furnishing protected persons to attend upon the infected. Still there was a certain amount of evil connected with this mode of protection. The chance of communicating a dangerous or even fatal malady, and the contingent propagation, from the inoculated individual to the unprotected, of this disease, dismayed many, and furnished arguments in former times against having recourse to it. When weighed in connection with the fact, that some few entirely escape small-pox during their whole lives, although these were admitted to be very few, many were induced entirely to neglect this mode of protection, and, in more recent times, to adopt a

milder method, and one which appeared to the public and to the profession, until lately, equally efficacious and permanent.

109. The chief objections here urged against inoculation were partly specious and partly just. Inoculation practised by ignorant, unskilled, and unprofessional hands, in improper seasons, ages, and circumstances, or with a total disregard of the states of health of those subjected to it, may occasionally be followed by dangerous or even fatal results. Nevertheless it has been shown that, with all these drawbacks, and without the precautions, the science, and the care, which the educated physician can employ, the proportion of deaths amongst the inoculated does not rise above 5 in 1000. That inoculation would spread the distemper is certainly true when a few only resort to it; but even such diffusion would prevent the recurrence of those pestilential epidemics which follow the accumulations of a great number of unprotected in one locality, and would diffuse the disease in a milder form than when it occurs epidemically; for it has been fully proved that infection from the inoculated distemper generally does not communicate so severe or dangerous an attack as infection from a natural and epidemic case. Besides, if inoculation were generally adopted at a proper age, there could not possibly be the pabulum for an epidemic outbreak, and scarcely the occurrence of a natural case.

110. (*c.*) Against this admitted amount of unfavourable contingency, must be placed the firm confidence of protection, which inoculation furnished to all persons, in all climates, and to all races within the tropics, and to the dark varieties of the species. In these climates and races, vaccination (which the law has made to supersede inoculation) has been demonstrated to be inefficacious; but in all these circumstances, however diversified or opposite, inoculation has been found, and still is found, the most certain protection from the severer distemper and from epidemic outbreaks.*

111. (*d.*) Several *unfavourable contingencies have been urged against inoculation;* but certain of these need not be apprehended. That this measure may communicate a severe, a disfiguring, or even a fatal malady to a person who may entirely escape it if inoculation were not performed, must be admitted; but this argument was without weight before the introduction of vaccination, and now the advantages of the one mode of protection should only be weighed against the other with the view of adopting either of them, for the neglect
of both is manifestly not merely improper b
even criminal. It has been urged that inoculatio
may not only be followed by a dangerous attac
but that it may develope other maladies, especial
severe affections of the eyes, terminating in blin
ness, and diseases of various organs; but the
would more certainly follow the natural infecti
of small-pox, which, without either inoculation
vaccination, could very rarely be avoided. T
these contingencies vaccination is certainly n
liable; but it should not be overlooked that scr
fula and tubercular formations are more fr
quently observed after vaccination than aft
inoculation (see *art.* SCROFULA, &c., §§ 48, 49.
The risk of a second attack after the inoculate
small-pox has been urged; but this risk hard
exceeds a possibility, and should not be take
into account; the risk of being attacked after va
cination, or even after revaccination, being i
finitely greater, especially during adult and a
vanced age. (See *art.* VACCINATION.)

112. (*e.*) It has been urged by Dr. BARON a
others, who are the most determined supporters
vaccination, that "the practice of inoculation, t
greatest improvement ever introduced in t
treatment of small-pox, although beneficial to t
person inoculated, has been detrimental to ma
kind in general. It has kept up a constant sour
of noxious infection, which has more than cou
terbalanced the advantages of individual s
curity." (*Life of Jenner*, vol. i., p. 260.) T
is true only to a certain extent; for if all we
inoculated early in life (as by law might be e
forced) there could be few or none liable to t
natural infection and epidemic visitation of t
malady; and according to the numbers unpr
tected would be the risk of such infection a
visitation. Inoculation, although practised t
most during the last half of the 18th century, w
nevertheless as often neglected or put off, until
was too late to prevent the natural infection, a
hence all reasoning respecting it became inco
clusive, especially in local and other circu
stances, respecting which the particulars we
either imperfectly known or altogether unknown

113. Sir G. BLANE has endeavoured to sho
that the proportion which the mortality by sma
pox in London bore to the general mortal
increased during the last century from 78
94 per thousand; and that the diffusion
small-pox by inoculation was more strong
exemplified in the country than in Londo
since there are many places where small-p
was not known for twenty, thirty, and ev
forty years, in which at present scarcely an adu
can be found who has not had it. These arg
ments are, however, more specious than sol
For, as respects London, the increase of popul
tion, the diminished prevalence of all other d
eases, and the prevalence of epidemic sma
pox, are not duly estimated. From 1711 to 174
when there was no inoculation, the deaths
small-pox were 65,383; from 1741 to 177
when inoculation was coming into use, the deat
were 63,308; and from 1771 to 1800, wh
inoculation was the most frequent, the deat
were 57,268. The increase of population duri
these periods should not be overlooked. As to t
escape of many places for many years, up
which Sir G. BLANE has laid so much stress,
should be known, that such places were alwa

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* Between December 1849 and April 1850 inclusive, 76 cases of small-pox were admitted into the General Hospital, Calcutta. Of these 20 died. Of the 76 admitted, 66 had been vaccinated. Of the 66 vaccinated, 41 had good cicatrices, and 25 had cicatrices not so well marked. Of the total 76 cases, 30 were severe and confluent, 46 mild or modified. Of the 10 unprotected cases, 5 were severe and confluent — of whom 4 died — and 5 were mild. Of the remaining 25 confluent cases, after vaccination, 12 had good cicatrices, and 13 cicatrices not so well marked. Of those that had been vaccinated in early life, 16 died, of whom half bore good scars, and half had scars not well marked. Of the whole number, 65 were males, 11 females; 8 were children aged five years or under, of whom 1 died. Six of these children had been vaccinated. The mortality here stated as occurring from variola after vaccination — 16 out of 66, or 24 per cent. — is the highest upon record in any country, and must be attributed either to the malignity of the prevailing epidemic, to the climate and locality, or to the influence of race, — probably in part to all these.

ted at last, and without exception, by most tructive epidemics, the great number of the protected furnishing an abundant papulum for ir malignant and fatal prevalence. It be- nes, therefore, much preferable to have, even in se places, the regular adoption of inoculation qualified persons, with even the highest rate mortality consequent upon this measure, than immunity of many years, with a mortality of or 30 per cent, as recorded of these epidemics.

114. There can be no doubt that early in, and ut the middle of, the last century, when culation was adopted only by a few, and even rwards, when inoculation was very irregu- y practised, and when many, even the ma- ty in many places, were left without that pro- ion, that it multiplied the sources of in- ion; but this was merely a powerful argument n for universal inoculation, as it is now for the ption either of vaccination or of inoculation, if latter were allowed by the legislature. On subject, as will more fully appear when vac- ation comes under consideration, writers have n partisans, rather than calm examiners of s, as formerly or at present observed, and as nful expositors of what may rationally be ected.

15. *There are a few rules requisite to the safe duct of inoculation* that ought to be observed: 1st. This measure should be employed for per- s in good health — in those who are neither ilitated, nor plethoric, nor obviously scro- us. Debilitated persons should previously be ored to health, and the plethoric reduced by lerate evacuations and active exercise. All secretions and excretions ought to be natural free; and wherever a cachectic state of system, ndications of visceral congestion or obstruc- exist, inoculation ought not to be performed. It may safely be practised at any age from e months and upwards, but it should not be rted to during pregnancy and the puerperal es, on account of danger to the mother and d, nor during lactation. 3d. It may be tised at all seasons in temperate countries, in all climates. The preferable season is that ch is moderately cool, and admits of due venti- n of the patient's apartment. In warm cli- es, the coolest season of the year should be cted; and this season has always been selected native inoculators in the warm climates of the t, where inoculation has been adopted from y ages. 4th. Inoculation is successful, com- d with the natural distemper, in all races and ates; but more especially in the dark races, in tropical countries; for, although the pro- on of deaths after inoculation may be higher e dark than in the white races, the protection ished by it is even greater in the former than e latter, natural small-pox being so remark- destructive in all dark races.

16. That variolous inoculation by unqualified ons ought to be prevented by legislative en- ent cannot be disputed; but there are circum- ces which may render recourse to it, under precautions, a justifiable measure, especially ollowing:— 1st. When small-pox unexpect- breaks out in a district, at a time when vac- virus is not to be obtained. 2d. When ons who have been vaccinated in infancy are t to proceed to inter-tropical climates, and are likely to visit places where small-pox either prevails or recurs epidemically. 3d. Among the dark races, when they will not adopt vaccination, or when the vaccine virus is inefficient, either as respects its local effects, or its protective power. 4th. When persons are insusceptible of vaccination, from peculiarity of constitution, or some other cause.

117. In the present state of our knowledge as to the protection furnished by vaccination — believing that this measure will never be generally adopted, and that, if it were so adopted, it could never altogether banish small-pox, nor prove a complete or lasting preventive of variolous infection — it becomes doubtful whether or no the amount of benefit conferred by vaccination will hereafter prove greater than would be furnished by the general adoption of inoculation: as respects inter-tropical climates and the dark races, the candid inquirer into the merits of both will ere long, even if not now, declare for the latter. As inoculation is still practised in some countries, as it is still in many climates preferred to vaccination, and as it is the measure to which the majority of persons above forty years of age owe their protection from the natural distemper, the more important particulars connected with its performance require to be stated; and I cannot do this better than nearly in the words of Dr. GREGORY:—

118. *Inoculated small-pox.*—Inoculation is performed by introducing into the arm, at the insertion of the deltoid muscle, by means of a lancet, a minute portion of variolous matter. The thin lymph of a fifth-day vesicle is to be preferred to the well-concocted purulent matter of the eighth day, but both are efficient. One incision only is to be made. A minute orange-coloured spot is perceptible on the second day, by aid of the microscope: on the third or fourth day, a sensation of pricking is felt in the part. The punctured point is hard, and a minute vesicle, whose centre is depressed, may be observed, surmounting an inflamed base. On the fifth day, the vesicle is well developed, and the areola commences. On the sixth day, the patient feels stiffness in the axilla, with pain. The inoculated part has become a hard and inflamed phlegmon; the subjacent cellular tissue having become involved in the inflammatory action. On the evening of the seventh, or early on the eighth day, rigours, headache, a fit of syncope, vomiting, an offensive state of the breath, alternate heats and chills, languor, lassitude, or, in the child, a convulsive paroxysm, announce the setting in of fever. The constitution sympathises with the progress of the local disorder, and the virus has affected the whole system.

119. On the appearance of febrile symptoms, the inflammation of the *inoculated part* of the arm spreads rapidly. An areola of irregular shape is soon completed, which displays within it minute confluent vesicles. On the tenth day, the arm is hard, tense, shining, and very red. The pustule discharges copiously, and ulceration has evidently penetrated the depth of the corion.

120. On the eighth day, spots of variolous *eruption* begin to show themselves in various, and often in the most distant parts of the body. In the majority of cases, the eruption is distinct and moderate. Two hundred vesicles are counted a

full crop. Sometimes not more than two or three papulæ can be discovered, which perhaps shrivel and dry up, without going through the regular process of maturation. In other cases, the eruption is full and semi-confluent, passing through all the stages to maturation, and scabbing, and cicatrisation, with as much perfection as the casual disease can display. Between these extremes every possible variety may be observed. The truly confluent eruption, with affection of the mucous surfaces, is very rare, and that implication of the fluids and of the nervous system, which together constitute the extreme of variolous malignity, is nearly, if not entirely, unknown. Secondary fever, therefore, is not common, at least in any intensity.

121. IX. TREATMENT. — Small-pox being a specific disease, of a determinate course as respects both the eruption and the febrile phenomena characterising it, is less amenable to treatment than most other acute diseases. Nevertheless rationally-devised means exert considerable influence on the course of the distemper. In many cases, little or no interference on the part of the physician may be required, but something is always expected from him when his aid is called in, and it should, therefore, be clearly known what measures may be injurious and what beneficial. In severe cases, however, medical aid is always more or less requisite and advantageous, but to be the latter it should be based upon sound pathological views, and upon an accurate recognition of existing morbid states. Dr. GREGORY justly remarks, that "it is a melancholy reflection, but too true, that for many hundred years the efforts of physicians were rather exerted to thwart nature, and to add to the malignancy of the disease, than to aid her in her efforts. Blisters, heating alexipharmics, large bleedings, opiates, ointments, masks and lotions to prevent pitting, were the great measures formerly pursued, not one of which can be recommended." We may smile at the red bed-hangings, the red blankets and counterpane, the mulberry wine, the juice of pomegranates, prescribed for the malady by JOHN OF GADDESDEN; "but if either he or GORDONIUS or GILBERTUS were to rise from their graves, and inquire whether this is one whit worse than mesmerism, or at all more absurd than homœopathy or hydropathy, we should, I fear, look a little foolish. Let us, then, avoid the errors of our ancestors, without reproaching them."

122. Even in more recent times, and down to the days of SYDENHAM, or even to those of VAN SWIETEN and HEBERDEN, physicians have entertained very erroneous notions as to the powers of medicine in small-pox, and as to the intentions by which they should be guided. They imagined that certain drugs possessed the power of promoting the eruption, and not only of promoting it, but of procuring a favourable sort — a power, however, which was much more frequently injurious than beneficial; and, as far as it was manifested, much less rational and serviceable than the means employed for ages in the East in the treatment of small-pox. In this disease, we remark, as in several others, that the boasted powers of doctrinal science, when not fully advanced, are often more prejudicial than beneficial, especially when blindly adopted, and applied without the guidance of rational observation.

123. The treatment of small-pox should b irected with similar *intentions* to those rec mended for the management of other fev s. Means should be employed, 1st, to mode e febrile phenomena, whenever they are sever or excessive; 2d, to prevent or remove local de rminations or congestions of blood, or other ncomitant affections or structural changes; d, 3d, to support the powers of life, whenever y are inordinately depressed or exhausted, by e influence of the morbid poison on the nervous d circulating systems. These *indications* sh d never be overlooked in any form, stage, or te of the malady. In the mild or distinct form, e active adoption of them may not be required : et even in it, the occasions which may demand ir due observance should carefully be watched r, and promptly met when observed.

124. *A. The primary or initiatory fever* ma ot be recognised as that of small-pox in cases ccurring independently of inoculation, or v iout obvious sources of infection, and in thes e treatment of this stage must be conducted ccording to the principles developed under e treatment of continued fever (see *art.* FEVE §§ 126. *et seq.*). If, however, it be knowr or strongly suspected, that the incipient disea is small-pox, the question arises, shall there be y difference in the treatment to be adopted m that usually employed in continued fever? t, as it is in continued fever, so it is in small- x, the febrile action, the type and character o e fever, may vary from inflammatory to ad a mic, or even putro-adynamic, and display ir e latter, as I have shown in respect of the for r, not merely either extreme of type, but e y intermediate phase. The treatment of this pe d, therefore, must necessarily depend upon the s es of the pulse and of the general phenomen in connection with existing evidence of vital po ; and upon the acumen and capability of e physician in recognising with precision these arious and varying states, and in controllin or guiding them to a successful issue. As rema ed by SYDENHAM, the fate of the patient dep ds upon the treatment of this stage, — that is, o e first three days of the disease.

125. The patient should be removed to a l ge and airy chamber, which ought to be dark ed and well ventilated. He should be laid on a ir mattress, and be covered by a moderate qua ty of bed-clothes, his head resting on a hair pil v, as being more cool than that in common use. e temperature of the room should be, accordi to the amount of febrile heat, from 55° to 65° ut preferably from 55° to 60°. If the diseas e distinct, and the febrile symptoms not ver evere, the patient may not be confined to d during the day, his clothing being appropria to the circumstances in which he is placed. A se of calomel with James's powder, or antim al powder, should be given, and be followed, e hours afterwards, by a purgative pill or dra t. After these, saline draughts in a state of effe scence may be prescribed from time to time, d the bowels preserved in a moderately open te by the usual cooling aperients. In the sli er forms of the disease, no further medicine wi e required; the beverages, diet, and regimen o e patient being regulated as stated hereafter.

126. If the primary fever assume a more s re

inflammatory character, and if the pain in the d, epigastrium, and loins, be too severe to be yed by the above means, and more especially e patient be robust or plethoric, blood should taken from the arm, in such quantity as the uliarities of the case may warrant, in addition ese means. When the brain, lungs, or liver ngested, or the pulse full, hard, oppressed, or p, a moderate bloodletting, relatively to the of the patient, ought to be prescribed; and measure will be still more requisite when the ache is intense, the face flushed, and the els throbbing, the irritability of stomach extreme, the breathing oppressed, and the pulse full labouring. When the eyes are suffused, and ache is experienced, leeches applied to the les, or behind the ears, may be sufficient; or, e more phlogistic cases, they may be emed in aid of bleeding from the arm, and be wed by calomel, James's powder, a purgative ght or pill, and cooling draughts. Dr. Gory remarks, that "it has often been said bloodletting, in the fever of invasion, inters the process of nature, repels the eruption, retards it, and so weakens the constitution, the due concoction of the pustules is never ted. It is undeniable that a man may be unnecessarily and too largely in small-pox, moderate bleeding does no harm, and, if ever runs high, often does great good." The iety of having recourse to venesection, espein the circumstances just mentioned, has insisted on by Sydenham, Biendisant, ini, Dover, Berger, Stubbes, Falconet, many others. De Valdes recommended letting nearly a century before Sydenham; Hecquet advised bloodletting from the feet s stage. Hufeland very properly directed es to be applied to the temples when the e was attended by convulsions. The quanf blood to be drawn should depend upon tate of the pulse and other peculiarities of se, always keeping in recollection the chaof the prevailing epidemic and of physical nces.

7. *a. Emetics* have been advised by some rs on the invasion of the primary form of smalland condemned by others. The propriety of g recourse to them depends upon the peculies of the case, the character of the epidemic he season in which the distemper occurs. nham prescribed an emetic, after blood, in the primary fever, and in the secondary with internal complication. He likewise had se to it as soon as the disease appeared to be ent. But there appears to have been much tion in his opinions as to both emetics and etting in small-pox at different epochs of actice, or rather during the different epiprevalences of the malady, as shown by his ccounts of several epidemics; and I cannot d so firmly upon the opinions of a physician, ny are disposed to do, who did not perceive, ly estimate, the contagious and infectious of the malady. That emetics are often vice, especially at the commencement of rimary fever, and when indications of obstruction, congestion, or accumulations resent, and during autumn or summer, I t doubt; but it requires close observation xperience to determine with precision the exact circumstances and period of the malady requiring their exhibition. They have been recommended by Dedekind, Hecquet, Leake, and many others, but in a too empirical manner, and with little regard to either the peculiarities of the case, the stage of the malady, or the choice of the agent. A writer in the Berlin Medical Transactions advises repeated emetics in this disease. The effects of one, however, will show the propriety of having recourse to it, and likewise of repeating it. In the low, adynamic, or confluent states of the disease, more especially, the choice of the agent is of some importance; for in these states, the more nauseating or depressing emetics, as tartar emetic or ipecacuanha, are not so appropriate as in the sthenic forms of the malady, unless they be conjoined with stimulants, aromatics, &c. In the former states the sulphate of zinc should be preferred. Some writers suppose that emetics diminish, others that they increase, the quantity of eruption; but it may be said of emetics, as of bloodletting, that they have little or no effect upon the eruption, or in lessening confluence. Their influence is exerted chiefly in promoting the excreting functions, whilst bloodletting diminishes inordinate vascular action, and relieves internal oppression and congestion.

128. *b. Purgatives* are generally beneficial during the primary fever, and very often also in the secondary fever; but they are required more especially when the secretions and excretions have not been duly evacuated previously to treatment, when the indications of local determinations, particularly to the head, are manifest, and when sthenic febrile excitement is considerable. In these circumstances, not only purgatives, but the whole of the *antiphlogistic regimen*, as insisted on by Sydenham, Hoffmann, Van Swieten, Bartholinus, Dimsdale, Currie, Eyerel, Beddoes, Perkins, &c., are beneficial. Much, however, depends upon the selection and combination of these means appropriately to the peculiarities of the case. In the primary fever, *calomel* is generally most serviceable, especially when conjoined with antimonials in the more sthenic forms of the disease, and with camphor in the more asthenic; but in most cases, a full dose of the calomel should be followed by a purgative draught in a few hours, if it have not operated sufficiently. Dr. Fowler supposed that, when calomel was given early in the eruptive fever, it diminished the quantity of eruption. But it cannot have this effect, unless it be taken before the first indications of eruption exist, and then its influence must be necessarily doubtful.

129. Osiander very justly cautions against too much purging; for it may develope an intestinal complication, in the form of either diarrhœa or dysentery, and thereby greatly endanger the patient. In the more inflammatory or sthenic cases, the phosphate of soda, the citrate of magnesia, or other cooling saline purgatives, should be preferred, or such as may be compatible with the use of saline diaphoretics, as the liquor ammoniæ acetatis and spiritus ætheris nitrici; but in asthenic or confluent states of the disease, after a dose of calomel or camphor, I have preferred to give the spiritus terebinthinæ, with about an equal part of castor oil, on the surface of a suitable vehicle, in quantity sufficient to act moderately on the bowels. If this dose be rejected, the

e ffect will, notwithstanding, be more or less beneficial, and after some hours it should be repeated, or the same substances in larger doses should be administered in an enema, which may be repeated according to circumstances.

130. During the primary fever, pain at the epigastrium is often considerable, or even urgent, and is frequently accompanied with irritability of stomach, and the rejection of whatever is swallowed. It may be requisite, from the severity of these symptoms, to endeavour to abate them. This object will be most readily attained by giving a full dose of calomel with a moderate dose of camphor and opium, and a little cinnamon or ginger, in the form of bolus, or in that of powder mixed in a little treacle. In these circumstances, saline effervescing draughts, with or without tincture of opium, generally fail of giving relief. If the disease presenting these symptoms is of an asthenic or confluent kind, as commonly observed, or if the medicine now recommended is not sufficiently efficacious, a mustard poultice may be applied over the epigastrium, or a mustard pediluvium or semicupium may be employed. In most cases I have preferred, to the mustard poultice, the application over the epigastrium of equal parts of the compound camphor liniment and of the turpentine liniment, with a little cajuput oil, and sometimes with a little olive or almond oil, on the surface of flannel or spongio-piline.

131. *c. Cooling diaphoretics*, especially small or moderate doses of the solution of the acetate of ammonia, or of the citrate of ammonia, or of the citrate of magnesia, or of the citrate of soda or potass, with the spirit of nitric ether, according to the states of the surface and of the bowels, will generally be of service; and the acid may be somewhat in excess when vascular action is inordinate. Cold sponging the surface, during the early part of the primary fever, or even the cold affusion, may be resorted to, as advised by BARTHOLIN, CURRIE, BEDDOES, JACKSON, and others; but when the eruption appears, these should be relinquished, for I believe that the recommendation of SCHAEFFER, SWAINSON, HUFELAND, WATSON and SELLE not to employ these means at this period is altogether judicious. MARCARD considered, and with much reason, that the tepid bath, previously to the appearance of the eruption, moderated the primary fever; and he recommended warm stimulating baths in the low and retrocedent states of the distemper. Many of the writers already named cautioned against carrying the cooling regimen too far, or employing excessive cold, in the treatment of low, confluent, or epidemic states of the disease, justly contending that a moderately cool or fresh state of the air, and a judicious recourse to restoratives or tonics were altogether indispensable in many cases, and especially in the epidemic prevalences of the malady. The treatment which appears the most appropriate to these cases will be hereafter stated (§§ 143. *et seq.*).

132. Dr. GREGORY justly remarks, that "if the circulation at this period (the primary fever) be languid; if the pulse be small and feeble, the skin pale, and the extremities cold; if the patient lies on his back, sunk and exhausted, let him have immediately warm brandy and water, cover him with bed-clothes, apply mustard poultices to the centre and extremities of the circulating system, and give thirty drops of laudanum, to be repeated in four hours if necessary. This cordial pla of treatment must often be continued for sev al days, when the eruptive nisus is accompa d with depression, and nature appears so obvio y unequal to the effort." (*Op. cit.*, p. 100.) n these circumstances, the opium should be g n with camphor or ammonia, or both; and the ot terebinthinate epithem will generally be re efficacious than the mustard poultices.

133. *B.* During the progress of the erup n, and in the *remission of the fever* which produc it, but little beyond a suitable regimen is require A too officious recourse to medicine is oftener p udicial than the contrary. The same re rk applies to the secondary fever, or suppur ve stage, when the disease is discrete and there no complication. During the period of eruptio nd development, however, the secretions and e etions should be carefully watched and cauti ly promoted, without producing irritation; an he senses and mind ought to be guarded again xcitement, very light and bland beverages, nd mild, weak, farinaceous nourishment, in all quantity only, being allowed. Dr. GREG y's remarks as to the treatment of this stage a so judicious, that I shall adduce them at this pl .

134. "While the pustules are in proce of maturation, a variety of measures may be pu ed, which, without interrupting the salutary nd necessary process of pustulation, lessen th patient's sufferings, and prevent subsequent fficulties. If the eruption proceeds favourably ou would not do more than lessen thirst by ine draughts, and occasionally relieve the bowel y a dose of castor oil. If the maturation of a rge crop of pustules excites much fever, it w be prudent to employ more active purgatives, s as calomel with colocynth, the compound pow of jalap, or the infusion of senna with salt all which cause a drain from the blood-vesse nd lower arterial action. Place the patient in a rge and cool room, and cover him lightly with edclothes. Remove all flannel coverings ich may usually be worn next the skin. If the s nce be very tender, apply to it some cooling on, such as the decoction of bran with some sp of rosemary. In all cases, even of modera intensity, it is proper to cut the hair close, an to maintain it during the whole course of the d ase. The head is thus kept cool; delirium is relie l or prevented; the risk of cellular inflammat of the scalp diminished, cleanliness enforced, an opportunity afforded for the employment of porating lotions, should more urgent symptom ise. Opiates may be occasionally administered edtime, when there is much cuticular irritat or great distress from want of sleep.

135. "The diet of the patient should co t of tea, bread and milk, arrowroot, rice-mil and roasted apples. Grapes, oranges, and rip ubacid fruits are grateful to the patient, and eful adjuvants to the antiphlogistic remedies. I onade, apple-water, tamarind-water, toast-wat and milk-and-water, must be the ordinary bev ges. SYDENHAM permitted his patients to drink allbeer — an indulgence which may still be g ted. To that able physician we are indebted f his the cooling system of treatment in small-po

136. "One of the first objects, which, i ases of more urgency, will attract your attentio s the condition of the throat. Gargles of i sum

sæ comp. afford some relief. When the diffiulty of swallowing is very great, and the tonsils uch swollen, leeches applied to the throat, llowed by poppy-water fomentations, are serceable. Under these circumstances, some phyians counsel you to apply to the throat, by eans of a camel-hair pencil, a strong solution of nar caustic (twelve grains to the ounce), with e view of checking the advance of the mucous sicles. I have not adopted this practice, from a nviction that it would not affect the tracheal lammation, from which alone danger is to be prehended." (*Op. cit.*, p. 101.) More retly, much stronger solutions of nitrate of er — from forty to sixty grains to an ounce of tilled water — have been applied to the phanx, inside of the glottis, and even within the lynx and upper part of the trachea, by means a sponge attached to whalebone; and, it is sl, with success in some cases. Chlorinated lons and gargles are generally of use when the ction of the throat and nasal passages is severe i onfluent small-pox.

37. *C.* During the *secondary fever*, when it is sere or complicated, the treatment should be ave but discriminating. The use of *purgatives* a this period was once a question of warm dussion. Dr. GREGORY remarks as follows:— "ne of the most remarkable disputes which e arose in physic was that regarding the poriety of using purgatives during the secondary fer of small-pox. SYDENHAM, with all his bness, never wholly divested himself of the ey prejudices which the Arabians had incated against purgatives in small-pox. MORTON inighed bitterly against their use, while Dr. FEND, with the true spirit of a reformer, advocal their free employment, especially during the sendary fever." "They are now as freely empled in the secondary fever of small-pox as in ag or in typhus. They are of the greatest sece when the skin is hot and dry, when a scatinal rash covers the body, or innumerable abesses give evidence of the excited state of the cuneous vessels."

8. Agreeing with the foregoing remarks, I wod add only that, when too strong, or too freently exhibited, purgatives may induce a daerous diarrhœa or dysentery, or an enteric colication, especially if the selection of the mes be not sufficiently discriminating in respect of e peculiarities of the case. As long as the dise manifests but little exhaustion of vital por, this care may be of less importance; but wh vascular action is asthenic, and constitution power is depressed, then such aperients as prote excretion, and, at the same time, impart onr energy, should be preferred. Such are the mes advised above (§§ 128, 129.), and such also are e compound decoction of aloes, or the compou infusions of gentian and senna, given in conction with the carbonates of the alkalies and arotic tinctures, or with the citrate of magnesia, or h the carbonate or citrate of ammonia. In ma cases, it may be requisite to aid the operatio of these by means of enemata containing the subnces already mentioned, with such others as the igencies of the case will suggest.

1. The propriety of *bloodletting* in the secondar ever has been denied by most writers, and conded for by others, but by these latter under certain circumstances only. SYDENHAM, when he first wrote on small-pox, advised bloodletting in the secondary fever of the confluent disease alternately with purging; but at later periods of his practice, and when describing the epidemics of 1670 and subsequent years, which were manifestly of a most malignant character, the treatment recommended by him was of a very different kind (§§ 147, 149.) from that formerly directed. It would seem that the small-pox previously to 1665 and 1666, that is, before the great plague, was of a more sthenic nature than subsequently; and that, after this most fatal epidemic, by which about 100,000 bodies were buried in a few months within and immediately around London, thus furnishing additional sources of contamination to both air and water for many years afterwards, small-pox and other febrile diseases presented a more malignant character, and required different means of cure from those formerly employed.

140. When the pulse presents more or less tone, and vascular action is high, in connection with internal complication — congestive or inflammatory — then bloodletting, cautiously and moderately employed, according to the peculiarities of the case, and aided by such means as may derive the fluids from the seat of complication, and promote excretion, &c., will prove of much service. But if the pulse be weak, very quick, compressible, or small and soft, and, more especially, if there appear any signs of putro-adynamia or malignancy, as respects either the state of the eruption or the constitutional symptoms, decided means of an opposite kind are obviously indicated (§§ 143. *et seq.*).

141. In the secondary fever, when uncomplicated with any *internal affection*, or *contamination* of the circulating fluids, little beyond the preservation of a free state of the secretions and excretions need be attempted; aided, however, by a suitable regimen. In cases presenting prominent affection either of the brain or its membranes, or of the lungs, pleura, &c., general or local bloodletting, or both, according to the peculiarities of each case, is generally requisite; and purgatives and derivatives are further required. The state of the surface may appear to contra-indicate a recourse to blisters; but when the pustules on the trunk, or in the situation where it is desirable to apply a blister, are few, then they may be applied; and in these circumstances, as well as in others in which they should not be resorted to, the terebinthinate embrocations or epithems, often recommended in this work, may be employed without regard to the state of pustulation in the situation, to which it may be desirable to make these applications. The treatment recommended in the complications of continued fevers (*see art.* FEVER, §§ 529. *et seq.*) is generally suitable to those which occur in the course of small-pox; existing pathological states furnishing the only true therapeutical indications in all forms of fever, whether simply continued, or exanthematous, or malignant.

142. Ophthalmia is one of the most common of the concomitant affections in small-pox. In many cases of this complication, the state of the system will not admit of general or copious bloodletting; but in these, as well as in most other severe cases, scarification of the conjunctiva, leeches or cupping-glasses on the temples, warm fomentations,

calomel, purgatives, terebinthinate medicines given by the mouth and in enemata, are required, and should be mainly depended on, in connection with such other internal, constitutional, or febrifuge means as the character and state of the febrile symptoms will suggest.

143. *D. In the confluent states of variola*, or even when the pustulation is profuse and general, the treatment should be such, from the commencement, as will not reduce the powers of life; and even before the eruption appears, and when the character of the primary fever, and the severity of the vomiting and pain in the back and loins, and the stinging heat of the surface, indicate a severe or confluent form of the disease, it may be necessary, especially if the pulse be very rapid, or deficient in tone, or broad, open, and very compressible, to have recourse to the more tonic of the several febrifuge medicines usually employed. In these cases, as well as in others presenting signs of putro-adynamia, as petechiæ, hæmorrhage from mucous canals, a dark brown or black appearance of the eruption, whether at an early stage, or during the maturation and secondary fever, the preparations of *cinchona*, either with the mineral acids or with the alkalies, according to the features of individual cases, are generally required.

144. Cinchona was prescribed in these states of the disease, in various forms of preparation and combination, and was administered in enemata by Gesner, Fouquet, Bayley, Hirzel, Wall, Baldinger, and others; and they relied upon it chiefly in the secondary fever, when accompanied with sinking of the powers of life, or with putro-adynamia. Hufeland advised the preparations of cinchona to be given with antimonial wine; but this combination is admissible only at an early stage of confluent or malignant cases, and is not suited to the more advanced stages, or when hæmorrhagic exudations are observed. In these latter circumstances, I have found the decoction of bark to be most beneficial when conjoined with the hydrochloric acid and the hydrochloric ether, or with the chlorate or the nitrate of potash and tincture of serpentaria, or with the nitric acid and spirit of nitric ether. The sulphuric acid was advised, in the form and states of the disease now being considered, by Sydenham, Brocklesby, Waldsmidt, Nowach, and others, conjoined with various stimulants. More recent writers have conjoined the decoction or infusion of cinchona with the sulphuric acid, and the spirits of sulphuric ether, for these and similar states of the distemper; and still more recent authors have employed the sulphate of quina in these or similar forms of combination. These means are severally of more or less service; and it may be even necessary to combine them still further, as with the tincture of opium, or with the compound tincture of camphor.

145. The nitric acid was recommended by Dr. Scott for the more adynamic and confluent states of the malady; the hydrochloric acid by Jahn, and the acetic acid with camphor by Marx, Thomann, Plinta, and Hopf. Either of these acids, or of those above mentioned (§§ 143, 144,), or the citric acid, is more or less beneficial when suitably conjoined with tonics, cordials, or stimulants, according to the peculiarities of the case; and in these combinations they have been prescribed by Falconet, Rush, Thuessinck, Lafontaine, and others. Of the good effects of the acetic or the citric acid, conjoined with campl , or with ammonia, this latter being in excess, l given with the infusion or decoction of cincho , and aided, in the more severe cases, by wi , beef-tea, &c., I can speak from experience.

146. *E.* In the *petechial form* of small-p , treatment will generally prove inefficacious. r. Gregory thinks that it admits of no essen l relief from medicine. He considers purgative o be inadmissible, and mercury without influe . The loss of a little blood from the arm s appeared to him more effectual than any o r measure. "The citrate of ammonia in e vescence, with port wine or brandy, may e given when the powers of life appear to fail, t the hæmorrhagic diathesis is often accompanie y a hot skin and an excited circulation." (*Op.* ., p. 104.) When the skin is hot and the culation excited, in connection with petechia r spots of purpura, or with hæmorrhage from mu s canals, the abstraction of a little blood from e arm may prove beneficial; but these sympt s should not prevent a recourse to the means st recommended (§§ 143. *et seq.*); for they often b side after a decided recourse to these me s, especially when the medicines are directed t e prevention or counteraction of the contamin n of the blood, and the defect of vital power, n which they depend. When the prostration is ot great, nor the hæmorrhage very considerable or the eruption of a dark or malignant hue, en recovery may follow a recourse to cinch a, conjoined with the chlorate or nitrate of p h, and with the carbonate of soda and cordi or stimulant tinctures; camphor, or small do of turpentine, being given occasionally in the er vals between the exhibition of these. Inste of cinchona, the preparations of valerian may be m ployed. I have generally preferred them en delirium was present. If the bowels are affe d, the preparations of opium, or the compound c ture of camphor, should be added to these; a if the evacuations are very offensive, as well a oo frequent, pure charcoal-powder, or the chlo es in small but frequent doses, may be presc d. When, with these putro-adynamic symptoms he liver is inactive or congested, then the o hydrochloric acids may be prescribed i he decoction or infusion of cinchona, or the inf on of valerian; and when cerebral symptoms p lo minate, or when low delirium, tremor, nd nervous exhaustion prevail, then the tinctu of *sumbul*, lately introduced into practice by r Savory, will be found of great service.

147. In cases presenting more or less n tamination of the circulation and adynam as those now considered usually present, smal nd repeated doses of *opium*, especially when n joined with camphor, or the chlorides, o he nitro-hydrochloric acids, or with cinchon or valerian, or sumbul, will generally be ost serviceable. When the bowels are most rel ed, in such cases the preparations of opium are re especially required; and they may be give ith milk and lime-water, or with aërated lime- er. In the circumstances just named, and more e cially in the secondary fever attended by m ed putro-adynamia or malignancy, Wandt nd Stroem prescribed opium with the sulph of alumina. Dr. Drummond recommended th re parations of opium, in large doses, from the m

ncement of the eruption in confluent cases ; ALLES, GEBEL and YOUNG adopted a similar tment. P. FRANK considered these preparations e deserving of our chief reliance in these cases ; the same opinion was entertained by HUX- M, DE HAEN, HUFELAND, SPRENGEL, STOERCK, others. SYDENHAM considered them of greatest vice when exhibited on the fourth day of the e ption in adults, and given in the evening or t ards night. He trusted to them especially in t confluent form, and about the eleventh day, o most dangerous period of the disease. THO- N prescribed opiates in severe cases, after the e ibition of an emetic ; and QUENTIN combined t n with the oxide of zinc. The preparations of o m, with the exception of the weak paregoric o he pharmacopœia, cannot be given, without risk of producing severe cerebral symptoms, i hildren under the age of four or five years ; even at that age, these symptoms may occur, ey be not guarded against by resorting to c -sponging over the scalp, and by cooling ape- ri ts. In cases which most require opium, cam- p , or ammonia, or the usual aromatics or st ulants, are also beneficial, and both promote good effects, and counteract the injurious in ence, of this substance. The excellent effects o e laudanum prescribed by SYDENHAM de- p led upon the combination of aromatics in its p aration — a combination which has been very im rfectly estimated, even by his warmest ad- m rs.

8. *F.* The *laryngeal* and *tracheal affection*, ar ng in the course of severe variola, is gene- ra an extension of the specific inflammation ex ing in the mouth and throat, and is seldom m h ameliorated by the means already noticed (§ 143 — 147.). After having had recourse to th , emetics, especially the sulphate of zinc, or ip cuanha conjoined with camphor, or ammo- ni or capsicum, may be tried ; for these have a m decided effect upon the respiratory surfaces th is generally recognised, especially in re- m ng the viscid mucus from the trachea and la bronchi that generally collects in large qu tity in these situations when the severe forms of nall-pox are thus complicated. In these co plications, the decoction of senega, or the pr rations of squill, or of ammoniacum, con- jo d with camphor, or ammonia, or other sub- sta es which the circumstances of the case will su st, may be prescribed ; and if these expecto- ra should act as emetics, as they will generally ac hen given in large doses, the effect will be the nore beneficial, especially in confluent, or seve e, or malignant cases.

9. *G.* The occurrence of *diarrhœa* or of *dy- sen ic symptoms*, especially in connection with the sec dary fever and in confluent cases, requires me s which should partly depend upon the ap rance of the evacuations. In most cases, the edicines already mentioned (§§ 146. *et seq.*), ipecuanha with camphor and opium, or with po ered carbon and the compound chalk- po er ; and the other medicines usually given for arrhœa or dysentery, may be severally pre- scr d in these complications of small-pox. SY NHAM gave boiled milk with lime-water in the cases, or with ammonia or magnesia when the tools evinced a somewhat sourish odour ; and ROYER and many others adopted a similar practice. But when this complication appears in malignant, or even in the more usual confluent cases, more active astringents are required, and these should be associated with antiseptics, and absorbents, and opiates.

150. *H.* The state of the *urinary secretion* should receive due attention from an early period of the disease. The urine is often not only small in quantity, but also voided at long intervals in some instances ; and it is occasionally remarkably high-coloured, and even contains albumen, and not infrequently blood, especially in the confluent and malignant cases. In the early stages of the more phlogistic cases, especially when the urine is scanty and very high-coloured, demulcents and diluents should be freely given, with the cooling diaphoretics already mentioned (§ 131.), and with diuretics of a cooling and febrifuge kind, as recommended by THOMANN, LENTIN, and others. When the urine contains albumen, or blood, globules, or even pure blood, then the terebinthinate embrocation or epithem may be applied over the loins, and repeated according to its effects.

151. *I. Small-pox in puerperal females*, especially when it occurs very soon after delivery, is always a most dangerous disease. Not only is it generally confluent, and attended by marked asthenia, but it is also complicated with very severe, and usually fatal, affection of the respiratory mucous surface, extending to both lungs. Of several cases of variola to which I have been called in the puerperal state, I have seen only one which was mild and uncomplicated. The treatment in these unfavourable circumstances should partly depend upon the time which has elapsed between delivery and the appearance of the distemper, partly upon the amount of hæmorrhage which has taken place at the period of delivery or subsequently, and upon the states of the lochia and of the lacteal secretion. When the discharges have been and are free, and the pulse is very frequent and soft, the severity of the laryngeal, bronchial, or pulmonary complication, or indeed of any other associated affection, should not prevent recourse to the means already recommended for the severe, confluent, and adynamic states of the malady (§§ 143. *et seq.*), especially to camphor, ammonia, wine, or other stimulants and tonics ; or to such as are advised for the malignant form of *puerperal fever* (see that article). When the respiratory passages are very severely implicated, the remedies already mentioned, especially senega, squills, ammoniacum, sulphate of zinc, &c., prescribed as expectorants or as emetics, according to the emergency of the case, ought not then to be overlooked. The great severity and unfavourable prognosis of small-pox in the puerperal state should not prevent a decided recourse to the most active means in the treatment of this class of cases, but, on the contrary, should induce us to employ the most energetic medicines in the most prompt and appropriate manner.

152. ii. EXTERNAL MEANS HAVE BEEN USED TO GIVE RELIEF AND PREVENT PITTING, but they do not always succeed as respects the former intention, and they often fail as regards the latter. When pustulation is profuse, Dr. GREGORY advises the surface to be liberally covered with some simple dry powder. Starch-powder, hair-powder, and powdered calamine are alike available for this purpose; cold cream, and mild unguents,

such as the unguent. cetacei, with a proportion of oxide of bismuth, are useful when there is much cutaneous irritation with a dry surface. "Fomentations and poultices are the only means of treating those abscesses and erythematous inflammations which so harass the patient, and so fearfully peril life in the later periods of secondary fever. All the attempts made by the use of masks to prevent pitting end in disappointment. The only effectual means of lessening such disfigurement are those which allay cutaneous action. Purgative medicines, low diet, and free exposure of the face to a cool air, are the sole measures on which reliance should be placed." (*Op. cit.*, p. 108.)

153. Whilst these means ought to be adopted, others may also be tried. Fresh air should be duly admitted; but, at the same time, light ought to be excluded as completely as possible. I believe, from what I have observed in several cases, that complete darkness prevents pitting, and that light increases the suppurative action in the pustules, and thereby occasions deep and permanent marks. Whilst the patient should breathe a freely-renewed air, the vesicles should be protected from the action which the oxygen of the air exerts upon them; and this may be done by various means, either by causing the vesicles to discharge their contents before suppuration commences, and by favouring the drying of their contents upon their surfaces, the scabs thus forming a natural protection from the action of the air; or by covering the vesicles with some substance, which may lessen the suppurative process, by protecting them from the air, and by lowering inflammatory action in the cutaneous surface.

154. The Arabians opened the pustules as fast as they ripened by a gold needle; and the moderns have applied lunar caustic to the pustules, so as to destroy them at an early period of their development. As to this latter practice, Dr. Gregory remarks that, as a partial application — say to vesicles forming near the eye — he can recommend this measure; but that he cannot advise it to be employed to any large surface covered with confluent or semi-confluent vesicles. He adds, "The latest mode of treating the surface during the maturative stage of small-pox, is that of applying mercurial plasters, containing calomel, or corrosive muriate of mercury, or covering the whole surface with mercurial ointment. In the French hospitals at the present time, the latter mode is in fashion. The reports of its success are not, however, very flattering. I have seen all three plans fairly tried at the Small-pox Hospital. The ointment and calomel plasters were inefficient. The plaster of corrosive sublimate converted a mass of confluent vesicles into one painful and extensive blister; but I am still to learn what benefit the patient derived from the change." (*Op. cit.*, p. 103.)

155. Other means have been used for the prevention of pitting, either by causing the abortion of the pustules in the course of their development, or by drying them up after they have maturated. Dr. Bulkley remarks, that, as a general rule, the more recent the eruption, the more easily it is arrested. One writer thinks that the pustules can be arrested, even after their suppuration, and another fixes the period at which this can be done as late as the seventh day. In 1825, I tried the effect of complete exclusion of light preventing pitting, and in that case it was alt gether successful. I have since had recourse to in three or four cases with success; in one co fluent case it failed. I have, in three other cas covered the surface of the face with almond olive oil, and excluded light, keeping the apa ment freely ventilated; these have not be marked; the eruption was very copious, but confluent in any of these. Instead of almond olive oil, glycerine, or collodion, as suggested Dr. Ranking, may be employed.

156. Incising or opening the pustules, or rath the vesicles, as recommended by the Arabia was the method of causing their abortion advis by Roggert, Voigt, Tournay, and Hufela M. Velpeau and Dr. Morton assert, that if pustules are cauterised within two or three days even later, no marks will be left. The latter s that, if the face be frequently wetted with spi of hartshorn, the inflammation will be abated, the pustules will be prevented from becom either large or irritable. M. Piorry recomme blisters to cause abortion of the pustules, bu consider their use not required in discrete ca and of very equivocal benefit in the more sev states of the distemper. M. Malapert prescr a solution of hydrate of potassa, which, he s dries up the pustules, without leaving ei cicatrices or stains. The strength of the solu is not stated.

157. Many years ago, Digby directed the to be covered with *gold-leaf*. Larrey adv the same means, and stated that this metho preventing pitting by small-pox was empl from time immemorial by the Egyptians Arabians. It can act only by excluding light air from the diseased surface. Drs. Craw and S. Jackson, of the United States, say they have found the *tincture of iodine* to suc in preventing the marks of variolous pustules; various kinds of ointment and plaster have also confidently recommended with this inten

158. *Sulphuric ointment*, rubbed lightly, times a day, over the parts affected, has bee commended for the prevention of suppuratio the pustules and the consequent pitting (*Gaz.* *de Paris*, Avril, 1841, p. 232.). The emplas plumbi, melted with oil of almonds, and laid the face by a camel's-hair pencil; has been scribed by Dr. Corrigan (*Dublin Qua* *Journ. of Med. Science*, Aug. 1846, p. 245.) mask, composed of mercurial *ointment*, ren more consistent by means of starch or fecu employed by M. Briquet. He causes it spread over the face, and to be renewed on twice daily. He says that it produces abort the pustules, and prevents the swelling atte the confluent form of variola. The same have been recommended by Prof. Benne Edinburgh (*Edin. Monthly Journal of* *Science*, Jan. 1850.).

159. A compound mercurial *plaster*, calle "plaster of Vigo," is often employed for th vention of pitting by French physicians. cording to M. Briquet, if mercurial plast applied before the fifth day of the eruption, two things happens — either the pustules disa by resolution, or they are changed into vesic into tubercles. The latter change is more and seldom takes place except on the face.

dressing is removed, small, hard excrescences,
ensible to the touch, are seen, which gradually
e, and disappear at the end of ten or twelve
s, partly by resolution and partly by desqua-
tion, and without leaving any trace. The mer-
ial plaster must be kept on from eight to
lve days. (*Gaz. Méd. de Paris*, Avr. 1846.)

60. A solution of corrosive sublimate — one
in to seven ounces of distilled water, and a
chm of laudanum—applied by compresses kept
with it, is also said by Dr. Bulkley to produce
marked effects in causing the disappearance
ustules, even after they have fully matured;
he adds that simple mercurial ointment is
h more frequently used, both in Europe and
America, than either the plasters of Vigo or
wash of the bichloride, and is probably equally
acious. It may be applied freely with a
h, or a camel's-hair pencil. Dr. Stewardson,
Philadelphia, speaks very favourably of its
ts (*Amer. Journ. of Med. Science*, June, 1843.
also Dr. Bulkley's *Notes to* Dr. Gregory's
. on Erupt. Fevers. New York. Ed. 1851,
51.).

61. iii. Inoculated Small-pox should be
ted according to the principles already insisted
and with strict reference to the type or cha-
er of the primary fever, and other features of
vidual cases. The Suttons and Dimsdale,
se reputation for successful inoculation became
markable about the middle of the last century,
somewhat later, insisted upon exposure of the
ce of the body to cold air during the primary
, and upon the full adoption of the antiphlo-
c regimen.

2. It was recommended by many physicians
practised inoculation before the introduction
ccination, to *prepare* the patient by treatment
ly before and after the operation, or until the
ary fever appeared. Others considered any
aration unnecessary, and sometimes even pre-
ial. Several eminent writers, such as Tho-
, Hufeland, and others, advocated the pro-
y of correcting the secretions and excretions,
f promoting a free state of the several emunc-
, especially when these appeared to require
aid, by one or more doses of calomel and
ony. Fordyce, however, considered this
ce to be unnecessary, and Eyerel, Boehmer,
others contended that there is no mode of
ration of any use. Gmelin recommended
ence from animal food for some time pre-
ly to inoculation, but Weikard believed
this plan to be injurious. On this topic, Dr.
ory very judiciously remarks, "Perfect
h being the best condition for receiving and
eliminating the poison, every thing that
to diminish plethora, to lessen cutaneous
, to render the bowels free, to preserve the
in a cool, pure, and normal condition, was
useful. Laxative medicines, a moderate
bstinence from all fermented and spirituous
s, cool chambers, gentle exercise in the
air, light clothing, all contributed, in their
l degrees, to the successful result. The
onial and mercurial medicines, which the
ns laid much stress upon, were useful only
cure the co-operation of the patient in
rs of more necessity, especially diet and
ure to the open air." (*Op. cit.*, p. 110.)

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(See also the BIBLIOG. AND REFER. to *art.* CINATION.)

S FTENING OF STRUCTURE. — SYNON: *oftness of organs*; — *Mollities*; — Μαλακότης rom μαλακός, mollis); — *Structuræ mollities*; - μαχακοσαρκος, Galen; — *Ramollissement*, r.; — *Erweichung, malacia*, Germ.

CLASSIF.: — GENERAL PATHOLOGY — MORBID S UCTURE — THERAPEUTICS.

. *An individual structure, or part, or organ, m present more or less softness, or diminution of s healthy or normal density, or of its natural st of vital cohesion*; — it may be preter- na rally soft, still retaining its usual amount of ohesion; it may be unusually friable, with- o being softened, or without losing its density; b these states are comparatively rare, for w n the one property is impaired the other is al diminished, and *with softening cohesion is ge rally proportionately lessened*. Softness of st ture is commonly not merely physical, but al vital. The structure evinces an impaired co- he on of its molecules, and a diminished vital re tance to external agents. When treating of th changes evinced by individual structures, I ha always described, as one of these changes, di nution of their cohesion, or softening. Thus sc ning of the brain, *Mollities cerebri*, is consi- de d in the article BRAIN; softening of the heart, C *liomalacia*, in that on the HEART; softening of e stomach, *Gastromalacia*, in that on the S ACH, &c.

I. PATHOLOGY OF SOFTENING OF STRUC- TU E. — *Preternatural softness of structure* is so times recognised during life; but most fre- qu tly comes under the observation of the phy- sic n after the dissolution of his patient; and it th becomes sometimes a question how far it may be post-mortem change. There can be no do t of much of the softness often found in the br or spinal cord after death is post-mortem, al ugh the change may have commenced some ti before death; and this remark equally applies to ftening of the tissues of the *digestive canal*. (S this art., §§ 34. *et seq.*)

Softening of structure may occur after de . — 1st. From the action of the gastric juice on arts with which this fluid is brought in con- ta soon after, or at the time of dissolution. — 2d. Fr infiltration or maceration of effused fluids, an putrefaction.

Softening may take place *during life*. — 1st. Fr congestion, and, still more manifestly, from effusion or infiltration of blood in the structure. — 2d. From inflammatory action. — 3d. From disease of the arteries or veins connected with the softened part. — 4th. From impaired organic nervous power of the part, causing impaired nutrition, sometimes with serous infiltration, or with fatty degeneration, or with a certain amount of either of these. Softening of structure after death has been noticed when treating of changes observed in the digestive canal and in other organs; but I shall here offer a few remarks on the pathological conditions of which it is a consequence during life.

5. i. The several changes just enumerated as most frequently producing softening of structure are chiefly concerned in causing this effect in particular organs or parts. But there are other states which occasion a *more or less general softening or loss of vital cohesion in most of the structures of the body*; and this softening may exist in a very remarkable degree throughout the whole frame, excepting the bones. It is presented to us during life chiefly in pestilential diseases and malignant fevers, and occasionally as a result of virulent poisons. The softening of the structures in these distempers is a consequence, as I have shown when treating of these distempers, 1st., of impaired and vitiated organic nervous influence; — 2d., of a contaminated state of the blood, with an impaired crasis of its fibrine, and change of the blood-globules; these two prime factors of ulterior alteration acting and reacting on each other. The softening of structure in the more severe cases of the several pestilences, and in the more malignant of exanthematous and continued fevers, had been in great measure overlooked until I described it in early parts of this work and in other places; and to what I have advanced respecting these diseases, under their several heads, I must refer the reader for my description of this remarkable change — this general diminution of vital cohesion of the tissues — at an advanced stage of the malady, or towards the close of life, with the rapid accession of putrefaction after death. This general and rapid form of softening may be called *acute general softening of the tissues*, to distinguish it from *partial or limited softening*, on the one hand, and from *chronic general softening* on the other.

6. ii. When softening of structure is *partial as to its seat*, or *limited to a single structure or organ*, it is a consequence of one or more of the pathological states enumerated above (§ 4.). — *A.* It may be the result, or the concomitant, of *congestion of blood* in the capillaries of the part, or of an *exudation of blood* from these vessels, and of the infiltration of it in the substance of the part. When the vital or the organic nervous influence of the part, and of its vessels, is impaired, the blood is liable to congestion in the vessels, or to further change; and, as a consequence, or as a concomitant of this state, softening of the part is liable to supervene. If, as a result of this change in the capillaries and their contents, blood be effused into the structure of the part, softening still more certainly ensues, and with a rapidity proportionate to the failure of vital power and resistance in the surrounding parts. The softening which is observed in congested and enlarged spleen, whether occurring primarily, or as a consequence of periodic fevers, and some of the cases of softening of the lungs are illustrations of the consequences, or of

the concomitant effects, of congestion of a simple or asthenic kind; whilst the red softenings seen in portions of the brain, and the softening with ecchymoses and bloody infiltrations, observed in several viscera and structures in scurvy, purpura, asthenic hæmorrhages, and in malignant or putro-adynamic fevers, &c., show the great extent to which softening proceeds when it is accompanied with exudations of blood. In all cases, when blood is exuded, infiltrated through the structure, or accumulated in masses, and retained even for a short time, softening of an inflammatory kind, although asthenic as to tone, certainly supervenes, and extends, more or less, according to the grade of vital resistance.

7. *B. Inflammatory action* is generally attended by softening of the affected parts; and when softening has not become apparent, or even when the part seems more dense, owing to the infiltration of a concrescible lymph, there is a defect of vital cohesion, as evinced by increased friability. The sthenic and chronic states of inflammation evince less softening and friability than the more asthenic and acute states. Erysipelas and other spreading inflammations, and still more the diffusive inflammation of cellular and adipose tissues, are often attended by softening, amounting to diffluence and disorganisation; and in proof of these changes, I have only to refer to these maladies, and to the art. GANGRENE.

8. *C. Disease of the arteries and veins*, especially of the former class of bloodvessels, is a very common cause of limited softening of organs. Obliteration of an artery, or even specific deposits in the coats, or other changes affecting the calibre, or impairing the healthy action of the vessel, as atheromatous or fatty deposits, may impair the nutrition of the part supplied by the diseased vessel, and thereby occasion softening and impaired vital cohesion of it. Instances of this connection or sequence, or even sometimes concomitance, of alteration, are often presented in the brain, heart, and other parts. Softening in these cases, more especially in the heart, is sometimes associated with a fatty degeneration of the structure of the organ. (See the chapter, in the article HEART, *on fatty degeneration of its structure*, §§ 224. *et seq.*) I have stated, when treating of *apoplexy*, that the change in the vessels of the brain, and in those of the heart, are sometimes the same at advanced age; and that whether the change be specific deposits in, or atheromatous or fatty degeneration of, the coats of the vessels, they frequently exist in the vessels of both these organs, and account for the not infrequent complication of disease of the heart with either apoplexy or palsy.

9. When the change in the arteries consists of atheromatous deposits in their coats, — which deposits were described by me in 1830, when writing on the diseases of arteries, and were stated to "consist of a suety matter, greasy to the touch," &c. (*see art.* ARTERIES, § 59.), — then the structures supplied by arteries thus affected are often not merely softened, but also otherwise changed; the softened part being flabby, and as if infiltrated with serum, and with more or less oil-globules. In other cases, especially when this change in the arteries is connected with softening of the cerebral structure, serous effusion often accompanies it, especially into the adjoining ventricles, and occasionally as an infiltration of the softened structure; this effusion being probably the result of the hysical condition of the organ, and either o he state of circulation in the part, or in its vic ty; or of the atrophy sometimes attending softe ng. Whether or no softening of the cerebral stru ure is attended by more or less of fatty degener on, as observed in the heart, has not been a ertained; but it is not improbable that the tty elements, contributing in their various de es, to produce what has been recently, and not always correctly, described as fat (and of ich the earliest notices are contained in va ous articles of this work, especially ARTERIES, § ; DISEASE, §§ 135. *et seq.*; HEART, STRUCT AL CHANGES OF, §§ 224. *et seq.*; PLEURA, §).; SEROUS MEMBRANES), are more or less ugmented above the natural standard in the sof ed structure of the brain; the healthy structu of the organ containing from three to eight per nt. of fat, which exists chiefly in the medu ry structure.

10. Disease of, or obstructed circulation thr gh the *veins*, produces softening of the tissue he blood of which passes to the affected veins ut the softening generally presents peculiar ch acters. It is always attended by great conge on, or infiltration of serum, or ecchymoses, or l all three. The vital tone or cohesion of tissues us circumstanced is already partially lost; and en they are subjected to any irritation, inflamm ry action of an asthenic character, is soon prod ed, which rapidly spreads, still further soften he part, and ultimately destroys its cohesion ar or-ganisation.

11. *D. The organic nervous influence* of a arts is more or less impaired, either previous to, in connection with, the changes already notic as productive of softening. But this influence ay be impaired primarily, and chiefly, and ind en-dently of any of the changes now adduced. is thus impaired either congenitally or heredit ly, or by the injurious agents in operation d ng early life; and the consequences are a pret na-tural softness and flabbiness, and impaired tal cohesion, of all the structures, not excepting en the bones, which, as shown in rickets and scr la, are not only slowly and imperfectly devel ed, but more or less softened, especially in eir spongy parts. This *chronic form of ge al softening* may exist in the fœtus, without ng hereditary; it may be hereditary, and yet n p-pear until some indefinite period after bir as when it proceeds from scrofulous parents It may be acquired from the nature or the sup of nourishment, or from the want of pure air, c.; the scrofulous, or ricketty, or tubercular ha of body, being thereby produced in young sub ts, and the scorbutic at more advanced ages. *S vy* furnishes one of the most remarkable illustr ns of chronic general softening, or general im ir-ment of vital cohesion, advancing in a slo nd progressive manner, commonly in adults, r ets equally illustrating it in children. The gener a-chexia resulting from the *syphilitic poison*, or m *mercury* acting in poisonous doses or mode or from the use of the *ergot of rye*, or from er poisonous substances, is chiefly characteris by softening, implicating, more or less, the wh of the structures, although manifested especia in certain tissues, particularly the cutaneous nd cellular, the osseous and periosteal, the mu s,

and, in certain of these, passing extensively *ulceration*, of which softening is a general edent.

. E. *Softening often depends upon the asso- n, in various degrees, of the foregoing morbid* , especially those causing partial or limited ing, and, even when thus associated, in its er grades it may be transitory, as when it s from œdema, or saturation of the tissues of t with serum. Such saturation may proceed local weakness of the tissue, or of the capil- supplying it, or from more general debility, m local changes, as obstruction in the return- rculation of the part, or obstruction of the ab- nts, causing this lesion. The serous infiltra- nay be soon removed, or it may persist, or it increase, and the attendant or consequent ing may also increase, and even go on to ganisation; certain intermediate changes, ver, sometimes appearing, especially asthenic mation. In these cases, the infiltration of , by its macerating property, weakens the cohesion of the tissue, or, by the possession irritating quality, induces a diffusive or nic inflammatory action, frequently passing gangrene. The mere separation of the in- e structure of cellular or adipose parts, by filtration into it of an inorganised and inor- able fluid, if continued long, tends to loosen ital cohesion of the part; and when this fluid ins, as often occurs, excrementitious or in- is materials, the result is both increased and ned, especially as it often also associates with er changes, seated in the vessels supplying part, tending most rapidly to gangrenous ing.

Œdema, or serous infiltration of the sub- of the brain, whether the antecedent or oncomitant of softening of the cerebral ure (for it may be either the one or the), generally induces and accelerates the ing process in this structure more remark- than in any other organ; complete disor- tion, or decomposition, being thereby often y induced.* Few parts, either by their phy- condition, or by the nature of their organisa- are more frequently subject to serous satu- than the brain; and although the serous tion is most frequently excessive between embranes and in the ventricles; more or uid being always in these situations, — still cessive accumulation of it in the ventricles ften affect the vital cohesion of the surround- ructure, so as to predispose to, or occasion ing in this situation or in the vicinity, espe- in the scrofulous diathesis and in ricketty , in which the vital cohesion of the tissues is ally weak.

Congestions of blood in parts, asthenic and elatous inflammations, the accumulation of mentitial and irritating materials in the cir- on, and the operation of animal and contami- poisons, all in their several grades occasion or less softening, which is most remarkably ested in those tissues, the organisation of which is most loose or yielding, as cellular or mucous structures and parenchymatous organs. In these, especially, the softening is followed by the exudation of a fluid, which is neither pus nor concrescible lymph, even when the softening is most inflammatory, but which, in the scrofulous diathesis, is either tubercular, or curdy, or sanious, or an association of these; and in persons who are constitutionally exhausted, or whose blood is self-contaminated or otherwise poisoned, the morbid fluid, serous or sanious, infiltrates the adjoining tissues, softens them with various degrees of rapidity, and ultimately disorganises or decomposes them. These consecutive states of softening, whether manifested in external or internal parts, in cellular and adipose tissues, or in mucous or parenchymatous organs, are presented to our observation in the course of adynamic or malignant fevers, and after the absorption of puriform and sanious matters into the circulation, and in the several forms of erysipelas; and whether puriform matter be formed in the softened part, or a sanious fluid, or a foul, contaminating serum, infiltrating adjoining parts, they always tend to further disorganisation, or decomposition or gangrene supervenes, unless vital power and resistance be reinforced, and the contaminating state of the circulation be counteracted or remedied by suitable treatment.

15. II. THE THERAPEUTICAL INDICATIONS applicable to softening of structures, should be based upon the pathological states from which it appears to proceed, or with which it is associated. But the result of treatment will entirely depend on the acumen of the physician in detecting this condition of structure and the changes in which it originates, and in attributing to each its due influence, and in adapting his means of cure to their several grades and relations. When treating, under their proper heads, of the several states of softening, as manifested in different structures, I then pointed out the measures most appropriate for each; and, reviewing this lesion as one of the most advanced, and as one of the most dangerous. I then more especially considered the treatment most conducive to the removal of the changes from which it proceeds. Whether arising from inflammations, especially the asthenic, — or from congestions, hypostatic or others, — or from obstruction of vessels, arterial, venous, or lymphatic, — or from morbid matters conveyed into the circulation, and thereby affecting predisposed or previously disordered parts, — or from the diminution of certain elements necessary to vital density or cohesion, as phosphorus, or sulphur and their combinations, — or from morbid poisons changing the states of organic nervous power, and of the circulating fluids, more or less, generally, — or lastly from the nature of the food and from states of nutrition, — the treatment of softening of structure has received due consideration, as respects, not only this particular lesion, but also the changes from which it proceeds. In the several articles on ABSCESS (§§ 62.); ABSORPTION (§§ 15. *et seq.*); ARTERIES (§§ 40. *et seq.*); ARTS AND EMPLOYMENTS (§§ 23. *et seq.*); BRAIN, *softening of the* (§§ 214. *et seq.*); CACHEXY (§§ 4. *et seq.*); CELLULAR TISSUE (§§ 9. *et seq.*); CHOLERIC FEVER OF INFANTS (§§ 11 *et seq.*); CONGESTION OF BLOOD (§§ 12, 13.); DEBILITY (§§ 25. *et seq.*); DIGESTIVE CANAL, *softening of* (§§ 34. *et*

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* is not improbable, that softening of the nervous s is favoured, if not caused, by a deficiency of sul- or of phosphorus, or of both, and of their combina- in the cerebral structure, these substances being present, but in varying quantity in this structure, normal states.

seq.); Dysentery, Asthenic (§§ 88. *et seq.*); Erysipelas (§§ 64. *et seq.*); Fever (§§ 559. *et seq.*); Gangrene (§§ 57. *et seq.*); Hæmorrhage (§§ 40. *et seq.*); Heart, *softening of* (§§ 216. *et seq.*); Inflammation, Asthenic (§§ 236. *et seq.*); Intestines, *softening of*, (§§ 131. *et seq.*); Œdema, Pestilences, especially the Hæmogastric and Plague (*in numerous places*); and Scrofula.

16. In the treatment of softening of individual structures, as well as of the general softening of the tissues consequent upon malignant fevers, and morbid states of the circulating fluids, attention should be chiefly directed to those pathological states of which softening is the consequence; and these ought to be either removed or counteracted by means suited to these states, the most important of which have been indicated above (§§ 6. *et seq.*), or more fully mentioned in the articles just referred to. But it should always be remembered, that the removal of the causes; a supply of deficient elements, in medicines, aliments, and mineral waters; a suitable diet and regimen; a pure, dry, and bracing atmosphere, with free ventilation; a healthy discharge of the digestive functions, and the use of pure, or appropriate mineral springs, are the chief means of cure.

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SPASM: — Synon. — *Spasmus*. σπασμος (from σπαω); *Hyperkinesia* (from ὑπὲρ, and χίνησις). I. Frank; — *Mobilitas nervosa nimia*, Auct. var. — *Ataxia Spirituum:* — *Spasmes*, Fr. — *Krampfe*, Germ. — *Cramp*.

Classificat. — II. Class. — II. Order (*See Preface*).

Definit. — *Involuntary or abnormal actions of muscular parts: or, in other words, contractions of muscular structures, different in continuance, or in severity, or in recurrence from healthy action; constituting a generic pathological condition; and although most commonly a sympathetic, yet an important morbid state.*

1. I. Varieties of Spasm.—The ancients comprised under the term, spasm, all convulsive affections or movements, but the sense in which the word is now and more strictly applied, is the contraction or tension of a muscular structure, independently of volition, and often disposing to or followed by convulsion. Spasm, or cr p,
frequently exists without convulsion, it may ct
either voluntary or involuntary muscles; d,
in either of these situations presents varying a-
racters; and it may be attended by conscious s,
or by an abolition of sensation, or even by va us
derangements of sensibility and mental ma s-
tation. The supporters and followers of e
nervous system of pathology, especially St L,
Hoffmann, Juncker, Sauvages, Cullen, d
others, attached great importance to this m d
condition, and sometimes inferred its exist e,
especially in internal and involuntary struct s,
where there was no evidence of its presence. l-
though the partial revival of the humoral p o-
logy, to which the early articles of this work ve
in no small measure contributed, especially se
on the Blood, on Disease, on Absorption, x-
cretion, Infection, &c., has, in some de e,
diminished the importance which had bee t-
tached to spasm, as an influential patholo al
state, still it performs a part of conside le
interest in the general doctrine of disease.

2. Sauvages arranged under spasm, all inv u-
tary muscular contractions, and divided them to
tonic and *clonic*. Under the former appell n,
he comprised those contractions which e,
more or less, permanent or continued; unde e
latter he ranged those which alternated wit e-
laxation; and both forms of spasm he divide to
partial and *general*. *Partial tonic spasm*, ac d-
ing to him, embraced strabismus, trismus, ti-
colis, priapism, and cramp attacking any o e
voluntary muscles. *General tonic spasm* con d
only of tetanus and catalepsy. *Partial ch ic*
spasms were carphologia, pandiculation, tre r,
palpitation, &c.; and *General clonic s ns*
were, eclampsia, epilepsia, hysteria, chorea, c.
Cullen adopted the view of Sauvages, in n-
stituting spasmodic affections a distinct ord of
nervous diseases. Pinel, however, did not n-
sider that the spasmodic state should be le
the basis on which an order of disease mig e
founded.

3. It is very doubtful, whether or no, a-
lepsy should be viewed as a species of ge al
tonic spasm, or even as a spasmodic affection a ll.
I have seen several cases of true catalepsy, a in
these there was no increased action of mu es
apparent. In cataleptic ecstacy, however, y
of the voluntary muscles are, more or less, n-
tracted; and when catalepsy occurs in n-
nection with hysterical attacks, muscular con c-
tions often precede the cataleptic state. n
most of the convulsive affections arranged er
eclampsia, epilepsy, and hysteria, the seizu is
generally tonic at its commencement, and c ic
towards its termination; so that it is very dif lt
to distinguish between those convulsive or s-
modic affections which are tonic, or which e
clonic, these terms being altogether conventi l,
and the morbid states which they are intend o
represent, passing gradually and insensibly n
the one into the other.

4. MM. Pinel & Bricheteau divided s-
modic affections into those which are unatte l,
and which are attended by lesion of the facult of
intelligence. Dr. Mason Good arranged e
latter, under the genus, "*Comatose Spasm*," as -
ing convulsions, hysterics, and epilepsy, to s
species. But hysterical spasm is often unatte d

y comatose affection, or loss of sensibility; iere, as well as in other morbid conditions, ifficulty of classification becomes apparent. ood divided his order of spasmodic affec- or nervous disorders affecting the muscles, three genera, consisting of "Constrictive ," of "Clonic spasm," and of "Synclonic ." The *first* of these comprised priapism, neck, distortion of the spine, muscular stiff- cramp, locked-jaw, tetanus, rabies, and essed pulse; the *second*, hiccough, sneezing, ation, nictitation, subsultus, pandriculation; *ird*, tremor, chorea, shaking palsy, raphania arbiers.

Dr. Good defined his genus "*Entasia*," or ictive spasm, to be "irregular muscular producing contraction, rigidity, or both." genus *clonus*, or clonic spasm, he described orcible agitation of one or more muscles in n and irregular snatches," or, in other words, ive or tremulous motions of the muscles. genus *synclonus*, or synclonic spasm, he to be "tremulous, simultaneous, and chro- itation of various muscles, especially when d by the will," or a "multiplied conjunctive npound agitation, or tremulous motion." The r, upon consideration of the above definitions, e at a loss to perceive the generic differences en the genera, clonus and synclonus, and he not be satisfied that tremor and shaking should be ranked as species of spasm.

Spasmodic action may occur in either volun- r involuntary muscular structures. In the r it may be limited to one or more muscles, ended to several, or even more or less gene- ; it may also, when so situated, be either e, or associated with unconsciousness. In tter class of structures, it is always partial ited, and is generally complicated with ir- n, or congestion, or inflammatory action, in ing or related parts. Spasm, moreover, is frequently and strictly a *symptomatic* af- n, and is rarely a *primary* or *idiopathic* er, unless when it occurs in the form of , or from over-exertion of the muscles ed, or from bringing muscles that have been lisused into action.

Spasm may be arranged into, 1st., that af- g involuntary muscular structures, or those which are supplied only or chiefly by gan- nerves; 2d., that attacking muscles which are nced by voluntary nerves; 3d., spasm impli- both involuntary and voluntary structures; th, spasm associated with want of conscious- When spasm is seated in either involuntary untary parts, it may be of varying duration; y be continued for a time and then perma- y relaxed; it may be thus continued and vards recurrent or convulsive; or it may be ent or agitative from the commencement, presenting either of, or all, the forms classed r. Good as tonic, clonic, and synclonic, and either partial, or limited, or more or less al. The limited states of spasm may be of lerable duration, and may even pass into a of permanent contraction, although this may rare occurrence. Several of the unnatural ons of organs or parts, as those of the eye, nities, &c., have been attributed to spasm of ular muscles; and probably the mal-position ave originated in this state, the contraction becoming permanent, whilst the spasm no longer existed; but it may have equally originated in a paralysed condition of antagonist muscles. In these cases care should be taken to distinguish between tonic spasm, permanent contraction of muscles or parts, and the deficiency of antagonist action.

8. i. *Spasm of involuntary structures* is an element of several diseases. It is most common in the digestive canal, in various parts of which it may exist in succession, generally in a recurrent, although sometimes in a more continued form. It may be limited to this canal, or be extended to adjoining parts, or even to voluntary organs. It may, when affecting the alimentary canal, be merely an exaltation of the peristaltic motion, as in diarrhœa or dysentery; or it may be more severe and attended by inverted action, as in vomiting, spasms of the pharynx or of the œsophagus. In these cases the spasmodic state is favoured either by extreme debility and sensibility of the seat of the disorder, or by inflammatory irritation, and is directly occasioned by any irritating substance. In any circumstance, the spasmodic action will be produced by irritations sufficiently great to excite it; and when the vital power of the parts is low, and the susceptibility great, even the accumulation of the natural secretions within these parts, or a vitiated state of the secretions, is sufficient to cause spasm, as evinced by certain states of diarrhœa, by vomitings, by colic, bilious cholera, &c. When any irritating body is brought in contact with the mucous surface of the digestive canal, whether that be gaseous, fluid, or consistent, spasm will generally affect the parts thereby irritated, or their more immediate vicinity. The same effect follows inflammatory action and ulceration, which are often followed by spasmodic action, as demonstrated in various parts of this canal, in the pharynx, the œsophagus, the stomach, the duodenum, the small and large intestines. Similar causes produce similar effects in the urinary passages, and even in the respiratory passages. In these latter the spasmodic action is often the most remarkable, and is generally followed by very manifest effects.

9. Various involuntary canals or parts have been supposed to be seats of spasm in certain disorders without sufficient reason. Thus the gall-ducts have been accused of spasm in some states of jaundice, and the capillary vessels in the cold stage of fevers. That irritating or morbid bile, or irritants at the mouth of the ducts in the duodenum, may cause spasm of these ducts, is very probable, but there is no palpable demonstration of this effect. That there is an apparent constriction of the capillaries, especially of those on the surface of the body, is very manifest in the cold stage of fevers and in states of vital depression; but it does not follow that the constriction is the consequence of spasm. It is merely the result of the contraction of these vessels upon a deficient amount, or the entire absence, of their contents, which are no longer propelled with sufficient power to fill or distend them, during these states of the frame.

10. Spasm of the parietes of the cardiac cavities has also been inferred to be present in cases of nervous palpitation; and when death has taken place suddenly, without any manifest organic lesion. That nervous palpitation is truly spasmodic, even when most exalted, is extremely doubt-

ful. There is certainly remarkably increased action and impulse with all the symptoms described when treating this affection of the heart (*see art.* HEART, §§ 43. *et seq.*) ; but morbidly increased action is not quite identical with spasm, although often nearly approaching it. With increase of action, prolongation or irregularity of the contraction is generally present in the spasmodic state. If we admit the occurrence of spasmodic or spastic contraction of the parietes of the heart of a much longer duration than that which takes place normally, death must necessarily follow ; but I much doubt the existence of this lesion, especially in such grade or continuance as to occasion death. It certainly has not been satisfactorily demonstrated, although admitted by some writers.

11. ii. *Spasm of voluntary muscles or parts* is of frequent occurrence, either in the form of cramps of particular muscles, or in that of convulsive action of several or many. Cramps in the extremities may follow over-action of the muscles attacked, or be symptomatic of disorder of the digestive canal, or of latent or inflammatory changes in the brain or spinal chord, or their membranes, or of the irritation produced by the circulation of effete or injurious materials in the blood, as in cholera, gout, &c. They may even follow a certain amount of pressure upon, or irritation of the nerves, supplying voluntary parts, either at the origins, or in the course of these nerves, with or without any other manifest disorder. Cramps or spasm, of the lower extremities especially, often precedes, recurring at intervals, for some time an attack of paralysis or apoplexy, particularly hemiplegia; and they often recur, in slighter grades, during the restoration of the lost power. Spasmodic actions of voluntary parts may result from irritations in their vicinity, or in situations more or less remote, from irritations immediately affecting the nerves supplying these parts, or mediately and indirectly conveyed to them from a distance, as in trismus, tetanus, &c. ; and the spasmodic action may be tonic or continued, or irregular or convulsive, or clonic or agitative, or recurring at intervals and occasioning snatches or startings, and various abnormal motions ; or it may pass in succession through all those, as in irregular convulsions, in some forms of hysteria, and even in some cases of epilepsy. The spasmodic state, however, is subject to so many variations and anomalies, that it is quite impossible to describe them correctly in all their details at this place. Those diseases, in which spasm, in any of its forms, constitutes a principal element, are fully described, and with especial reference to this morbid condition, under their special denominations ; it is requisite, however, to notice certain associations of this condition.

12. iii. *Spasm may affect both involuntary and voluntary parts.* It may extend from one order of parts to the other — most frequently from the former to the latter, if the succession of morbid phenomena be closely analysed, although voluntary parts manifest this disorder most evidently. Spasm, even when affecting most severely the voluntary muscles, may proceed from very remote sources of irritation, as I have shown in several places in this work before the subject was duly considered by any one else. Commencing with those sources which are the nearest to the parts which are morbidly contracted, and concluding
with those which are the most remote, we
that muscular structures may experience uni
ral action or spasm in some one of its va
forms, — 1st., from irritation in or near the
morbid action, as shown more especially in
cular canals — in the digestive, respiratory,
urinary passages ; 2d., from irritants affectin
nerves supplying the affected muscles, as evi
in both involuntary and voluntary parts ;
from irritation or lesion of the spinal marrow
near the origins of the nerves supplying
muscles ; 4th., from lesion (not necessarily s
tural) of parts of the brain, or of its membr
having relations with the nerves going to the
vulsed or spastic muscles ; 5th., from irritati
any portion of the digestive viscera and can
of the generative and urinary organs transm
by ganglial nerves to the roots of the s
nerves, or to the spinal cord, and reflected t
by voluntary nerves to the external muscle
members ; 6th., from irritation of any o
senses — of hearing, sight, smell, taste, or
— transmitted to those parts of the nervous ce
with which they are respectively in conne
and thence reflected upon parts intimately re
to them ; thereby producing startings, tre
sneezing, cough, retchings, or convulsive
ments, as either of these senses are irritate
abnormally excited. These several sourc
spasmodic action have been sufficiently illust
in the articles CHOREA, CONVULSION, EPIL
HYSTERIA, SYMPATHY, TETANUS, &c.

13. II. CAUSES OF SPASM. — i. *The predis*
causes are the same as those fully described
treating of the individual species of spasm,
causes being generally common to all the sp
the exciting causes, and the several intrinsi
cumstances or peculiarities of the patient
mining the form of the attack. Hereditary
or disposition, congenital conformation, a
development of frame, the female sex, a
and humid climate, the ages of infancy,
hood, and puberty, the critical epochs of fe
premature sexual indulgence and masturba
luxurious indulgences and voluptuous
of living, prolonged indulgence in bed
sleep, inordinate devotion to music and po
studies, excitement of the imagination, wa
repose, mental anxiety, sleeplessness, exhau
discharges, the sudden suppression of accust
evacuations, or of external pains ; the gouty
calculous diathesis ; excited and ungratifie
insufficiently gratified, sexual passions ; suppr
emotions ; the period of utero-gestation, the
peral states, abortions, exhausting lactatio
anition ; extreme states of vascular plethora,
anæmia, &c., severally predispose, and ofte
rectly produce, some one or other of the usual
of spasmodic disorder, or such states of spas
may be considered as anomalous, or different
those commonly described by nosological wri

14. ii. *The exciting causes of spasm*, whethe
cific or anomalous, are chiefly influences aff
the mind, the senses, the nervous centres, th
mentary canal and digestive viscera, the s
and urinary organs, &c. ; more especially th
lent emotions of mind, whether manifeste
suppressed ; severe disappointments and l
strong or strange impressions of the senses,
ling noises, disgusting or horrible sights, obje
terror or surprise ; violent excitement and the

of the imagination: titillation or irritation of ore sensitive parts of the surface, prolonged olent pain; disordered dentition and dental ions; derangements of the digestive canal, ularly the presence of worms, or of acidity, flatus, or of morbid secretions and excretions, fæcal accumulations; the passage of biliary li, or of disordered bile; irritation or excite- , or functional or structural lesions of the l or urinary organs or passages, calculi in the ys or bladder; inordinate or prolonged mus- action; various organic lesions or external es, implicating either the parts affected, the s supplying them, or related portions of the us centres or their membranes; sudden or me changes of temperature, or electrical con- s of the atmosphere; sudden suppression of arges, eruptions, or external pain; the drying chronic ulcers; the nature of the ingesta, ially acid or unripe fruit, poisonous articles ken for food; the poison of lead, and nume- other injurious substances mentioned under ead of Poisons.

iii. *The immediate or efficient cause of* —the pathological condition constituting affection — has been a topic of contention g pathologists. It was generally ascribed itation of the nerves supplying the affected les, either at their origins, in their course, or ir terminations; or to a sympathetic affection se nerves propagated from distant but related to those thus attacked; or to an irregular ution through the nerves of the nervous in- e or power, and determination of this influ- o the affected parts. Towards the close of st century, Ritter, Sprengel, and others, d spasm as a result of an alteration of the zation of the terminations of the nerves in n to the muscular fibres; and this doctrine, aving been neglected for half a century, has evived at the present day, and supported by nnection established between magnetism and icity. This latter theory may admit of a n degree of practical proof, by having re- to electricity or galvanism, or of electro- tism for the removal of spasm, an energetic se to either of these, overcoming, as it does hter cases, as shown by my own observation, orbid condition of the muscles. Never- s, the same agencies may be viewed as y successful in the removal of spasms, on the ption of their dependence upon the irritation nerves in any way related to the affected The *juvantia* cannot always prove the of the affection. I have seen, as far back 20, the most severe cases of tonic and of spasm produced by the internal strangu- of a minute portion of the small intestines, y the irritation of worms in the bowels, the t affection of the voluntary muscles having from those causes and ceased with them, the on having been propagated by ganglial nerves roots of the spinal nerves, and thence re- upon the muscles in whch these latter terminated; the history of these and nume- her cases favouring rather the old doctrine of on of nervous distributions than the less old cently-revived theory of altered polarization nervous fibres, with relation to the muscular in producing spasmodic actions.

III. Diagnosis of Spasm.—The existence or non-existence of spasm is in many cases remarkably evident; but, in many others, even as respects some disorders which have been viewed as spasmodic, the evidence is by means satisfactory. As to the insufficiency of this evidence in regard of some disorders, I have already hinted. We have no proof of spasm in any quarter in cases of *catalepsy* of a true pathological form; at least, I could detect none upon a close examination of several cases. The several forms of true *tremor*, as arising either from mental emotion, or from mineral or other poisons, or from functional or structural changes, evince no true indication of spasm. The disordered motion is merely the result of an imperfect determination or transmission of nervous power to the tremulous parts, owing to an insufficient or an interrupted supply of this power from the voluntary or involuntary nervous sources, as either voluntary or involuntary parts are affected.

17. Various *paralysed parts* may present states which may be mistaken for spasmodic affections; and the paralysed state may rapidly pass into the spasmodic, and this latter into the former, which is much the most common. The existence, the morbid relations and the transitions of both these morbid conditions thus become extremely important. *Hysteria*, the *convulsions*, and other spasmodic and anomalous affections of infants and children; diseases of the brain, or of its membranes, in the same class of subjects; diseases or injuries of the spinal marrow, &c.; epilepsy, apoplexy, paralysis, &c., either frequently or occasionally, present more or less of spasmodic action, often passing suddenly or rapidly into one of entire loss of power. The irritation, softening, effusion, compression, or other original morbid change affecting the nervous centres, whilst slight, or in a lesser degree, may occasion only cramps (spasmodic motions), but, when increased relatively to the state of nervous power, may cause the loss of all motion. We thus often observe, that several maladies commence with more or less of spasm, or cramps in the extremities, especially the lower, and soon pass into the paralysed state; apoplexy, epilepsy, paralysis, and various other specific and anomalous affections of the nervous system, manifest in many instances this succession of lesion and of resulting phenomena.

18. Dr. M. Hall is of opinion, that the spasmodic affections ushering in many cases of these maladies commence, or are seated, in the superficial muscles of the neck; and that the spasm of these muscles, by compressing the larger veins, occasion congestion of the brain, and the several consequences of congestion when the spasm is not soon relaxed. He believes that "certain causes and principles, emotions and irritations, act directly or diastaltically upon the muscles of the neck," inducing what he designates "*Trachelismus*":— "If this spasm can be dissolved, all its effects cease more or less perfectly." That the muscles of the neck are affected with spasm in many cases of hysteria, especially in the more severe or paroxysmal, cannot be doubted; and that those seizures which originate in violent mental emotions are often thus characterised, or even thus originate, may be conceded; but the spasm of these muscles is not so general, nor always so early in the procession of morbid phenomena, as Dr. M. Hall supposes. When it does exist, and is either severe or protracted, the consequences which fol-

low are generally serious; and it then constitutes an important portion of the courses of morbid actions and changes, each successive portion being the cause of that which follows it, as it is itself the consequence of that portion which precedes it.

19. Spasm of involuntary muscles must necessarily be imputed to irritation of the ganglial nerves supplying these muscles, or to some alteration in the relations subsisting between the nervous and muscular fibres of the affected part. But when spasm attacks voluntary muscles, the irritation has been generally supposed to be seated in, or to implicate, the voluntary nerves. It is, however, very doubtful whether the spasm of these muscles is so generally caused by irritation of voluntary nerves as is commonly believed. It is very probably so caused in many cases, as shown by injuries of the spinal chord, and by inflammation of this part of the nervous system or of its membranes; but there are various diseases, in which spasm performs a chief or a subordinate part, where irritation of any part of the voluntary nervous system is by no means demonstrable, either the muscular fibres or the ganglial nerves supplying them being much more probably the primary seat of such disorder. In trismus and tetanus, in which the voluntary muscles are so severely contracted, there is no proof that the voluntary nerves are primarily implicated; for volition produces no effect on the spasm, and whatever lesion these nerves present, in some cases merely, may be consecutive much more probably than primary. In the most severe cases of spasmodic cholera, in violent cases of colic or ileres, and in others where a very limited injury is sustained by a portion of intestine, as in partial strangulation, I have seen the spasm of the voluntary muscles as general as in tetanus, and continue in this state for long periods, and yet the cerebro-spinal nervous system must be inferred to have been free from all irritation but what was propagated to the spinal nerves from the ganglial nerves supplying the digestive canal.

20. IV. The Prognosis of Spasm may be most favourable, or the most fatal, according to the seat of spasm, and the circumstances in which it occurs. A spasmodic affection may terminate the life of an infant in a few seconds, especially when it is caused by disease about the base of the brain, or near the medulla oblongata, or thin membranes; or it may cease in a very few minutes, where it is produced by acidity or by any other source of irritation in the alimentary canal. Clonic spasm of the diaphragm may arise, especially in young persons, from the deglutition of a hard or imperfectly masticated substance, or from acidity, flatulence, &c., or it may be the indication of a fatal issue in many acute and even chronic diseases. It may proceed from inflammatory action or irritation of one or more of the digestive organs, or from the sinking of vital power preceding dissolution.

21. Spasm affecting either involuntary or voluntary parts is not attended by danger when it occurs in hysterical or nervous females, or when it cannot be traced to disease or injury of the brain, spinal marrow or their membranes, or to antecedent or existing visceral disease, pectoral or abdominal. When however it has been preceded or is attended by inflammatory action, or by hemorrhage, or even by evidence of congestion of any important organ, or by effusion into any cavity, pecially if hæmorrhage has been excessive effusion great, spasms of any part, and more p ticularly if they affect the diaphragm, or even pharynx, œsophagus, or stomach, are a most favourable, and generally a fatal, symptom.

22. Spasms of either voluntary or involunt muscles are always indications of great dar when they appear in the course of malignant other fevers, and especially in an advanced st of those fevers, or when they are present in pe- lential distempers, or at the commencement acute inflammation of abdominal organs or at advanced stage of chronic visceral or struct disease; the amount and imminence of dar depending upon the violence or malignity of disease, upon the contamination of the bl upon the stage of the malady at which spa occur, and upon their seats and extension. Spa affecting the muscles of the superior extrem are always much more dangerous than thos the lower extremities, and, when they extend f the former to the latter, the danger is extreme

23. Spasms of voluntary muscles attending or rheumatism are readily removed when they caused by acidity and flatulence, or accumula of morbid secretions and excretions in the in tinal canal or in the biliary organs; but whe these diseases spasm appears independently of disorders just mentioned, or when struct change is detected in the heart, or when the of the urine indicates disease in the urinary or or passages, more or less danger should be ap hended; and, although present risk may be ave a future attack, with its contingent danger, supervene sooner or later.

24. Spasmodic attacks consequent upon tracted lactation, upon menorrhagia, or profuse corrhœa, or upon other exhausting discharge upon manustupration or venereal excesses, or inanition or anæmia, are frequently tempor removed by treatment; but they return, or ass a more serious aspect, if the morbid conditio which they originate be not removed by ap priate means, or they may pass from the hyste character, in which they generally first pr themselves, into the epileptic or into mani confirmed insanity.

25. Spasms occasioned by the extent or se injuries generally excite great anxiety, and are frequently attended by danger. But the am of danger, or even the absence of it, dep chiefly upon the nature and seat of injury, the amount of vital shock (*see art.* Shock) tending it. When the cranium or spinal col is the seat of injury, when there is a penetr wound or compound fracture, or when sinking indicates the violence of the shock tained by the frame, the presence of spasn merely complicates the injury, but also indi its severity, and the imminent danger att ing it.

26. V. Treatment. — It is obvious that treatment of spasm should in great measure de upon the seat and nature of the disease, of the spasmodic symptoms form either a subord or a most prominent part. When the spa more than a symptom, depending upon special malady; when it constitutes an early dominant or principal morbid condition, with or without loss of consciousness, it pre

rding to its antecedent or associated and pe- ır phenomena, certain special forms, which described under the several heads of *chorea, ulsions, epilepsy, hysteria*, &c., and for each hich, in its several varieties, the treatment is described. It therefore remains only to state general principles or indications which ex- ence indicates or contra-indicates, under cer- circumstances and morbid conditions with h spasm is generally allied.

'. It would appear from what has been stated e, that one or other of the different forms of n is contingent upon, or is produced by, one or of the following pathological states, — 1st, estion; 2ndly, inflammation; 3rdly, irritation ed by acid, acrid, or otherwise disordered secre- and excretions; 4thly, a contaminated state of irculating fluids; 5thly, some structural lesion jury affecting adjoining or remote nerves or origins of nerves; 6thly, extreme exhaustion rganic, nervous, or vital power; 7thly, the sive action of muscles, and the contraction uscles independently of a co-ordinate or suf- t determination of volition to them; 8thly, tures or other injuries of tendons, nerves, or s membranes; 9thly, the irritation of the l or urinary organs; and 10thly, two or more se states conjoined. It will be seen, from a deration of these antecedents, that spasm is commonly a symptom of certain disordered orbid conditions, to which attention should y be directed in its treatment, and that it is when produced as just indicated in the th and eighth of the above series of causes cumstances, that spasm can be considered as nary or idiopathic disease. (See arts. Tetа- nd Trismus.)

A. Congestion, in connexion with spasm, may wed both as an antecedent and associate of tter condition. It may, moreover, be further ated, as with irritation or some structural ; and as long as these are in existence, so nay the spasm continue or recur, as various rring causes may favour its return. The ıce of congestion is often difficult to deter- for when the spasm implicates any part of espiratory apparatus, or when it is so ge- as to give rise to convulsions, with or with- ss of consciousness, the congestion which is made manifest is more the result of the than the cause of it. Congestion of the or near its base, especially if consciousness , and congestion of the lungs and cavities heart, are common effects of general spasm ıvulsions, especially when any part of the tory passages is affected. Congestion may ly exist in either organ antecedently to spasm or convulsion, for it is frequently use of both; but the spasm may increase ngestion, and it may even be the cause of g the spasm when the congestion becomes e. This latter effect takes place chiefly in e congestion of the brain, when conscious- lost; the congestion, in connexion with culation of imperfectly oxydised blood in ıin, both relaxing the spasm and permitting newal of air in the lungs. The more mo- congestion in these cases first occasions or convulsions; but when the congestion of ised blood, increased by the convulsions, es extreme, then the spasms are relaxed and altogether resolved, and either natural respiration is resumed, or death takes place from the cessation of respiration, owing to the effect produced by the congestion at the origins of the respiratory nerves. In cases of spasm, thus arising or thus associated, the treatment must be directed by the following intentions: namely, 1st, to diminish or remove congestion by means which experience has shown to be most efficacious in obtaining this object; 2ndly, to prevent the recurrence of this condition and its contingent effects.

29. *a.* Spasm depending upon or connected with congestion of any vital or important organ has been too generally treated by large vascular depletions, both general and topical. In young, robust, and plethoric persons, and when the spasms have been consequent upon the stoppage of accustomed discharges, both the one and other mode of depletion may be employed, but with extreme circumspection, more especially during the attack. In most even of these cases, local depletions are the safest and most efficacious; for when the circumstances just mentioned as warranting the depletion are not manifestly present, or when the patient is of a nervous temperament, either the local depletion should be small, or it should be altogether dispensed with, and other means be chiefly confided in. When local depletions are indicated, cupping is the most beneficial; and when the loss of any blood is justly dreaded, then dry-cupping may be resorted to. The circumstances indicating depletions, as well as those contra-indicating them, require for their recognition great discrimination, guided by an enlightened experience, and are such, in their natures, complexities, and varied successions and associations, as to be estimated correctly only at the moment by the closely observing physician. When therefore there is any doubt as to the propriety of bloodletting, it will be preferable to resort to dry-cupping, and to emetics and purgatives, conjoined with stimulants and antispasmodics, — with these latter more especially when nervous energy is much reduced or originally weak.

30. *b. Of emetics*, especially when spasm is imminent, or when it attacks any part of the respiratory apparatus, the most energetic is the *tinctura Lobeliæ*, or *Tinct. Lobel. Ætherea*, given with vinum ipecacuanha to ensure its emetic operation, or with sulphas zinci. When vital or nervous power is much reduced, it may be given with spiritus ammoniæ aromaticus, or with camphor. When bloodletting is manifestly indicated, or when congestion of, or vascular determination to the brain is urgent, then depletions and derivatives, as mustard pediluvia, should precede the exhibition of an emetic; and the affusion of cold water on the head, or cold sponging, may also be practised, the emetic operation and the relaxation of spasm being often promoted by these means. When congestion of the liver is connected with spasm, local depletion or dry-cupping, or both, are often required, and then the preparations of colchicum may be given, at first in a large dose, either with or without an emetic conjoined, and afterwards relinquished for purgatives and antispasmodics. The operation of the first dose of colchicum should be carefully watched, particularly when large, and, if vital depression follow it, stimulating antispasmodics, as ammonia, camphor, valerian, &c., be exhibited. The spasms or

convulsions which sometimes occur on the invasion of exanthematous fevers, are often connected with congestion; and for these an emetic and a warm bath are often of service.

31. *c. Purgatives* are generally beneficial, more especially when the liver or brain is congested, and when the spasm is connected with acidity and flatulence of the digestive canal, or with accumulations of morbid secretions, excretions, and fæcal matters, as when spasms occur in colic or in the course of gout, rheumatism, hysteria, hypochondriasis, &c. In these, as well as in some cases of other diseases, not only are morbid excretions thus liable to accumulate, but the blood becomes more or less contaminated by effete materials, which the impaired functions of the emunctories fail of removing. In these circumstances, purgatives should be selected with the view not merely of evacuating the contents of the bowels, but also of promoting the functions of excreting organs. When cerebral congestion is connected with spasms, then active derivative purgatives ought to be exhibited by the mouth and in enemata, and with this view, as well as with the intention of removing spasms by one of the most powerful antispasmodics that can be prescribed, a full dose of spirit of turpentine should be given with castor oil, or with other purgatives, and administered in an enema. When the liver is congested or torpid, as may in many cases be ascertained by percussion, then calomel with camphor, and various other chologogue purgatives, will be most appropriate.

32. *B.* When the spasm is contingent upon *Inflammatory Action*, recourse to vascular depletions, general or local, is commonly required; and what has been stated above (§ 29.) respecting bloodletting is also here applicable to a great extent. It should always be recollected that inflammations accompanied with spasm or convulsion rarely admit of vascular depletions to the same amount as will be safely and advantageously borne in pure uncomplicated inflammation. Indeed the depletions may even increase the spasm without materially diminishing inflammation when injudiciously employed, or when confided in chiefly, and when the inflammation is of an asthenic character. In this latter state more especially, and in other circumstances of this morbid alliance, deobstruent purgatives, conjoined with stimulants and antispasmodics, are required; and even in cases where vascular depletions are most indicated, not merely such purgatives, but also stimulating antispasmodics, may be most beneficial, with other restoratives which the peculiarities of the case will suggest. In some instances an emetic, judiciously selected and combined, will also be of much service, after depletion has been resorted to, when clearly indicated. In the worst form of spasm, as in that contingent upon asthenic or cachectic inflammation, for which bloodletting is generally more injurious than beneficial, the early exhibition of an emetic, followed by purgatives, and by tonics conjoined with alkalies, antispasmodics, counter-irritants, &c., will be found more certainly useful than other means.

33. Spasms of the voluntary muscles, either limited or more or less extended, are often produced by inflammation at or near the origins of the nerves supplying the affected muscles, or by inflammatory action, or irritation of the membranes in the vicinity, or by disease of the adjacent b es, as shown when treating of lesions of the *b* n, *spinal chord*, and *membranes*, or of the *craniu* or *spinal column;* and for these, although gener or topical bleeding may be requisite, accordir to the nature and features of the case, purga es, alteratives, derivatives, counter-irritants, seda es, and the other means fully set forth in thes articles, are especially required.

34. *C.* The dependence of spasm on *acrid, m d, or other irritants in the digestive canal*, is o requent occurrence, both primarily and unconn ed with any special malady, or so associated, in gout, hysteria, &c. In all these circumsta es, emetics, purgatives, anthelmintics, &c., as ve recommended (§§ 30. *et seq.*), are indispensabl In the gouty and rheumatic diathesis, equal pa of magnesia and sulphur, taken on several occa ns, and followed by a more active cathartic, w be found efficacious; and if there be reason to fer the presence of worms, the spirit of turpe ne with castor oil, or anthelmintics, purgatives c., will be generally indicated; but they shou be afterwards followed by chalybeates, tonics nd antispasmodics, as recommended in the artic on WORMS.

35. Irritation of the higher portions o he alimentary canal by the irruption of acri ile into the duodenum often occasions spas of the abdominal muscles, and calves of the gs, but these generally subside after the evac on of the morbid matters; dilution of the acr secretions by warm emollient fluids, narcotic sequently, and mild purgatives afterwards, ing a complete cure, generally in a short p (See CHOLERA, &c.)

36. *D.* Spasm is not frequently occasioned *b* *ontamination of the circulating fluids*, unless a advanced period of febrile and pestilential dis es, as in pestilential cholera, and when the fun ons of the kidneys are impaired, interrupted, or erwise disordered. In these circumstances tal power requires support, whilst morbid matte are evacuated, and the actions of the depu ing organs are excited by their appropriate st uli. We should, moreover, endeavour to chan or counteract the influence of those materials ich thus accumulate in the blood,—to remove o eutralise them. They can be removed only increasing the functions of the emunctories nd they may be neutralised by appropriate al ine or mineral agents, and by antiseptic and tispasmodic medicines, as recommended when aling of the maladies in which spasms are ost frequently observed.

37. *E. Structural lesions, injuries,&c.* of the es, or membranes near the origins, or in the rse of, the nerves supplying the extremities or untary muscles not infrequently occasion spa of these muscles, and require the means alrea recommended (§§ 29. *et seq.*), modified accor to the nature of the lesion or injury, and to the culiarities of the case in other respects. In ese states of disease the performance of the ral excreting functions requires especial attentio nd the evacuations a particular examination.

38. *F. Extreme exhaustion of vital or* *ous power*, causing spasm or irregular or convuls actions of voluntary muscles, or of involuntar rts, is often irremediable, especially when it app s at an advanced stage of pestilential or febrile ala-

, or after large losses of blood, and in the rse of exhausting or contaminating diseases. these circumstances powerful stimulants and spasmodics—wine, opium, camphor, ammonia, le of bismuth, ammoniated copper, cajuput oil, sphoric acid, the preparations of sumbul, arnica tana, the ethers, brandy, &c. — are necessary, one or more of these may be conjoined with preparations of iron, or of assafœtida, or of rian, of zinc, of silver, of phosphorus, canabis ca, or of musk, castor, &c., as the peculiarities e case will suggest.

9. *G.* When spasm or cramp is caused *by exces- action of the affected muscles*, or by contrac- of muscles without a due determination of ion, it generally soon ceases, and requires ly frictions and quiet. If it recur, friction stimulant liniments, the application of warm ocations near the origins of the nerves or por- of the spine enclosing these origins; frictions chloroform or æther, or with turpentine and hor, either over the affected muscles, or along pine; and subsequently the cold douche or on, or sponging the spine night and morning a tepid or cold solution of bay-salt, followed entle friction with the hair glove, &c., will ally prevent a recurrence of the spasm.

. *H. Punctures or injuries of tendons, &c.*, are ionally followed by trismus or tetanus, the continued and dangerous form of spasm, and hich requires, more than almost any other e, the most energetic stimulants, antispasmo- and tonics; the powerful doses of sedative and tic substances generally resorted to for this ion tending rather to hasten than to avert ution. (See arts. Tetanus and Trismus.)

. *I.* The *influence of the sexual organs* in pro- g spasm or convulsion is especially mani- by the female. But there are often other d conditions present besides either irritation, stion, or inflammatory excitement, or vas- determination of these organs. Generally us power, especially organic nervous power, austed or depressed, the secretions disor- , and the excretions insufficient or retained; uently assimilation is impaired, and the poor. The affection of the sexual organs is y induced by mental emotion or desire; and fection reacts upon the brain and nervous generally, is propagated by the ganglial to both the abdominal and thoracic viscera, ering the functions of the urinary organs, oning spasmodic actions of the alimentary respiratory organs and passages, and often g spasms or convulsions, or both, by the ion of the irritation to the roots of the spinal , and even to the spinal marrow, medulla ata, and brain.

4 The treatment hitherto recommended in cases has consisted chiefly of stimulants ntispasmodics, and have been but insuf- ly directed to the sexual organs and to ind. The morbid or irritated state of organs should be removed, and sexual de- ppressed. Instead of stimulants and heat- tispasmodics, cooling medicines, as nitre, doses of camphor, magnesia, alkalies, &c., be given in bitter infusions, and the mind to be occupied agreeably and profitably. spasmodic affections occur in females or especially if the countenance become pallid or sallow, then the most noxious vice of all vices should be suspected, namely self-pollution (see arts. Debility and Pollution); and unless this be relinquished, and the mind be healthily and morally regulated, medical treatment will be of no avail. (See arts. Chorea, Colic, Convulsions, Epilepsy, and Hysteria.)

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SPINAL COLUMN, DISEASES OF.—

Synon. — *Vertebral column; Columna vertebralis; C. spinalis*, Auct. Var. *L'épine du dos, Rachis*, Fr. *Der Rückgrat*, Germ. *The Spine, Spinal Chord, and Membranes.*

1. I. Preliminary Remarks: — The spinal column has attracted to itself a due proportion of attention from medical writers only in comparatively recent times. The diseases of the several tissues, of which this column and its contents consists, were either altogether unknown, or overlooked, or if partially known, undeservedly disregarded, until J. P. Frank, in 1791, published his celebrated treatise on the great importance of this part of the frame in disease. Previously to this period, disorders and lesions of the spinal column and chord received only partial and very imperfect notices from medical and surgical

writers. Some mention of the functions and diseases of these parts is to be found in the works of Hippocrates, Galen, Aretæus, and Celsus; but the structure and functions displayed by them, more especially by the spinal chord, were very imperfectly investigated and understood, until Bartholin and Blasius entered upon this undertaking. Vieussens afterwards, Huber subsequently, and Monro, Frotscher, Ludwig, Gall, and Home, at later periods, cultivated still further this field of research. Injuries and diseases of the vertebral column were treated of by Pott, Paletta, Soemmering, C. Bell, A. Louis and others; whilst the maladies implicating chiefly the spinal chord and its membranes were illustrated successively by Vogel, Portal, Bergamaschi, Brera, Autenrieth, Mussy, Schmalz, Racchetti, Choulant, Ollivier, Brodie, the author, and others; but it was not until the researches of C. Bell, Magendie, M. Hall, Valentin, Stilling, Van Deen, Budge, &c., had thrown additional light upon the structure and functions of the chord, that the diseases of this organ and of its envelopes have been duly illustrated. Even at the present time, it is doubtful whether or not these diseases have received the full amount of investigation, which they have so long required. The reader will find, in the sequel, an account of the works furnished not only by writers now enumerated, but also by many others, who have contributed more or less to the present advanced state of our knowledge of diseases of the spinal column, and of the very important tissues which this admirable structure contains and protects.

2. *A.* It may not be disadvantageous to take *a brief survey of various topics connected with the pathology of the spinal column, and of the parts which it contains, especially in relation to certain agencies, and to other maladies, with which affections of these structures are often more or less intimately associated.*

3. *a.* During the several forms and stages of *fever*, periodic, continued, exanthematous and malignant, the functions of the spinal chord are more or less impaired or disturbed, as evinced by the pains in the back, loins, and limbs, and by incapability of assuming the erect posture, or even of moving. In the early stages of these maladies, these symptoms are manifestly due chiefly to congestion of the veins and venous sinuses of the vertebral canal, and to disordered circulation in the chord and its membranes; but, at more advanced stages, the morbid or contaminated state of the blood itself, and the failure of vital power generally, still further increase the deficiency of voluntary motive power, paralysing not only the limbs, but affecting more or less, through the medium of the branches of spinal nerves communicating with the ganglial and visceral nerves, the functions of the several internal organs, and especially of the urinary and genital.

4. *b. Rheumatism* and *gout*, the former especially, may attack, by metastasis or otherwise, the membranes of the spinal chord, and by the effusion of lymph between them greatly impair or entirely abolish either motion or sensation, or both, in parts supplied with nerves from or below the seat of effusion. A similar succession of disease may occur in the course of various acute eruptive maladies, although much more rarely.

5. *c. Scrofula, tubercles,* and *rickets* very quently attack the spinal column, generally bodies of the vertebræ, and produce the serious effects not only upon these, but not in quently also upon the membranes, the sp chord itself and the roots of the spinal ne causing the several sympathetic disorders w will be described in the sequel. The affec of the spine may, in scrofulous subjects, be only serious manifestation of the scrofulous t or it may be associated with, or consecutive u other outbreaks of this taint, in the form of tu cular infiltration or other structural lesions.

6. *d.* The affection of the spinal chord and m branes may be connected with *disorder of sexual and urinary organs;* and, although more severe affections of the former gene disturb or abolish the functions of the la serious or protracted disorders of the urinary sexual organs not infrequently excite impc lesions of the spinal chord. This latter pr sion of morbid phenomena admits of ready planation. Exhausting seminal and other charges from the genitals depress vital p generally, impair the requisite nutrition, an generation of the nervous influence of the cl and thereby not merely weaken remarkabl functions of this organ, but affect its intima ganization, favouring softening or other struc change. Irritation also of the sexual organ of the urinary organs also, may be propagat the communicating branches of nerves t spinal chord, and, when thus extended and petuated by a continuance of the cause of tion, serious lesions may be reasonably infer arise not only in the chord itself, but also several envelopes, and even in the bloodv lodged between these envelopes and the bod the vertebræ.

7. *e. Inflammatory affections of the nerves,* cially of those of the lower limbs, may e even to the spinal chord or membranes, and duce in these similar changes to those follow the metastasis of rheumatism or go these structures, or the suppression of erup &c. This succession or extension of disea rare, but a few instances have come unde observation, especially the extension of infla tory sciatica to the sacrum and back, an supervention of spasms, followed by loss o tion, &c.

8. *B. There are various symptoms, ci stances and complaints, several of them appe obscure or anomalous, which ought to direct o tention to the spinal column, and lead to a careful examination of its state and functio* *a.* The *voice* and *respiration* are often af when the upper portion of the medulla or is in any way implicated in disease. I saw years ago a gentleman who had been seized w young man with hemiplegia, the speech, to and muscles of the face having been aff He was subsequently quite restored to healt presented no indication of paralytic affectio had for many years pursued his profession. on the last occasion of his consulting me he plained of a form of hoarseness, or state of which had been treated by more than one cian as a chronic laryngitis. I had arrived at the same conclusion; but an examinati the chest, throat, and neck, attention to his

tion and voice, and the previous history of case, convinced me, that the affection was paralytic than inflammatory, and that he in imminent danger of an attack of asphyxia, poplexy, or general paralysis, from lesions t the medulla or base of the brain. The ment was directed accordingly ; a seton was ed in the nape, but he died suddenly some afterwards. The affection of the functions of ration, and even of the actions of the dia- gm consequent upon disease of the medulla, its envelopes, was known to GALEN.

b. Since the days of GALEN (*De Locis affectis*, c. 10.), the influence of the medulla oblongata pinal chord upon respiration and the actions e *heart* was overlooked until VERNAY, MOR- I, ELLER, ZINN, LE GALLOIS, PROCHASKA, IE, and more recently W. PHILLIP, C. BELL, M. HALL, directed especial attention to the ct. The last-named writers, however, im- l the action of the heart entirely or almost y to the nervous influence of the medulla, ooked the more important influence of the ic or ganglial nerves abundantly supplied to eart and respiratory organs, and directed attention chiefly to, and over-estimated, the nervous influence, which only reinforces modifies the more important and greater — ore vital power—which the heart and lungs ve from the other source just named. There is oubt that the mechanism of respiration — the atory muscles, are more especially influenced ctuated by the medulla and chord ; and that ever interrupts or intercepts the nervous in- e from these sources, or from the more r and central parts of the brain, by causing xia, soon arrests the actions of the heart. the contractions of the heart may be ren- more energetic, more tumultuous or impul- either by mental emotion, or by irritation of ources of nervous influence now named ; or, e other hand, that these contractions may ne more slow, more weak, and even more lar and intermittent, until death may su- ne with more or less rapidity, owing to a de- e or an interrupted, or an intercepted trans- on of nervous influence from these sources, t be disputed. In cases, therefore, which at disordered action of the heart, of whatever not only should this organ itself be carefully ined, but also the state of the spine, as far t may be done, and the several manifesta- of organic nervous influence, as displayed e several digestive, assimilating, and excret- nctions.

c. The abdominal muscles are subject not y to *cramps* and *spasms* when the medulla is or its membranes are diseased, but, even endently of cramps, the patient often com- of a remarkable increase of the sensibility cutaneous surface, of a sensation of girding *striction* around the abdomen or base of the x, subsequently of impaired sensation and n, with great constipation of the bowels, re- n of urine, and various other symptoms, ding to the portion of the chord which is ated. (See art. PARALYSIS.)

d. The limbs are often the subjects of s, or permanent *contractions*, often with an ening sensation of *prickings*, numbness, and iar modifications of sensibility, especially near the points of the toes or fingers, with a sense of weight and numbness of the legs and feet, or of the whole limb. Occasionally these sensations are felt on one side only, or in both, or more severely in one than in the other; and, although they often precede an attack of gout, they frequently are precursors of organic lesions of the chord or its membranes, and thus usher in an attack of paraplegia, or inflammation of the chord and its membranes, or accompany inflammation of the intervertebral cartilages, or caries of the bodies of the vertebræ.

12. *e.* More or less *severe pain* or *neuralgia* may be complained of, in some remote part from the spine, or in one or more limbs, often in the extremities, but as frequently deep-seated in the middle of the thighs, or in the abdominal muscles, or between the ribs, the pain often admitting of being traced to the origin of the affected nerve in the spine. The effect of position upon the pains—of standing, or sitting, or lying down in the prone or in the supine position ; and the periods of the day or night when they are most acute, ought to be carefully ascertained. In cases of inflammation of the chord, or of its membranes, or of the bodies of the vertebræ, the pain is much increased towards morning and after lying upon the back, and extend around the abdomen and down the limbs, with at first retention of urine, constipation, and subsequently loss of power of the sphincters. If, however, the inflammation be slight, and the patient has not retained the supine posture during the night, the pain may be diminished in the morning, owing to augmented capacity, by elongation, of the spinal canal.

13. *f.* The state of the *sexual functions* are often much disordered in diseases or injuries of the spine or of the chord. Whilst masturbation, or sexual intercourse, when excessive, may impair the nutrition of the chord, and induce disease both of it and its membranes, the latter occasions, particularly when the lesion is low in the chord, loss of sexual power, and incontinence of urine. Injuries or acute disease in the cervical portion of the chord are often attended by priapism.

14. *g.* The above and other phenomena, which will attract the attention of the observing physician, will always suggest to him the necessity of having recourse to a careful examination of the spine ; and even when none of the above is present, the patient, however, presenting unusual debility, or impairment of activity or motion in the lower extremities, or great weakness or trembling of the knees, with a bent, staggering, or unsteady mode of progression, emaciation of the lower extremities, relaxation of the ligaments of the joints, &c., the experienced observer will infer impaired nutrition and function of the spinal chord, either from the exhaustion produced by masturbation or excessive sexual indulgence, or from congestion of the venous sinuses of the vertebral canal, or from incipient softening or other structural change in the chord, or in its membranes.

15. *h.* *An examination of the spinal chord* should be commenced with a careful inspection of it in various positions — whilst standing erect, whilst the trunk is bent to either side, and when the patient is prone. The effect of bending or turning quickly to either side should be observed ; for, even in incipient caries of one or more bodies of the vertebræ, the patient sometimes experiences a

sensation, grating, or crepitation, on making any of those changes of position. The sensibility of the surface of the trunk and limbs, the temperature and state of the skin, and the degree of rapidity with which volition is conveyed to the extremities ought to be noted. The clavicles, the ribs, the sacrum, the crests of the ilia and hips, should also be noticed, in respect of their particular states, and of their relations to the spine; for by their aid, relative position, and direction, incipient states of curvature may be ascertained. The effects of pressure and of percussion over the spinous process of each vertebra, and over the outlets of the spinal nerves, should be carefully observed. It has been supposed that the pressure of a hot sponge directed over the vertebræ will detect subjacent lesion, and point to its exact seat when other modes of having recourse to pressure will fail. I have not observed much advantage from this mode of examination, but it need not be neglected; inasmuch as the more fussy and the more particular, and the more singular the mode and means of examination resorted to, even when the nature of the case is as clear as sunshine, the more they will attract the observers, both interested and disinterested, and accord with the prevailing ad captandum minuteness and professional manipulations of the day. If there be no occasion for a graceful display of the stethoscope—and when may not such be necessary, or made apparently requisite? And if there be no requirement for the introduction of the speculum — and when, indeed, should the phalloid instrument be neglected, if the patient be a female!—let us by all means have recourse to some other medium of communication between the patient and doctor — some new instrument of legitimate medical charlatanry—that may strike, if not amuse or gratify, the former, and recommend the latter. How is it that, amid the remarkable number of spine-doctors and writers on spinal curvatures for the benefit of a discerning public, no one has invented a pocket instrument for examining and straightening the spine? Or, has one been actually invented, but, having been always applied *a posteriore*, no one besides the inventor and manipulator has yet been able to detect the excellence or penetrate the mysteries of the invention?

16. II. The Causes of diseases of the Spinal Column, Membranes, and Chord, are generally sufficiently manifest; but they are occasionally more or less obscure, especially as regards the extent of their individual influences. As the causes of disease of the several structures composing the spine are almost common to each variety or form of malady to which these structures are liable, although certain of the causes affect one tissue in preference to the others, I shall, therefore, devote a due consideration to all of them, with such notices of their effects as may best subserve practical purposes.

17. *A. Improper physical education and clothing* comprise a great variety of circumstances and causes productive of curvatures, and even of more acute disease of the spinal column; and, although this class of causes operate chiefly in childhood and early life, yet their effects often continue until old age, and are rendered more severe and irremediable by the regimen and clothing adopted during puberty and adult age. In this climate more especially, the frequent and sudden vicissitudes of temperature and humidity require
the body—both trunk and extremities—shoul
covered in such a manner as to preserve the
face in a sufficiently warm and perspirable s
avoiding any excess or extreme of cold or war
and to allow a free and easy exercise of all
muscles of the extremities and trunk. T
clothed, and avoiding all cinctures or corset
other baneful contrivances introduced by i
rant dogmatisers, from the period of infancy
wards; exercise in the open air and in sunsh
sufficient but not immoderate or improper
are the means which will best ward off affec
of the spine, and in proportion as either of
is neglected, so will a predisposition to these
tions be generated.

18. The use of stays or corsets of any kind du
childhood, and exposure of the joints to cold
amongst the greatest evils to which the hu
race is liable. The former embarrasses and l
the actions of the dorsal and lumbar muscles
of all the muscles of the trunk, weakens an
laxes the vertebral ligaments, and whilst it fa
unnatural curvatures, endangers more or les
important parts lodged in the vertebral canal
latter weakens and enlarges the joints, an
presses vital power. The want of due ai
proper exercise from the age of five yea
twenty; the mental cramming pursued d
the greater part of that time; the prol
periods of study in a crowded and insuffic
ventilated apartment; sleeping in a self-c
minated air, and in chambers overcrowded
small for the number of occupants; insuffi
or unwholesome or incongruous food, are
generally associated causes of the delicacy o
stitution, of the weak or imperfect developm
muscle, and of the relaxation of ligaments, v
both predispose to, and even directly occ
spinal curvatures and disease. The vice o
pollution, moreover, which is apt to spring u
diffuse itself in young persons about the age
berty, when they live in considerable nu
under one roof, remarkably aid these causes
veloping their effects upon the nervous s
and spinal column; but to this most imp
agency more particular attention will be pa
the sequel.

19. In connexion with the use of stays, the
mode of their construction requires some n
Whilst they are so made as to press d
wards and together the lower ribs, to redu
cavity of the chest, especially at its base, to
injuriously upon the heart, lungs, liver, sto
and colon, and even partially to displace
vital organs, they leave the upper regions
chest exposed—those very regions where t
cular, consumptive, bronchial, and inflamm
diseases generally commence, or are the
prone to attack—to the vicissitudes of season
ther, temperature, humidity, and external i
These noxious and unnecessary articles of
ing — these mischievous appliances to the f
form, useful only to conceal defects and ma
deficiencies in appearance, are rendered still
injurious by the number of unyielding, or
partially yielding, supports with which the
constructed on every side. There are the v
bones in the back and sides, and the steel in
extending from nearly the top of the stern
most to the pubes. The motions of the trun

are thereby restrained, and the nutrition of compressed parts impaired; but, irrespective e displacement of vital and assimilative vis- that follows the amount of pressure, the l support in front has an injurious effect, h has been universally overlooked. How- well it may be protected from contact with urface, it acts as a conductor both of animal th, and of the electro-motive agency passing gh the frame: it carries off by its polariza- into the surrounding air, especially during d states of the atmosphere, the electricity of ody, this agent being necessary to the due arge of the nervous functions, either in its o-galvanic, or magneto-electric, state or ma- ation. The injurious influence of stays on male economy, as respects not only the dis- of the spinal column, but also the disorders uterine organs, is manifest to all who con- the subject, and has been ably discussed in k by Mr. Whitfeld of Ashford, to which I the reader.

B. Constitutional vice and diathesis espe- favour the occurrence of, and even directly ion, diseases of the spinal column. Of the most influential are the scrofulous, the natic, and the cancerous. Scrofula, either or developed — whether concealed or tuber- s — often produces disease of the bodies of ertebræ, either in the form of scrofulous in- ation of them, or by infiltrating their can- ed structure with tubercular matter. The *of scrofula,* fully discussed in another place *rt.* Scrofula, §§ 13. *et seq.*), have in many ces the effect of developing disease of the without having previously changed the dia- or habit of body, at least in an obvious er. In such cases, they are often only pre- ents to such disease, some other agencies g it. Whilst scrofula chiefly causes dis- f the vertebræ, the rheumatic diathesis, or isting rheumatism, favours the occurrence umatic inflammation of the ligaments of the or rather of the sheath and membranes of ord. Inflammation of these tissues may ap- ither as a metastasis of the rheumatic attack, marily upon exposure to cold or wet, or to ts of cold air in this quarter. The gouty sis is not so frequently a cause of spinal ons as rheumatism; but congestion of the s sinuses of the spinal canal, causing pain in ck and loins, and feebleness of the lower ities, is a frequent complaint in gouty per- The cancerous diathesis has probably little ce in the production of spinal complaints, gh the several varieties of cancerous disease een occasionally found to implicate one or of the spinal structures. Children, whose s are aged or debilitated, and whose con- ion is originally weak; the progeny also dissipated, the drunken, or the exhausted by is, mercurial courses, or cachectic affections; l or premature growth, and children brought hand, or living in large towns without the ad- e of occasional change of air; are much iable to spinal affections, than others differ- circumstanced, as they advance in growth or

C. Certain previous maladies, especially above-mentioned, exanthematous and malig- evers, more particularly scarlet fever, the syphilitic cachexia, tuberculous disease, sexual and urinary affections, particularly in the female, aneurisms of the aorta, and internal tumours and abscesses, either favour the development or excite disease of the spine, or of its contents. Aneurisms of the aorta, and internal tumours and abscesses in some instances, by their size and pressure, occasion erosion or ulceration of the bodies of the vertebræ. Flexures of the spine and disease of the vertebræ frequently follow the more severe attacks of the exanthemata; and tuberculous disease with caries of the vertebræ, sometimes followed by abscess, is frequent not only in the scrofulous diathesis, but after tuberculous affections have been developed in the lungs, mesenteric glands, or in other parts.

22. Uterine irritation and excitement, and the several forms of hysteria, and their numerous manifestations and alliances, are often followed by congestion of the venous sinuses of the vertebral canal; by what has usually been called spinal irritation, or inflammatory congestion or irritation of the chord and its membranes; and by flexures of the spine or structural change of the contents of the column. Frequent sexual excitement and consequent exhaustion, alternating with unnatural rapidity, are the most frequent causes not only of these uterine and hysterical disorders, but also of the allied affections of the spine and its contents: and, although the one class of disorders is generally consecutive of the other, the spinal diseases with their several sympathies more commonly following the sexual, the former may be primarily manifested, especially in the male sex; masturbation about the period of puberty, and premature or excessive sexual indulgences, being the most common causes of chronic disease, the most injurious of vices, mentally and physically, and, whilst they most powerfully predispose to, they directly occasion, especially in weak constitutions, and when aided by other causes, one or other of the more serious maladies of the spine and its contents. (See *art.* Pollution.)

23. *D. The influence of physical agents,* especially of cold, currents of cold air, unusual increase of temperature, more particularly if these be applied to the back; sleeping in damp beds or upon the ground, or in the open air, with exposure of the back; sitting in wet or damp clothes; exposure of the back or loins to much heat, especially during dinner; sudden suppression of the perspiration by exposure to cold or to cold air, as when a person is called out of a warm bed. A medical man was called out of bed when perspiring freely, and got into an open carriage insufficiently protected, during a cold night. He was soon afterwards seized with inflammation of the membranes of the spinal chord. I attended him with other physicians. A corpulent female of middle age slept with her back to a window which had been left partially open. She complained of chills, pains, and rigors, during two or three following days, subsequently of acute pain in the loins, pain, numbness, and cramps in the lower extremities, and other symptoms of inflammation of the spinal membranes. She afterwards became paraplegic. A gentleman from Jamaica, after a hot day, fell asleep at night on the deck of the ship in which he was making his passage to Europe. He awakened cold, shivering, and benumbed, and was soon afterwards generally pa-

ralysed. A gentleman dined at a party where he was a stranger, and did not complain of the heat of the fire at his back. The following day and the next he had frequent vomitings, violent pain in the back and loins, numbness, pain, and cramps in the legs, obstinate constipation and retention of urine, followed by paraplegia. I could adduce numerous instances similar to the above which have occurred to me during a practice of upwards of thirty years. The causes which I have mentioned under this head, as well as those which follow the next to them, generally affect primarily or chiefly the membranes of the spinal chord, the affection of these and its consequences generally implicating more or less the chord itself and the origins or roots of the spinal nerves.

24. *E. The metastasis and suppression of external disease or accustomed discharges* have been partially noticed above. During an early period of my practice, I observed several cases of this occurrence, chiefly at the institutions to which I was physician. In one case of metastasis of rheumatism to the spinal membranes which I treated in 1820, general palsy supervened, and I had an opportunity of minutely examining the spine and its contents after death (*see Lond. Med. Repos.*, vol. xv.). Since that period similar cases have come under my observation, which have terminated either in paraplegia, or in general palsy and death. Suppression of the catamenia, the stoppage of profuse leucorrhœa and of hæmorrhoids, the drying up of accustomed discharges, the healing of chronic ulcers and cutaneous eruptions, have severally been followed by disease of the spinal contents. In many of such cases the blood has been more or less impure—has been insufficiently depurated by the several emunctories; and when the manifestations of this morbid condition have been suppressed in quarters which served as safety valves from more dangerous consequences, they have broken out in other surfaces and parts, and been followed by much more serious results; and although the spinal membranes and chord may not be frequently thus consecutively assailed, yet they are occasionally, when the suppression of the primary disease has taken place before the blood has undergone depuration by an increased action of the excreting organs. We frequently observe surgeons endeavouring to cure eruptions, ulcers, chronic discharges, &c., by lotions, ointments, cerates, and other appliances, either unsuccessfully or with the contingent result of consecutive internal disease when they succeed; whereas, a decided action on the several excreting organs, by appropriate means, by removing effete or injurious elements and materials from the blood,—by counteracting or eliminating those irritating and self-contaminating matters perpetuating or causing the primary disease,—would most speedily and effectually remove it, and prevent any subsequent risk from metastasis or other morbid manifestation.

25. *F. External injuries* are amongst the most common causes of disease of the spine, or of its contents. These injuries may be so slight as to be overlooked or forgotten, their effects being developed slowly and insidiously until they arrive at a pitch which alarms either the patient or his medical attendant. The more severe injuries by which a vertebra is broken, or its intervertebral cartilages torn, or ligaments or muscles ruptured, and the chord or its membranes either more o injured at the same time, or consecutively aff by inflammation, effusion, &c., readily acc for the great extent and danger of the effects duced. But there are slighter injuries, w sometimes slowly, and after a protracted pe occasion no less serious results. A slight fa the back, as on descending a stair, or a fall wards, when the back, or even the os coc strikes against a hard or sharp substance, is times followed, if due care be not taken, by se effects—by inflammation of the membranes c chord, or even of the chord itself, and, i rationally treated, and even when so treate faulty constitutions, and if a proper regime not adopted, by paraplegia, often passing general paralysis, and ultimately terminatin coma and death.

26. Concussions of the spine occasione falls, or by leaping from great heights or modes, are frequently followed by effects us produced by the most severe injuries o column, even although no fracture, ruptur dislocation can be traced. The vertebræ an tervertebral cartilages may nevertheless have tained some injury, and the minute organiz of the chord and the origins of the nerves have been ruptured or injured so as to escap tection after death upon a superficial inspe In these cases, the severity of the effects will to a due appreciation of the importance o cause. But a slight effect should not be heeded; and even the most trivial sympton parently to the uninstructed or inexperie ought to attract to itself marked attention care. Several instances have come unde care where the most dangerous and even hop consequences have followed the slightest fall concussion, the more immediate effects h failed to attract the attention or care of th ferer.

27. Amongst the less marked causes of d of the spine or of its contents, although occasio productive of the most important results muscular efforts in lifting heavy bodies, or lar efforts made suddenly or irregularly, and volition is not duly exerted, or is directed a a different direction. Rapid movements, to or bendings of the spine; undue pressure upon one side of the vertebral bodies, by tural positions retained for a long time; fre rotations of the column, and reaching to o too high or too low, are occasionally prod of injurious effects. The most fatal injury even follow a common or slight effort. A muscular man broke the second vertebra neck completely across on both sides when ing his head on the pillow as a fulcrum to e him to turn in bed, and the nature and exte the injury were ascertained after death by P sor QUAIN and myself.

28. Curvatures of the spine often result assuming the same position on frequent occ —by sleeping on a high pillow on the same by improper postures in writing, playing o harp or guitar, by drawing, by carrying a or burden on the same arm, as in nursing, a always using one hand more than the other. ing on horseback produces most injurious ph and moral effects on females: it gives the s certain degree of twist; and the concussio

ed to the nates, pelvis, and trunk, occasions a
ee of excitement followed by exhaustion,
h, if not amounting, often leads on, to self-
tion. To these apparently slight causes, es-
ally to their continuance, the lateral curva-
of the spine, so very frequent in females, are
eat measure to be attributed.

9. III. Curvatures of the Spinal Co-
n, — Flexures of the Spine, — Lateral
vatures of the Spine,—*Lateral Deflections*
e Vertebral Column ; — Unnatural Deviations
he Spine.—Distortions of the Spine. — Func-
l Curvatures of the Spine.

. Classif.—I. Class. IV. Order (*Author*
reface).

. Definit.— *Unnatural curvatures of the*
bral column, occurring from other causes than
structural changes of the bodies of the ver-
e.

2. Curvatures of the spine, produced other-
than by caries or anchylosis of the vertebræ,
be divided into three *varieties or forms,*
ely, *posterior curvature,* or excurvation, the
exity being directed backwards or outwards;
nterior curvature, or incurvation, the con-
y being inwards or anteriorly;—and *lateral*
ature, the convexity being to either side,
rally the right, and, when considerable,
g either double or complicated. The angu-
rojections occasioned by caries or anchylosis
e bodies of the vertebræ are altogether differ-
in their natures from these curvatures, and
under a different category of lesions.

3. i. Posterior Curvature of the Spine,
xcurvation, — Cyphosis, — affects chiefly the
l and cervical portions of the spine, and only
sionally extends to the upper lumbar verte-
It is often caused in infancy by the common
ice of raising the child by the open hands
d under the arm-pits, whereby the ribs are
ed inwards, and the spine and sternum are
ed outwards, as described when treating of
rmities of the chest (see *Art.* Chest, §§ 2. *et*
, where the causes producing it are fully
d. Slighter forms of this curvature occur in
g persons, and in adults, owing to shortness
ght and the habit of stooping, and holding
head near objects when reading, writing, or
ing; and in aged persons from diminished
ness and elasticity of the intervertebral car-
es, and in these the curvature extends lower
e spine. When the curvature is considerable,
anterior portion of the ring or body of each
bra is rendered somewhat thinner or more
ned, especially in the centre of the curvature,
d, as a necessary consequence, the transverse
esses, and still more so the spinous processes,
more separated. The ligaments are also af-
d, the posterior being more or less stretched.
n the ribs are laterally compressed, so as to
nish the diameter of the chest from right to
the sternum is pushed outwards, assuming a
ar position to the dorsal spine. In other
s, the sternum follows the direction of the
al vertebræ, the ribs being curved outwards,
the diameter of the thorax being lessened be-
n the spine and sternum. If the excurvation
icate the lumbar vertebræ, the angle formed
his part of the spine with the direction of the
um or pelvis is lost, and the brim of the pelvis
mes horizontal, the spine and the direction of the pelvis being in nearly the same axis. In excurvations of the spine, the capacity of the thoracic and abdominal cavities, and the position of the viscera, are more or less affected, the former being diminished, the latter being somewhat changed or embarrassed.

34. ii. Anterior Curvature, — *Incurvation of the spine, — Lordosis.* — This form of spinal curvature is most rare. It is most frequently met with in a slight form in the lumbar vertebræ, and is then merely an exaggerated state of the curvature natural to this part of the spine, and is seen not infrequently in persons who, in early life, have brought their lumbar muscles into very active use. In other circumstances, however, it is occasionally observed giving the abdomen unusual prominence, and, when seated near the pelvis in females, presenting the appearance of pregnancy or of ovarian disease. When this curvature affects the dorsal vertebræ, it occasions marked deformity of the chest: the posterior angles of the ribs pass outwards and backwards from the spine, and the antero-posterior diameter of the thorax is diminished, unless, indeed, the sternum be also pushed forwards, which is rarely the case. When the anterior curvature is seated so low down in the lumbar region as to form an angle with the sacrum, the effect in females during parturition may be serious, as it is frequently connected with a diminished antero-posterior diameter of the brim of the pelvis.

35. This form of curvature may arise from an increased force, or more frequent and developed action, of the dorsal or lumbar extensor muscles, relatively to the vital tone or cohesion of the anterior ligaments of the spine, and to the action of the recti abdominal muscles; and it may be associated with some constitutional taint or disease, as with scrofula, rickets, syphilis, or some cachectic condition, &c. When it is connected with rickets, it is most apt to occur during convalescence from this malady.

36. iii. Lateral Curvature. — *Lateral deflections of the spine,—Scoliosis.*—This is by far the most common form of spinal curvature; and generally appears between the ages of 10 and 18, although it may commence either earlier or later. It is most common in the upper and middle classes, and comparatively rare in the lower or harder working orders. Owing to the position of the viscera—to the heart on the left, and the liver on the right, it has been supposed that there is always a tendency to a double lateral curvature of the spine, especially in lymphatic, weakly constituted, and cachectic persons. There can be no doubt that, whatever influence may be produced by this circumstance, it is really so small as not to deserve consideration. The upper lateral curvature has generally its convexity to the left, is small, and comprises the lower cervical vertebræ with two or three dorsal vertebræ. The second or middle curvature is the most remarkable; has generally its convexity to the right, and is formed by the dorsal vertebræ. The third or lower curvature has its convexity to the left, and comprises the lumbar, and lowest dorsal vertebræ. The first or upper curvature may be very slight or altogether wanting, although the second or dorsal is considerable; but, in this case, this latter extends higher, and the third or lumbar is also considerable. Either the dorsal or lumbar may

be the most marked, more frequently the former, which, in some instances, may appear the chief or only one.

37. Lateral curvatures may be very slight, or they may be very great: they are seldom completely lateral, but are commonly conjoined with more or less posterior curvature. It is manifest that, when the deflections of the column are very considerable, the natural rotation of each vertebra on the other must be diminished or limited in the curvatures, and that it must take place chiefly between them, or between those vertebræ which remain the nearest to the natural axis of the trunk. The sides of the bodies of the vertebræ must also experience greater pressure towards the centres of the concavities and diminished pressure at their convexities: hence will result compression of the more yielding tissues and impaired rotation at the more flexed situations. The intervertebral tissues are first compressed in the sides, which are concave, and afterwards thinned. The bodies of the vertebræ are also more or less affected, and atrophied in these sides, and assume somewhat of a rhomboidal form. The articulating processes are much altered in the situations where the curvatures are greatest: they are atrophied, nearly obliterated, and absorbed in the concavities; and rendered more prominent, the spinous processes being also more protruded, in the convexities.

38. When lateral curvatures are very great, the effects become still more serious. The passages between the vertebræ for the nerves and bloodvessels are straitened and almost obliterated in the concave side, and enlarged and elongated in the convex. The consequences of the constriction of these outlets must be evident in respect of both nerves and bloodvessels. They were pointed out by MORGAGNI and PORTAL, and more recently insisted upon by CHAILLY and DUGES. The pressure, also, on the sides of the vertebræ sometimes causes partial absorption or caries of the part which suffers the most from it; and, in these situations, or where the concavity is greatest, ossific deposits are there formed, producing partial or lateral anchylosis, sometimes extending to the lateral, transverse, or oblique processes of articulation, and furnishing support to the most affected and weakened part of the spine. In these situations the ossific formation results from a state of chronic inflammation which is productive of this work of reparation.

39. The *consequences* of extreme or even of considerable lateral curvatures are often very serious. The patient is liable to severe pains, cramps, numbness, and impaired action of the muscles supplied by nerves issuing from the concave side of the spine, when the passages for the nerves and bloodvessels are narrowed. Emaciation frequently follows; and owing to the falling inwards and approximation of the ribs on the concave side of the curvature, and to the bulging outwards of those on the convex side, the cavities of the chest and abdomen are rendered more or less irregular or unsymmetrical, and are also much encroached on; the viscera, especially the lungs and heart, and even the liver, kidneys, and alimentary canal, are embarrassed or impeded in their functions; difficulty of breathing, amounting sometimes to orthopnœa, and palpitation, or slowness, or irregularity of the pulse often occurring, with a feeling of in-
capability of raising the ribs, or of taking a
inspiration, especially on the concave side.
quently the viscera accommodate themselve
their unnatural position, when the curvatures
crease gradually, and comparatively little
convenience is experienced unless upon incre
exertion; but, when these viscera, particularly
heart or lungs, are attacked by disease, to
causes of which their physical and vital co
tions render them most susceptible, then the
sequences are much more serious than when t
organs are attacked in different circumstances

40. It is very rare for the spinal chord o
membranes to experience much disorder du
lateral curvature, unless the bodies of the verte
at the place of greatest concavity become infla
or carious; but, when either of these res
ensues, chronic inflammations, effusions, and
ganic changes occasionally supervene, in
parts contained by the diseased vertebræ, and
usual effects, namely, severe pain, spasms,
contractions of the muscles of the trunk and
tremities and loss of motion, with or without
of sensation, generally take place. The dis
of these structures sometimes extends until
greater part of the spinal contents is invaded,
even until inflammatory action reaches the m
branes of the brain, and occasions effusion wi
the cranium, coma, and death.

41. When the deviation is great, deformi
manifest as regards the position of the shoul
blades, the collar-bones, and the pelvis. The
cles are also affected, those which are the least
becoming pale and atrophied; and the ribs are
more or less distorted, those on the concave
not merely being closely approximated, but, i
and extreme cases, becoming partially anchyl
The chief curvature implicating the dorsal s
commonly presents its convexity to the ri
pushing outwards the shoulder-blade, and cau
the left shoulder-blade to fall inwards. W
the chief curvature is in the lumbar region,
generally directed to the left, and more or
posteriorly, the bodies of the vertebræ being
siderably changed (§ 37.), and sometimes bec
ing even disorganised.

42. *The progress* of spinal curvatures is
tremely variable. They sometimes pro
slowly and insensibly; occasionally rapidly. T
have been said sometimes to occur suddenly
unexpectedly after a first confinement, and
crease remarkably. It may be suspected tha
such cases, the curvature had existed previou
but had been concealed by the dress; the p
peral states and lactation merely augmenting
deformity. Curvatures may proceed to a cer
extent, and become stationary ever afterwards
they may, upon the removal of the causes, an
proper means, be in great measure remed
When neglected, they may be increased so a
bend the patient forwards or to either side,
most surprising manner, the arm-pit almost re
ing the hip-joint.

43. iv. The PROGNOSIS OF CURVATURES
pends chiefly upon their extent, and upon the e
produced upon the spinal contents, upon
spinal nerves, and upon the viscera of the c
and abdomen. The curvature may be very g
and yet, as long as neither spasms, nor para
nor marked embarrassment of the functions
vital or internal organs, nor other serious disor

vene, reasonable hopes may be entertained advanced age being reached. The appear- of such disorder, as a manifest consequence irvature, should suggest an unfavourable nosis ; the danger having stricter reference nature and extent of the consecutive dis- nce, than to the amount of curvature. The val of old curvatures is seldom attained with lete success ; and, unless with the view of ating serious disorder occasioned by them, d not be rashly attempted ; for adhesions, ations of parts, ossific formations even, and alterations, may have taken place, that may e disturbed, without occasioning more serious bance.

v. THE CAUSES which more especially oc- n curvatures of the spine are the female sex ; ge between 9 and 18 ; a lymphatic, scrofu- or ricketty constitution ; an originally weak rmation of frame; an exhausted, feeble, hectic habit of body ; insufficient food, liv- n low, humid, and close situations, and all uses productive of scrofula ; convalescence acute and chronic maladies ; want of pure ght, and sunshine ; a premature and rapid h ; defective or improper exercise ; crowded lose apartments during night and day ; the uance of mal-positions ; the too exclusive f the right hand and arm ; the use of stays metal or other supports, and self-pollution. w attributed curvatures to a want of har- between the development of the vertebral n and that of the muscles ; and MORGAGNI, r, and more recently GUÉRIN, believed that are often caused by contraction of the es consequent upon disease of the nervous s. MAYOW's hypothesis is incapable of rt ; the opinion of MORGAGNI is more de- g of attention, and may be admitted to be some instances.

vi. THE TREATMENT OF SPINAL CURVA- , as promulgated to the public in recent would, in the hands of a MOLIÈRE, furnish st bitter satire on medical practice :—so writers, and so much said, and yet so little ation furnished,—each successive author ciating the means advised by his predeces- and yet adding nothing to what was already ,—every new spine-doctor having his own atus, instrument, or couch to recommend sell, either or both being said to be capable ing cases which were heretofore incurable, parading of casts of deformed trunks, ren- as symmetrical as the statues of antiquity newly discovered or peculiar method of ent —the publication of books, containing y exaggerated accounts of successful cases, ut even, as in some of these publications, otice of the methods employed,—the pro- tion of opinions opposed to anatomical and al truths to subserve delusion,— and large ses, but scanty performances, were amongst of the means adopted by the majority of who had chosen this *speciality*, as the best ated to fulfil the objects of their profes- mission. But it may be as well to take a iew of the methods lately promulgated, and progress made (?) in this department of me- practice.

Mr. BAYNTON, in 1813, advocated rest for g time in the horizontal position, on a specially constructed couch, but furnished no particulars of treatment.—Mr. SHELDRAKE in 1816, recommended an instrument of his own to support the weight of the head ; and extension on an inclined plane, &c.—Mr. WILSON, in 1820, advocated chiefly muscular exercise directed especially to the dorsal muscles, the horizontal position occasionally ; and he justly condemned all instruments which are made to act from the pelvis upwards, and which were then much in vogue among distorsion-curers.—Dr. JARROLD, in 1823, considered curvatures to depend upon constitutional causes, treated them accordingly, and prescribed chiefly muscular exercises, burnt sponge and carbonate of soda internally.—Mr. BAMPFIELD, in 1824, advised muscular exercises, extension of the spine by pulling the legs and arms, frictions and shampooings, and the use of instruments to exercise particular parts.—Dr. DODS, in 1824, objected to the inclined plane, to any spinal apparatus, and to the practice of carrying weights upon the head, as directed by some of his predecessors. He employed a concave couch to bend the whole spine forwards, and to relax the spinal muscles. The success of this plan must have been astounding ! — Mr. JOHN SHAW, in 1827, resorted to muscular exercises, to supports for the spine, and to extension on a couch of his own contrivance. — Dr. HARRISON, after publishing numerous cases of vaunted success, and withholding any account of the means employed, produced, in 1827, a large book, which contained nothing but unsound views, exaggerated accounts, and a mystification as to his method of treatment. This, however, was nothing more than the horizontal position on a fixed mattress, friction, &c. This last he directed by means of assistants in such a manner as to lead his victims to persevere, and to inspire them with hopes which were rarely realised.—Mr. STAFFORD, in 1832, advised spinal supports, the horizontal position, conjoined with exercises.—Mr. BEALE, in 1833, recommended frictions, muscular exercises, mechanical extension, and instruments in certain cases.—Mr. COULSON, in 1839, prescribed suitable exercises, and condemned, with great justice, all kinds of collars, machines, or instruments.—Mr. WARD, in 1840, resorted to the recumbent position, to exercise of the muscles of the spine and head, and objected to mechanical supports.—Mr. TUSON, in 1841, advocated principally the recumbent position on a couch of his own contrivance, that admitted of muscular exercises while recumbent.—Mr. C. R. HARRISON, in 1842, published his work to say, that he cured deformities of the spine and chest by exercise alone, and without extension, without pressure,—the means empirically employed by his late namesake,—and without division of muscles — the division of muscles having been then brought into vogue from Germany, the fruitful parent of humbug, for curvatures, for squinting, and for every thing to which credulous fools would submit.—Mr. HARE, in 1844, wrote to recommend his couch, which acted on the spine by extension produced by pulleys and weights.—Mr. COLES, in 1845, praised the prone position, for which he constructed a couch on which the patient reposed upon his chest and abdomen, with exercise of the muscles of the spine and upper extremities.—Mr. TAMPLIN, in 1846, confided altogether in mechanical support by means of a steel instrument, which he contrived for this purpose, based, like many of those employed by the instrument makers who had gone before him, to rest upon the pelvis. He condemned the horizontal position and all kinds of couches.—Mr. Lonsdale, who has furnished me, in his work, with a portion of the above information, in 1847, improved greatly on Mr. Tamplin's instrument, adding its best and most original part, and recommended a couch which appears to be the best of all hitherto employed.

47. From this exordium, the reader will perceive the amount of information to be obtained from books, each one of which is written to recommend the practice adopted by its author to the notice of a "discerning public." Physicians are now-a-days allowed to have nothing to say to, far less to do with, this very notable "speciality," or indeed with any complaint, respecting which speciality-doctors have enlisted the "sweet voices" of the public. But physicians will nevertheless look on, and even observe closely the results, note the errors committed, mark the subterfuges resorted to, notice the delusions practised, and remark also the credulity, occasionally interrupted by passing visions of the truth, displayed by the victims during the protracted treatment of a spine-doctor. The study all the while is not without interest to the philosopher: the arts and cunning displayed to conceal expected want of success, and to ensure the faith and perseverance of the patient; the resignation of the latter, and the confident dogmatising of the former; the entire surrender of judgment, liberty, and opinion on the part of the devoted sufferer; the "hoping against hope," and the influence gained over weak minds by the assumed confidence, the decided manner and the repeated promises of the reputed deliverer, furnish food for contemplation and instructive illustrations of the constitution of the human mind. In this way, months, and even years, are passed; the submission and credulity of the one keeping due pace with the domination and perseverance of the other — the hopes entertained by the patient, that future success may ultimately compensate for the losses and sufferings and endurance of the past, protracting still further the period of empirical domination, until at last emancipation arrives; and the patient awakes to her condition, and arises with emaciated muscles, impaired strength, and with loss of the use of her limbs. Nevertheless, she may not confess her delusion. The power which had so long fettered her mind and body retains still a portion of its sway; and whilst she feels the bitterness of her delusion, she has no desire to admit her folly or to confess the full amount of its consequences. She consoles herself with the idea, assiduously inculcated by the persevering attendant, that, without the means of which she has been the victim, the deformity might have been much worse, and with thankfulness for this assurance, she submits to her fate, until another "unfailing method of treatment" excites her attention, when the desire of recovering her shape or of preventing extreme deformity again induces her to enter upon another protracted period of penance, the means being different but the results the same as heretofore.

48. Now, after the numerous repetitions of the means enumerated above, — after the endless variations, modifications, combinations, denunciations, &c. which the very imperfect list just furni
presents — what can I have to recommend,
have seldom had to deal with such cases, u
in rare instances when I have considered it rig
interfere to prevent the dangerous conseque
which would ensue, or were actually ens
from a vicious system? What I therefore ac
may be briefly enumerated in the following
tegories: —

49. *A.* To ascertain the several, and espec
the chief causes of the curvature, extrinsic
physical, intrinsic or constitutional, mental
moral; to endeavour to estimate correctly
individual influences; and to direct a decisive
scrutinising inspection on their energeticall
culcated removal and avoidance. If only o
the causes of mischief continue in operation
best devised treatment may be inefficacious.

50. *B.* To determine accurately the extent
nature of the curvature, the amount of deforr
and the degree in which it has involved the na
positions of the pelvis, shoulders, the clavi
sternum and ribs; to ascertain in how fa
shape and capacity of the thorax and abdo
are affected; to note the states of the diges
assimilating, and excreting functions; to exa
the condition of the muscular and fibrous s
tures, as manifested by the muscles of the t
and extremities, and especially by those o
spine, and by the joints; to detect wha
disorder of the thoracic or abdominal o
the curvature may be associated with; to
termine the state of the circulation and o
blood as respects the presence of chlorosis,
mia, or plethora, and to ascertain the condi
of the uterine or sexual organs; and, ha
acquired all the information that can be obta
respecting these, and having reviewed this i
mation in connexion with what is known as t
causes, to consider well the indications and m
of cure which the whole inquiry may suggest

51. *C.* Having commenced thus carefully, t
these intentions and means into practice, decid
but cautiously, and in suitable combinations
such are clearly indicated: — (*a*) To pay
attention to the restoration of the general h
— to attend to the digestive and depurating f
tions, to the advantages of pure air, ventila
sunshine, and suitable exercise, both before,
during, the employment of other means dire
more especially to the removal of the curvat
and at the same time to have recourse to suc
nics and restoratives as will promote assimilatio
(*b.*) To have recourse to instruments only
these are imperatively required, and to select
as will admit of the movements of the s
muscles, and press upon the convexity of
curve. — (*c.*) If couches alone, or in additic
instruments, in the intervals between having
course to them, or after due exercise, be absol
required, to select those which furnish pre
chiefly on the convexity of curvature, and lib
the spine from the pressure and warmth
supine position; and facilitate a recourse to
tions and other means of restoring the tone o
spinal muscles and ligaments. To each of
I would direct a more particular notice.

52. *D. The restoration of the general h*
previously to, and during, a recourse to the
empirical and mechanical means adopted by
who take this particular class of affections

generous protection, is too generally ne- d. Many of the causes most influential in cing curvature act chiefly by impairing the tutional powers and the general health — feebling the digestive and assimilating func- by impeding the excreting actions, by relax- e tone of the nervous and fibrous structures d hence the importance of the entire removal se causes, and of the restoration of these ons to health. Of all the causes of curvature, st frequent, the presence of which it is the most lt to ascertain, and the most seldom relin- ed when so long practised as to produce this is *self-pollution.* Its effects in exhausting ic nervous power, in emaciating the muscles, relaxing the ligaments, are much more re- ble than those of any other cause. Atten- therefore, should always be especially di- to its detection and entire relinquishment.

Restoration of the vital functions in spinal ers should be directed not merely to the func- of digestion and excretion, but also to the ions of the vascular system and of the uterine rinary functions. If vascular plethora be not t — a condition which is seldom associated curvatures — the preparations of iron are lly of service, especially if anæmia or sis also exist. If neither of these be pre- bitter infusions or decoctions may be first and afterwards the tincture of sesquichloride , with or without a little hydrochloric acid, he infusion or tincture of calumba, may be ibed accordingly; but, in cases associated næmia or chlorosis, the preparations of iron be adopted forthwith, especially if the urine aline or contain much of the phosphates; n these circumstances, the preparation just and the hydrochloric acid should be em- , and they may likewise be prescribed if erine discharge be great, or leucorrhœa be t. In other conditions, or when the cata- evacuation is insufficient or obstructed, the te of iron, with the aloes and myrrh pill, or mpound mixture of iron, with a sufficient ty of the compound decoction of aloes to ve the bowels freely open, will generally most beneficial.

5 *E.* Without due *ventilation, light, sunshine, ercise in the open air*, short of occasioning , health will neither be restored nor pre- . Large airy sleeping apartments, the light ven, and *exercises* of the muscles of the back xtremities, are the most conducive to the tion of curvatures, and to the restoration health of crooked persons. These persons never ride on horseback, nor even in a ge, when either can be avoided. Walking best exercise, and next to that such exercises moderately engage the muscles of the arms, ers, and back. Various modes of exercising muscles have been recently recommended; hatever plan be followed, the muscles of ides ought to be equally exercised. Certain ses tend more to *prevent* curvature than to e it; as the skipping-rope, shuttle-cock and door, the use of dumb-bells, and exercises he rod. The Indian sceptre exercises de- l by Mr. WALKER, in his work on "*Exercises dies*," are the best adapted to the prevention vatures and to the removal of those which ght. When the curvature is more manifest, or even very great, pulleys should be fixed, at a considerable height above the patient's head, with weights attached to them, great in proportion to her age and strength, and in a situation which will admit of their being pulled in either a forward or backward direction. A stand, also, with a cross bar, or with more bars than one, considerably above the head of the patient, may be erected in a suitable open or airy situation; and, by taking a firm hold with both hands, attempts should be made, gently and cautiously at first, to raise the body by the muscles of the arms and shoulders. When the muscular debility is great, it is generally of great service to have recourse to frictions over the muscles of the spine and back with a warm stimulating liniment or embrocation, for some time previously to adopting these exercises. In 1822 the daughter of a friend had for a very long period been cased in metal instruments, and had suffered in health and strength, without any benefit as to the curvatures. I requested the instruments to be thrown aside, directed frictions to the spine and back, at night and in the morning, with the following liniment, and afterwards a gradual and careful recourse to the exercises just described. The cure was rapid, complete, and permanent.

No. 336. ℞ Balsami Peruviani, et Bals. Tolutani, āā, ʒj.; Olei Terebinthinæ, ℥j.; Linimenti Saponis ℥jss.; Olei Cajuputi ʒjss, Olei Olivæ, ʒjss. vel q. s. ut fiat Linimentum, more dicto utendum.

55. In many cases sponging the back with a strong solution of bay-salt, of a tepid warmth at first, and gradually reducing the temperature subsequently, will be of service, and may be employed once or twice daily. The exercises should be carefully directed, used for short periods only, especially at first, and never so long as to cause fatigue. In the intervals between exercise, the patient should assume the recumbent position — either supine or prone, or upon either side — on a firm horse-hair couch, either horizontal, or very slightly inclined, and with a low pillow. If the patient recline on the side, especially on the right side, or on that which presents the greatest convexity, she ought to place a horse-hair pillow under that part, so as to thrust the convexity towards the true axis of the spine, and retain it in that position as long as she can. Sleeping with too high a pillow, and generally on the same side — most frequently the right — often of itself produces slight curvature. In these cases, a different position should be chosen, the pillow ought to be placed under the side just beneath the arm-pit, when that side is reposed upon, and the patient should be induced to employ the arm and hand of the side on which the dorsal concavity exists.

56. *F. The use of instruments* has been very generally advised by both qualified and unqualified persons. They are required only in the more extreme cases of curvature, and at intervals, or only when it is necessary that the spine should be supported or aided in carrying the weight of the head and shoulders. Mr. LONSDALE's spinal support is the best hitherto constructed, inasmuch as it both supports the weight of the upper parts, and presses the convexity of the curvature inwards, or towards the true axis of the spine. The chief objection to this and all other instruments is the material of which they are constructed; for a broad hoop of iron or steel encircling the pelvis as a basis for support and pressure, and the other

metal parts forming the supports, springs, screws, &c., however well they may be padded, not only hamper or restrain the movements as long as they are applied, but also, and most injuriously, act as conductors of the electricity circulating through and on the surface of the body, conveying it into the atmosphere, especially during warm or humid states. The other instruments, which I have seen, besides those just mentioned, are altogether undeserving any notice.

57. *G. Of couches*, it is unnecessary to say much. A common horizontal couch, firmly made with horse-hair, or one very slightly inclined, is all that is required; but it should be well provided with hair-pillows of different sizes; and, when the patient reclines on the side with the dorsal convexity, a pillow should be placed under it in such a manner as to press it upwards; and when she reclines in any other position as well as in this, the pillow under the head should be low, unless, indeed, she attempts to lie on the side of the dorsal concavity, when it ought to be much higher. I have recommended this use of the pillows of the common sofa or couch for upwards of thirty years in the few occasional cases of curvature, which I have been requested to treat for other ailments; and I believe they are used in a similar manner by Mr. Shaw. In the excellent couch constructed by Mr. Lonsdale, a broad belt passes between supports attached to the sides of the couch, and the patient, when reclining, places the belt under the convexity, and has it drawn upwards; the weight of the body being in great part borne by the belt, which thus presses the convexity upwards. Another couch has been employed by Mr. Coles, for facilitating the prone position and exercise with the arms when this position is retained. It is well adapted to posterior curvature or excurvation of the spine, but it should be used with great caution when this curvature is owing to disease of the bodies of the vertebræ, as will be shown hereafter.

58. IV. Spinal Column—Nervous or Painful Affections of the.—Synon.:—Rachialgia (from *ραχις* the spine, and *αλγος* pain).—*Spinal irritation*, of several modern writers.

59. Classif.—I. Class. IV. Order (*Author*).

60. Definit.—*Pain in some part of the spinal column, generally accompanied by neuralgic or hysterical affections, unattended by fever, or by other indications of inflammation, injury, or structural change of the vertebral column, or of its contents.*

61. Painful affection of the spinal column may be limited to a single point or part, or it may affect more than one part, or extend along a considerable portion of the column. It may be continued, remittent, or intermittent, or even periodic. It may be *nervous* or *hysterical*, *rheumatic*, *gouty*, or *syphilitic*. When the pain is connected with any evidence of inflammation or injury, or structural change, it is merely a symptom of such lesion, and may be inconsiderable, or often not the most prominent symptom. It is generally difficult, and frequently almost impossible to determine, in the present state of our knowledge, the precise seat and nature of the pain which is so severely felt in the spine in nervous and hysterical subjects; but that it is chiefly functional, and intimately connected with pain in other situations, or with some other disorder, are well ascertained
facts. How far these may illustrate the natu
true rachialgia will be considered hereafter.

62. i. Description.—The history and
scription of *spinal irritation* were first furni
by the Franks, under the denomination
Rachialgia, and subsequently considered
Nicod, Teale, Brown, Darwall, Tate, I
rish, Griffin, Entz, Ollivier, and Benn
Most of these writers have viewed the comp
more or less in connexion with neuralgic
hysteric symptoms, and have overlooked son
its other morbid relations. It is generally a
sequence of pre-existing disorder, more espec
of hysteria, of uterine irritation or disorde
prolonged leucorrhœa, or of excessive or disord
menstruation, of exhausting discharges, of g
rheumatism, and several other chronic dise
attended by debility or nervous exhaustion.
characterised by pain, seated as mentioned ab
increased by pressure on the spinous process
the chief seat of pain, and often accompanie
painful, anomalous or hysterical symptom
parts supplied with nerves from the seat of
in the spine.

63. i. *A. Spinal irritation occasioning neur*
or hysterical affections.—This is the chief for
which painful affection of the spine presents
in practice, especially in females, or in we
constituted or debilitated males. If the re
refer to the article Sympathy he will there fi
exposition of the connexion subsisting bet
the ganglial, sympathetic and spinal nerves,
of the manner in which irritation, undue ex
ment, or exhaustion, or altered sensibility o
one part of the sensory circle of nervous en
ment, may implicate, in some way or other, di
parts,—may induce severe pain, in situa
remote from the seat of irritation, or spasn
various modifications of sensibility, or
anomalous affections. I have shown in va
parts of this work, that irritation or other m
states of parts of the alimentary canal, or o
uterine or sexual organs, or of the kidneys
urinary passages, may be propagated thence t
roots of the spinal nerves, to the chord, an
reflected from these, by either sensory or m
nerves, to internal or distant parts; and tha
original seat of irritation may produce these ef
either functionally and without developing in
matory or other palpable changes, or it may in
these changes, owing to prolonged enduran
its violence, and to the nature of the ex
causes. (See arts. Chorea, Cholera, Con
sions, Hysteria, Disease, &c.)

64. The remarkable diversity of pa
anomalous and hysterical symptoms atte
spinal irritation renders a detailed descripti
this affection unnecessary. The more prom
features are sufficient for its recognition.
distant symptoms or sympathies are often the
ailments to which the patient has directed
tion, or even of which he is cognisant. Bu
physician, upon hearing of these, immed
infers that the disorder is merely manifest
the extreme ramifications of the nerves; an
it is actually either seated in the origins of
nerves, or that it is transmitted to the gang
roots of these nerves from visceral or ga
nerves, or that it has been thus transmitted, i
first instance, but followed, owing to the int

ntinuance of the irritation, by disease at the ıs of the nerves displaying the disorder. He fore examines attentively the state of the , by pressure, percussion, or otherwise, ially at those situations where the nerves ying the affected parts originate; and he finds, although the patient has never com- ed of pain in any part of the spine, great in these situations, as well as increased dis- of the distant or external parts, when this nation is being made. Pain, more or less in the spine, is also excited by muscular , by a sudden or quick movement or rotation spine, or by a jerk or slight concussion, or ing a false step even in walking.

In connexion with the tenderness and pain or more parts of the spine, neuralgic pains, s or convulsive movements, great tenderness surface, sometimes loss or diminution of ion, occasionally loss of motion or incom- paralysis, and even, in severe or protracted paraplegia; loss of motion being often more ete in one extremity than in the other, and ion being but little impaired. When the pain or tenderness is felt in the *dorsal* , it is sometimes referred chiefly to one side column, generally the left side, and extends s felt only, beneath the left mamma, much rarely on the right side or in the mamma In these cases it is often associated with cal symptoms, with a sense of constriction the thorax, or with a sense of suffocation, ea or orthopnœa, pleurodynia, palpitations, elerated or irregular action of the heart, dic cough, and various other ailments, present numerous changes and associations, of them ceasing suddenly, others appear- l becoming variously complicated, and often rated by the fears of the patient, or the t direction of the mind to them.

When the lumbar portion of the spine is affected, then the pains, altered sensibility, , constriction, &c. are complained of in the s of the abdomen, or hypogastrium, and Numbness, cramps, pains, excessive ness, or even more or less complete para- the most severe cases, are experienced in wer extremities, with constipation, sup- n or retention of urine, or irritability of the bladder or uterine organs, disordered uation, morbid sensibility of the genito- organs, and occasionally a marked and e alteration of the state, constitution and y of the urine itself.

Spinal irritation of the cervical portion is requent as in the situations just mentioned; often connected with a similar affection of other of these, especially with the dorsal d tenderness. Sometimes the cervical pain high as the occiput, and is then associated euralgic pains in the face or neck, with s or noise in the ears, difficulty of swal- a sense of choaking, loss of voice and speech, spasm of the larynx or a state ling an attack of spasmodic croup, and sense of suffocation, complete aphonia, attack of suffocative cough, altered sensi- r incomplete paralysis of one or both arms, s and numbness of one or both hands, prick- ations, formications, &c., in these extremi- h more or less variability and irritability of temper, and often with several of the other ailments enumerated above.

68. The spinal tenderness in some cases shifts its situation. In these, the sympathetic affections are also changed. In connexion with the symptoms already noticed, the functions of the thoracic and abdominal viscera, and even those of the organs of sense, are more or less disordered, but in various and constantly varying degrees, the seat of disorder depending much upon the portion of spine affected. When the disorder is of a very severe character; when epilepsy, convulsions, amaurotic symptoms, deafness, hesitation or difficulty of speech, retention or suppression of urine, hiccup, vomitings, gastrodynia, obstinate constipation, paralysis, &c. take place, then it becomes a matter of doubt whether or no the spinal affection has proceeded to inflammatory action, or has extended to the base of the brain, or to serious congestion of the spinal veins, with increased serous effusion; and a careful consideration of all the sympathetic and constitutional features of the case is then especially requisite.

69. *B. Rheumatic, gouty, and syphilitic* forms of rachialgia, or painful affection of the spine, especially the rheumatic and gouty, are not infrequent—(*a*). The *rheumatic* occurs chiefly in the rheumatic diathesis; in persons who have suffered previously from rheumatism, and very probably is seated chiefly in the fibrous structures of the spinal column, in the ligaments of the spine, and probably also in the intervertebral structure. It is experienced principally on motion, and in portions of the spine which has been the seat of previous injury, sprain, twist, &c. It is generally diminished by the warmth of bed and by the recumbent posture; and it is often accompanied by several of the sympathetic affections already mentioned; but, when these are severe, and are obviously connected with the seat of pain in the spine—when cramps, numbness, constrictive pain in the muscles, prickings in the extremities, loss of motion, &c.,—then the supervention of inflammatory action, or of effusion, or of thickening of the affected tissues, or of congestion of the vascular apparatus of the spine, should be dreaded, even if not actually existing.

70. (*b*). *Gouty rachialgia* is common in old gouty subjects; affects chiefly the lumbar region; is often attended by weakness or impaired motion of the lower extremities, by incontinence of urine, and by other disorders of the urinary organs, or of the urinary secretion itself, varying with the duration and amount of the spinal affection. Gouty rachialgia is chiefly to be referred to congestion of the venous sinuses of the vertebral canal; this congestion probably inducing an increased fluid effusion, with thickening of the ligaments and fibrous tissues of the vertebræ external to the canal; the functions of the chord, or roots of the nerves, being thereby more or less embarrassed.

71. (*c*). *Syphilitic rachialgia* sometimes occurs in the secondary or tertiary stage of syphilis. It may affect the bodies of the vertebræ, or the intervertebral structures, or the ligaments; but it is very doubtful whether or no it exists as a purely nervous affection in the course of this constitutional malady, before these structures are attacked by the changes characterising the advanced progress of this malady. The portion of the spine most frequently attacked by syphilitic lesion, ac-

cording to my experience, is the cervical, the spinal lesion appearing to me to have been an extension of the alterations which had taken place in the throat and pharynx.

72. (*d*). *Scrofulous rachialgia* may be referred to slow inflammatory change, or to tuberculous deposits, in the bodies of the vertebræ; and hence it, as well as the syphilitic, hardly falls under the present category, but comes more legitimately under the head of *disease of the bodies of the Vertebræ.*

73. ii. The Diagnosis of spinal irritation, or pain in the spine, appearing independently of inflammatory or structural lesion, is by no means so easy as several recent writers appear to believe. Whether the painful affections of the spine are the chief disorder, or are attended by various symptomatic disorders of a more prominent character even than their parent affection, they often so nearly approach the milder grades of inflammatory action, in some one or more of the tissues of the spine, that a precise line of demarcation can hardly be drawn between them. An affection which may be, with much justice, viewed as functional to-day — as spinal irritation merely — may be inflammatory on the morrow, and be rapidly followed by the consequences of inflammation. Or a case may occasion apprehensions of inflammation, and yet, as respects its progress and treatment, prove functional merely; whilst another, furnishing less serious grounds of apprehension, may have been actually inflammatory, and soon furnish undoubted evidence of the usual results of inflammation.

74. The diagnosis between functional and structural rachialgia requires a most attentive consideration of all the circumstances of the case, after a careful examination of the spine, and of the whole extent of constitutional and symptomatic ailment. Messrs. Griffin, who have written with much ability upon this affection, have given the following indications of its existence, especially in its nervous or hysterical form: — "1st. The pain or disorder of any particular organ being altogether out of proportion to the constitutional disturbance. 2nd. The complaints, whatever they may be, usually relieved by the recumbent posture, always increased by lifting weights, bending, stooping, or twisting the spine, and among the poor classes often consequent on the labour of carrying heavy loads, as in drawing water, manure, &c. 3dly. The existence of tenderness at that part of the spine which corresponds with the disordered organ, and the increase of pain in the organ by pressure on the corresponding region of the spine. 4th. The disposition to a sudden transference of the diseased action from one organ or part to another, or the occurrence of hysterical symptoms in affections apparently acute. 5th. The occurrence of fits of yawning or sneezing, which, though not very common symptoms, yet, as scarcely ever occurring in acute or organic diseases, may generally be considered as characteristic of nervous irritation." (*Op. cit.* p. 214.)

75. These may be viewed rather as aids to the diagnosis of this affection than as establishing its existence independently of inflammatory action; for many cases, which have been viewed merely as functional, although presenting some degree of prominence of the spinous processes, in the seat of tenderness, certainly are attended by more or less inflammatory action, or congestion, with swell-
ing of the vertebral tissues, the local changes
insufficient to cause very manifest constitu
disturbance, or to disorder the vital and exc
functions. When, however, these are disor
the existence of inflammatory action or cong
should be suspected. In all cases prese
swelling or prominence in any marked deg
will be safer to view this as a result of a mil
slow form of inflammation or congestion,
flammatory congestion, with slight effusion,
to consider the disorder as merely nervous.
the description of disease of the Vertebræ.)

76. iii. The Duration and Prognosis of
irritation require but slight notice. — (*a*)
duration of this disorder is most variable. I
be only three or four days, or as many m
or even as many years, according to the se
the causes and the treatment of individual
There is every reason to infer that the mo
stinate cases, especially where the treatme
been judicious, is perpetuated either by th
tinuance of their causes, or by a chronic or
ring inflammatory congestion of one or more
tissues of the spine.

77. (*b.*) The *prognosis* of this affection is
rally favourable, where it is purely nervous o
tional. But, when it is attended by pheno
local and constitutional, indicative of any de
inflammatory congestion, the several conting
of such disorder, as respects both the verteb
the spinal contents, should be kept in view,
more cautious or guarded prognosis be
When rachialgia occurs in connexion with
matism, or gout, or scrofula, or syphilis, a
less favourable prognosis ought to be give
when it is more purely nervous, or simpl
gestive or inflammatory. In the rheumatic
there is danger of the affection extending
the ligamentous or fibrous structure to the
branes of the spinal chord; and in the gouty
especially if it be associated with disorders
secretion or excretion of urine, a favourable
is often long deferred, or even unattaina
very aged persons; whilst in the scrofulo
syphilitic states of the affection, disease
bodies of the vertebræ, if not constantly, is
rally present, and the prognosis is conseq
very unfavourable.

78. iv. The Causes of spinal irritation ha
already noticed (§§ 16. *et seq.*) when treatin
causes of spinal diseases generally; but th
certain causes which are more especially p
tive of painful or functional disorders of th
These are certainly much more frequent in
than in males, the female clothing and p
education of the sex favouring, as shown
(§ 18.), this result. Of 248 cases addu
Mr. Griffin, 26 only were males. It m
cur at any age between 10 and 65; and the
and rheumatic forms at much more ad
ages. The nervous variety, the most com
females, is met with from 15 years of age
but most frequently from 20 to 25; in its
cal form from 15 to 50, the menstrual ep
female existence. It is much more freq
the unmarried than in the married, and is n
fined to any particular habit of body or te
ment; the nervous and lymphatic tempera
however, predominating. The most comm
citing causes are, self-pollution, excessive
intercourse, uterine disorder, affections

ach and bowels, the presence of worms in the
tines, or other sources of irritation, as morbid
tions, fæcal accumulations, inordinate exer-
sudden muscular efforts, sprains, exposure to
and moisture, anæmia, rheumatic fevers or
ic affections, &c.

. v. The NATURE of spinal irritation has been
discussed. The pain in the spine, whether
constant or remittent, or excited only by
ure of the spinous processes in the seat of the
ion, can be viewed merely as a symptom
me lesion, functional or structural, either
tissues constituting the column, or of the
membranes, or nerves, and, in this respect,
ike the more distant symptoms and sympa-
attending it, merely an external expression
anifestation of that lesion, whatever it may
As no opportunity of examining after death
ent who has been the subject of this affection
ccurred, as far as I know, until it has passed
ndoubted structural change, and become
ed by either inflammatory action, or by para-
, it is difficult to infer with any precision what
nature and exact seat of the affection ; but
is every reason to infer, with LUDWICK, HOFF-
, and the FRANKS, that it is connected with, if
e result of, congestion of the spinal circulation.
xistence of congestion of the venous sinuses
spine must necessarily affect the capillary
ation of the cord and its membranes, and
nount of the fluid interposed between them ;
s a consequence of the amount or extent of
changes, the functions of this part of the
us centres, both sensory and motory, and of
erves proceeding from it, must thereby be
or less disordered. That inflammatory action,
ammatory congestion, or indeed any form of
c inflammation, or its usual results, is not the
y lesion in the purely nervous or hysterical
lgia, may readily be admitted, when we con-
he exhausting nature of its causes, and that
stion of organic nervous, or vital power al-
productive of congestion in parts on which
ses of the exhaustion more immediately act.
may be as readily allowed, that chronic in-
ation is the more prone to supervene in these
he greater or more persistent the congestion,
lly if the usual causes of inflammation come
peration. I have seen not a few cases of
gia, which had been evidently merely con-
or functional at the commencement, but
by neglect, or improper treatment, had
into chronic inflammation of the spinal
anes ; and I have even seen some of these,
to super-added causes, or to perturbating in-
s, pass into an acute state, the inflammation
ng along the membranes, until it reached
e of the brain, and terminated in phrenitic
n, coma, and death.

vi. TREATMENT.—Rachialgia, according to
al and constitutional symptoms and cir-
nces of the patient, requires very different,
en opposite, means of cure. The spine
o be carefully examined, and the habit of
f the patient and the causes of the com-
ully considered, before the intentions of cure
ertained. The particulars to which the at-
of the physician should be especially directed
st. The presence or absence of local inflam-
signs, of general vascular disturbance, and
hora or of anæmia ; 2nd. The situation of spinal pain and tenderness, and its relation to existing sympathetic affections ; 3rd. The presumed or ascertained causes, and the aggravating circumstances; 4th. The existence or non-existence of interrupted, disordered, or suppressed evacuations, especially the catamenial, and the hæmorrhoidal, where this latter has been often a cause of complaint; 5th. The nature and amount of uterine or sexual disorder with which the spinal affection is allied.

81. *A.* If there be actual evidence of inflammatory action or congestion of any of the spinal structures furnished by the local signs and constitutional symptoms, *local vascular depletions*, according to the severity of these symptoms and the state of vascular fullness, as indicated by the pulse and condition of the veins, are obviously required, the amount of depletion being guided by the indications furnished by these sources. The situation from which the blood should be taken has been the topic of some discussion. J. FRANK considers, that local depletion attracts the flow of blood to the seat of depletion; and he therefore recommends the application of leeches to the anus. If rachialgia be connected with scanty, interrupted, or suppressed catamenia, or suppressed hæmorrhoids, leeches may be applied to the anus, or below the groins. In these circumstances, there can be no objection to these situations being adopted : indeed, they are the most likely both to restore the suppressed discharge and to relieve the local affection. But in other cases, there can be but little risk incurred from cupping, or applying leeches on each side of the affected portion of the spine, or even a little above or below this part.

82. *B. Blisters*, and *counter-irritants* of different kinds, have likewise been recommended by several recent writers. J. FRANK disapproves of their application over or near the affected part of the spine. I have not seen sufficient cause for not having recourse to them, even in these situations, although they are often employed when they are not obviously required, and where recovery would take place without them. A blister, however, is often very beneficial, and its repetition may be necessary. Mr. TATE, who has very justly insisted upon the connection of this affection with disorders of the uterine functions, prefers the inunction of the spine with the tartar emetic ointment. I have found the liniments or embrocations here prescribed much more certainly beneficial than any other local application, or external irritant; and either may be employed some time after a blister has been applied.

No. 337. ℞ Linimenti terebinthinæ ℥ij ; tinct. opii ʒj ; olei olivæ ℥ss ; olei cajuputi ʒj. M. Fiat linimentum, vel embrocatio ope spongio-pilei applicanda.

No. 338. ℞ Linimenti camphoræ comp. et linimenti terebinthinæ, āā, ℥jss ; vini opii ʒj ; olei cajuputi ʒjss. M. Fiat embrocatio, vel linimentum.

83. Even when local depletion is required, restoratives, tonics, or antispasmodics may not be the less necessary ; but, in all cases, the adoption and the selection of these ought to have especial reference to the ascertained and inferred causes, to the state of the urine, and to the particular character of the sympathetic affections, — neuralgic, hysterical, or spasmodic. If there appear reason to infer, that the affection has been occasioned by masturbation, even local bleeding will generally be injurious, chalybeates or other tonics and re-

storatives being requisite: but, when the complaint has arisen from this vice, or from excessive sexual intercourse, even the best means cannot be of service unless these causes are relinquished. In females, both the spinal affection, and the uterine or hysterical disorder, with which it is generally associated, equally (although either of them may primarily) arise from this vice, and are perpetuated by persistence in it: and hence the use of the speculum uteri, and of other phalloid instruments, is so gratifying to the patient. In all cases, the urine should be carefully tested, and the treatment regulated conformably with the states presented by it, as fully described in the article on the Urine, and on the disorders connected with this excretion.

84. *C.* When spinal irritation is associated with suppression of the catamenia, then the application of leeches below both groins, two or three days previously to the expected period, and the exhibition of equal quantities of the aloes and myrrh pill, and of the biborate of soda, or of the compound iron mixture and compound decoction of aloes, in doses sufficient to act freely on the bowels, will frequently be efficacious; more especially if the embrocations prescribed above, or No. 311. in the Appendix, be applied to the spine, and repeated according to its effects. In many of these cases, not only are the catamenia irregular, sometimes excessive, but more frequently defective, scanty, suppressed, or difficult and painful; a more or less profuse or continued leucorrhœa often replacing the healthy periodic discharge. In some, these complaints are further complicated with anæmia or chlorosis, and ultimately terminate in irremediable visceral disease. The treatment of these complications, even in their milder forms, is always difficult, and in their severe forms often hopeless, especially when the vice in which they originate is persisted in. The spinal and the sexual disorder frequently act and re-act on each other, until ultimately paraplegia and various associated evils are produced. The uterine affection suggests either vaginal injections or an examination per vaginam; the speculum follows, and various applications are made to the os uteri, of a stimulating, astringent, or irritating nature. As the os uteri possesses an organic sensibility, but little, if at all, inferior to that manifested by the clitoris in the sexual orgasm, neither the vaginal injections, nor the phalloid instrument, nor the applications made by its aid, are at all unpleasant to the self-polluted female. The local irritation thus produced, increases or at the least perpetuates, by nervous communication, the spinal affection; and after the constant attendance of "ladies' doctors" for many months, or even years, the patient having become paraplegic or generally paralysed, and having continued in this state for months, requiring the urine to be drawn off twice or thrice daily, besides other aids, ultimately dies from the extension of disease to the cerebral membranes, or from organic changes in the spinal cord, or in its membranes, or in the kidneys, or in some other organ.

85. As the patient sows, in such cases, so she reaps. But let not the treatment be a perpetuation of the cause of the malady, in a different form—let not the physician furnish, not merely a novel mode, but even a new instrument, of self-pollution; and thus minister to the accursed moral
taint of his patient. In many cases, doubtless
is done unknowingly, by his adopting a me
brought into vogue by others and pleasing t
patient, and by his ignorance of this cause of
complaints, — a cause which obtains in at
nine cases out of ten. In most of these the
tient will confess to the vice, which has occasi
the disease, if the matter be judiciously mana
and even if this vice should not be admitted,
exposition of the consequences of persisting in i
produce a good effect; for many patients sin
ignorance, and are not conscious of the evil
are committing. I have had many instanc
lustrating this position, brought before me. O
(but these are comparatively few) persist in
cause, and either require some restraint or g
until a drivelling amentia, or irremediable
tural disease, overtakes them. When there is r
even for suspecting the existence of this vice
physician does not discharge his duty to hi
tient, and to the family of the patient, if he do
investigate the case as circumstances will sugg
admit of; for, if this cause be continued, a cur
be impossible, but by relinquishing it, remedie
be successful, and even the efforts of nature v
themselves be often efficacious. There is on
cumstance, which may not be known to ma
those who are so much in the habit of recom
ing stimulating and astringent injections, an
tating or escharotic, substances, to the os ut
the aid of large glass or other syringes, or o
cula—namely, that similar, and even many
same, substances were thus employed by th
cients, and by the Chinese and Tartars fr
mote ages, to excite or to gratify the sexual d
and that the modern treatment, by these me
uterine disorders, whether allied or not to
irritation, can neither permanently cure thes
plaints, nor remove "a rooted evil" fro
mind.

86. *D.* When the spinal affection is assc
with neuralgia, then the preparations of iron,
sulphate of iron and sulphate of quina, with
phor, hyoscyamus, and as much of the alo
myrrh pill as will keep the bowels freely
will be of service, the embrocations pres
above being applied to the pained portion
spine; or the treatment advised for Neu
Affections may be adopted. If the spin
order have been induced by masturbation,
be connected with suppressed or scanty c
nia, the combination of substances just n
commended will be of service. If, on the
hand, it be associated with leucorrhœa, or
superabundance of phosphates in the ur
with involuntary pollutions, the tincture
sesquichloride of iron, with a small addi
hydrochloric acid, may be prescribed, w
infusion and tincture of either columba o
sia. In most cases of spinal irritation, the
ment should depend, in great measure, up
character of the associated or sympathetic
tions — whether neuralgic, spasmodic, c
terical; due attention being also paid
digestive, assimilating, excreting and uterin
tions. But unless the causes be recogni
avoided — unless correct hygeienic measu
also adopted, based upon the predisposi
exciting causes above insisted upon (§§ 1
the treatment will very frequently be ineffi

87. In some prolonged cases of spinal ir

ongestion, associated with uterine disorder, plete paralysis of the bladder, irritability of the ach, constipated bowels, and paraplegia, espe- y as respects the function of motion, sometimes r. This severe form of the disease generally lts from self-pollution, and often resists almost y kind of treatment, if this vice be not discon- ed. I have seen several cases of this kind, he means which I have found most efficacious the assiduous application of one or other of the rocations or liniments already recommended, the spine; and the use of the iron or myrrh ure, conjoined with the decoction of aloes, or ills prescribed above (§§ 53, 84.). Various means have been also employed, according features of particular cases—as the iodide of n syrup of sarza, or the iodide of potash in infusions, and occasionally the resinous ex- of nux vomica, conjoined with the aloes and h pill. In a severe case of this kind, attended mitings, retention of urine, suppression of the enia, &c. which I saw with Mr. Flockton, a pea-issue was made in the inside of both , close to the groins, and a free discharge red. The paraplegic and other symptoms disappeared, and the patient was quite re- ed in the course of a very few months.

When spinal irritation or congestion has e chronic, it is sometimes accompanied with s of faintness, or leipothymia, and, in rare with cataleptic seizures — with the latter, when the affection has been produced by tupration. In these, the treatment already d, or that prescribed in the articles on these ons, will be appropriate. These disorders iefly aggravated forms of hysteria, and are reated conformably with the principles in- on, under the heads of Debility, Faint- Hysteria, Neuralgic Affections, and : and for these, as well as for spinal irrita- d spinal curvature, a digestible and moderate regular, but not too long intervals be- the meals, gentle exercise in the open air, of air, of scene, and of locality, a residence y and temperate situation, the use of cha- mineral springs, or of such mineral waters tate of the catamenia or of the urine in in- l cases will suggest, are important remedies, d, the most requisite elements of the treat- this group of disorders.

89. When rachialgia is connected with *rheu-* or with *gout*, or with *scrofula* or *syphilis*, l means already advised may be employed, ng to the features of the case; but the treat- hould be in great measure based on the tional complaint of which the rachialgia y a manifestation. In some cases, par- y the rheumatic, gouty, or scrofulous, may be applied, and even repeated, to or affected portion of spine, and be followed, ers, or by the terebinthinate embrocations onstitutional or internal treatment suited eculiarities of the case, especially by the in the preparations of sarza, the iodide of m with the solution or carbonate of potash, c infusions or decoctions; or the bi-chlo- mercury, taken with a full meal, or in a usion; or Donovan's solution of the iodide ury and arsenic, and the preparations of subsequently, or the sulphuretted mineral In these forms of the complaint, as well as in the nervous or hysterical, avoidance of the causes, a due promotion and regulation of the digestive and depurative functions, and strict attention to diet, regimen, exercise, air, locality, and the purity of the water in use, are essential parts of the treatment.

90. V. Concussion of the Spinal Cord.— The nature and extent of injury sustained by the spinal marrow in circumstances of violence which occasion concussion of this part of the nervous system, can rarely be ascertained soon after its occurrence, and sometimes not even after death.— *A.* The *causes* of concussion are generally falls from a height on the back or trunk, or upon the hips, upon the ground, or even upon any partially yielding surface that may not occasion fracture or dislocation. A violent blow on the back, jumping from a height, a railway concussion or shock, or any sudden or violent succession of the trunk also may occasion it, in a slight or in a severe form, according to the circumstances of the case.

91. *B.* The *symptoms* vary with the violence and nature of the cause, but consist chiefly of an impairment, in slight cases, and of a more or less complete extinction in severe cases, for a longer or shorter period, of the functions performed by the spinal cord. There are loss of voluntary motion and of sensation, either or both of which may be partial or complete, especially of motion; the excreting functions being generally more or less affected, and the functions of respiration and circulation much disturbed. In most cases, particularly when the concussion has been violent, diminution of temperature, failure of the pulse, pallor, and the other phenomena characteristic of *physical shock* (see art. Shock), are also present.

92. *C.* The *appearances after death* are frequently so slight, or even when most manifest, are altogether such as are insufficient to account for the effects in rapidly fatal cases; and, in those of longer duration, they are generally consecutive upon the change more immediately produced by the concussion. It may be presumed that, in those cases of severe concussion, which are soon followed by dissolution, and yet present no appearance of lesion, the intimate organisation of the cord has sustained an injury incompatible with the discharge of its functions and the continuance of life, although the injury may escape the detection of our senses. In cases of longer duration, softening of the cord, with or without inflammatory appearance, either in the cord or in the pia mater, is often observed; but frequently the softening follows rapidly upon the concussion before inflammatory action supervenes, or even before it has had time to appear.

93. *D.* The *treatment* of concussion of the spinal cord differs not in any respect from what I have recommended when treating of Shock (§§ 19. *et seq.*).

94. VI. Spinal Column. — Inflammation and Caries of the Vertebræ. — Synon:— *Inflammation of the vertebræ, and of the intervertebral substances:—Mal vertebral, Fr. — Pott's disease of the spine:—Spinitis; — Inflammation and caries of the spine.*

Classif.—III. Class.—I. Order (*Author.*)

95. Definit:—*A dull and generally a continued pain in some part of the spine, with slight fever, manifested chiefly towards evening, and often attended by a sense of constriction around the trunk in a*

situation corresponding with the affected portion of the spine, terminating generally in caries, or in symptomatic abscess, or in both.

96. i. Description.—The structures constituting the spinal column are liable to inflammatory action, from sprains, injuries, external violence, from cold, and from constitutional vice or a morbid diathesis. The inflammation thus produced may advance silently and slowly for a considerable time, and suddenly assume a more active or acute form: the affection may even be sub-inflammatory at first, and escape detection, or it may be more acutely inflammatory, and more manifestly declare itself, but it is commonly chronic or slow in its progress. When the disease appears in the scrofulous diathesis, as it does in the majority of instances, it then consists of tuberculous deposits in the cancellated structure of the vertebræ, and can hardly be viewed as inflammatory at the beginning, although it becomes so, in some measure, owing to the irritation caused by the morbid deposit. When it thus proceeds from tubercular deposits, the cancellated bodies of the vertebræ are generally their seat. But it may appear, especially in weak or cachectic constitutions, independently of tubercles, although this occurrence is comparatively rare, and commence either in the intervertebral substance, or in the bodies of the vertebræ, or even in the ligaments covering the spinal column; and ultimately involve the other structures. A recent writer justly remarks, that "the vertebræ in their natural structure are extremely cancellated, and of a vascular texture; and any increase in the circulation of this part may induce inflammation. The ligaments covering the spinal column are also extremely vascular, and the vessels supplying both freely communicate; so that when any increased vascular action is set up in the structure of either, it may continue for some length of time, and very considerably in its activity, relatively to its cause. We observe an example of this in cases where the ligaments are strained by some sudden or powerful exertion. This brings on inflammatory action, in which the cancellated structure of the bones participates, owing to the free communication of the vessels of these two parts." E. W. Tuson, *on Curvatures of the Spine*, &c. p. 218. 8vo. London, 1841.

97. *A.* Inflammation having commenced, it may continue a long time without giving rise to any severe symptom, until at last the motions of the spine, by perpetuating and aggravating the inflammation of the fibrous membrane covering the bones, cause thickening or swelling of it, which, with the products of the inflammation thrown out within the spinal canal, occasions pressure or irritation of the cord, or of the roots of the nerves, and the various spasmodic and paralytic symptoms, which sooner or later supervene. Whether the disease commences in this more unequivocally inflammatory form, or in that of tubercular infiltration of the cancellated structure, on which the inflammation is contingent, the progress it makes is slow, and its nature frequently not clearly declared. There is generally pain in the portion of the spine affected; but this is the case in rachialgia; so that it is difficult, and often impossible, at an early stage to distinguish between this complaint and that, until the inflammation has induced dangerous changes (*see the Diagnosis*).

98. When the disease of the cancellated s
ture is produced by tubercular infiltration, a
most frequently, the spinal cord and its
branes are then very rarely implicated until
has occurred, this lesion often then irritating
affecting the ligaments and membranes, and
ducing the same symptoms, especially sp
cramps, paralysis, &c., as generally, at a
earlier period, accompany chronic inflamm
of the ligaments covering the bodies of the
bræ, or of the intervertebral substances.
whichever tissue the inflammation may comm
or whether it originates in this state of morb
tion, or in tubercular deposits in the cance
structure, softening of the bodies of the ver
generally results, and the softened stru
yield to the weight of the superincumbent
of the body, and ultimately caries take
Pott, who was the first to describe accu
this affection, viewed it as generally s
lous. Paletta, however, contended tha
is not the case, and that it often arises inde
ently of the scrofulous taint. In this view
has been supported by Boyer, Dugès, and
Nevertheless, Paletta is in the main c
for it sometimes proceeds from the foll
causes, independently of scrofula, although
causes will very readily induce it in the
lous diathesis also.

99. *B.* The *Predisposing* occasions of the
are not infrequently severe attacks of
thematous fevers, unwholesome or insu
food, and a humid or impure air in chil
masturbation about the period of pube
syphilitic taint, or general cachexia, and t
cessive use of calomel, or of other mercu
childhood or infancy. The most common
causes of the inflammatory states of the a
are exposures to cold, external injuries,—
blows, sprains, severe jerks, or sudden tw
forcible rotations of the spine, and over e
of the muscles, especially in endeavouring
very heavy bodies. A blow over the lower
or upper lumbar vertebræ, particularly
child or young person is struck in this situa
very remarkably injurious; for the weight
upper part of the body carries this part bac
with a sudden jerk or impetus, whilst the parts
are as forcibly driven forwards. The resu
if the blow be severe, either a luxation
luxation of two or more of the vertebræ, or
ture of, or severe injury to, the ligaments
tervertebral substance. The more manifest
of injuries of this nature may not become m
until some months have elapsed from their
In such cases, inflammatory action of a
chronic kind is occasioned; and this is fo
either by thickening, swelling, effusion, or
lent infiltration between the membranou
ments and the bone, and, as a consequence
latter changes, by caries of the bodies of
more vertebræ, or by infiltration of p
matter between the ligaments and muscles,
causing symptomatic abscesses. Disease
bodies of the vertebræ, proceeding on to
consists—1st, of inflammation of the canc
structure—of an *osteitis vertebralis* of some
the *ostéite raréfiante* of M. Gerdy; and
tubercular deposits in this structure.

100. *C.* Inflammation commences with in
vascularity of the surface of the affected v

wed by erosion or incipient ulceration. At a advanced period, the body of the vertebra is len, injected, and of a deeper red colour. At ame time its structure is less dense, softer, and friable; and is hence more disposed to yield, be compressed, or injured by the weight of uperincumbent parts, or by suddenly bending tating the trunk, or when lifting heavy bodies. form of the disease may also commence in gaments covering the bodies of the vertebræ; t may be connected with acute or sub-acute natism, especially when commencing in the ents, although this is a rare occurrence: however occurring or associated, it may exo the periosteum, the inflammatory products ating the adjoining parts, detaching the perin from the bone, and thereby causing caries latter; or it may even originate in the intebral fibro-cartilaginous substance, and exto the other structures, more especially to dies of the vertebræ.

The disease may commence in the centre or sides of the bodies of the vertebræ. In this the bone is found to have become redder, and more vascular, and less capable of ing a super-incumbent weight or pressure; e progress of the disease is generally more than when it begins in the intervertebral ge, or in the ligaments. If the disease coms in the membrane covering the upper and portions of the bodies of the vertebræ, the ments between these become weakened and tely destroyed, and the malady proceeds onsiderable rapidity. When it originates in ntre or in one side, or anterior part of the rtebral substance, ulceration frequently , or suppuration supervenes from the ex of the inflammation, the matter infiltrating joining tissues, and either causing or ex the caries of the bone. When the dismmences in the centre of the intervertebral re, a softened, greyish, and brownish state structure is observed; and this is followed eration, disease of the bodies of the verteries, suppuration, &c. In these cases, the of the structure may advance anteriorly, either side, and, according to its direction, n not only a more or less angular form of re, but a lateral curvature also; a cirnce requiring attention in forming our diagnd prognosis. Thus disease of the bodies vertebræ may be either primary, or the uence of inflammation, suppuration, and on of the intervertebral substance, and of mentous apparatus of the column.

D. Tubercular disease of the bodies of the æ occurs either as an infiltration of the ated structure with tubercular matter, or as omeration of the matter into masses, which rounded by a cyst or envelope; this latter ore frequent and most manifest. In these he tubercular masses undergo similar to those observed in the lungs; and as ss from a crude to a softened state, excaand ulceration of the containing or surg parts takes place, until the vertebra is reduced to a shell, or is formed into several nd becomes crushed under the superint weight; the spinous processes of the disertebræ, which at first were merely tender ominent, rapidly becoming angular, and passing from an obtuse to a more acute form. As soon as the curvature presents a sharp or angular projection, destruction or loss of substance of a part of one or more of the bodies of the vertebræ may be inferred. The resulting deformity will depend upon the portion of the spine affected, and the extent of destruction which has taken place.

103. ii. The Symptoms and Diagnosis of this state of spinal disease are extremely delusive at an early stage, and before curvature becomes manifest; and it is still more difficult to determine, even at any stage of the complaint, in many cases, whether the malady results from inflammatory action, or from tubercular deposition, or from both, either having been the primary change. A knowledge of the constitution or diathesis of the patient, of the causes which have produced the disease, and of the whole history of the case, will often throw considerable, or even sufficient, light on its nature; but these data may be wanting, and the only information which can be obtained may be afforded only by the existing state of the patient, or even by the angular distortion demonstrating more or less destruction of the bodies of the vertebræ. Whilst the scrofulous diathesis, and the stealthy progress of the affection, indicate tubercular deposits as the cause in the one case, the previous occurrence of injury, and the absence of the scrofulous taint, will suggest inflammatory action in the other; and, when viewed in connection with more or less pain, and with the other symptoms, will often evince the nature of the mischief, even before it has advanced to angular projection. Pain is not, however, a constant symptom even in the more inflammatory state of the disease, especially at an early stage, and often it never amounts to more than an aching; whilst in the scrofulous form, pain may not be much complained of, unless on some occasions. As the disease advances, pain is either more constant, or more severe, especially in certain postures, or when rotating or bending the spine; and it is attended by a sense of constriction and pain in the base of the thorax and epigastrium, or in the abdomen, according to the part of the spine affected. Even before any marked curvature is detected, this constrictive pain is often felt, and the patient sometimes complains of a grating sensation when turning or rotating the spine, more especially when the disease originates in inflammation of the vertebræ, or of the spinal ligaments. In addition to these symptoms, nausea, vomiting, attacks of pain at the epigastrium, dyspnœa, restlessness, costiveness, and evening exacerbations of fever supervene, with increased sensibility of the surface, and cramps, or sometimes numbness of the lower extremities. These may continue an indefinite, but generally a considerable period; the angular character of the curvature becoming more and more manifest. The patient now is generally unable to sustain the weight of the parts above the diseased portion of the spinal column; and he endeavours, when erect, to support himself by leaning upon his elbows or arms, or by placing his hands upon his hips or thighs. He becomes also less capable of walking, his gait being unsteady, shuffling, or peculiar and slow.

104. Whether originating in inflammation, or in tubercular deposits in the bodies of the vertebræ, the angular projection of the spinous processes is not very great until caries of the bone, and ulcer-

ative destruction of the intervertebral substance, have advanced. The loss of structure in a portion of the column, owing to the weight of the superincumbent parts, is attended by more or less distortion, not only of the posterior aspect of the spine, but also of the anterior regions of the trunk. According as the cervical, the dorsal, or the lumbar vertebræ are diseased, the distortion varies remarkably, and as a necessary consequence of the difference in the conformation and attachments of the vertebræ of these regions.

105. *a.* When the *cervical vertebræ* become carious — an occurrence, according to my experience, observed chiefly as a sequela of scarlet fever—the curvature or projection of the spine is not marked; but the neck becomes shortened, drawn somewhat to one side, and is moved with great pain. Partial or incomplete paralysis, chiefly of motion, is often experienced, and frequently increases or passes into general palsy, terminating in asphyxia. Yet I have seen cases in which anchylosis took place, the recovery being complete and permanent, the neck being only shortened, and rendered stiff, the head being generally turned somewhat to one side.

106. *b.* When the *lower cervical* and *upper dorsal vertebræ* sink from loss of structure, the chest is flattened, the sternum is drawn inwards and downwards, and the patient generally experiences difficulty of breathing, owing to the impaired action of the scaleni and other respiratory muscles. The depression of the chest anteriorly is often very great in these cases. When the middle or lower dorsal vertebræ are diseased, the chest is either flattened anteriorly, or in a lateral direction, one side falling inwards more than another; or either side may be compressed whilst the other projects; or both sides may be flattened, and the sternum pushed forwards. The thorax always approaches very close to the pelvis, and the abdomen is much shortened. The distortion varies much with the seat and extent of caries; and, according as either side of the vertebræ is more affected than the other; the posture most commonly assumed by the patient, and found most easy, also influencing the form of distortion.

107. *c.* When the *lumbar vertebræ* are diseased, the lower or floating ribs are sunk inwards and downwards, and sometimes even below the crests of the ilium. The abdominal regions fall inwards, and are much diminished in their vertical direction. Owing to a greater or less amount of caries in one side of the vertebræ than in the other, or to continuing a certain posture in preference to any other, or to spasm, or permanent contraction of certain muscles, more or less of lateral curvature may be associated with angular projection of the spine, the caries being the cause of both the forms of curvature. When these cases terminate favourably, or when anchylosis takes place, this associated form of curvature may exist to a greater or less extent, and even be attended by some degree of twist, or contraction of the trunk to either side.

108. iii. The Consequences, Complications, and Terminations of angular projection or curvature of the spine are—1st, changes in the tissues external to the spinal column, or in its vicinity; 2nd, changes in the structures lodged in the spinal canal, and in the nerves issuing from the canal; and, 3rd, alterations of a restorative nature in the seat of the disease.

109. (*a.*) When inflammation, ulceration, or
ries exists in one or more of the vertebræ, the u
products of these changes frequently contami
the adjoining cellular tissue, induce inflammat
action, and give rise to purulent formations, wh
pass in various directions, according to the pe
liarities of the case, ultimately pointing externa
or even internally, at a distance from the orig
seat of disease, as fully shown when treatin
symptomatic abscess. (See art. Abscess, §§
et seq.)

110. (*b.*) Although inflammation or carie
one or more of the vertebræ often exists wit
implicating the spinal cord, or its membra
or even the nerves proceeding from the ca
nevertheless the membranes are often affect
chronic form of inflammation being develo
which may be followed by effusion of lymph,
by consecutive changes in the cord, or in
roots of the spinal nerves. When the membr
or cord are thus implicated, the symptoms a
to be described, as indicative of inflammatio
these parts (§§ 120. *et seq.*), are observed, an
usually followed by incomplete or complete
plegia, and often by the extension of the m
action along the spinal membranes to the ba
the brain, occasioning general paralysis, deli
coma, and death. But, independently of an
fection of the cord, or of its membranes
nerves may be subjected to pressure, owi
the attendant swelling of the parts surrou
their exits from the spine, or to the destructi
parts in the progress of caries. If the pre
be slight, or if it occasion merely irritation
nerves, severe or neuralgic pains in the cou
terminations of the affected nerves, or cra
the muscles supplied with them, will be e
enced; but if the pressure be greater, paraly
motion, or of sensation, or of both, will be
sent. Thus, owing to consecutive affectio
the consequent congestion, irritation, or in
matory action, tumefaction, effusion, and pre
implicating the membranes of the spinal
the origins of the spinal nerves, and even the
itself, pain, spasm, paralysis, &c. superven
complicate the disease of the vertebræ;
with or without either of these states of asso
disorder, suppuration not infrequently takes
in the adjoining cellular parts, and purulen
lections form, and often extend to considerab
tances from the seat of caries (§ 109.). In
cases, pain of a severe form is experienced
seat of lesion, and even still more severely
lower extremities, whilst the urinary fun
are often more or less disordered.

111. (*c.*) When the destruction of one or
of the vertebræ has proceeded to an indefini
tent, a reparative process—*anchylosis*—often
mences, owing to a salutary change in the co
tion of the patient, produced either by an im
ment in the diet, or in the air, or by a jud
treatment; and a matter is exuded, which be
the seat of an osseous formation, cementing t
joining vertebræ, and often partially filling
spaces left by the destruction of the bodies
or more of the diseased vertebræ. In these
the intervertebral and cartilaginous porti
the spine which have been destroyed are
stored, the osseous formations extending, w
loss of continuity, but with varying gra
thickness, from the adjoining healthy verteb

2. iv. THE DURATION AND PROGNOSIS of ca s of the vertebræ may be inferred from what ha been already advanced. The *duration* of the m dy is rarely less than two or three months, an t may be as many years. The *prognosis* depe s much upon the habit of body, and previous he h of the patient. Also upon the presence of su uration, or of paralysis, or of both. Matter oft forms and collects near the column, especie its anterior surface; and, in the more fa rable of these cases, opens externally, the tra of the matter being sometimes very long, an he external opening distant from the diseased ve bræ. The carious destruction may, even in so of these cases, be repaired by anchylosis, and by e column falling together at the angle corres nding to the quantity of substance lost; but mu more frequently the disease exhausts the pat t, the symptoms usually showing that the spi cord and its membranes suffer more or les Thus the cord itself may be compressed by mefaction of the ligamentous apparatus, by the ruption of an abscess into the canal, by dislocat of fragments, or of the whole, of a vertebra, or the products of circumscribed inflammation of t dura mater of the cord; or it may be bent, pre d upon, or irritated, at the spot where the ang ar projection is commencing; or it may was , or circumscribed inflammation may take pla in it, or diffused inflammation in its membra s. When the upper dorsal vertebræ are car s, the abscess sometimes opens into the tho ic cavity, or into one of the bronchi, and mat and necrosed or carious fragments of ver bræ are discharged through the air-passages. Car of the abdominal part of the column is very ofte complicated with what is commonly called *soa bscess*.

1. The prognosis may be further directed by he llowing symptoms:—If a scrofulous or ypl tic taint exist; if the constitutional or vital pows be much depressed; if symptoms of inam ation of the membrane appear; if palsy, or ve ramps, supervene; and, more especially, if he lsy extends; if febrile symptoms with deliium re present; and if the urinary functions are muc disordered, an unfavourable opinion of the suc hould be entertained. On the other hand, tl general health be not greatly impaired; if he eral excreting functions are not materially ffec d; if sensation and motion are not disrde l; if pain or constriction is not present, nd the digestive and assimilative functions are ot ch disturbed, more or less complete restoatic to a healthy state, by means of anchylosis, nay e expected.

1. v. TREATMENT. — The means of cure hou depend chiefly upon the causes and circum nces originating the disease. If inflammaory ymptoms be present at an early stage,—if hes ave followed a blow, sudden jerk, or injury f a kind; and if constriction, severe pain, inrea l by motion, be complained of, the application f leeches, or of cupping glasses, near the eat pain, will generally be serviceable. These nay e followed by a terebinthinate embrocation, r b blister, the latter being applied considerbly elow the seat of the disease; or the blister nay llow several applications of the embrocaion r it may be kept discharging for some time. The means, however, ought to be employed, or persisted in with due caution, and a careful observation of their effects.

115. If the disease appear independently of any injury, violent exertion, or inflammatory cause; if it come on in a gradual or stealthy manner; if it occur in a scrofulous, cachectic, or syphilitic diathesis, or taint; if the patient feels a grating sensation when rotating the trunk; and if indications of purulent formations in the vicinity, or of a symptomatic abscess, are present, neither leeches, nor cupping, nor blisters, will be of any service; they will much more frequently be prejudicial. In these forms and states of the disease, such means as will remove the weight of the upper parts of the frame from the diseased vertebræ, and promote vital resistance to the extension of the disease, and improve the digestive, assimilative, and excreting functions, have been found most beneficial in my practice—even in some cases of great and almost hopeless severity. A combination of these, with such as more frequently produce an alterative influence upon the capillary circulation, more especially with the preparations of iodine, or with the bichloride of mercury, or with the solution of potash, or Brandish's alkaline solution, ought always to be preferred. I have often found that a change from a course of some continuance of the one, to that of another form of combination, has been of manifest benefit—that the exhibition of the bichloride, in the simple or compound tincture of cinchona and fluid extract, or concentrated compound decoction of sarza, for a longer or shorter period, according to circumstances, followed by the compound tincture of iodine, or the iodide of potassium, with BRANDISH's solution, or the carbonate of potash, and the other preparations just mentioned, has been of very essential benefit.

116. When the inflammatory form of the disease has gone on to the production of caries, or to suppuration, and in the scrofulous, syphilitic, or rheumatic states, the above means are most deserving adoption, and may often be aided by the application of the liniment already prescribed (§§ 54.) along the spine, or of some one of the other terebinthinate liniments prescribed in various parts of this work, as well as in the *Appendix*. When the disease is attended by anæmia and much debility, then the preparations of iron, especially the iodide of iron, should be given in syrup or sarza, or in other suitable forms. In the several scrofulous states of the disease, the means advised for the treatment of SCROFULA (§§ 172. *et seq.*) will be of more or less service. The propriety of having recourse to issues, or setons, or moxas, or other forms of derivation, has been a subject of discussion. POTT recommended issues on each side of the projecting spinous processes, and the practice has been very generally adopted since his time, with apparent benefit in some cases, and with no advantage in others. Sir B. BRODIE, an authority of the greatest weight, states that he has seen no benefit result from the use either of these or of blisters. There can be no doubt that they are not so generally, or even so often, beneficial, as they were formerly believed to be, and that an indiscriminating recourse to them is as frequently injurious as beneficial; but, if due regard be paid to the form, state, or progress of the disease, they will often be of service; if, however, caries be extensive; if it be attended

by anæmia, great emaciation and debility; if the digestive, assimilating, and excreting functions be much impaired; and if the medicinal and regimenal treatment be not prescribed appropriately to the state and peculiarities of each case, these and similar means will not only entirely fail, but will even accelerate a fatal issue, by lowering still further the already depressed condition of vital power, and by increasing the extent of caries, or the amount of suppuration, or of vascular contamination. I have usually had recourse to these means only after inflammatory symptoms have been combatted as far as circumstances permitted, and when the contra-indications to their use were not present; and during their employment I have advised the tonic and alterative treatment already mentioned (§§ 115, 116.), with due attention to diet, change of air, &c.

117. Whilst duly regulated modes of *exercise* are beneficial in other kinds of curvature, perfect *rest* is requisite in this; but rest should be aided by a wholesome air, and a well-ventilated apartment. The use of those couches which facilitate the *prone* posture should be adopted; and, whilst all measures which forcibly extend the spine and risk injury to the structures contained by or adjoining the diseased vertebræ, ought to be avoided, the position chiefly maintained should as much as possible be such as will prevent the increase of curvature. This is as much as may be expected from couches merely; but, either with or without these, the avoidance of all motions of the vertebræ—either of flexure or rotation—ought to be studied. Forcible extension of the flexed portion, or forcible depression of the projection, may injure the early reparative changes of the diseased parts, by which anchylosis, and a restoration to a comparatively healthy state are affected.*

118. The consecutive disorders (§§108-111.), especially symptomatic abscess and paralysis, which often complicate angular curvature or caries of the spine, caused either by inflammation or scrofulous disease of the vertebræ, should be treated conformably with the views above exhibited, but appropriately to the stages and states of each case, and to the particular disorders which have been thus superinduced. As to the additional means which these latter require, I must refer the reader to what has been fully stated respecting them when treating of *symptomatic abscess*. (See ABSCESS, §§ 62. *et seq.*), of *Paralysis* (§§ 204. *et seq.*), and of *Spasm* (§ 313.), where such measures as are most suitable to each of these associations are described.

119. VII. INFLAMMATION OF THE MEMBRANES, AND OF THE SPINAL CORD. — SYNON. — *Rachialgitis*, J. Frank :—*Rachialgia Inflammatoria*—*inflammation commencing in, or extending to, either the spinal cord or its membranes, or both.*

CLASSIF.—III. CLASS.—I. ORDER (*Author*).

120. DEFINIT. — i. *Pain in the spine, often acute, with or without rigors, commencing with increased sensibility of the surface of the body, and symptomatic fever, followed by spasms, cramps, constriction, &c., especially on motion, passing into palsy, usually in the form of partial or complete paraplegia, or general paralysis, with interrupted or disordered excretion.*

121. ii. PATHOL. DEFINIT.—*Inflammatio curring primarily in, or extended to, either the mater, or arachnoid, or pia mater of the cor the spinal cord itself, and generally implic two or more of these, followed by thickening, sions, adhesions, disorganization, &c.*

122. The diseases of the spinal cord, wh inflammatory or structural, present num analogies to those of the brain, not merely in natures, which are frequently identical, but a the phenomena to which they give origin. friend Dr. WOOD, of Philadelphia, justly rer in his very excellent work, that there is in brain and spinal marrow the same liability flammation of the membranes and the ne matter, to derangement from non-inflamm organic affections, including hæmorrhagic serous effusion; and these different affectio the one not infrequently merely extensions o same affections in the other. Like the brain the spinal marrow contains nervous centre conducting filaments, and it may suffer dise these constituents separately or conjointly.

123. The spinal cord discharges certai fices, a knowledge of which is necessar the diagnosis of its diseases.—1st. It rec impressions from other parts of the body, transmits influence to these parts, either pendently of the brain, or with the due ex of the functions of the brain; — 2nd. It veys influence to and from the brain;— It is the medium by which impressions fluences are often conveyed from the ga centres to external and voluntary parts, and the latter to the former.—(*a.*) According *first* office, it aids the ganglia in the discha their functions, and reinforces their ene whilst, on the other hand, the ganglial infl is extended to it, by means of communicat anastomosing branches. Hence lesions o cord or of its membranes very manifestly respiration, assimilation, secretion, excretion reproduction.—(*b.*) Conformably with its office, voluntary motion or sensation, or bot interrupted, or disordered, or perverted, either the spinal marrow or its membrane diseased.—(*c.*) And, according to its *third* irritation or other affections of internal vi digestive, excreting, and reproductive, are quently transmitted to external, distant, an luntary parts, and from these latter to the fo as illustrated by the origins and courses of diseases.

124. It is manifest that the amount, as w the character and seat of disorder, will va markably with the particular structure infl or otherwise diseased, and with the situat the diseased part in the spinal canal, or wi extent of it along the cord. In estim therefore, the seat and nature of the malad dicated by the symptoms, certain pathol conditions should be kept in recollection:- Disease or injury of the vertebræ, or of the vertebral substance, or of the ligamentous ratus, may, by irritation or pressure, more interrupt, disorder, or pervert the function charged by the spinal cord. 2nd. The produ congestion, or of inflammation of the memb may, by irritation or pressure, exert a similar ence, in respect of the offices of the cord, ind dently of any actual or manifest disease or c

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* I have great pleasure in referring the reader to what Mr. BISHOP has stated on this subject, in his very able and philosophical work on Deformities of the Human Body, which appeared as this sheet was passing the press.

int. 3rd. That inflammation, aided by its usual plucts may, on the one hand, extend not only towo, or to all the membranes, but also to the sstance of the cord itself. 4th. That inflamnory or other lesions of the cord itself, may, o the other hand, extend to one or all its membnes. 5th. That this extension of the disease to th several structures is more frequent than the litation of it to one only; and the extension of mbid action, more or less along the spinal membnes and cord — or even to the base of the brn—is much more common, especially in very yng subjects, than the limitation of it to a part or. 6th. That the extension and diffusion of inmmation is more rapid and general in the mbranes than in the substance of the cord; an more so in delicate, scrofulous, and cachectic hts, than in the robust and healthy. 7th. That, as r as my own experience enables me to judge, th extension of meningitis spinalis upwards to th brain is much more frequent than the exteon of it downwards along the spine; and th atter mode of extension, as well as the complition of spinal meningitis with cerebral meningi, is most frequent in very young and delicate chlren, and in cachectic and broken down consttions.

25. Although inflammation of the membranes is ten associated with inflammation of the substae of the spinal cord, the disease commencin r predominating in either, still the one or the otr may be separately, solely, or chiefly infled; and hence it is in some measure requisite to nsider the phenomena which more especially beng to each, and which indicate a more promint affection of one structure than of the otr, when they are all more or less implicated. I ll therefore first notice inflammations of the mbranes, and next inflammation of the subste of the cord.

26. i. INFLAMMATION OF THE MEMBRANES OF HE SPINAL CORD. — SYNON. — *Meningitis splis — Arachnitis spinalis — Meningite spinale,* Fr-*Spinal Meningitis.*

27. DEFINIT.—*Acute pain in the course of the sp, with or without rigors, attended by increased senbility of the surface of the body, by symptomc fever, by tonic spasms, especially on motio followed by palsy, and often by delirium and co.*

28. Although either of the membranes of the spl cord may be primarily, or even separately an solely inflamed, yet the symptoms which me especially belong to the affection of each— wh indicate either their separate or conjoint disse—cannot be distinguished in such a manner as justify an attempt to form a diagnosis betwn them. That these membranes may be serately inflamed, although their conjoint affectic is much more common, is often rendered mifest by the appearances observed after death, th pia mater displaying most frequently and m evidently the changes characteristic of inflamatory action.

29. *a.* The *dura mater* of the spinal cord is ve seldom inflamed, unless as a consequence of inries of the spine and disease of the vertebræ. In are instances, however, I have found it infled in connection with acute rheumatism, the usl changes consequent upon inflammation of th membrane, and of fibrous tissues in general, namely, exudation on the inner free surface, thickening, and adhesion to the arachnoid, having been found after death.

130. After injuries and caries of the vertebræ, local or circumscribed inflammation of the dura mater has occurred. In these circumstances, effusion of fluid has been seen exteriorly to the membrane, or between it and the bodies of the vertebræ, with or without exudations from the arachnoid lining the dura mater, &c. These changes have been described by BERGAMASCHI, LALLEMAND, OLLIVIER, myself, and many others.

131. *b.* The *spinal arachnoid*, especially in its visceral layer, forms a sac, which does not adhere closely to the pia mater, as it does within the cranium. This visceral layer, and the sac within it, are the seats of the most serious lesions of the inner membranes of the cord — of both the *arachnoid*, and of the *pia mater* of the cord. Inflammation of the arachnoid—*arachnitis spinalis*—is rarely observed without inflammation of the *pia mater* of the cord, and the vascularity is much more manifest in the latter membrane than in the former. There is, however, one change often seen in the arachnoid alone that may be viewed as a consequence of repeated or protracted congestions, or of slight attacks of inflammation. This consists of dulness, opacity, and thickening of the arachnoid, and is usually combined with chronic effusion of serum into its sac, especially the inner sac. Adhesions between the arachnoid and dura mater are rarely seen, unless as a consequence of injuries.

132. *c.* Inflammation of the *pia mater* of the cord (*meningitis spinalis*) may occur spontaneously or primarily, but it is most commonly connected with inflammation of the other membranes — frequently a consequence of inflammation of one or both; and is generally occasioned by external injuries. Spontaneous inflammation of the pia mater of the cord is often associated with cerebral meningitis, and is then especially extended along the spinal cord. This complication is most frequent in infancy and early childhood. Inflammation of the pia mater is also commonly associated with inflammation of the substance of the cord with *myelitis*. I shall first notice acute spinal meningitis, subsequently the chronic states of the disease, and lastly, the complications which spinal meningitis often presents in practice.

133. *A.* ACUTE SPINAL MENINGITIS.—*a.* Acute inflammation of the membranes of the cord, when occurring as a *primary and uncomplicated malady*, generally commences with pain or soreness in the spine, with chills or rigors, and increased sensibility of the surface of the body. In other cases, the attack is more sudden and violent, with a sense of heaviness, pain, or uneasiness in the extremities. The pain is severe, and, although beginning in a particular part or region, generally extends more or less along the spine. The cervical region is most frequently attacked, especially in children, but the situation first affected depends much upon the cause in relation to the portion of the spine on which it acts. The pain is not confined to the spine, for all parts of the frame supplied with nerves proceeding from the portion affected, or its vicinity, are more or less subject to neuralgic pains, or uneasiness, tingling, and formication, accompanied with spasms, and with constrictions around the corresponding parts of the

trunk. These symptoms are always increased on motion, and in infants on their being moved, and when lying on the back on a warm bed.

134. When the cervical portion of the membranes is most affected, trismus, spasmodic retraction of the head, and tonic spasm of the spinal muscles, contraction or spasm of one or both arms, and twitchings or convulsive movements of the lower limbs, are commonly present. When the dorsal or lumbar portions are chiefly affected, painful constriction of the thorax or abdomen, increased pain on motion, with the other symptoms already mentioned, are present. In extreme cases the spasmodic contractions of the dorsal muscles recur, or are exacerbated, at intervals, and give rise to attacks of opisthotonos. Although the lower extremities are affected by pain, cramps, or clonic spasms, and are more or less enfeebled, the power of voluntary motion is not lost at an early stage; but it becomes much impaired, and ultimately abolished at an advanced period, and when the disease is not arrested in its usual course.

135. Febrile symptoms are always present; the pulse is hard, frequent, and constricted, or sometimes small; the heart's impulse is increased; the skin hot, acutely sensitive, sometimes perspiring freely; respiration is laborious, anxious, suppressed, or painful; the bowels are constipated; and the urine is suppressed or retained.

136. The above symptoms remit and recur at intervals, but they rarely intermit; and if the course of the disease be not arrested, they return with greater violence, the local symptoms evincing the extension of the disease along the spine, if it have commenced in any part of the column, until the paralytic affections become more and more general or complete, and until drowsiness, lethargy or delirium; irregularity, smallness or slowness of the pulse; involuntary evacuations, retention or incontinence, or alteration of the urine, and ultimately either asphyxia or coma, or both, supervene, and indicate the extension of the disease to the base of the brain, as well as the more or less complete abolition of the functions of the cord, by the products of inflammation of its membranes. A fatal issue may take place in four or five days, or from that time to two or three weeks, from the commencement of the attack.

137. *b. On examination after death,* the dura mater is generally found of a deeper colour than natural. The arachnoid is duller, more opaque, and somewhat thickened. The pia mater is reddened, injected, and swollen, especially in its posterior aspect. Fluid is effused between the membranes, especially between the pia mater and arachnoid, which is sometimes turbid, but more frequently coagulated, or in the state of coagulated lymph; or a purulent matter, occasionally mixed with a turbid serum or lymph, is sometimes met with. These changes may be limited to a portion of the cord, but they are more frequently extended more or less along it. The substance of the cord is often more vascular than natural. It is sometimes less vascular and firmer than usual, probably owing to the pressure occasioned by the effused fluids. It is not softened, unless the inflammation has extended into it.

138. *c. The association of spinal meningitis with cerebral meningitis—acute cerebro-spinal meningitis*—is more common than uncomplicated spinal meningitis, especially in infants and children. disease may commence in either the spine, within the cranium, and extend more or rapidly from the one to the other. It ra occurs co-etaneously in both. According to experience, it most frequently commences in near the base of the brain in children, extend downwards; and oftener in the spine in adu advancing upwards to the brain. It has been served, in both endemic and epidemic forms some parts of Ireland and France; and Wood refers to Drs. Hicks, Taylor, and A who have described its occurrence, in these for in some districts of the south-western state North America.

139. *Cerebro-spinal meningitis* commences, the milder cases, with general uneasiness, a se of fatigue, headache, pain in the neck and b extending often along the spine, stiffness of jaws, difficulty of deglutition, constipation, and tention of urine, or difficulty of micturition. the disease advances, headache becomes m violent, and is attended by great sensitivenes light and sound, by rigid spasms, retraction the head and neck, acute sensibility of the sur of the body, by increased rigidity of the trunk cramps of the extremities on motion, and by vulsive movements of the limbs. The febrile citement is great; the pulse is very frequ constricted, or small; the skin is hot, thirst is gent and constant, delirium supervenes, an often preceded by vomitings.

140. In the severest attacks, chills or rig attended by severe pain in the abdomen and sp and by vomitings and purging, are followed reaction, and by all or most of the symptoms enumerated in a more violent form. If the ease be not early arrested by treatment, more less general paralysis and coma soon follow above symptoms, and death ensues. The dis may run its course in forty-eight hours; b much more frequently continues for six or se days, and sometimes it may be prolonged to or three weeks.

141. *d. On dissection,* the morbid appearances said to have been comparatively slight, in som the endemic or epidemic cases, vascularity effusion not having been great, although mor less general, and the substance of the brain cord not sensibly altered. More frequen however, the changes have been remarkable, pecially an effusion of greenish or yello lymph between the arachnoid and pia ma which was scanty or nearly absent on the cere hemispheres, but much more abundant at base of the brain, and in the spinal column, ei investing the cord completely, or some more abundant on its posterior aspect. It sometimes extended along the whole cord to extremity of the caudex equina, coating even roots or commencement of the spinal ner This morbid exudation has not been found in external sac of either the cranial or the sp arachnoid.

142. *B.* Chronic Spinal Meningitis.—C nic inflammation of the membranes of the sp cord has hitherto been very imperfectly descri and illustrated, and, as far as my own experie warrants the statement, it is certainly not so a malady as stated by several recent writers. may occur as a consequence of an acute or

ac e state of spinal meningitis; but I have ob-se ed it much more frequently as the primary di se, upon which an acute or sub-acute state su rvened sooner or later, or as the disease ex-te ed upwards to the medulla oblongata, or base of e brain. The earliest account of a case of ch nic spinal meningitis, with the appearance af death, was recorded by myself in 1820; and sir then I have seen a considerable number, and ex ined the bodies of several of them.

3. Whilst the morbid appearances in the cases of cute spinal meningitis have been such, as far as have observed them, as to indicate the chief se of morbid action to have been the inner sac of th rachnoid, or between the arachnoid and pia ma r, the changes in chronic spinal meningitis ha shown the external cavity or sac to have be their principal or only seat, effusion of co-ag ble lymph between the arachnoid of the dura ma r and the visceral arachnoid, obliterating the ca y by adhesions of the opposite surfaces by this me um. This diversity may depend upon the cir mstance of the disease assuming not only a mo acute, but a more rapidly diffusive character wh the inner arachnoid is attacked, or when the flu is effused between the arachnoid and pia ma , than when the disease commences, as it pro bly does in chronic cases, either in the dura ma r, or on the arachnoid covering it. Chronic me gitis may follow the acute form, or be pro-du l by any of the causes about to be assigned.

4. *a.* The *causes* of chronic spinal meningitis are e causes of spinal maladies generally (§§ 16. *et* .), but they are more especially blows or falls on e spine, particularly on its lower regions; cur-ren of cold air, after having been over-heated, dir ed on the spine; sprains or bruises of the col n; sleeping in damp beds, or upon the gro d; the abuse of alcoholic liquors; venereal exc ses; the extension or metastasis of rheuma-tis o the membranes and ligaments of the spine; the ongestion of the spinal membranes during con ued and eruptive fevers; caries of the ver-teb ; and various organic changes implicating the rd or the membranes.

5. *b.* The *symptoms*, especially the initiatory sym oms, vary much, according to the cause, to the emperament, habit of body, and age of the pat t, and to the region of the spine primarily affe ed. Whatever part may be first attacked, the ndency to spread, or to extend upwards, as wel as downwards, should not be overlooked; for, though this tendency is not nearly so re-ma ble as in acute spinal meningitis, yet it exis more or less. It may not be remarked for onths, or even for years, in the more ro-bus nd otherwise healthy subjects, the patient liar presenting any increase of ailment, or eve becoming greatly relieved; but more fre-que ly, especially in delicate or cachectic per-son or during an injudicious treatment, the sym oms extend and become aggravated, more or l rapidly, and either pass into a sub-acute or acute state, or indicate the extension of the flammatory action to the base of the brain. Thi ggravation and extension of the malady are fav ed by a recurrence of the causes which first duced it, by mental perturbation, by phy-sica exertions, attended by sudden or frequent mov nents of the spine, by measures which lower the wers of life and of vital resistance, by imperfect attention to the digestive, secreting, and excreting functions, &c.

146. Chronic spinal meningitis generally comes on slowly and insidiously; and, owing to many of the most severe symptoms being experienced in parts far removed from the spine, it is often, at early periods of its course, mistaken for chronic rheumatism, for neuralgia, or for simple weakness of the limbs, or even for atonic gout. As it proceeds, it may be viewed as a form of rachialgia or spinal irritation, or as an attack of chorea, either of which may be followed by, or pass into, chronic spinal meningitis, at some period of their course, even if they should not prove identical with the early progress or commencement of chronic inflammatory action in the spinal membranes, or with congestive states of these membranes, upon which the inflammatory may supervene.

147. The patient complains of aching, or of dull pains in some part of the spine, generally connected with pains in the nerves, or in their extremities, corresponding with the part of the spine affected; or with pains in the extremities; or with formication, tinglings, prickings; or with a combination of these, with some degree of numbness in the lower limbs. The pain in the lower extremities is sometimes most poignant, especially in certain positions or movements; is occasionally absent, or intermittent, or remittent; and is succeeded during the intermissions by uneasiness in various forms. The gait of the patient becomes now weak, unsteady, and tottering. He moves with difficulty or uncertainty, and staggers or straddles when he attempts to walk. If the disease extends to the dorsal and cervical regions of the cord, a similar difficulty and irregularity of motion are observed in the hands. The fingers imperfectly perform their office; their motions being irregular, slow, and difficult, and articles being held by them awkwardly and insufficiently. The movements of the arms are irregular or in jerks, so that the patient is either nearly or altogether incapable of feeding himself. He may continue in this state for months, or even years. One gentleman whom I attended was nearly, as now described, for seven or eight years, experiencing various exacerbations, but always suffering more or less, the disease having all this time affected the whole spine to above the nape of the neck, and being attended, as it usually is, by spasmodic contractions in various muscles, and distressing constrictions around the abdomen and thorax. During this state of the malady, flatulence of the stomach and bowels, anorexia, costiveness, or marked irregularity of the bowels, incontinence of urine, dryness of skin, or occasional sweats, and aggravation of the symptoms during the night, or when warm in bed, are more or less experienced.

148. During the progress of the disease, the pulse may not be materially affected, especially when the lower regions of the cord are chiefly or solely affected. But when the membranes of the cervical portion of the spine are attacked, the pulse is often very slow, and the actions or impulse of the heart disordered. Palpitations are frequent when the dorsal region is more acutely implicated. Difficulty of deglutition, slowness, or irregularity of respiration, spasm of the muscles of the neck, with paralysis of one or both arms, or

irregular motion, or contractions of the arms, often supervene, particularly as the disease extends upwards to the cervical membranes. Ultimately the paralysis becomes complete, especially the power of motion, at first in the form of paraplegia, and, if not arrested, passes into incomplete or complete general *paralysis* (see that article, §§ 69. *et seq.*). With the progress of paralysis, impaired animal heat and nutrition, a disposition to form gangrenous sores in parts pressed upon, and the several phenomena described under that head supervene. At last the lesion of the membranes extend to the medulla oblongata and base of the brain, and life is terminated by asphyxia, or more slowly by coma, supervening on delirium. In some cases the chronic affection of the lumbar or dorsal spinal membranes, after a protracted continuance or even after a marked improvement of all the symptoms, is unexpectedly followed, or after evident causes, by an acute attack, extending upwards to the cervical region, or to the base of the brain, and more or less rapidly causing dissolution. Of this course of the malady, I have met with several instances. A few of these have been noticed under the article Paralysis, in the chapters on *Paraplegia* and *General Paralysis* (§§ 48—74.); others have occurred to me since that article was written.

149. *c. Chronic spinal meningitis following the acute.*—A medical friend was driven, after having been over-heated, during a cold night, to some distance in an open carriage. He was soon afterwards seized with pain in the lower dorsal and lumbar spine, with spasmodic contractions of the lumbar muscles, and with most acute pain and cramps in the lower extremities. I did not see him until several weeks after the commencement of this acute attack. He then complained of extremely severe rheumatic pains in the lower limbs, with increased sensibility of the surface, a nearly total loss of motion of the lower extremities, of tenderness on pressing the spinous processes of the upper lumbar vertebræ, of a girding sensation proceeding thence around the abdomen, with occasional cramps and paroxysms, of pains in the thighs, legs and feet. His bowels were costive; his urine was voided regularly; but it contained much of the phosphates. The disease was viewed as acute rheumatic inflammation of the membranes of the cord, which had passed into a more mitigated and chronic form; and it was inferred that coagulable lymph was effused between the membranes, the patient having continued paraplegic. Another medical friend, whom I soon afterwards attended, for some time with Dr. Watson and Sir B. Brodie, was similarly attacked. The urine was freely voided, but it abounded with the phosphates. In the course of our attendance, inflammation of the femoral veins supervened. This complication was, however, overcome; but the spinal disease became chronic. This case was also caused by exposure to cold after being over-heated, and was viewed as rheumatic.

150. *d. Chronic spinal meningitis; lymph between the membranes, partially converted into adipose substance.*—A female, aged about fifty, very corpulent, complained of pain in the dorsal spine, and loss of the power of motion in the lower extremities, with tenderness on firmly pressing on the spinous processes of the lower dorsal vertebræ, and with spasms of the muscles of the lower limbs. The loss of motion was gradual, was
ceded by spasms and increased sensibility,
was more complete in one limb than the ot
but it slowly became complete in both. T
was no loss of sensibility. The bowels were
tive, the urine was sometimes retained, but su
quently was often passed involuntarily. A
tressing feeling of constriction around the a
men was complained of. After some months
voluntary motions of the lower extremities
tially returned, and the excretion of urine
more under command; but some time afterw
the pain in the spine extended upwards, the
striction being then referred to the thorax.
arm soon afterwards became partially paraly
and she soon afterwards died of asphyxia.
had imputed her attack to exposure of her bac
a current of cold air when insufficiently cloth
but her habits were very intemperate. On
amination after death, the venous sinuses of the
tebral canal were remarkably congested with bl
semi-fluid blood. Coagulated lymph, parti
organized, was effused between the dura m
and visceral arachnoid; and the more organi
portions presented an adipose appearance, f
the quantity of oil-globules they contained.
upper portion of the cord and medulla oblon
were very vascular, and surrounded by a tu
serum and recently effused lymph.

151. The inflammation in this case, after b
limited for many months, in a chronic form to
membranes of the lumbar and dorsal portion
the cord, ultimately extended upwards in a n
acute form to the membranes of the cerv
medulla and the medulla oblongata; the e
sion of lymph from the inflamed and conge
membranes in these latter situations having b
the more immediate cause of death. The ole
nous change, or approach to a fatty degenera
of the more organized portions of the coagul
lymph, observed in this case, was still more
markable and complete in the following.

152. *e. Chronic spinal meningitis superve*
upon prolonged jaundice; lymph effused between
membranes, and converted into a soft, adipose ti
in the dorsal and lumbar region.—A lady, a
about fifty at her death, was attended by
King, of Eltham, and the author, for jaund
which had continued for several years, with
having been materially influenced by treatm
She had, however, retained her strength, f
and spirits, and was able to go abroad daily, u
nearly a twelvemouth before her death, when
gradually lost the motive power of her lower
tremities, sensibility having been unimpaired.
had, previously to, and about the accession of,
palsy, complained of pain in the lower dorsal
lumbar spine, with constriction around the a
men. The bowels were costive, but the ex
tion of urine was not materially affected.
menses were regular, and continued so up to
or three months before her death. The palsy
continued for many months, with a slight
provement during the latter months, when a
days before her death, and owing to mental
physical perturbation, signs of the extension
the spinal meningitis, in an acute form, to
cervical portion of the cord, and to the bas
the brain appeared, with paralysis of the u
extremities, delirium, and coma.

153. On examination after death by Dr. K

wo other medical men, in my presence, the l and lumbar spinal membranes were found tinated by a substance, which presented an ization almost identical with adipose subte, but which, as it approached the upper porof the dorsal region, presented more and of the characters of firmly coagulated, or ally organized lymph; and, in the cervical n, as far as the base of the cranium, the h had the usual appearance of recent effuand was attended by a considerable accution of turbid serum. In this case, as well others where I have observed coagulated h many months after its effusion between s surfaces, the conversion of it into an adi or rather into a cellulo-adipose tissue—a or less fatty degeneration of the coagulated ganised lymph—had been effected, this conn being in some respects a process of repa, admitting of a partial return of the func of the diseased parts (see *Of the Causes, re, and Treatment of Palsy, and Apoplexy.* . Copland, M.D., F.R.S. &c. London, 8vo. 0. *et seq.*)

4. ii. Inflammation of the Spinal Cord. *yelitis*, from *μυελος, the medulla spinalis.*—*te*, Fr.—*Markentzündung*, Germ.—Inflamn of the substance of the spinal cord may be or *chronic*, as observed in spinal meningitis, may occur primarily and simply, but it is more ently associated with inflammation of the pia of the cord, often extending also to the visceachnoid. The frequency of these associations extension of the inflammatory action from ne structure to the other—and the circum that the disease rarely comes under the eye physician until it is advanced in its course, r the early history of myelitis difficult to be bed. The older writers on medicine appear e been unacquainted with this disease; and nly since pathological anatomy was advanced mparatively recent inquirers, that the disof the spinal cord, and of its membranes, received any attention, very much still reg to be ascertained respecting the extent of on and the lesions of this part of the nersystem, and the signs and symptoms by these lesions are manifested during life. g the several writers of the present day who noticed the diseases of the spinal cord, very ave endeavoured to distinguish the symptoms are proper to inflammation of the cord, those which more especially belong to ination of its membranes; and the signs, some writers have assigned to the one dishave been by others attributed to either.

5. *A. Acute Myelitis* commences, with or ut chills or rigors, with acute, deep-seated n some portion of the spine that is much vated by motion. J. Frank, however, says, e has not observed this exasperation of the n motion. I have remarked it, but not al The patient lies sometimes on the abdosometimes on either side, but he cannot lie n his back on a soft and warm bed. According Klohss, this last position may be much retained on a hair mattress. The spinal s generally more or less limited in extent, attended by stupor, or numbness and prickr tinglings in the corresponding muscles and The stupor is the more marked the more violent and rapid the inflammation, and the sooner terminates in more or less complete palsy. In some cases the patient cannot move his lower extremities, which are the seats of excessive pains, exasperated most acutely by the slightest contact. M. Ollivier and myself have seen the pain and sensibility so excessive as to render the contact of the bed-clothes unbearable. The retention of the fæces and urine is at first more or less complete, but their involuntary excretion is very common as the disease advances. In rare cases, or when the malady is very rapid, the alvine discharges are involuntary from the beginning. Occasionally, however, constipation continues throughout, and excretion of urine remains under the control of the will.

156. The paralysis consequent upon myelitis sometimes ascends from the lower extremities until it reaches the superior parts of the trunk, and even the superior members, causing death by affecting the respiratory nerves, and producing asphyxia. In rare cases, the disease proceeds in an opposite direction, extending from above downwards. In some instances, there is only loss of motion, sensibility being slightly or not at all impaired. In others, sensibility alone is abolished; and in several, there is loss of both motion and feeling to an equal extent. These differences are owing to the parts of the cord affected. It was formerly believed that the anterior columns, presiding over motion, were affected when motion was lost, and that the posterior, presiding over sensation, were affected when sensibility was lost. Several cases, however, recorded by Rullier, Stanley, Webster, and others, prove either that the changes observed in the posterior columns of the cord have taken place at the moment of, or immediately after dissolution, or that sensation may be transmitted through other channels besides these columns, or even independently of the spinal cord itself. But this subject has been sufficiently discussed in the article Paralysis (see §§ 179, *et seq.*). It may, however, be here remarked, that in the cord, as in the brain, the white or fibrous structure may be more especially connected with motion, the grey structure with sensation and its several manifestations. Usually paralysis commences in a single limb, and afterwards extends to the opposite side. Sometimes spasms, contractions, or convulsions of various duration, precedes the paralysis. When palsy is complete, the limb is flaccid as well as motionless, but when less so, permanently contracted and painful.

157. Myelitis seldom is seated in the whole extent of the cord; much more frequently in a portion only, the symptoms generally indicating the seat. If it be in the vicinity of the annular protuberance, disorder of the senses, or furious delirium, or many of the symptoms of inflammation of the brain, and even hydrophobic symptoms, followed rapidly by general paralysis and asphyxia, are often observed. If the cervical portion is affected, there are pains in the neck, and generally rigidity of the muscles of the neck and of the upper extremities, which are sometimes convulsed or contracted, and at last paralysed. The palsy usually commences in one of these extremities only, and is preceded by numbness and prickings, at first at the points of the fingers, rising gradually, thence to the hand, fore-arm, and arm, and is soon replaced by loss of motion, and often

also by more complete loss of sensation. Respiration is generally laborious, painful, anxious, and performed chiefly or only by the diaphragm. M. Ollivier and myself have observed difficulty of deglutition at an advanced stage, this function being often painful also, especially when swallowing fluids. Singultus is also sometimes observed.

158. When the inflammation is seated in the dorsal portion of the cord, or between the two thicker portions, giving origin to the nerves of the extremities, then continued or frequent succussions of the trunk of the body, not extending to the limbs, are observed. If the thicker portions of the cord are affected, the convulsive movements extend to the limbs whose nerves originate in these portions. Respiration is short, precipitate, and performed by the diaphragm : there are likewise palpitations, and strong, frequent or irregular action of the heart. To these symptoms, according to the younger Pinel, there are joined a nearly entire abolition of the functions of the nerves originating in this part of the cord, and a state of febrile excitation of the other functions. When the lumbar portion of the cord is affected, spasms or constriction, or contraction of the abdominal muscles, paralysis of the lower limbs, involuntary stools, or retention of the urine and fæces, with deep-seated pain in the lumbar spine, are observed. Sometimes priapism occurs, especially when myelitis is caused by a fall or injury. The *duration* of acute myelitis may vary from three or four days to as many weeks ; and various febrile and sympathetic phenomena may attend individual cases ; as vomiting, singultus, dyspnœa, delirium, morbid states of the urine, and a disposition to bed-sores, especially in the more prolonged cases, &c. (see art. Paralysis, §§ 64. *et seq.*).

159. *B.* Chronic Myelitis may follow the acute, which, owing to treatment or other influences, may become chronic and slight, or subacute and ultimately chronic ; or it may commence in a slight and chronic form, and after an indeterminate period, becomes more or less acute and rapidly fatal. The symptoms are chiefly a less intense state of those characteristic of the acute. There are generally pain, more or less slight or severe, in some part of the spine, and pains or cramps in corresponding muscles or limbs, for some time before loss of sensibility, or of motion, takes place. The paralytic symptoms may, however, be preceded by so little suffering as not to interest the patient, or come under the cognizance of the physician. There is seldom much tenderness upon pressing the spine, or increase of pain upon percussion of, or when pressing, the spinous processes. After a time, and sometimes without much previous disorder, simple diminution of sensibility or of the power of motion is experienced. This increases slowly. The patient is subject to tremor. The gait becomes uncertain, staggering, or tottering. He lifts and directs the extremities with difficulty, and uncertainty. Ultimately the limbs no longer can support the body. Involuntary startings of the muscles, subsultus, or rigid contractions of muscles or limbs occur. The paralysis ascends to the trunk, affects the excreting functions, and implicates in some degree the circulating and vital functions. The pulse becomes slow, irregular, or weak ; the limbs flabby, œdematous, and cold ; sloughs form on parts which sustain pressure. The urine is morbid, retained, or passed involunt
abounding in the sulphates and phosphates ;
ultimately dyspnœa, coma, and death by ex
tion or by asphyxia takes place.

160. *C. Appearances in fatal cases of Myeli*
These consist chiefly of red softening of the
in various degrees. It may extend throug
the columns of a small portion of the cor
along a large portion, and it may vary fr
slight diminution of consistence to complet
fluence of the structure. It may affect only o
more columns, or it may be limited to eith
white or to the grey structure, or it may e
to both. The softening is often yellowis
presents merely a slightly red or pinkish s
The changes in the cord may exist alone,
associated with inflammatory changes in th
mater and visceral arachnoid ; much more
with changes between the dura mater and vi
arachnoid.

161. Rokitansky remarks that, in the co
in the brain, inflammation attacks sometime
white structure, sometimes the grey substanc
casionally both together. But myelitis c
grey substance exists in long streaks, or i
whole extent of this substance, restricting
to this structure, and producing a peculiar
dition of the cord, as well as the increa
volume, which attends softening, and a pe
form of dropsy, in which it occasionally t
nates. Red softening of the grey substa
tinted according to circumstances, of a cho
brown, or plum colour, or rusty brown, or
yellow, and corresponds with the central s
ing of the spinal cord, described by Albers
chronic cases of myelitis, yellow softening c
columns, and condensations or indurations i
ous grades and extent, have been observed.
rations, conjoined with atrophy, chiefly c
white columns, have also been remarked.

162. M. Calmeil, who has paid much att
to diseases of the spinal cord, states in relat
the comparative frequency of softening in th
ferent regions, that, in twenty-five cases, six e
in the cervical region, eleven in the dorsal r
five in the dorso-lumbar, and two in the lu
In one case only was the organ softened thr
out. In one instance, the left half of the
only was softened ; in two the anterior col
were alone thus altered. The softened ne
structure preserved its natural colour in ten
It presented a yellow tint in six ; a rose ti
four ; a red colour in three ; and a brown h
one. The softened molecules were mingled
blood-globules in one. The pia mater was l
in one case ; was injected and red in sever
covered by false membranes in two instance
may here be remarked, that the white and y
softening does not necessarily proceed fro
flammation ; but as it gives rise to nearl
same symptoms as the inflammation, the diff
of separating them is great.

163. iv. Diagnosis.—*A.* It is of much in
ance to distinguish between *rheumatism* and in
mation of the spinal cord or of the memb
The pain both in the spine and in the correspo
nerves, or in muscles supplied by these n
will not be mistaken for primary rheumati
this very correspondence be attended to, e
the girding or sense of constriction in the c
sponding situations of the trunk be consic

The history of the case will also assist the diagnosis. It should, however, be recollected, that rheumatism may either extend or occur as a metastasis to the membranes of the cord. This has been supposed to be a very rare occurrence; but according to my experience, although not frequently observed, it is by no means rare. When, however, it takes place, it is essentially inflammatory, assuming the sub-acute or chronic states of spinal meningitis, and hence no distinction is to be made between them in nature or treatment. It is only when rheumatism, in its usual forms, attacks parts in the vicinity of, or in nervous connection with, the spine, that the diagnosis is of importance. The spasms, the deep-seated burning sensation in the course of the spine; the chronic contractions of the muscles of the back, curving the trunk backwards; the altered sensibility of the surface, with numbness or prickings in the extremities; the stupor or loss of motion will distinguish spinal meningitis and myelitis from rheumatism, which is unattended by cramps or tonic spasms, or by the constrictions or girdings of the trunk already mentioned. In the former, also pressure or percussion, or pressure conjoined with heat, over the spinous processes, sometimes increases pain; but in the latter, pain is increased by pressure on the sides, or in the vicinity of these processes, and by motion of the affected parts.

164. *B.* The diagnosis between *spinal meningitis* and *myelitis* is much more difficult, inasmuch as the former generally influences more or less the functions of the cord, and inflammation of the visceral membranes of the cord is often associated with myelitis. Spinal meningitis, however, has a marked disposition to extend itself, and is frequently complicated with cerebral meningitis, especially in children, whilst myelitis is generally limited to a portion of the cord only. Acute spinal meningitis may, with much certainty, be inferred from three symptoms: the first is a general contraction of the muscles of the back, varying from simple muscular rigidity to violent spasm, or tetanic rigidity occasioning complete opisthotonos. In meningitis of the base of the brain, the head is thrown backwards, or the cervical portion of the spine is sometimes retracted; but the trunk preserves its form. The second symptom is the violent pain extending more or less along the whole spine. The third is the continuance of sensibility even of the limbs, although motion may be abolished by the pressure of effused lymph on the cord and roots of the nerves.

165. The febrile symptoms are more marked or more severe in spinal meningitis than in myelitis; and paralysis of motion either does not occur, or not until effusion disorders the functions of the cord, or until inflammation extends to the substance of it. In myelitis the pain is not so severe; and the most remarkable symptoms are, impairment or loss of motion, and diminution of sensibility. In chronic myelitis, the membranes often become similarly, or even acutely affected, the symptoms most characteristic of both spinal meningitis and myelitis being present.—*Spinal Apoplexy* (§§ 192. *et seq.*) is to be distinguished from both these diseases by the sudden accession of the severe symptoms, and by the rapid occurrence of the paralysis of motion, and generally also of sensation.

166. v. Complications.—Spinal meningitis may be associated with myelitis, and, in such cases, the symptoms of the one will be accompanied with those of the other. This complication is often a consequence of severe injuries; retention of urine, priapism, paraplegia, &c., frequently being present, according to the seat and severity of the injury (see art. Paralysis, §§ 50. *et seq.*). One or both these diseases may be further complicated with inflammation or caries of the vertebræ, or of the intervertebral substance; or with aneurism of the aorta, or with spinal apoplexy, or with some one or other of the organic changes implicating the spinal cord or its membranes, about to be noticed (§§ 178. *et seq.*). Spinal apoplexy, when it fails of producing death in a very short period, is generally followed by spinal meningitis or myelitis, according to the seat of the sanguineous extravasation. The complication of spinal meningitis with cerebral meningitis has been sufficiently noticed above (§§ 138. *et seq.*).

167. vi. Prognosis.—*A. Acute spinal meningitis* is a dangerous disease, and the association of this with cerebral meningitis is still more dangerous, although not necessarily fatal when actively treated at an early stage. Chronic spinal meningitis, when it has advanced so far as to cause paralysis, is seldom altogether removed; but the symptoms, both paralytic and spasmodic, may be considerably ameliorated, whether it has occurred as the primary malady, or followed the acute. At all periods during the course of chronic spinal meningitis, an acute extension of the disease, generally upwards to the base of the brain, may occur, especially upon exposure to any of the causes of the malady, or even after any physical or mental perturbation, and carry off the patient. I have observed this to take place in chronic cases, even of ten or twelve years' continuance. In some cases, the disease may advance slowly for many years; in others, it may be stationary for as long a period; and in a few, an amendment more or less considerable takes place. It is chiefly before the supervention of paralysis that treatment is most efficacious; and even in this early period the best devised means often fail: much depends upon the constitution, habits of life, and previous ailments of the patient. Whilst writing this, a gentleman whom I attended nine years ago for acute spinal meningitis, affecting chiefly the cervical and dorsal regions, called upon me. He had been seen also by Drs. Chambers and Bright, in consultation with myself. His habits had been irregular, and the acute attack passed into the chronic, with paralysis of motion, which was more remarkable in one side than the other. The painful symptoms have long since ceased, and the paralysis is considerably less.

168. A lady, aged about forty, and very corpulent, was seized with acute spinal meningitis and suppression of the catamenia. She had had several children. The disease had existed three or four years when I was requested to see her. Paralysis of motion was complete from the neck downwards, but sensibility was not impaired. Her spirits were good, and she still retained considerable power over the alvine and urinary excretions. She possessed only a very slight power of motion in one arm. Treatment similar to that about to be advised for the chronic form of the disease (§§ 173. *et seq.*) was prescribed. She recovered gradually: could use both hands, and walk abroad.

She went on the continent; after some time she proceeded to the north of Scotland to the family seat, and continued in comparatively good health for a long time. She had, whilst at her residence in the north, what was supposed to have been an attack of fever, of which she died. It is more probable, from the presence of cerebral symptoms in her case, that an acute extension of spinal meningitis had supervened, and implicated the membranes of the base of the brain, and thereby proved fatal, as I have uniformly observed when the malady was thus extended.

169. A respectable tradesman complained of chronic spinal meningitis, consequent upon a fall on the lower part of the back, attended by partial paralysis of motion in both lower extremities, and constriction around the abdomen. I saw him occasionally for some years, during which time he was able to walk about with the assistance of a stick, or of the arm of a servant. After a time I was requested to see him, and was informed that he had called to his aid an irregular practitioner, who had confidently promised to cure him, and that he soon afterwards became much worse, complaining of spasms, and of severe pain along the whole course of the spine. He was delirious and generally paralysed when I now saw him; but was soon afterwards comatose. A gentleman, aged about forty, gradually became affected, as described under the head of chronic spinal meningitis (§§ 159.). Sensibility was not diminished, but voluntary motion was remarkably impaired in all his limbs. The bowels were always costive, and the power of retaining the urine was very much lessened, and ultimately lost. Still a full dose of opium or morphia enabled him to retain it from six to ten hours. He lived in this state for about twelve years. He afterwards became much worse, was feverish, delirious, and comatose, in succession. I examined the body of both these persons after death, and found the changes, as already described (§§ 160.). The spinal cord appeared somewhat atrophied. Recent inflammatory appearances were observed in the membranes of the base of the brain and medulla oblongata in both.

170. *B. The prognosis of myelitis*, when *acute*, is generally most unfavourable, death often taking place in a few days, even although the treatment may have been both prompt and judicious. The *chronic* form is less unfavourable. It may continue for months, or even years, when limited in extent; or the patient may even recover partially. In these cases, it may be inferred, that the resulting lesions have either been slight, or at least partially removed, so as to admit of the continuance of life for an indefinite period. An exasperation of the disease is, however, apt to take place when exposed to causes of physical or mental perturbation. Although but little hope can be entertained of effecting a cure, when confirmed paralysis exists, yet we may be more sanguine as to the result at any early stage. When, however, the powers of life are evidently sinking; or when the urine is very morbid in its constitution, or as regards the functions of excretions; or when the influence over the sphinctures is lost, or especially when sloughs form on parts which sustain the pressure of the body, then hopes of sustaining life much longer cannot reasonably be encouraged. The danger is always greater when the cervical or dorsal portions of the cord are affected, an
when the lumbar region is attacked.

171. vii. Treatment.—The treatment of in
mation of the membranes of the spinal cord, a of
the cord itself, varies much with the acutenes he
duration, and the special characters of indiv al
cases, and with the constitution, state, and r-
cumstances of the patient.—*A. Acute spina*
ningitis requires very prompt and energetic m s;
for, if the disease proceeds so far as to occasi its
usual changes, the best devised means will en
prove inefficacious. Bloodletting, genera or
local, or both, according to the habit of the y,
strength, and age of the patient, is necessar s-
pecially very early in the attack. The amou as
well as the repetition of the bloodletting, s ld
depend upon the circumstances just mentio l;
but I have generally preferred the applicat of
cupping-glasses along the spine, followed by
binthinate epithems or embrocations. The b
should be freely evacuated; and this inte
may be accomplished by the immediate ad is-
tration of a full dose of calomel, or of calom
James's powder; and within a few hours
wards by the infusion of senna, or other ape ts,
which ought to be repeated until the desired
is produced. Terebinthinate enemata are a
beneficial, not merely in procuring a full ev
tion of the bowels, but also in presentin he
changes usually following acute inflammat of
serous membranes; and hence the spiritus te
thinæ may be given with benefit by the m
for when thus exhibited, and in such a m
will not excite vomiting, it is more certai
prompt in preventing the effusion of lymp
these membranes, than the free administrat
mercury.

172. Besides the above, various other
have been advised by writers, especially
deep incisions on each side of the spinou
cesses by Goss; the cold affusion, or the
cation of ice, along the spine by Ollivie
the warm or vapour bath by others. C
and scarification, or dry-cupping, when the
is no longer required, should be preferred
first of these; the benefits or the effects pro
by the second have not been shown, and t
vantages produced by the third are very
vocal. Warm pediluvia and manuluvia, s
mustard, having been added to the wate
generally of service. But after the sa
tory operation of the means advised abov
due consideration of what should be a
may be of more service than the employm
means of doubtful efficacy. The patient
lie on a hair couch, on either side, so as t
the spine moderately cool, and allow the
cation and renewal of such agents to it as
been advised. Vomiting, straining at stoo
motion, should be prevented as much as po
and if the urine be not duly evacuated, it
be drawn off frequently, care being taken
allow an accumulation of it in the bladder f
considerable time. Cooling diaphoretics
frigerents are always of service as long
brile symptoms continue. Blisters are ra
service, but are oftener productive of irr
of the urinary passages. Terebinthinat
thems or embrocations, such as I have a
in various parts of this work, or a combi
of these with opium—the tincture, wine,

very frequently of use, and may be repeated
, or twice in the day. If the pain and sym-
etic affections of spinal meningitis continue,
ithstanding the means above prescribed, the
ure or extract of *aconite* will often prove of
service, when exhibited in sufficient doses.

3. *B.* If *chronic spinal meningitis* either follow
cute or occur primarily, certain of the means
ly mentioned may be cautiously employed.
me instances, scarification and cupping, or
upping, or a repetition of these, may be still
ted to, especially at an early stage of the
ary chronic, or during the insidious com-
ement of the disease. The intestinal and
ry evacuations always require attention.
us counter-irritants have been advised, espe-
blisters, issues, moxas, setons, tartar-emetic
ent, the actual cautery, &c. I have very
seen either blisters, or setons, or issues, or
rtar-emetic ointment, of any service in this
of the disease. Of moxas and the actual
ry, I have not had sufficient experience.
BENNETT states, that he has seen the latter
produce a cure in two cases of chronic spinal
gitis occasioned by diseased vertebræ. It
st probably in this complication, that the
l cautery, setons, issues, and moxas are
likely to be of benefit. In other circum-
s of the disease, the terebinthinate embroca-
or epithems along the spine, or the frequent
ing of the surface of the spine with a strong
on of bay salt have been more serviceable,
ding to my experience, than either of these.

. In chronic spinal meningitis, I have not
lowering measures of much service, espe-
when far advanced or of long standing;
when it has produced paralysis, owing to
anges consequent upon inflammatory ac-
I have generally prescribed such means
med most likely to support vital resistance
extension of the disease, and at the same
o remove the structural alterations which
ave already been produced. With these
I have given small doses of the bichloride
rcury, with hydrochlorate of ammonia, and
the decoction or the tincture of cinchona,
e fluid extract of sarza; and after this com-
n has been continued for a considerable
ut with strict reference to its effects, I have
uted the iodide of potassium and the car-
of potash, or liquor potassæ, or BRANDISH's
e solution, for the bichloride and the am-
, the other medicines being continued in
ction with the iodide and fixed alkali.

. *C. The complications* of either the acute or
ronic state of spinal meningitis clearly de-
means such as have been advised. When acute
l meningitis is associated with the spinal
, the best devised means are generally in-
ious, but those already prescribed appear the
ppropriate. The complication of chronic
meningitis with rheumatism requires the
dications of cure, and similar means to those
l above (§§ 171. *et seq.*). But in this state of
sease, as well as in certain other chronic
cations or forms, medicated warm baths,
lly such as contain stimulating substances,
a cautious trial; and if they be found of
st service, they should be sufficiently tried.
case in which the spinal malady appeared
course of very prolonged jaundice (§ 152.), the more severe symptoms were somewhat mitigated, notwithstanding the persistence of the primary disease. The association of spinal meningitis with disease of the vertebræ, or of the cord itself, has been treated by me, according to the principles now enunciated; and I have no experience of any other means, than those already noticed, which appear to be of any service in those or other complications of the malady.

176. *D. Acute Myelitis* requires similar means to those already advised for acute spinal meningitis; but, even at an early stage, vascular depletion is not so beneficial, and admits not of being so freely employed in the former as in the latter. The other means, especially the internal medicines and the external applications, particularised above, may be resorted to. In addition to these, urtication, warm baths containing stimulating and rubefacient substances, anodyne and terebinthinate embrocations along the spine, and the preparations of aconite when spasm or pain is urgent, may severally be employed. The paralytic symptoms, which are generally much earlier and more complete in myelitis than in spinal meningitis, may be combatted by the bichloride of mercury, or by the iodide of potassium, and the other remedies, as combined above (§ 174.). The preparations of *nux-vomica* or *strychnine* have been recommended, and too frequently and injuriously employed in these cases. In all cases which may be inferred, from the mode of attack, or from the characteristic symptoms, to be either acute or chronic myelitis, we have few, and oftener no, means of ascertaining the nature of the changes which have taken place in the cord and its membranes; and hence those preparations, especially strychnine, which excite or irritate the spinal cord, should, if prescribed at all, be exhibited with great caution.

177. *E.* In the more or less *chronic* states of myelitis, various means have been tried, but rarely with more than very temporary relief. In these states especially, the preparations of nux vomica, of strychnine, of arnica, phosphorus, &c.; electricity, galvanism, electro-magnetism; frictions, with various stimulants and irritants, and external derivatives, may severally be resorted to, according to the peculiarities of the case, but they require both discrimination and caution. It is only in the more protracted cases of either myelitis, or spinal meningitis, where the symptoms indicate passive, rather than active disease—when neither acute nor painful symptoms are present, that these means should be employed. Farther remarks on the use of these and similar means, will be found in the article PARALYSIS (see §§ 244, *et seq.*), and in my work on *Palsy and Apoplexy* (see p. 397. *et seq.*).

VIII. STRUCTURAL CHANGES OF THE SPINAL CORD AND OF ITS MEMBRANES.

CLASSIF. — IV. CLASS. — III. ORDER (*Author*).

178. i. MORBID STATES OF THE SPINAL MEMBRANES. — The *dura mater* of the spinal cord is unprovided with the granulations called Pacchionic glands. It is not so firmly attached to the bones as that of the brain, and the arachnoid and pia mater are more loosely united to the cord than these are to the brain. Owing partly to these circumstances, diseases of the spinal bones less frequently affect their contained structures, than those of the cranium.

179. *A.* The membranes of the cord are sometimes *distended* by fluid, *discoloured*, and present various grades of *consistence*, but not so frequently as those of the brain. *Irritation*, vascular *erethism*, and *congestion* often are observed, especially in continued fevers, in the exanthemata, in tetanus, in rabies, in spinal epilepsy, convulsions, gout, rheumatism, &c.; but these are not to be confounded with true *inflammation*, which, however, may occur as an epi-phenomenon in these diseases. All the alterations consequent upon inflammation of the membranes of the brain are observed after spinal meningitis, as effusions of *plastic lymph*, or of *serous*, or *sero-albuminous* or *puriform fluids*, *thickening*, *induration*, *agglutination*, and partially organised *adhesions* of the membranes, *cartilaginous* and *ossific deposits*, and much more rarely *ulceration* and *mortification*. *Tubercular* formations, *tumours* of various kinds, *cancer*, and *hydatids* have also been found in these membranes on rare occasions.

180. *B. Morbid or effused fluids* are usually contained in the more external sac formed by the arachnoid membrane; but sometimes, as in the brain, between the arachnoid and pia mater; occasionally also between the dura mater and the bony parietes of the canal. Admitting that a limpid serum naturally exists between the spinal membranes, yet an inordinate, as well as a morbid effusion, is not infrequent, particularly in tetanus, epilepsy, some fevers and eruptive diseases, paraplegia, epilepsy, chorea, &c. The more morbid effusions between the membranes are, that of *air*, (Ollivier, Briere, Otto, &c.); large *collections of water*, dropsy of the spine, *hydrorrhachis*, either in an acute or chronic form: it may take place alone, or in conjunction with dropsy within the head: when great it usually produces universal palsy, owing to its pressure on the cord: *puriform matter*, proceeding from ulceration of the spinal marrow, or of its membranes, as in bedridden persons; or from the cavity of the skull (Denmark, Otto); or from carious vertebræ, as well also as effused from abscesses in the vicinity (Brodie, Velpeau, Jackson, &c.); *albuminous lymph*, or a *coagulable* and *organizable matter*, exuded by inflammation of the membranes, or by metastasis of rheumatism to them, as observed also in paraplegia, general paralysis, and in some cases of chorea (Copland and Prichard); and *lastly*, a *bloody fluid* or *pure blood*, liquid or coagulated, arising from injuries of the spine, from concussions of the trunk, from the breaking of an aneurism of an adjoining vessel, as of the aorta, or spontaneously from disease of the spinal vessels, or from some internal cause (Howship, Ollivier, Chevalier, &c.).

181. ii. Morbid states of the Spinal Marrow.—*a.* The *size* and *form* of the spinal cord vary materially. They generally correspond with the length and form of the spinal column: the cord may be too long or too short, in proportion to the rest of the body. Sometimes it is congenitally *thinner* or smaller, either in parts or throughout, especially in monsters with deficient or distorted heads and limbs. But it is subject to a morbid diminution of size—a true *atrophy*, as in *tabes dorsalis* — dorsal consumption. In this latter case, it is sometimes wasted more in one place than in another, being apparently indented and knotty. Atrophy is most frequently met with in extreme old age — *atrophia medullæ senilis*
protracted cases paraplegia and general pa
and in the lumbar region of the cord as a
sequence of loss of the generative power, an
spermatorrhœa. It often extends upwards a
the cord. It may also arise from the effusio
lymph between the membranes—of this ass
tion I have met with several instances—in
nic spinal meningitis consequent upon rhe
tism, and in connection with chorea. In
cases the diminution of volume is associated
a dirty whiteness and toughness of the fib
columns, and with a rusty-brown or fawn ti
the grey substance. In other instances, the
is not only thus discoloured, but also infilt
with serum, soft and withered (Rokitansky)

182. The cord may be more or less *thi*
parts, from *compression* by the adjoining bone
by invasion of the canal, by thickening of th
tervertebral substances, by bony concretion
varicose states of the spinal vessels, by aneu
of the vertebral arteries, by effused blood or
fluids, by hydatide, or by tubercles, or by c
rous or other tumours. The pressure of eith
these may be such as almost to divide the
or to reduce the pressed part to extreme thin

183. The cord may be unnaturally *long* in
born infants. Béclard found it to descen
the tail-bones in two children born with
Extreme *thickness* at certain parts is only
genital; but a portion of the chord may be
bidly swollen, owing to either extreme conge
or effusion of blood (apoplexy of the cord
of pus, or of other fluids, in its substance.
form of the spinal marrow is most comn
affected by *dropsy* or *hydrorhachis*, also called
spine, or *spina bifida*, when connected wit
open state of the vertebral canal. This is
rally a congenital malady, associated with c
the spinal canal, and often also with int
dropsy of the head, hemicephaly, and hy
cephalocele. It generally terminates fatally
paralysis. But cases have occurred of chi
living many years with the disease, and
reaching puberty. Paletta and Acrel met
it at seventeen years of age; Hendersc
eighteen; Apinus, Warner, and Hochste
at twenty; and Camper at twenty-eight.
a case of it, with immense tumour in the loi
a female of about twenty. In rare insta
dropsy of the spinal cord has occurred
birth, and even in adults. This change, in
nection with the state of the spinal marro
more fully described in the article Dropsy
Dropsy of the Spinal Cord, § 178.).

184. *b. A rupture* or rather *protrusion* of
spinal marrow may occur from *hydrorrhachi*
that, being itself expanded by the water, or
pressed between the membranes by this flui
may be more or less protruded through the
in the spine, thus forming a *rupture of the s*
marrow (*hernia medullæ spinalis*). In very
cases, the chord may deviate from its na
position, in consequence of caries of its
walls (Ferro, Lecat, Phillip, and Richt
The *colour* of the spinal chord may vary, as
of the brain, but very seldom without chan
structure, excepting in some rare instance
jaundice.

185. *c.* The *consistence* of the marrow is
liable to vary. It may be *simply softened*, wit

r change, or it may be softened with change,
intimate structure, forming the *pulpy dege-*
on described above (§ 160.), and when treat-
the BRAIN (§§ 71. *et seq.*). Its structure
e even entirely broken down: it may be al-
liquid or diffluent, or this state may present
ture of blood. The broken-down state, either
or without blood being effused or infiltrated
part, may exist only in spots, or in a con-
ble portion of the cord, and is to be as-
to diseases which destroy its cohesion, espe-
inflammation, suppuration, watery infiltra-
the substance of the part, and to a morbid
ficient state of its nutrition. Paraplegia
r less complete, or paralysis more or less
l, is the usual result of softening; and
degeneration of the cord.

. *d.* On the other hand, the structure of the
ay be *too firm*, or even *hard*. This state
times conjoined with diminution of size or
y in dorsal consumption, and with thick-
fter chronic inflammation. PORTAL, BER-
HI, EQUIROL, BIRCH, VELPEAU, and OL-
, have found different portions of the spinal
v nearly as hard as cartilage, particularly
ptic, insane, and paraplegic persons. GEN-
as observed the same cord very hard in
rt, and very soft in others.

e. The *continuity* of the structure of the
ay be destroyed by disease, as by extreme
degeneration, by the *laceration* occasioned
ffusion of pus or of blood, and by concus-
the spine. This lesion is, however, more
nly occasioned by wounds, violent exten-
ctures and dislocations of the vertebræ.
e of those cases, the marrow protrudes
the opening in the pia mater. Small
of the cord may, in some cases, heal.

f. Inflammation of the substance of the
Myelitis (§§ 154.) is, in some instances, an
ic disease, and in others, it results from
l injuries and diseases of the surrounding
es. Inflammation is to be distinguished
ngestion of this part, both in respect of
racteristic appearances, and of their usual
ences. Inflammation may appear in the
form of *vascular irritation*, unaccom-
by any very marked change of structure,
any fevers, eruptive diseases, rabies, epi-
nvulsions, trismus, tetanus, painters' colic,
in all which the spinal marrow may be
less affected. This organ may be more
ocally inflamed either primarily or idio-
ly, or consecutively and contingently, es-
in the course of some cases of the above
When truly *inflamed — myelitis* — the
e of the cord exhibits a rose-red colour,
me deeper-coloured or dusky spots and
with enlargement of its minute vessels,
ection of the pia mater surrounding the
n some cases, there is a distinct swelling,
erally some change from the natural con-
namely, softening, or complete disor-
n, or dissolution into a semi-fluid, disco-
y, or mixed with blood. In rarer cases,
ammatory appearances are accompanied
rdening. Myelitis seldom terminates in
puration. In rare instances, small ab-
ave been found in the cord. *Gangrene*
ore rare. *Ossific deposits*, or *bony con-*
which are sometimes found in the membranes (§ 179.), do not seem to form in, or even to invade the structure of the cord.

189. *g. Congestion* of blood in the spinal cord may be consequent upon, or conjoined with a varicose state of the veins, or with congestion of the venous sinuses of the vertebral column; and the congestion when extreme, and especially when connected with atheromatous or fatty degeneration of the vessels (see art. ARTERIES § 59., *and my work on Palsy and Apoplexy*, pp. 266 288.), many terminate in *effusion of blood* in the substance of the cord, or between the membranes, or external to the dura mater, and between it and the walls of the canal (ABERCROMBIE), owing either to rupture of the diseased vessels, or to sanguineous exudations from them, produced by certain obvious causes, or occurring spontaneously, and without any assignable cause — *apoplexy of the spinal cord.*

190. *h. Hæmorrhage into, or from, the spinal cord*, according to the seat of the vessels whence it proceeds, may exist between the pia mater and the arachnoid — in the internal sac of the arachnoid; and, when thus seated, there being no laceration of the structure of the cord, it may be inferred that the blood has proceeded from the vessels of the pia mater. In most cases of hæmorrhage into the substance of the cord, the effusion has taken place in the grey substance, and has even been infiltrated to a great extent along the internal canal of its axis (CRUVEILHIER, *Anat. pathol. Leivr.* 3d). Circumscribed extravasations are also found in the structure of the chord, the blood effused undergoing the same changes as described in cerebral apoplexy, and the surrounding nervous tissue also presenting similar alterations (HUTIN, STROUD, GAULTIER, GRISOLLE, BENNETT, &c.).

191. iii. APOPLEXY OF THE SPINAL CORD. — *Hæmorrhage may take place into the external sac of the arachnoid—between the dura mater and arachnoid; or into the internal sac of the arachnoid, or between the pia mater and arachnoid.* When thus seated, the hæmorrhagic effusion has been called *Hæmatorachis* by OLLIVIER. *When the hæmorrhage occurs into the structure of the cord,* it has been termed *Hæmatomyélie* by this writer.

192. *A.* The *causes of spinal apoplexy* are chiefly injuries sustained on the spine, especially blows, falls, fractures, concussions, &c. Spontaneous hæmorrhage in either of the situations just specified, or *between the dura mater and the walls of the vertebral canal,* is rarely met with; and when observed, is to be attributed chiefly to pre-existing disease of the vessels (§ 186.); extreme exertion or efforts of any kind, or unusual demands made upon the circulation of the cord, or whatever interrupts the return of blood from or through the vertebral sinuses, being the more immediate or exciting causes.

193. *B.* The *symptoms* of spinal apoplexy have been imperfectly observed, owing to the rarity of the disease, and to the early progress of it having passed unobserved by competent persons. The mode of attack necessarily varies with the seat and amount of effusion. The most frequent phenomena characterising the attack are, pain, sudden and acute, in the region of the spine corresponding with the seat of extravasation, convulsions and paralysis. Precursory shivering and pain are sometimes ex-

perienced shortly before the complete or severe seizure. M. Calmeil adduces several cases to prove that, when the hæmorrhage takes place between the membranes, the pain is always acute, and is attended by convulsions or spasmodic contractions, paralysis being slight, or absent, unless the hæmorrhage is very considerable; and that, when paralysis of motion, or of motion and sensation, is sudden and more or less complete, convulsions being slight or absent, the spinal cord is then itself the seat of extravasation. When the hæmorrhage occurs in the cervical region, or in the upper part of the dorsal region, then priapism is generally present, as commonly also observed when these parts of the cord are injured by dislocations or fractures. Constipation and retention of urine are observed at first, and these may be followed, if the disease be not quickly fatal, by loss of power over the sphincters; these symptoms, however, depending much upon the seat and amount of hæmorrhage. When the effusion occurs in the higher regions of the cord, paralysis of the muscles of respiration soon supervenes, owing either to the amount of effusion, and in this case, death quickly supervenes, or to the changes consequent upon the effusion, and then this issue is longer in occurring. The changes may extend upwards, even when the hæmorrhage is low in the spine, and cause death by paralysis of the respiratory muscles, and asphyxia. The following case, recorded by Mr. Curling, will illustrate the symptoms and appearances after death of this malady:—

194. A gentleman, aged forty-four, a stout man, of active habits, but a free liver, and subject to gout, had just got into bed about 11 p.m., when he was suddenly seized with spasms in the stomach, and found that he had lost all sensation and power of motion in the lower half of the body. An hour after this seizure, the patient was found shivering in bed by Mr. Curling, with complete paraplegia of the whole of the body below the third ribs, and strong priapism. He had perfect use of the arms, but complained of pain about the wrists. No excito-motary actions were producible. His mind was quite clear. After the circulation was restored, the treatment consisted chiefly of cupping between the shoulders, a blister at the nape of the neck, purgatives to unload the bowels, frequent doses of calomel, and regular relief of the bladder. The priapism subsided in about twenty-four hours. There was no extension of the paralysis, except numbness in the hands, and at last imperfect power of using them. During the first eighteen hours after the attack, scarcely any urine was secreted, and it subsequently continued scanty in amount. The breathing gradually became embarrassed and difficult, and the patient died the fourth day after the seizure, his intellect being unaffected until within a few hours of his death.

195. On examination after death, the muscles of the back were much loaded with blood. No fluid escaped on opening the theca vertebralis, the head being in a depending position. The vessels on the surface of the cord were very congested. An incision was made along the front of the medulla, commencing at the part corresponding to the third cervical vertebra, and terminating at the last dorsal. There were two small clots of blood, amounting together to about a drachm, in the interior of the medulla, occupying about an and a half in extent, and situated betweer origins of the second and third pairs of d nerves. The substance of the cord arounc clots was somewhat soft. The medulla was or less infiltrated, and stained with blood fror site of the clots, upwards as high as the thirc vical vertebra, and downwards as low as th dorsal. (*Third Report of the Proceedings c Pathological Society of London*, p. 28.)

196. *C.* The *diagnosis* of the lesion, marked, is not very difficult. The suddennes severity of the pain, of the spasms, or of the lysis, and the degree of constitutional or vital which ushers it, distinguish it from other s affections, and prevent it from being mistake rheumatism, with which slighter and more gr attacks may be confounded. The priapism, the upper portion of the cord is the seat, an states of the excretory functions, further aic diagnosis.

197. *D.* The *prognosis* is always most unfa able when the attack is such as to admit of a dent diagnosis. But the issue may be protra especially when the lower portion of the cc the seat of hæmorrhage, and is then to be asc chiefly to consecutive changes, which may r an indefinite period to produce their ult effects. When the effusion is near the pc medulla oblongata, or even when it is in the vical region, and especially if it is of consid amount, at any part of the upper regions c cord, then death may occur immediately, c few hours, or in less decided cases, in a few M. Hutin found in the cervical portion c cord two clots of blood. The person during the night. When the hæmorrhage is limited, restoration of the lesion, and even functions depending upon the seat of lesion take place. M. Cruveilhier states, that a cal student lived five years after a circums hæmorrhage in the left side of the cervical tion of the cord. Loss of motion was e enced in the same side — in both the lowe upper left extremity. The patient died of a greater hæmorrhage than the first, and the s that was found cicatrized, the blood having absorbed, and the movements of the side gra restored. This case shows, that hæmorrhag the substance of the cord and the seat of ha rhage undergo similar changes to those obs in the nervous structures contained withi cranium — that apoplexy of the cord may covered from; remains of old apoplectic similar to those observed in the brain, having met with in the substance of the cord, pa larly in its cineritious structure.

198. *E. The treatment* of spinal apoplexy be founded more upon the analogy of this d with cerebral apoplexy than upon the resu experience. It may be directed with the f ing intentions:— 1st, to arrest, or to prev recurrence of the effusion; 2nd, to favou absorption of the extravasated blood; and keep within due bounds the vascular react irritation accompanying or following upo process of reparation in the seat of injury. these purposes, bloodletting, chiefly by cu glasses applied on the spine, according to the and habit of body of the patient; terebint epithems or embrocations along the spine

or lateral recumbent posture, perfect rest; ion to the secretions and excretions; frequent rse to the catheter, if it should be at all re- l, and the earliest and utmost endeavours to nt bed-sores, by recourse to air-pillows, the static bed, &c., comprise the chief means vill be found useful in these seizures. Most measures will either prove inefficacious or ous, excepting such other means as have advised for *myelitis* (§§ 171. *et seq.*), which upervene upon the more limited or slight s of hæmorrhage.

. iv. TUMOURS OF VARIOUS KINDS, DEVE- IN, OR NEAR TO THE SPINAL CORD, pro- effects which terminate fatally, after having oned, for an indefinite period, paraplegia or l paralysis. The tumours, or morbid pro- ns, or growths, which may implicate the or its membranes, are of various kinds; ay be formed either in the vicinity of the or in the membranes, or even in the cord Certain of these are developed exteriorly cord only, and others may even be pri- formed in it, although very rarely, as well ts membranes, or in its vicinity. *Aneurisms* aorta may produce ulceration and absorp- the bodies of the vertebræ, and ultimately he membranes, or even the spinal marrow *Hydatids* may produce similar effects.

. *a. Cartilaginous productions* may invade tebral canal, or *exostoses* may form within the diminish its calibre, and press upon the cord. se recorded by Mr. A. KEY, the ligaments g the intervertebral substance between the and third lumbar vertebræ, were hardened ominent, projecting so far into the canal as nish it by one third of its diameter. The had lost the power of motion, but retained n of the lower extremities. In another loss of power of motion, numbness and from the loins downwards, retention of nd imperfect command over the sphincter re experienced, terminating in sloughing nates and death. "The intervertebral ce above the 12th dorsal vertebra, with ment covering it, presented a slight ridge, ng into the medullary canal, as if an tion from the edge of one bone tended e with a similar growth from the other This transverse ridge manifestly narrowed al."

b. Tumours, fibrous, fungoid, or otherwise ed, malignant or non-malignant, may grow ly to the vertebral canal, and may invade rely the walls of the canal, but also the anes and cord itself; or such tumours mmence in, or be attached to, the dura f the chord. *Tubercles* and melanoid and *ncerous growths* are very rarely found in al cord, although not infrequently seen rain. *Tubercle* occurs only in connection bercles in other organs, and chiefly in the and lumbar regions of the cord, where ies the white fibrous structure, and some- e grey substance. As in the brain, so in al cord, it occasions red or inflammatory g, or yellow softening of the surrounding In some cases, several tubercles, not ex- the size of millet or hemp seeds, are together. In others, only one tubercle ze of a pea or bean is found.

202. *c. Cancerous formations* are very rarely found in the cord, and even then chiefly in a secondary form, or in connection with similar productions in other parts. The very extensive experience of ROKITANSKY, furnished him with only one instance of true and primary cancer of the cord. But he has met with several instances of circumscribed callous induration of the white columns, of the cancerous nature of which he is in doubt. OLLIVIER mentions several examples of diffused carcinomatous growths implicating the spinal cord, as well as of so-called colloid cancer.

203. *d.* The *symptoms* produced by morbid growths and alterations of structure in the spinal cord and its membranes, or by tumours developed in the vicinity, are generally those which indicate a slowly increased pressure on the cord, or a slowly advancing interruption of the functions of this organ. They are rarely such as enable us to distinguish the nature or the particular kind of lesion producing the interruption, unless a tumour of sufficient size be formed in the vicinity, and even then the information is only partial. As in cases of *softening*, *induration*, or *atrophy* of portions, or of a considerable extent of the cord, the lesions now being considered produce phenomena which vary much with the region in which they are seated, with the nature and extent of the lesion, and with various concurrent or consecutive changes. When the organic lesion is seated in the lumbar region, and is only slightly developed, so as neither to compress nor destroy part of the organ, there are numbness or pain, prickings, twitchings, insensibility, and difficulty of motion of the lower extremities, or even of one lower extremity only. In proportion as the disease compresses or destroys both sides of any portion of the cord, hemi-paraplegia increases and extends, and complete paraplegia is developed. At last, after a longer or shorter time, according to the nature and progress of the lesion, paraplegia becomes more complete, there being loss of motion, sometimes of feeling also, of the lower limbs. Micturition and defæcation, at first difficult, become almost impossible. The catheter is constantly required, as well as the most active purgatives, which are often without effect, inflaming merely the bowels. The patient thus drags on a miserable existence, till at length escars form in the parts subject to pressure, and infiltration of the extremities and loose cellular tissue, and various consequent affections, chiefly suppression of the excretions and absorption of morbid matters, supervene, and terminate life by contaminating the circulation.

204. When the structural lesion is seated in the dorsal region of the cord or of its membranes, or spine itself, the above phenomena are often attended by difficult respiration, owing to impeded action of the inspiratory muscles from impaired influence of the intercostal nerves. And when the cervical portion of the cord is affected, besides the preceding lesions of function, the superior extremities, and even the voice and speech and muscles of deglutition, slightly participate in the paralytic disorder. The whole train of symptoms is often attended at first by little pain in the parts of the spine affected, unless when the lesion is cancerous. These formations are generally developed, more or less slowly, without any symptoms of vascular reaction or febrile commotion;

but contractions of, or spasms, or pains in, the limbs, and severe pains in corresponding regions of the trunk with the seat of disease, are very generally experienced during the more advanced stages.*

205. *e.* But little can be said respectin *diagnosis* of the above lesions with any tru precision. It has been supposed that scirrh cancer, involving the cord or its membranes be indicated by lancinating pains occurri intervals, especially towards the close of th ease; by a straw yellow tint of the skin; b presence of the same disease in other parts body, and by the advanced age of the patie it seldom appears until after the meridian c But, although these indications are generall served, they are not always present. Tub can be inferred to be the cause of the sym characteristic of organic lesions of the cord, only when their existence in other o or parts have been or are manifested; and the early age of the patient, the scrofulous and the absence of inflammatory symptom ther aid this inference. The syphilitic cacl and the existence of osseous tumours, exte may suggest the presence of similar tumours

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* The following cases, more or less abridged from the original reports, will illustrate the history of the lesions now considered:—

i. *Fibrous tumour in the Theca Vertebralis.*—A female, aged thirty-five, felt pain the back and side, and was very sensible of cold in her legs; the left foot and ankle soon afterwards becoming weak, cold, heavy, with impaired power of locomotion. Two months afterwards the right leg was similarly affected; these sensations, with numbness now extending up to her loins. Her gait was unsteady, but there was no tenderness along any part of the spine. Five months after the first symptoms, she had darting pains in the knees, aching in the loins, and great difficulty in walking. Sensation was impaired. She had cramps in her legs. In about twelve months, she could not stand, involuntary movements of the lower extremities occurred, and she voided urine with difficulty. Fourteen months from the commencement of disorder, sensation and motion of the lower limbs were abolished, but the urinary bladder expelled its contents. Four years from the invasion, any attempt to move caused cramps of her whole frame. She had severe pain in the back and lower part of the body. Both limbs were very cold, and the right was much swollen. Five years from the date of disorder, no sensation or motion existed below the loins, but tickling the soles of the feet produced involuntary movements. She lived upwards of seven years from the invasion of the paralysis.

On *inspection* after death the body was much emaciated, extensive sloughing existing over the sacrum and hips. The brain was healthy "At the lower dorsal portion of the spinal cord, there was a tumour, involving the substance of the cord, about the size of the last joint of a man's forefinger. It was of firm consistence, and osseous where it sprung from within the dura mater, opposite the eleventh dorsal vertebra, to the depth of a quarter of an inch, and fibrous, with rough granular matter intermixed in the rest of its structure. Its distinct round form compressed, and was firmly attached to the arachnoid and spinal cord itself, so as to cut into and flatten the nervous substance of the cord. For about two inches below the tumour the cord was much softened, and a little behind its centre was a canal, half an inch long, within its neurine." (Smith and Ewen, *in Reports of Pathol. Soc. of Lond.* 1847 and 1848, p. 180.)

ii. *Tubercles in the Spinal Marrow.*—A laundress, in a delicate state of health for some time previously, complained of pains in the back and lower extremities, with impaired power in her legs. After some weeks, she complained of tingling and pricking pains, and a fortnight afterwards, she had complete paraplegia, both sensation and motion being simultaneously destroyed. She now began to suffer severely from spasmodic contraction of the muscles, chiefly when about to fall asleep, or when the legs were touched or shifted in bed. The knees were then rigidly bent and drawn up to the abdomen. The introduction of the catheter into the bladder, produced the spasms. The bowels were constipated; but after the action of medicine, she could not retain the fæces. She had catching pains, with spasms in the lower ribs and hypogastrium, and pain in the lumbar region, with slight projection of one of the spinous processes. A slough formed on the sacrum; bronchitis supervened, and she died, about three months from the invasion of paralysis.

The *examination, post mortem*, displayed the membranes of the spinal cord in a healthy state; "but at two points, the upper one opposite to the eighth, and the lower to the twelfth, dorsal vertebra the spinal marrow was slightly swollen into a globular form, and felt hard; the surface, in colour, texture, and vascularity, remaining unchanged. On making a longitudinal section of the upper swelling, an oval mass of tubercular matter, three-quarters of an inch in length, and about the same diameter as the spinal marrow, of the firmness of a lymphatic gland, of uniform structure, and of a pale green hue, was seen to occupy the whole interior of the organ, and was invested all round by a thin layer of medullary matter. The structure of the spinal marrow immediately adjoining the morbid growth appeared sound. The swelling a few inches lower down was caused by a similar circumscribed mass of tubercular matter, contained in the interior of the cord, but it was smaller in size. In the left crus cerebelli, close to the pons Varollii, and about its middle, another tubercular tumour, in colour and size not unlike the kernel of a hazel-nut, was found imbedded in the substance of the crus, at the depth of a quarter of an inch from the surface, the adjacent medullary matter being quite healthy. There was also a tumour of the same structure, and of the size of a the left hippocampus minor. Tubercles were sc through both lungs, &c." (Mr. Shaw, *in Ibid.*, 18 1849, p. 24.)

iii. *Cancerous tumour in the Spinal Canal.*— aged forty-six, of intemperate habits, could not without support. There was complete loss of vol power below the pelvis, and total anæsthesia in th leg. He could feel pinching in the left. Refl tion was slowly produced by severe pinching, easily excited erythema. There was tenderness the lower dorsal vertebræ. The paralysis afterw vaded successively the abdominal muscles and th der and arms, so that for some weeks before dea of sensation and voluntary motion was complete the chest. Slight reflex action of the legs could duced by severe pinching. Convulsive attacks p death.

On *examination*, the body was much emaciated. brain and membranes were healthy. Within the canal, closely adherent to the theca externally, th isted an irregular encephaloid mass, mottled wi spots, extending from the third to the sixth dors tebræ, the bodies of which were carious, and inf with cancerous matter. The tumour extended ou between the spines of the vertebræ and muscles the integuments. The portion of the cord ben was flattened, soft, and wasted. An ounce of fl contained beneath the arachnoid below the tum Cancerous matter was found also in the lungs, heart, and pancreas. (Dr. C. J. B. Williams, *i* 1846 and 1847, p. 43.)

iv. *A fibro-carcinomatous tumour invading the Canal, &c.*—A young lady had a tumour firmly at between the angle of the eighth rib, and the spino cesses of the vertebræ on the left side. It was painless, and immovable, and of the size of orange. Five months afterwards, she had weakn numbness of the legs, so that she could not stan the following day she was completely paraplegi on the day after this she passed her motions i tarily and there was retention of urine. She afte had cough, rigors, profuse perspiration, shortn breath, and quick pulse. She had a slight convul and soon afterwards expired — four days from t pearance of paralysis.

After death, this tumour was found to be comp carcinoma fibrosum, and was very dense. The a the dorsal vertebræ and the spines were next rais upon the visceral surface of the fourth and fifth, a somewhat similar to the external one, and of such a to contract considerably the calibre of the vertebra was discovered. "This growth resembled carc although somewhat lobulated. Opposite to th theca was congested. although its normal conto preserved. Upon opening the theca posteriorly, centre, the veins on the posterior surface of th were turgid, and the cord itself was a little fla When the anterior portion of the theca was divi the centre, and reflected laterally, the anterior c seemed to fall spontaneously on either side, and pose the grey matter of the medulla, which w darker tint than usual, and very soft. This so extended about an inch." The left thoracic cav invaded by a tumour corresponding with that dorsal region outside. (Mr. A. Key, *in Ibid.*, 18 1849, p. 25.)

l canal; but of this there is rarely any evi- e; a supposition only can be entertained.

6. *f.* The *prognosis* in the above states of dis- is always unfavourable. No correct idea can be formed as to the term of their dura- After the paraplegic symptoms, or spasms, 1 they produce, have appeared, a few days may be the term of existence; or life may rolonged for several years, as in the cases 1 I have here adduced. When the lesion is d in the upper regions of the cord or its embranes, the duration of the disease is gene- much shorter than when it is seated in the ar region.

7. *g.* The *treatment* of the structural changes considered, cannot be directed with much ntage, even if the nature of these changes sufficiently manifest; but in most cases we ed in the dark, although in some instances, or less light breaks upon our path. Yet, ever may be the particular lesion in this er that we may be required to combat, there e indication which should always guide our and this is to support the vital resistance to xtension of disease. There are very few or- changes which are not increased by inflam- y action, on the one hand, and by debility— npaired constitutional power, on the other. should, therefore, endeavour to improve the al health, by promoting the digestive, the as- ting, and the excreting functions, and by re- l to a dry, pure, and temperate air; avoiding ment, and all sources of physical and mental ion. It may sometimes be requisite to rt the strength; and for this purpose such ines as have the effect may be given with which are most likely to procure the absorp- f morbid growths, or to arrest their progress. these intentions, the bitter infusions may be with small doses of the iodide of potassium he solution of potash, or the carbonates of 1, or Brandish's alkaline solution; and to the preparations of sarza may be added; or, cumstances may suggest, the iodide of iron be given in the syrup of sarza. In many the chief manifestation of disease—the pa- s produced by the organic change, will be treated empirically or removed from the of the scientific physician; and, although n of the means thus employed may be more ss beneficial, especially electricity, galvan- nd electro-magnetism, yet they may be in- s, in some cases, when prescribed without discrimination. Whenever the paralytic oms are attended by spasms or spastic con- ons, then these are hazardous means; and ame may be stated respecting nux-vomica, nine, and phosphorus. But it is unneces- o add to what I have advanced above (§§ t seq.), or to what has been adduced respect- e *treatment of* PARALYSIS.

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SPLEEN — DISEASES OF THE.

— SYNON. —Σπλήν, Gr. — *Splen*; *Lien*, Lat.—*Rate*, Fr. —*Milz*, Ger.—*Milza*, Ital.—*Milt*.

1. The *diseases of the spleen* have not attached to themselves that degree of importance to which their not infrequent severity, their prevalence in malarious localities, more especially in warm climates and in armies, and the danger often attending them, most undeniably entitle them. This may be partly owing to the uncertainty hitherto existing respecting the functions of this organ in health, and of the exact nature and pathological relations of the maladies to which it is subject. The superficial manner in which disorders of the spleen have hitherto been considered is an opprobrium, with which not English medical literature merely, but the medical literature of other countries also, is justly chargeable. When it is considered, that our expeditions and armies during the last two hundred years, and in all latitudes, from Heligoland, Walcheren, &c., to Burma and China in the East, and the Monte Video in the West,—that all our colonists and settlers, from Canada to Australia,—that all our dependencies in both the Eastern and Western hemispheres,—and that all races, both fair and dark, more especially the former, have suffered more or less, and have not infrequently been carried off by diseases of the spleen, the imperfect knowledge and scanty literature of these diseases are matters of no small surprise.

2. I. Intimate Structure of the Spleen:—Before proceeding to consider the diseases of the spleen, it will be advisable to offer some remarks upon the normal structure of this organ. From the time of Winslow to that of Andral, this viscus was said to be composed of the following constituents: — 1st, A fibrous structure forming its sub-peritoneal, proper, and investing capsule or membrane, and detaching from its internal surface a number of fibrous septa and filaments, which divide and subdivide so as to form a number of cells into which the blood is effused; 2nd, Veins, which throughout their whole extent, communicate with these cells by an infinite number of perforations in their sides; 3rd, Arteries, the small branches of which ramify on the septa of the cells; 4th, Nerves and lymphatic vessels. Sir E. Home and Beclard appear to have agreed with the foregoing description, and to have viewed the spleen as strictly an erectile structure.

3. More recently the microscopical anatomists, especially of Germany, have upset this account; and Müller, Ecker, Güsburg, Gluge, Œsterlen, Hessling, Gerluch, Giesker, Arnold, Kölliker, and others, have furnished us with very different descriptions of the structure of this viscus. These, however, by no means agree; but, as Kölliker's description appears to be the most minute, and to enjoy the most credit—as it is, moreover, published in this country, and in a contemporary work, I shall endeavour to give a brief account of the results of his researches. These are, however, by no means clear, and certainly tend to throw but little light upon the diseases and lesions of the organ.

4. This author notices—1st, The *serous* or *peritoneal membrane*, which accurately covers the outer surface of the spleen, with the exception of the *hilus*, constituting the gastro-splenic ligament, and conveying the vessels to and from the viscus; this covering is intimately connected with the subjacent fibrous and proper coat of the organ.

5. 2nd, The *fibrous or proper coat* encloses the parenchyma of the spleen on every side, as a sac or envelope, with the exception of the hilus, where the two membranes diverge, and are separated by vessels, nerves, and areolar tissue. The inner surface of the coat "bounds the parenchyma of the organ, and with the exception of very numerous solid processes, which come off from it, is limited by the *trabecular tissue*. At the hilus of the spleen it sinks into the interior of the organ in the shape of tubes (*vaginæ vasorum*), which ensheath the entering and emerging vessels, and are continued on these throughout the whole parenchyma." The fibrous coat is composed of white fibrous tissue, mixed with elastic or yellow fibres; the former of these consists of bands which take a parallel course, but do not form distinct bundles; and the latter are united in a very dense and irregular network.

6. 3rd, The *trabecular tissue* consists of "white, shining, flat or cylindrical fibres, which arise in great numbers from the inner surface of the fibrous coat, and in smaller quantity from the exterior surface of the sheaths of the vessels. These are so connected with similar fibres in the interior of the spleen as to form a network which extends throughout the organ. Between the fibres of this net exist a great number of spaces, which
are connected with each other, and are occ
by the red spleen substance (5th) and splenic
puscles (4th); and which, although very
gular in respect of their form and size, have
considerable resemblance to each other."
trabecular tissue completely corresponds wit
fibrous coat, since it consists of white and ye
fibres; and this Kölliker considers to be
cular; but, if this be admitted, the fibrous
should be considered as muscular also; and
being viewed us muscular, the contractio
the spleen, so often remarked upon, may be
counted for. Malpighi and others had,
viously to this writer, contended for mus
fibres in the partitions of the spleen; but Köll
appears to have been the first to demonstrate
microscopically.

7. 4th, The *splenic vesicles or Malpighia*
puscles, are whitish spherical corpuscles imbe
in the red spleen pulp (5). They are frequ
not seen in the bodies of men dead of diseas
though normal structures, which are inva
present in the healthy subject. The size of
corpuscles varies from one-tenth to one-third
line, on an average of one-sixth. They are
bedded in the red spleen substance, and, wit
exception of one point, where they are att
to external twigs, they are every where surro
by this substance. Hessling and Köllike
lieve that, in the healthy spleen, they cons
from one-fifth to one-sixth of the whole s
mass. Each Malpighian corpuscle posses
special membrane and contents, and theref
not a solid corpuscle, but rather vesicle
membrane appearing to be only a modified
tion of the vascular sheaths (§ 5.) with
it is continuous. The contents consist of a
quantity of a clear fluid, and a large quant
morphous particles, which, according t
Müller, very much resemble the corpuscl
the spleen-pulp, and have a general liken
the blood discs, but are irregularly sphe
often resembling the chyle corpuscles. Köl
maintains that the Malpighian bodies are
corpuscles, and stand in no connection wit
lymphatics; that they constitute a kind of
glandular vesicle, and that there is nothi
warrant their being regarded as glandular ve

8. 5th, The *red spleen substance, pulp, o*
renchyma of the spleen, is a soft reddish
which fills up all the interstices between the
partitions and the stronger vessels. Having
a section of the viscus, it is easily scraped
squeezed out. It consists essentially of thre
stituents, viz. fine blood-vessels, parenchyma-
and small portions of fibres, to which m
added, extravasated blood in various met
phoses. The cells of the spleen pulp, or p
chyma cells, are similar to the Malpighian
puscles, but of a darker colour, and of a
variable and smaller size. The blood effus
the spleen pulp and the blood-globules ar
most constantly undergoing dissolution i
spleen and disappearing, according to th
searches of Kölliker.

9. 6th, The *vessels of the spleen* enter the
of the spleen, and on arriving at the viscus, bo
terial and venous branches receive, as a cov
or sheath, a process of the tunica propria o
spleen, which forms the *vaginæ vasorum*, al
noticed (§ 5.). The calibre of the s

according to HOME, GIESKER, and others, is
portion to that of the artery, as five or six to
whilst the thickness of its coats is very incon-
able, and it has no valves. The arteries,
, and nerves are enclosed in sheaths of the
propria; and not only are the trunks of
ng and emerging vessels thus covered, but
finer ramifications receive a similar clothing.
arterial branches ramify minutely in the Mal-
an corpuscles and surrounding red pulpy
ance, into which latter part especially, all the
pencil-shaped ramifications pass; and the
encements of the veins spring from these
hes. These nervous commencements or
aries are tolerably large, anastomose fre-
ly with each other, and scarcely have a spe-
oat as yet. They give the cellular appear-
seen in inflation of the veins of the pulp, and
, injected, form structures resembling the
ra cavernosa of the penis. The lymphatics
n are rather less numerous than in the other
ular organs.

7th, The *nerves* of the spleen, proceeding
the splenic plexus, accompany the splenic
, and divide in such wise at the giving off
branches, that each artery receives one, or
frequently two nerves which accompany it,
ere and there anastomose with each other.
nerves may be traced on the arteries which
the Malpighian corpuscles; and by the aid
microscope, they may be seen passing into
lp, on the pencils of minute arteries.

II. THE PHYSIOLOGICAL PATHOLOGY OF
PLEEN rests on a knowledge of its structure;
herefore I have endeavoured to give, as suc-
y as possible, the results of the researches of
IKER. HEWSON has remarked, that when an
receives more blood than it requires for its
nutrition, we may conclude therefrom that
lood undergoes a change from it, or a secre-
rocess takes place; and this applies strictly
spleen. This physiologist, and subse-
ly TIEDEMANN and GMELIN, believed that a
ular lymph is generated in the spleen, which
to form blood-globules. But KÖLLIKER
es this view, and contends that the interior
spleen is quite poor in lymphatic vessels,
at the blood in the splenic veins is poor in
-globules; and hence that it is impossible to
e in the formation of a special lymph in the
, or a relation to the lymphatic system. He
ds that no trace whatever of the formation
od-globules can be detected, but that, at
step of his researches, indications of a disso-
or decomposition of the globules in the
were presented to him. He concludes,
the blood-globules undergo solution in the
, and that their colouring matter is employed
paring the colouring matter of the bile."

The contractile power of the spleen was
ved by many anatomists, and an explanation
power has been furnished by KÖLLIKER'S
ery of muscular or contractile fibres in it,
own above. Hence this viscus can dilate
ontract itself by relaxation of its contrac-
muscular fibres existing in its balks, coats,
essel-sheaths; and hence it becomes turges-
and by contraction of these it becomes small.
g its turgescence, a stagnation, and possibly
an extravasation of blood takes place in its
aries and pulp, the globules thus more readily undergoing solution or destruction; this change taking place in the Malpighian corpuscles, and in the parenchyma cells.

13. This theory of the function of the spleen has received the support of ECKER and BECLARD; and it serves to explain the diseased condition of the viscus, and the influence exerted by those conditions on the œconomy. That this organ is more or less affected in the course of fevers, periodic, continued and exanthematous, is well known, and especially when these maladies assume an adynamic or malignant character. That it is also often disordered or diseased in scurvy, purpura, chlorosis, rheumatism, and in some other chronic maladies, has been remarked; and it is generally admitted, that enlargements and other organic changes of the organ, if they be of considerable continuance, are attended by more or less marked anæmia and emaciation. The emaciation, anæmia, and other changes in the blood, as a superabundance of fibrine, &c., so frequently observed in the progress of periodic fevers, rheumatism, &c., may readily be referred to dissolution of the blood-globules in the spleen during the congestions and enlargements of it in the course of these maladies. J. P. FRANK has remarked respecting the spleen that, "aliorum fere morborum imperio turget et subsidet," and, in these circumstances, the changes produced by it on the blood, cannot fail of being more or less considerable.

14. III. CAUSES OF DISEASES OF THE SPLEEN. — Diseases of this viscus occur at all ages. I have seen them in infants of only a few weeks old, and in very aged persons, as well as at every intermediate age. They are very frequently met with in warm, marshy countries, previously to puberty, in both the white and dark races, but more especially in the children of Europeans born in those countries. The children of English or other European parents born in the East or West Indies, seldom escape some affection or other of the spleen, if they continue to live in malarious districts during the periods of childhood, or until the period of puberty. The male sex is more liable to them than the female, probably owing to the former being more exposed to the causes of splenic disease, and to the greater temperance, and to the periodic discharges of the latter. Of all causes, the *endemic* are the most influential, especially malaria from any of its various sources, and the use of marshy, stagnant, or impure water, or water preserved in tanks, or containing decayed vegetable or animal matters, or both (see art. ENDEMIC INFLUENCE). These causes, according to their concurrence with other causes, or to the constitution of the individual, are productive of either inflammations, congestions, enlargements, or other organic changes of the spleen, generally as a complication or as a consequence of periodic fevers; but they may produce these affections independently of antecedent or attendant periodic fever. Besides these causes, others are not without influence, namely, living in low, humid, and close situations, and in wet, clayey localities, or in cold and damp cellars; debility and vital depression, produced in any way; unwholesome or insufficient food; running, long walks and fatigue; intemperance in food or drink; and whatever contaminates or alters the constitution of the blood and chyle.

15. There are certain circumstances connected with the circulation and the state of the blood, which favours the production of splenic disease, although various local and constitutional causes aid in the result. Continued muscular efforts not merely increase the rapidity of the circulation, but also change, in some degree, the state of the blood itself, and alter more or less its normal distribution in the several organs and parts of the frame. During muscular exertion, the blood is thrown inwards in larger quantity, and distends the visceral veins and large venous trunks, the spleen becoming in some measure a diverticulum to the venous circulation in these circumstances. Somewhat similar changes occur during the cold stage of agues, and in the period of invasion of other fevers, before reaction takes place; but, instead of the circulation being greatly accelerated, and *active* congestion of, or vascular determination to, internal viscera being produced, as in the former circumstances, it is rendered slower than natural in the latter; *passive* congestion of the internal veins and viscera being occasioned by the partial suppression of the circulation in the extremities and on the surface. During the operation of any of the former category of causes, the active determination of blood to the organ may occasion the more acute forms of splenic disease, whilst during the action of either of the latter, engorgements, enlargements, and other chronic affections of the organ are more liable to result.

16. The state of the blood itself also very materially influences the nature and form of the resulting disease. As long as this fluid continues uncontaminated, or preserves its natural crasis, the splenic affection retains more or less of a sthenic character. But when the blood becomes contaminated, either by infectious emanations, or by septic or deleterious effluvia, more especially by such as proceed from the decomposition of animal matter, the spleen experiences the most serious changes, and these generally assume an asthenic or septic character, this organ being not merely congested or enlarged, but also remarkably softened, deprived of vital cohesion, and otherwise greatly altered. There is no part of the frame, which sooner or more remarkably betrays, by these changes, the consequences of vital depression and contamination of the circulation, especially in warm and malarious climates and localities, than the spleen.

17. Amongst the most common causes of disease of the spleen, especially of an acute character, are long marches in malarial countries, running, fatigue; falls, injuries, or blows on the left hypochondrium; drinking cold fluids when the body is overheated and perspiring, unwholesome beverages, and irregularities in diet. Hence the greater frequency of affections of the spleen, and the very acute form which these affections often assume, in soldiers in active service in warm climates. Diseases of a chronic kind, and very often those which are acute, are, in these circumstances, amongst the most difficult and serious maladies which come under the care of the physician; and they are not the less so, that they are seldom primary, and rarely occur in persons previously healthy, they being more frequently complications, or consecutive upon, or sequelæ of other maladies, especially of periodic fevers, of obstructions of the liver, of chlorosis and uterine
obstructions, of diseases of the heart and vascu
system, particularly the veins.

18. Anxieties of mind, depression of spi
from any cause, discouragements, disappoi
ments, losses of friends or fortune, nostalgia, a
whatever tends to lower the tone of the mind,
to depress mental vigour and activity, exert c
siderable influence both in predisposing to, a
in more immediately producing, disorders of
spleen. Persons predisposed by these causes
the most liable to be attacked not only by disea
of the spleen, but even more frequently by th
maladies, of which these diseases are either co
plications or sequelæ; and are much more s
ceptible of the effects of those endemic cau
which are so injurious in hot climates. It is
great heat merely which is productive of dise
of the spleen and their allied maladies, but chi
sudden falls, or rapid alternations of temperat
At the terminations of the periodic rains,
when the nights become comparatively cool
cold after hot days, the air being loaded w
malaria, and the circulation determined, fr
the surface and extremities, upon the inter
viscera, the frequent congestion of the sple
thereby produced, or otherwise caused, as
the frequent recurrence of the cold stage of
ague, occasions either inflammatory or sub
flammatory affections, or structural changes
this viscus,—results which the impression of
laria on the nervous system, when aided
mental depression and vicissitudes of temp
ture, the more certainly and severely induces.
warm climates congestions or other disease
the spleen seldom occur in females, either pri
rily or consecutively of periodic fevers, with
being associated with disordered menstruation
without delayed menstruation or chlorosis in yo
females, or suppressed menstruation or leucorr
in females of maturer age.

IV. PAINFUL AFFECTION OF THE SPLEEN

SYNON.—*Splenalgia* (σπλην, spleen; and αλγ
I am pained). — *Dolor lateris, obstructio lie*
Auct. Var. — *Splenis dolor*, — *Splenic pain*,
in the left side.

CLASSIF.— II. CLASS. — III. ORDER (
thor in Preface).

19. DEFINIT.—*Pain in the left side, with*
febrile symptoms, occurring often suddenly,
frequently ceasing as suddenly, sometimes cause
running, and occasionally being symptomatic
hysteria or uterine disorder.

20. *A. Splenalgia* most commonly occurs in
circumstances just named, and in its slighter fo
it is often complained of by boys or others u
sudden exertion, especially running up hill,
against the wind, or ascending heights; an
usually ceases soon after the causes. Whe
appears in hysterical females, or in connec
with uterine disorder, it is much more obsti
and liable to recur. With the severity of p
referred to the left hypochondrium, there is o
either shortness of breath, or a painful stitch
breathing, or frequent sighing, and the pain
be mistaken for pleurodynia, or even for pleur
but the absence of febrile symptoms, the circ
stances in which it occurs, and its sudden or q
subsidence with the cessation of the cause, s
ciently characterise the disorder, and distingui
from inflammatory or structural disease of the vis
When splenalgia is occasioned by running or o

of physical exertion, it may with justice puted to a rapid or sudden congestion of the n by a greater flow of blood into the organ return of the fluid by the veins; the sudden sion or turgescence, causing stretching and of the fibrous structure and peritoneal en- e of the organ. When the affection is con- d with hysteria, or with uterine disorder, or indigestion, it may be imputed either to n congestion, or to a morbid sensibility of erves supplying the viscus. It may be re- ed, that the term splenalgia has been im- rly implied to both inflammatory and or- lesions of the spleen—as a generic term for c diseases — by some modern as well as r writers: I have restricted it as above.

B. The *treatment* of splenalgia depends upon uses. If induced by the nature or amount of ise, repose will generally soon remove it. If neuralgic, or connected with hysteria or ute- lisorder, the means advised for these affec- respectively will be most appropriate. ever this viscus betrays a disposition to dis- by an increased or morbid sensibility, then a ative treatment, especially by chalybeate pre- ons or mineral waters, appears to be indicated. should not be overlooked, that this affection, rsistence or recurrence, may pass into pro- d congestion or tumefaction, or into acute or ute, or chronic inflammation, although this is not of very frequent occurrence. In these nstances, the treatment hereafter to be no- should be adopted (§§ 62. *et seq.*).

Congestion or Simple Turgescence of pleen.

lassif.—*See Painful Affections of.*

2 *Turgescence* of the spleen is generally *cha- ised by more or less pain or tenderness, by a s or weight, in the left hypochondrium, some- by shortness or rather shallowness of breath- d by various sympathetic feelings, according ssociation or complication with periodic fevers r ailments.*

2 Congestions of the spleen are most com- met in connection with agues, with ob- ons to the portal circulation, and with the liseases incidental to warm and malarious es, especially in children and young persons, e offspring of Europeans in these climates. slighter states, congestion of this viscus is a primary affection, and it then less fre- y comes under the observation of the phy- It chiefly, when it occurs as a complication arious diseases, or when a frequent recur- or a prolonged continuance of congestion, en followed by inflammation, or by perma- nlargement, or by other organic lesions of cus, that this disorder, or rather its conse- s, comes under medical treatment.

2 *A.* The *symptoms* of splenic congestion vary vith the extent of congestion, with the rapidity ccurrence, with the causes which produced the temperament in which it occurs, and he disorders of which it is a complication. ccession be sudden or rapid, there is gene- ore or less pain in the splenic region; if r if the affection be consequent upon ague, ay not be much complained of. But there rally a sense of weight or uneasiness, or ful- and more or less pain or soreness is induced ssure or percussion of this region, with occasionally manifest enlargement, but more commonly only an indistinct fulness of this part. There is generally no fever, unless the affection be connected with some febrile disease. When the congestion is greater or of longer continuance, the digestive, assimilating, and excreting functions are more or loss disturbed. The fulness or enlargement in the left hypocondrium is greater, is often attended by tension, and the pain or tenderness produced by pressure is more felt. Various sympathetic pains are then often experienced; and the patient presents a more sickly, or a more sallow or lurid, or even a partially anæmied hue. Sometimes, also, especially when the disorder has been of some continuance, emaciation takes place, and the tongue becomes loaded or flabby, or indented at the edges. The skin generally remains cool; the pulse is low or weak, and the conjunctiva pale. The breathing is superficial or short; and the stools are very dark, whilst the urine is pale and of natural quantity. Females are generally during the continuance of congestion of the spleen subject to amenorrhœa, or to difficult and scanty menstruation, or to leucorrhœa.

25. If congestion of the spleen continue long or recur frequently, one or other of the affections about to be noticed generally supervenes, especially in hot and malarious localities, or when the disorder is connected with periodic fevers, or with obstruction to the portal circulation. Prolonged congestion, as well as other chronic diseases of the spleen commonly, is attended by, even if it actually be not influential in producing, a poor or morbid condition of the blood and impaired nutrition. The dark and sallow hue; the pallid lips, tongue, and gums; the general emaciation contrasting often remarkably with the fulness in the splenic region, and the deficient capillary circulation on the surface, impart a striking appearance to persons subject to chronic congestions and structural diseases of the spleen. Whether the changes produced in the blood by the spleen be such as tend to the full elaboration of the blood-globules — to the formations of healthy blood, — as was believed by many pathologists, and only recently denied, or whether the spleen reduces or dissolves the blood-globules, and prevents their excessive formation, as inferred by Kölliker and others, there can be no doubt that diseases of the spleen induce a poor state of the blood, and more or less emaciation. If the former doctrine be entertained, the inference must necessarily be, that the splenic disease impedes the healthy or natural changes produced by the spleen on the blood. If the latter theory be adopted, it will as necessarily follow, that either the diseased spleen does not cease to reduce or dissolve the red globules, or that some other organ or organs take up the office vicariously for the spleen, and that, moreover, this office is discharged to a much greater extent during diseases of the viscus than it is even in health.

26. *B.* The *treatment* of splenic congestion consists chiefly in the removal of, or from, the causes producing the complaint, and in the cure or prevention of the diseases, of which it is consecutive. These causes are chiefly endemic, and hence change of air and locality is essential to a permanent cure of the complaint. Tonics, chalybeates, and stomachic aperients, are generally beneficial. These secretions and excretions should be sufficiently

free; but the means used to fulfil this intention ought not to be of a depressing kind. Stomachic and chologogue aperients should be conjoined with tonics, as the compound decoction of aloes with the compound mixture of iron, &c., or the compound infusion of gentian, with the infusion of rhubarb, &c.; or quinine, or preparations of cinchona may be given in various states of combination, according to the peculiarities of individual cases. In most cases, and even during residence in localities productive of congested spleen, I have found a combination of the sulphates of iron and quina, and the aloes and myrrh pill most serviceable, the last being given in sufficient quantity to act satisfactorily on the bowels. The treatment hereafter to be recommended for chronic enlargements of the spleen, may also be prescribed, in more obstinate cases, or when the disease is complicated with ague or with biliary obstruction. In the former morbid association, the decoction of bark, with serpentaria, or with the nitro-muriatic acids; or the infusion of calumba or quassia with preparations of iron, and sponging the surface of the abdomen with the nitro-muriatic acid solution, and an occasional recourse to a warm bath, followed by frictions with the horse-hair or Indian glove, will generally be most beneficial, due attention being always paid to the states of the intestinal and urinary excretions.

VI. Inflammations of the Spleen.—Synon. *Splenitis*, Auct Var.—*Lienis Inflammatio*, Sennert. — *Lienitis*, Auct. — *Cauma Splenitis*, Young. — *Empresma Splenitis*, Good. — *Splenite, Inflammation de la Rate*, Fr.—*Entzündung der Milz, Milzentzündung*, Germ.—*Acute and Chronic Splenitis.*

Classif.—III. Class. — I. Order (*Author in Preface*).

27. Defin. — *Pain, increased fulness, weight or oppression in the left hypochondrium and side of the abdomen, with febrile symptoms of a continued, remittent, or intermittent character, according as endemic causes and morbid associations may influence the œconomy.*

28. *Splenitis* is not a frequent disease, especially in an acute, and still more particularly in a sthenically acute form. Much more frequently a sub-inflammatory state, or a sub-acute, or a chronic form of inflammation exists, the last named being often long present before it comes under the notice of the physician, or not being discovered by him until its results have been fully produced, or until they have been disclosed by a post-mortem examination. The existence of acute splenitis has been even denied by some writers; but even independently of the nature of the symptoms during life, the changes found after death, sufficiently indicate an acute form of splenitis.

29. The *causes of splenitis* are those generally which have been noticed as producing indiscriminately the several affections of the spleen (§§ 14. *et seq*); but there are some which most commonly induce the inflammatory diseases of the viscus. These are chiefly exposure to low ranges of temperature after hot and sultry days in a malarious climate; the suppression of accustomed discharges, as the hæmorrhoids and the catamenia, in these circumstances, especially if the persons thus affected have lived richly, fully, or intemperately. Neglect also of turgescent or congested states of the organ may be followed by inflammatory action, those states being merely the initiatory stages of inflammation. Running, long marches, especially wh followed by exposure to malaria, to the night or dew, or by resting or sleeping on the groun contusions, blows, or other injuries on the hypochondrium; and previous functional disor of the viscus, are frequent causes of the seve grades of inflammation of this organ.

30. i. Acute Splenitis, *when primary or idio thic*, is most frequently the consequence of sev injuries of the splenic region, or of the sple itself, and of the extension of inflammatory act from an adjoining viscus, as the stomach, liver, peritoneum, to the spleen; but it may follow any the causes already named (§§ 14 *et seq.*).—*A.* usually is ushered in by chills or rigors, followed febrile action, and this by perspiration. To th are generally added nausea, depression, a sense tension and fulness extending from the epigastri around the left hypochondrium, and someti vomiting. A feeling of weight, oppression, and tension, is soon followed by more or less ac pain, extending often to some distance arou the splenic region, and sometimes to the shoulder; this region being deeply sore, tend and often somewhat tumid, elastic and ter. There are generally more or less thirst loss of appetite. The urine is at first clear highly-coloured, afterwards depositing a sedime. The fever is commonly continued or remitte, with evening exacerbations. At this stage, with the urinary deposits, or with the occurre of a copious perspiration, or with looseness of bowels, or with an uterine or hæmorrhoidal charge, the symptoms may abate, and the dise subside or disappear; or the inflammation pass into a chronic state, the symptoms hav abated more or less, but the swelling continu, or being even increased.

31. *B.* In the *most acute* cases, occurring in most unfavourable circumstances, as in soldi during long marches in malarious localities, disease often becomes greatly aggravated wh advanced as far as just described, the local syn- toms, as well as the general disturbance be much increased. The tongue is furred and d; diarrhœa supervenes, with sinking of vital pow, delirium, hiccup, general tumefaction of the ab men; or, in other cases, vomiting of blood, bl or bloody stools, sunk and lurid features, gene agitation and distress, unconscious evacuatio, &c., and death in the course of five, eight, ten twelve days.

32. *C.* On *examination after death*, the splee found increased in size. The peritoneal envel and proper coat are of a deeper or browner than usually seen, approaching in places to a bl or deep green. They are so soft and friable a break down easily under the pressure of the fing. The internal structure is still more softened. So parts appear a little more dense. These presen greyish, or a yellowish grey hue, and cont points of purulent infiltration, which had begu form, death having occurred, probably from si ing of vital power and contamination of the blo in conjunction with the local change, before su puration could proceed. In these cases the d ease may be viewed as having gone on to g grenous softening, or to a state very nearly proaching to this.

33. *D.* In cases less *hyper-acute*, the dise sometimes goes on to *suppuration*, and is genera

onger duration than the preceding form; but result of acute splenitis is not frequent, unless ie unfavourable circumstances above alluded § 31.). In these, the disease having appa- ly reached its acme, in the course of from n to twelve days, remits somewhat. The fe- symptoms and the pain abate, or the latter iges its character. Chills or rigors occur, inating in flushes of heat and profuse per- ation. The swelling in the splenic region r increases or becomes more determinate or imscribed, and the tenderness on pressure inues. The pulse is quick and soft; the ptoms varying much according to the direc- the abscess may take. Generally, as the ab- advances, symptoms of partial peritonitis rvene, in the direction in which the abscess eeds. The peritoneal envelope becomes in- ed at the part where the abscess points, and ihesions are formed between it and an ad- ng viscus, it will break into that viscus; iey be not formed, it will break into the oneal cavity, and general peritonitis instantly w, and soon terminate fatally. Thus, in the se of splenic abscess, the pain in the side may me more acute, and the swelling more pro- nt, owing to adhesions of the external aspect e spleen to the abdominal parietes, and to an rnal pointing of the abscess, which may occur ny situation between the left ribs and ilium, etween the umbilicus and left lumbar region. e adhesion forms between the spleen and sto- h, the gastric symptoms become severe, and ibscess may break into the stomach. Cases been observed, in which splenic abscesses thus opened into the colon, into the stomach, ugh the diaphragm into the pleural cavity, the lungs, &c.

. *E. Abscess of the spleen* is generally, but not ssarily, fatal. Some of the cases of recovery, to have taken place, are not very conclusive; st in a very few instances recorded, the evi- e of the existence of abscess and of recovery it is more convincing. Acute splenitis may rently terminate in suppuration; and the e signs of suppuration (§ 33.) may be pre- and even an obscure fluctuation may be de- d, and still the existence of abscess of the is may be disputed, or these symptoms may /en ascribed to other lesions. From this state patient may recover; and although we may ctly infer that absorption of the pus formed ie viscus has taken place, yet the proofs of may not be fully conclusive, although the s of the urinary, the intestinal, and the cuta- s excretions, seem to warrant the inference. n the matter is discharged externally, or even e stomach or bowels, the patient subsequently vering, then the fact is conclusive. Dr. SE, of Bonn, has recorded the history of a of splenic abscess, in which the matter made ay from the spleen through the diaphragm the lung, and was expectorated in great tity, the patient afterwards recovering. As ess of the spleen is comparatively rare, such must necessarily be much rarer; but there reason wherefore abscess in this organ should ss likely, than abscess of the liver, to be re- red from.

. ROKITANSKY observes, that, in a favourable the abscess may be circumscribed by adhesive inflammation, and, being inclosed in a sac formed by obliterated parenchyma, which has been converted into fibrous tissue, may be borne for a long period; a partial absorption of the pus may take place, and the remainder becoming inspissated, be reduced to a calcareous, greasy pulp, or even to a hard concretion. The more common case is, that the parietes of the abscess also put on inflammatory action and suppurate, in consequence of which the abscess generally enlarges very rapidly, with symptoms of violent reaction in the shape of acute hectic fever. If the inflammation extends to the sheath of the spleen, inflammation of the splenic and adjoining peritonal surface ensues, but is not, however, apt to spread far. He adds, "that the abscess may be discharged into the abdominal cavity, and produce circumscribed peritonitis, which causes the formation of a sac, bounded by the external wall of the abdomen and the diaphragm, the fundus ventriculi, the colon and its mesentery; the entire spleen being thus occasionally destroyed by suppuration." Much more frequently, however, the discharge of the matter into the peritoneal cavity is rapidly followed by general peritonitis and death.

36. Whilst we conclude that acute splenitis may *terminate*—1st, In resolution or recovery; 2nd, In chronic splenitis and various organic changes of the viscus; 3rd, In gangrenous softening or destruction of the organ; 4th, In suppuration or abscess—it may be still further inferred, that splenic abscess may be recovered from—1st, by absorption and diminution of the puriform matter; 2nd, by pointing externally or into some viscus, by which it may be discharged from the frame; but that it much more frequently terminates fatally, by the vital and local changes it occasions, and the contamination of the circulating fluids it produces, or by the consecutive changes it causes in adjoining organs or parts, into which it may proceed or break, as the peritoneum, stomach, &c.

37. *F. Asthenic acute, or consecutive splenitis.*—Acute splenitis is much more frequently a *consecutive* than a primary disease — *consecutive of*, or *complicated with*, adynamic fevers, but more especially, and more frequently and severely with the the jungle, or remittent, or continued fevers of warm or malarious climates. In these circumstances and associations, the severity or malignancy of the fever often masks the splenic complication. The affection of the spleen, if it may be called inflammatory, is of a most *asthenic* and disorganising kind; it implicates all the tissues of the organ, but attacks chiefly its internal structures, and proceeds in a very few days, often in three or four, to produce not only great turgescence, but a complete softening, often amounting to a liquefaction of the viscus. This form of disease is a frequent complication of the periodic fevers — intermittent and remittent — and of the continued fevers of the swampy or jungle districts of the East, and of Africa; and is often also observed in the course of these fevers in the countries bounding the Mediterranean. The *symptoms* of this form of splenitis are not severe, although the changes are most rapid and disorganising, — results which are chiefly to be ascribed to the primary fever, of which the splenitis is a dangerous complication. The ex-

tremely lurid state of the countenance and general surface, the vital depression, the swelling and tenderness in the splenic region, the decubitus on the back or right side, are amongst the earliest and chief signs, those which follow, especially the dry, dark tongue, the vomiting, often with discharges of blood, hiccup, delirium, rapid and weak pulse, &c., being ascribable as much to the primary fever as to this complication, but truly to both. The rapidly disorganising course of this form of splenitis is caused chiefly by the marked depression of vital power, and the condition of the circulating fluids, the spleen being one of the most early parts of the œconomy to experience the effects of vital depression and of vascular contamination, the existence of these states both aggravating and accelerating the unfavourable result.

38. ii. Chronic Splenitis is much more frequently observed than the acute.—*A*. It may occur *primarily*, or *consecutively* of the *acute* or *sub-acute;* for, between the most acute and most chronic or mild, there may exist, as in other inflammatory diseases, every grade of severity or duration. Chronic splenitis frequently does not come before the physician until it has given rise to changes, which, although no longer entitled to the appellation of splenitis, are generally the results of inflammatory action or irritation. In malarious countries, chronic splenitis is most commonly a complication of agues, or a consequence of intermittents and remittents. In these circumstances, the initiatory inflammatory action is often masked by the primary disease. When the chronic affection is consequent upon an acute attack, the passage of the latter into the former is often gradual or insensible.

39. Chronic splenitis, whether primary or consequent upon periodic fever, or dysentery, or hepatitis, &c., may, by muscular exertion, by prolonged or quick marches, by mental excitement, or by injury, or even by a too rough examination of the splenic region, be aggravated to such a pitch as to assume a truly acute or a subacute form. But in many complicated cases, in which the patient has died subsequently to attacks of these diseases, especially in miasmatous districts, chronic splenitis has not been detected, or has been merely suspected, until a post-mortem inspection has shown purulent formations in the substance of the viscus, cartilaginous or ossific deposits in its fibrous coat, false membranes, or adhesions between the peritoneal envelope and adjoining viscera, and other changes sufficiently indicative of inflammatory action, which, however, had either not been manifested during life, or had been overlooked, especially when masked by the primary disease.

40. *B*. The *symptoms* of chronic splenitis are, however, in some cases, more distinctly evinced. The pain, weight and uneasiness in the left hypochondrium are more felt, especially after exertion, and in soldiers after marches. There is generally a remittent or intermittent form of fever, either connected with ague, especially its more irregular types, or simulating this complaint, the exacerbations being most remarkable in the evening or night; the skin being dry, and the pulse frequent, whilst the countenance is sallow, and the skin harsh. As the disease proceeds, the already existing swelling of the splenic region, or even of the whole abdomen increases, or becomes re tense, whilst the extremities and other part re more or less emaciated. There are always digestion, disturbed dreams, and obtuse pain o neasiness in the left side, which is increased en turning in bed, or on pressure. In some ca , a dry cough supervenes, with frequent and su ficial respiration, and in others palpitation ; ar in the more prolonged or neglected, or impro rly treated cases, ascites is superadded. After a indefinite time, either recovery takes place sl ly, owing to change of climate and regimen, or ath occurs from sinking of the vital powers in nnection with changes in this viscus and adjo ng parts, especially purulent collections and eration of the circulating fluids.

41. As in acute, so in chronic splenitis he variation in the severity and character o he symptoms is very great. The duration also he latter form varies remarkably. In the cour of it various complications not infrequently ap ar, chiefly owing to the altered state of the circul ng fluid, in some cases, doubtless, produced by th absorption of matter from the spleen, or from th extension of functional or structural disease om this viscus to adjoining organs. In many es, as the disease advances, debility and emac ion become extreme; and hectic fever, some nes slight, in other instances severe, is generall resent. Vomiting or diarrhœa often occurs, a is generally obstinate or attended by dischar of blood either upwards or downwards. Achi of the back and limbs, restlessness, anxiety, w ht, soreness, oppression and tenderness in the s nic region, are severally more or less experienc

42. When considerable enlargement of th viscus attends chronic splenitis, dry suffocative c gh, dyspnœa, hiccup, palpitations, &c., are ten complained of; and, in some instances, if t inflammation have extended to the surface the upper portion of the viscus, the peritoneal ing of the diaphragm becomes implicated, and l ph with adhesions is sometimes formed, these nptoms being much aggravated and occasional accompanied with several of those which I ave shown to characterise *diaphragmitis* (see art. Diaphragm, §§ 2. *et seq.*). In other inst es, the disease superinduces effusion of fluid i the peritoneal cavity, an occurrence often obs ved when chronic splenitis follows, or is sociated with obstruction to the portal circu ion through the liver, or structural disease of this v us. Less frequently the disease extends to th left kidney; and, in this case, nephritis super es, with more or less disturbance of the urinary nctions, and aggravation of the febrile sym ms, generally terminating in delirium, coma nd death. In rare instances, phlebitis in some mb or organ takes place, and soon carries o the patient.

43. The variations in the severity, the nptoms, associations, as well as the *duration* of ronic splenitis, are very great. If the disea accompany ague, it may be so slight at first to escape attention ; but it generally becomes ore severe and manifest with the recurrence the aguish paroxysms. If neglected at first, it ten becomes a painful, a prolonged, and ev a formidable disease, generally continuing s ral months, and not infrequently lasting for me years, with periods of remission.

C. The *terminations*, or rather the results of acute and chronic splenitis are — 1st, resolu which seldom occurs; 2nd, aggravation of inflammatory action to a sub-acute, or even cute form; 3rd, suppuration and abscess in forms already noticed; 4th, softening, indu n, ossific deposits, &c.; 5th, enlargement, with us associated changes. Although *gangrene* times follows the hyper-acute, or the asthe- ly or complicated acute form of the disease, y rarely or never follows the chronic, unless latter have become suddenly or severely ivated by exertion, as by long or quick hes in military service, or by external inju- These consequences or terminations are common to the acute form, for this rapidly s into a sub-acute or chronic state, unless it is complicated with malignant or adyna- ever, and terminates in fatal disorganization ngrene.

Dr. VOIGHT states, that *splenalgia* (syno- us, according to him, with inflammatory af- ns of the spleen) rarely goes on to suppura- Bengal; but, when not fatal, it generally nates in induration, if not cured in time. brile symptoms then disappear, and pain in ft hypochondrium is much diminished, but mour remains and becomes hard and dis- The health improves, and, with the excep- f costiveness, a sensation of fulness and t under the left false ribs, a dry cough, dyspnœa, and occasionally a slight pain ng to the scapula, the patient feels pretty nd may live on for many years in that con- He is, however, generally predisposed by ver, liver complaints, dysentery, dropsy and a, and by some one or other of these he is carried off.

In its more severe states, especially when cated, splenitis runs its course very rapidly, may terminate in death in three weeks or a . Œdema of the feet and legs, ascites, ery, ecchymoses, severe affections of the h, singultus, are the general precursors of in sub-acute cases, whilst diarrhœa and close the scene in the more chronic form. s who have once had disease of the spleen y liable to be attacked by it again.

D. In *children*, chronic splenitis is not an ent disease even in this country, at least ac- to my experience, during the many years of ng physician to the Infirmary for the Dis- Children; but it is much more frequent in limates, especially among the children of an parents. In them it generally com- with anorexia, restlessness or fretfulness, en sleeplessness. They gradually lose all f play, and become indifferent to surround- ects. These precursory symptoms may e some days, or even as long as a fortnight, e colour of health is more or less lost, and ates into a pallid, sallow, or even a leaden d the conjunctiva assumes a pale blueish he skin, especially over the abdomen, is hot, and a greater degree of debility is nced than the severity or duration of the nt appears to warrant. The pulse is fre- specially in the evening, and a remittent ic form of fever is commonly present; uneasiness, headache, slight difficulty of on, and occasionally palpitation, and pain in the left shoulder, are also complained of. There is a constant feeling of tenderness and of weight in the left hypochondrium, increased by pressure. When the patient lies on his back, and the fingers are pressed under the false ribs of the left side, a hard tumour is felt, the size being generally less than that usually termed enlarged spleen, or even that called congested spleen. The patient dislikes the erect posture, and lies chiefly on the left side with the knees drawn up, and the trunk curved. The bowels are irregular, generally costive, the evacuations being very dark, greenish, or greenish black. The urine is usually pale and copious. After an indeterminate time, either recovery takes place, or more severe or more complicated disease, and more marked sinking of vital power supervene and terminate existence. In some cases, the emaciation becomes remarkable before dissolution, and in these, as well as in others, ascites has often existed for a considerable time previously to death.

48. iii. DIAGNOSIS OF SPLENITIS.—Inflammation of the spleen may be either overlooked, or be mistaken for some other disorder, especially for peritonitis, pleurisy, nephritis, or even for tumours, enlargements, &c., of the kidney.—*a.* When the symptoms of splenitis are mild, and when the disease appears in the course of remittent, intermittent, or continued fever, then it is often difficult to ascertain the existence of the local affection, and it very frequently is overlooked or undetected, until it has advanced to serious organic change. In all periodic fevers, and more especially in persons who have experienced more than one attack of these fevers, and still more particularly in warm, humid, and malarial localities, a very careful examination should be instituted, in order to determine the existence of splenitis or other affections of this organ.

49. *b.* The diagnostic symptoms vary much with the nature of the affection, and with the part of the organ chiefly attacked. When the upper part is inflamed or engorged it may then press upon the diaphragm, occasioning dyspnœa, oppression in that situation, and even pain, which may be mistaken for pleurodynia or pleurisy. If the diaphragm be pushed upwards by the enlarged spleen, the absence of the respiratory murmur, and the dulness on percussion at the base of the left thoracic cavity may suggest the existence of pleuritic effusion. But the absence of aigophony and the extension of the dulness below the margins of the ribs, and the persistence of dulness on percussion in different positions of the body, will indicate the nature of the disease.

50. *c.* The character of the pulse, and of the pain, will generally distinguish splenitis from *peritonitis;* but when the peritonitis is limited to a portion of the peritoneum in the vicinity of the spleen, and the symptoms are not very acute, it is very difficult to distinguish it from splenitis. The peculiarities of the case, the causes of the complaint, &c., will often aid the diagnosis. In *nephritis*, the history and antecedents of the disease, the state of the urine, and the symptoms characterising it, sufficiently distinguish it from affections of the spleen. The same remarks apply to *psoitis*, which can hardly be confounded with splenitis. There is a much greater probability of *tumours* of the omentum, especially when they appear near the situation of

the spleen, being mistaken for chronic inflammation or enlargement of this organ.

51. *d.* Simple *turgescence*, or various grades of *congestion* and *enlargement of the spleen*, may occasion, owing to the stretching or distension of the peritoneal envelope and fibrous coat of the viscus, more or less pain, and may thus be viewed as inflammation of the viscus, and suggest a practice not always the most appropriate to the state of the case. The circumstances and history of the case, especially the state of the pulse and the presence of febrile symptoms, will generally evince the nature of the disease; but it should not be overlooked that the effect of the distension or swelling of the organ upon its envelopes may be such as will often pass into inflammation, if not arrested by judicious means. *Splenalgia* (§ 19.), whether produced by sudden turgescence of the viscus or hysteria, or neuralgia, or uterine disorder, may be similiarly misunderstood, if the causes and alliances of the disorder be not attentively considered.

52. *e.* The diagnosis of *suppuration* or abscess of the spleen is very often difficult, the indications of this change being generally obscure. The antecedent disorder, an irregular recurrence of chills or rigors, the continuance of the febrile symptoms, the softness of the pulse, and the occurrence of sweats of unusual abundance, on frequent occasions, are indications of suppuration, but not actual proofs of its existence. When, however, there is also swelling or tumour in the splenic region, with pain or throbbing, and marked disorder of the stomach, the probability of abscess is greater than when the foregoing symptoms are not attended by any increase of the size of the organ.

53. *f.* The *complications* of affections of the spleen may either render more difficult, or may facilitate, the diagnosis of these affections. Antecedent periodic fevers often indicate the spleen as the organ affected, when other signs of splenic disorder are present; but much more frequently the complications mask this disorder, and render the diagnosis more difficult, especially affections of the stomach, enlargements of the liver, diseases of the heart, pleurisy and pleuritic effusions, peritonitis, partial or general, and dropsical effusions into the peritoneal cavity. When chronic obstructions of the liver, or congestions, or even inaction of this organ, are evinced, or when organic disease of the heart is present, changes in the spleen are very frequently also present, although they may not be manifested during life.

54. iv. The Prognosis of splenitis and other diseases of the spleen depend much upon their severity, their nature, their causes, and their complications. When the affection is simple congestion, and is consequent upon intermittent fevers, the result is much more likely to be favourable than when it appears under other circumstances, or is produced by, or occurs in the course of remittent fever of a low adynamic or putro-adynamic character. When the symptoms indicating splenic disease are obscure, of long continuance, and not amenable to treatment, the risk is much greater than when they are more acute and more deserving of reliance. When the most acute states of splenitis occur, especially when it is detected in the course of adynamic or malignant, remittent or other fevers, the danger should be considered as great; but the degree of danger or the hopes of recovery should depend very much upon the constitutional symptoms, and the states of vital power and of the circulating fluids. The effects of treatment, also, when this is rational and appropriate, ought not to be left out of view.

55. Even when the disease is sub-acute or chronic, our opinion of the result ought to depend much upon the history of the case, upon its origin, upon the state of constitutional power, upon the morbid associations it presents, and upon the evidence of the existence or non-existence of suppuration, or of the extension of disease to the peritoneum or adjoining organs. The signs of suppuration are always unfavourable, although recovery occurs in a few cases where this change has undoubtedly taken place. All the complications of diseased spleen are dangerous, especially pleuritic or peritonitic inflammations, or effusions, organic disease of the heart, obstructions, enlargements, or other structural lesions of the liver, disease of the stomach or bowels, and scurvy. Vomiting of blood, or the presence of blood in the stools, has been supposed by some to be a favourable crisis of splenic inflammations or enlargements. This may be the case in a few instances, but not in others. The occurrence of the catamenia in abundance at the natural periods, and of the hæmorrhoidal discharge, is much more favourable than hæmorrhagic discharges from the digestive canal.

56. The prognosis in all diseases of the spleen should be guided also by the severity of the local symptoms, in connection with the constitutional powers of the patient—by the state of emaciation, by the presence or absence of anæmia, by the manner in which the digestive and depurating functions are performed, by the extent of swelling and tenderness in the region of the spleen, by the duration of the complaint, and by the persistence or the removal of the causes, occasional or endemic, from which the disorder arose. As long as the patient continues to remain in the locality concerned in producing splenic disease, either a cure will be rendered difficult or abortive, or the disease will return with the season and circumstances which had previously produced it, with equal or even greater severity, and will either become more complicated, or terminate most unfavourably.

57. The *children* of European parents, residing in warm and malarious climates, affected with chronic splenitis, or other affections of this viscus, seldom recover completely or permanently, unless a change of climate or locality be obtained for them. An amendment often takes place during the healthy season; but the complaint generally returns with or after the rainy season, either with increased severity, or in some one of the several complicated forms, in which affections of the spleen present themselves in those climates, death generally, although at some remote period, taking place, often preceded by dropsy or great disorder of the digestive canal.

58. v. Treatment of Splenitis.—*A.* The *treatment of acute splenitis* has been very rationally stated by Van Swieten and Sauvages; but at the end of the last century and the commencement of this, the indiscriminate and often improper use of calomel, and of calomel conjoined with opium, superseded a more appropriate practice, especially

India, and was more frequently prejudicial than beneficial. More recently, the means usually employed have been both more rational and more salutary, although more discrimination in the employment of remedies against this disease, than is usually evinced, is still required. Calomel, or calomel and opium, general and local bleeding, &c. are still too generally prescribed, although, in some cases, either or even all of these may be required. The treatment mainly depends upon the stage or progress of the disease, upon the degree of either sthenic or asthenic action evinced by the local and constitutional symptoms, upon the type or character of the primary or of the symptomatic fever, and upon the air in which the patient resides. These should be severally weighed in connection with the age and constitution, and previous disorders of the patient.

a. If the attack be recent, acute, more or less sthenic, and the disease be primary, and the symptomatic fever continued, a general bloodletting may be prescribed according to the strength and age of the patient; and this will be the more required if the disease have been occasioned by injuries or causes directly affecting the spleen. In these circumstances, also, calomel, or calomel and opium, followed by a brisk cathartic, will be of service. A second general bloodletting will seldom be required, but local depletions may be necessary. In this form of disease, active purging, and diaphoretics in the intervals, are generally useful. Subsequently the tepid bath, frictions of the surface, and the application of a terebinthinate embrocation or liniment, as advised in several parts of this work (see Appendix, For. 311.), or a blister over the splenic region, will be of advantage. After the acute symptoms are removed, the persistence of disease in a sub-acute, chronic or mild form, or enlargement of the viscus, will require a repetition of these external means, and a recourse to stomachic and chologogue purgatives, or to such other means advised for these states of the disease, as the circumstances of the case will suggest.

b. If acute splenitis be consecutive of adynamic remittent or malignant, or typhoid fever; if it present asthenic characters, even when primary; if the attendant fever be periodic, the pulse quick, weak or soft; if the vital power be very much depressed, although vascular action be excited or the stomach irritable; if the disease has been of some duration, and has arisen from malaria, and its usual consequences; if it have been accompanied with diarrhœa, or by hæmorrhagic discharges; and if the patient still continue, or is likely to remain, under the influence of the air instrumental in causing the attack, bleeding and other lowering means should not be resorted to. A very opposite treatment is required in these circumstances, and should be prescribed promptly and with decision. In these, the sulphate of quinine, the sulphate of iron, camphor, &c., should be conjoined with aloes, a very small quantity of this last acting freely on the bowels when combined with sulphate of quinine. In some cases, it may be necessary to apply some leeches to the left side, and to give a full dose of calomel and camphor at the commencement, and a stomachic purgative in a few hours afterwards, especially if the evacuations betray biliary obstruction or disorder. But, immediately or soon after their action on the bowels, a dose of the following pills ought to be taken; and the embrocation applied over the splenic region, or over the epigastrium, by means of flannel or spongio-piline moistened with it, especially if the stomach be irritable; and this application should be renewed according to the state of the case, and the effects produced by it.

No. 339. ℞. Quinæ Sulphatis, ℈j.; Ferri Sulphatis, gr. xxv; Camphoræ, ℈j.; Extr. Aloes purif. (vel Pil. Aloes cum Myrrhâ) ʒss ad ℈ij; Pulv. Capsici. gr. x.; Extracti Taraxaci, ʒj.; Olei Cajuputi (vel Juniperi), q. s. *m.* Contunde bene et divide Massam in Pilulas xxxvj. Capiat æger duas, bis terve in die.

No. 340. ℞. Linimenti Terebinthinæ, ℥ij.; Linimenti Camphoræ comp. ℥jss.; Olei Olivæ, ℥ss.; Olei Cajuputi, ʒj. *m.* Fiat embrocatio more dicto utenda.

61. The ingredients in these may be varied in quantity, according to the effects produced by them, or others may be added or substituted. If sthenic action or febrile symptoms still continue, the sulphate of iron may be omitted; and if the bowels be already sufficiently acted upon, or if diarrhœa be present, opium may be substituted for the aloes, especially if pain be severe; and the vinum or extractum opii may be added to the embrocation. The warm or tepid bath; diaphoretics, frictions of the surface, and a farinaceous or emollient diet, and gentle aperients, will materially aid these remedies, and remove the disease altogether, or reduce it to a sub-acute or chronic, or mild state. In climates where the patients continue subjected more or less to malaria; in persons addicted to intemperance in eating and drinking, or to the abuse of stimulants or alcoholic liquors; in those who have been subject to periodic fever, or to hepatic or dysenteric affections, acute splenitis often degenerates into the milder forms, or into some one or other of the organic diseases about to be noticed.

62. *B.* If *the sub-acute or chronic form of splenitis* be primary, if it be not a sequela of the acute, or if it do not appear in the course of intermittent or remittent fever, the treatment should depend much upon the severity of the initiatory symptoms. If these be severe, and the pulse excited, local depletion, and a brisk cathartic, will be of service; and if calomel be prescribed at the onset, or suggested by the appearance of the evacuations, it ought to be conjoined with a cathartic extract. I have seen in these cases, as well as in the most acute, a full dose of spirits of turpentine, with an equal quantity of castor oil, taken on the surface of cold coffee, or of milk, or of some aromatic water, and followed by the above medicines (§§ 58—61.), soon arrest the disease, especially when prescribed at an early period. At the commencement of these forms of splenitis, as well as in the acute, the enlargement of the viscus is generally not great, even although the pain may be considerable; but, as the disease continues, and as the more acute symptoms subside, the swelling increases, and the propriety of having recourse to those medicines which support vital resistance, and arrest the progress of the malady, becomes more manifest.

63. When sub-acute or chronic splenitis follows the acute, or occurs in the progress of periodic fevers, then a decided recourse may be had to the sulphate of quinine, combined as above (§ 60.),

never omitting the sulphate of iron, when febrile or inflammatory action is not present; or the infusion or tincture of calumba may be given with the ammonio-chloride of iron, or with the ammonio-citrate of iron, or with the citrate of iron and quinine. Previously to the introduction of quinine into practice, I had employed the decoction of cinchona with ammonia and camphor, and the compound tincture of cinchona, with advantage.

64. In *the consecutive states* of chronic splenitis, the administration of these medicines should not prevent an active recourse to purgatives or cathartics, but these should generally be conjoined with bitters, stomachics or tonics; and the external means, especially the embrocations and liniments already noticed, should not be overlooked. As the disease becomes more decidedly chronic or indolent, the enlargement often increases, and if these means have been duly employed without a satisfactory result, then those about to be recommended for chronic congestion and enlargement of the organ (§ 100. *et seq.*) should be employed, especially the iodide of iron in the syrup of sarza, and the sulphate of quinine and aloes in doses which will act freely on the bowels.

65. *C.* When acute, or sub-acute, or chronic splenitis is followed by symptoms of *suppuration*, or when more precise indications of abscess of the viscus exist, then the indication already stated, viz. to support the vital powers and resistance, should be steadily adhered to, whilst the secretions and excretions ought to be promoted. Various means may be additionally employed, according to the direction which the abscess may take. The most hopeful terminations of this state of disease is to procure the external pointing of the matter, or the absorption of it. The former of these may be attempted by means of poultices, or the insertion of a seton or issue, whilst the powers of the constitution are supported by the means already advised, aided by change of air, and a suitable diet and regimen. The latter, or absorption of the matter, if the internal or constitutional means be not judicious and energetic, may be followed by phlebitis, or by consecutive suppuration or abscess in other parts; but, to obtain absorption when, and as we could wish, is rarely in our power. This end can be attained only by preserving and promoting the digestive and assimilating processes, by promoting the excreting functions, by preserving the bowels in a freely open state, by conjoining vegetable tonics with chalybeates, and by removing the patient to a dry and pure air.

66. *D.* The *complications* of both acute and chronic splenitis should receive due attention.—*a.* If the early stage of the acute or sub-acute disease be primary, and appear to extend to the peritoneal surface of the diaphragm, or pleura, or to the fundus of the stomach, or to adjoining parts of the peritoneum, or to the left kidney, the initiatory bleeding already advised is generally required, and should be in such quantity, or be followed by such an amount of local depletion, as the circumstances of the case will warrant; and calomel, or calomel and opium, in one or two full doses, may also be given. But these should be followed by a cathartic, and preferably by the terebinthinate draught prescribed above (§ 62.), which may be repeated according as it may be required, and by blisters, or the terebinthinate embrocation. Vascular depletion is rarely beneficial in other states of complication, and is generally prejudicial, when the splenic disease appears consecutively, or as a complication of other maladies, especially when it is associated with dysentery, adynamic or remittent fevers, with obstructions to the portal circulation, scurvy, or disease of the heart.

67. *b.* When the *stomach* is prominently affected, and indeed in the other associations of the disease, whether *gastric*, *intestinal*, or *hæmorrhagic*, the terebinthinate embrocations or liniments already prescribed will prove serviceable, if duly persisted in — if applied over the epigastrium, the splenic region, or abdomen, and renewed, as circumstances may suggest. If chronic *diarrhœa* be associated with chronic splenitis, ipecacuanha may be given in the form of pill with the sulphate of iron, quinine, and the extract of hops. If the splenic disease be complicated with *disease of the heart*, our chief reliance should be placed on the sulphate or other preparations of iron, conjoined with the medicines just mentioned, or with henbane, conium, opium, &c., according to the peculiarities of individual cases.

68. *c.* The association of chronic splenitis or its consequences with biliary obstruction, or *hepatic disease*, is very frequent in warm and malarious climates, and is especially obstinate, the splenic affection generally going on to chronic enlargement. In this frequent complication, a weak dilution of the nitro-muriatic acids should be administered both internally and externally — internally with light bitter infusions, as the calumba or cheireita, and the preparations of taraxacum; and externally in foot baths, or as tepid lotions or epithems over the hypochondria and abdomen. The preparations of iron should not be given in this complication. If *jaundice* be superadded, or dropsical effusion into the peritoneal cavity, the supertartrate of potash may be prescribed in large doses; sometimes with small or moderate doses of the potassio-tartrate of iron, and always with extract of taraxacum, in the form of an electuary with any suitable syrup or confection; or the acids already named may be given in the compound decoction of scoparium. Whenever the liver is implicated, the preparations of iron are generally prejudicial, the potassio-tartrate being the only one admissible, and only in small doses. If the associated diseases of the spleen and liver be characterised by enlargement, or if these diseases be very chronic and indolent, the iodide of potassium may be employed, if these acids have failed, and may be conjoined with the solution or subcarbonate of potash, and the decoction of taraxacum; or the compound decoction of scoparium. In cases such as these, the bowels should be kept freely open, and the constitutional powers duly supported.

69. *d.* For all *hæmorrhages* from the stomach or bowels, in the course of chronic splenitis, the spirits of turpentine, given by the mouth, or even administered in enemata, will be found the most efficacious in arresting the hæmorrhage, when the arrest is indicated as it is most frequently in splenic affections, or when it proceeds beyond what may prove salutary, or when it occurs in delicate, exhausted, or anæmied persons. This medicine may be prescribed, as in the following

fo ıla, the dose being increased or repeated ac- co ng to the urgency of the attack.

341. ℞. Olei Terebinthinæ, ʒiss.; tere cum Pulv. Ra Glycyrrh. ʒjss. dein adde, Mellis et Syrupi Rosæ Ga æ, āā, ℥jss. et misce. Capiat æger ℥ss. pro re na

. When the consequences of splenitis, espe- ci enlargement or chronic congestion of the sp n, are connected with *amenorrhœa*, or with ot e disorder, the compound iron mixture, con- joi d with the compound decoction of aloes is mo serviceable.

. In all forms and complications of chronic sp itis, change of air is extremely beneficial, an the benefit is further promoted when this ch ge is conjoined with a regulated diet and a pr r recourse to chalybeate or sulphureous mi- ne springs, or to artificial waters.

. *E. The treatment advised by writers* on inflam- ma n of the spleen has been stated more empiri- ca than with due reference to the forms and sta s of the disease. The early and acute stage is d, by a recent writer, to require "general blo letting as long as the inflammatory pain is to lerable, provided the patient's strength will ad of it. A moderate degree of catharsis sho d be kept up. A plentiful application of lee es to the seat of pain, followed by vesication, wi ometimes complete the cure; but the dis- ea s apt to remain latent: it may subside appa- re , and then reappear with a violence sooner or er fatal." (*Cyclop. of Pract. Med.* vol. iv. p. .) As I have contended above (§ 60.), th nost acute splenitis, if it present asthenic ch cters, will not, however prompt or energetic the epletion may be, admit of this treatment; an even the most sthenic form of the disease re res the more cautious recourse to depletion, wh I have recommended, especially when the dis e proceeds from endemic causes. It should be collected, that the causes are generally of a de sing nature, and if these still continue in act , too free depletion renders the disease mo serious, and its consequences more diffi- cu to remove. The re-appearance of the com- pla with fatal violence, here said to occur co gently, is frequently owing to the neglect of tonic remedies which I have advised after the ute symptoms are subdued, especially when spl itis is consequent on periodic fevers, or is oth wise complicated, or when the patient re- ma in a malarious locality. When, however, the sease is associated with peritonitis or with pleu- riti &c., vascular depletion, general or local, as I ha recommended, should not be neglected, with du eference, however, to the peculiarities of the cas

. Sauvages insisted on the propriety of ha g recourse to tonics and to chalybeate pre- pa ions, in connexion with aperients and seda- tiv as soon as the more acute symptoms were sul ed. Dr. Bree advised active catharsis, and co m and other sedatives, to remove irritation. He ndeavoured to subdue inflammatory action by oodletting, antimonials and local depletions. Gi tanelli, who lived in a country where dis- eas of the spleen are endemic, advised for simple ac splenitis, and for splenitis complicated with ga tis or peritonitis, or diaphragmitis, or nephri- tis psoitis, hepatitis or peripneumonia, general blo letting, to be repeated if the circumstances of e case required it, or local bleeding in the nearest situation to the part most affected. As the disease subsided to a chronic state, he recommended those remedies which act chiefly by promoting absorption, and by acting on the kidneys, and which are both antiphlogistic and diluent, as nitre, supertartrate of potash, antimonials, digitalis, &c. If the attack followed suppression of the catamenia or of hæmorrhoids, he prescribed the application of leeches upon the recurrence of painful or severe symptoms, and as soon as all signs of hypersthenia had disappeared, the gradual use of tonics to be followed by chalybeates, especially the ammoniate of iron.

74. Inflammations, as well as other diseases of the spleen, must be treated in great measure with reference to the endemic influences which are chiefly concerned in producing them. In the miasmal districts of Western Africa, and in many countries in the East, these diseases very frequently either are not benefited, or are aggravated by general and sometimes even by local bloodletting, especially in the dark races. In most acute cases, however, local depletions, when duly regulated, are of use. But, in temperate countries, either the one or the other form of depletion, or even both, are more generally required. In those more unfavourable and depressing localities, where greater caution in the use of antiphlogistic means is requisite, and the more acute symptoms rapidly pass into asthenic engorgement and enlargement of the organ, what have recent writers advised? Before the introduction of quinine into practice, I had occasion to treat cases, in these unfavourable circumstances, and I had recourse, early in the disease, to the decoction of cinchona with camphor, aided by purgatives, and epithems externally, as advised above (§ 60. *et seq.*). Subsequently a much earlier and a much more decided use of quinine, in the course of splenitis, than hitherto advised, was recommended by Nelet, Cruveilhier, Bailly, Piorry, Dalmas, and others, especially when the disease proceeds from malaria, or is associated with periodic fever; and, even in the early and acute stage, a much more cautious and sparing recourse to vascular depletions and other antiphlogistics, than previously advised, was found advantageous in these circumstances. In most cases, however, purgatives are most serviceable, especially when duly selected, and conjoined with quinine or cinchona, or with preparations of iron, as I have already pointed out (see § 59. *et seq.*).

75. VII. Organic Lesions of the Spleen.— *Structural Changes consequent on Functional and Inflammatory Diseases of the Viscus, and on Periodic Fevers, or other Disorders.*

Classif. — IV. Class, I. Order (*Author*).

76. M. Andral considered that the structural alterations to which this organ is liable should be sought for in one of its two component parts—the part contained, which is blood, and the part containing, which is fibrous tissue. Those affecting the latter, or which are seated in the capsule or its fibrous prolongations, the trabecular tissue and muscular fibres of Kölliker, and in the pulp or parenchyma of the viscus, and in the splenic cells, he thinks, are of comparatively rare occurrence; those of the former, or which are found in the matter contained in those cells, are more important, inasmuch as they are variously modified, and, he

conceives, intimately connected with the origin and nature of a number of morbid productions. The matter contained in the cells consists of blood and fibrine or lymph. This latter substance was first observed by Hewson, and has been recently viewed by Kölliker, as the fibrinous remains of the blood-globules after dissolution in the intimate structure of the spleen. The importance of this substance in the animal œconomy was insisted on by Tiedemann and Gmelin. M. Andral has made no reference to the observations of these physiologists; but, to the morbid states of this coagulated matter contained in the spleen, he has chiefly ascribed, not only a number of the changes which this organ exhibits, but many also which are found in the other parts of the body. Professors Tiedemann and Gmelin had attributed important offices to this matter, conceiving that it was influential, when carried into the chyle by the absorbents, or into the circulation, in changing the chyle into blood; and they had recourse to pathological facts in support of this opinion. But M. Andral went still further, and conceived that "it enjoys, although not possessed of any distinct organisation, perhaps, a greater sum of vitality than the fibrous tissue which contains it, and consequently is more prone to become altered in its nutrition, and to separate from its own substance various morbid products."

77. M. Andral has erred in imputing to this matter endowments and powers which it is not entitled to, and which are merely changes or modifications of this matter, owing to the states of the vital energies of the frame, especially as manifested in this viscus through the medium of the nerves supplying its bloodvessels and proper tissue, — this matter itself not being the active agent in producing those changes, but the passive recipient merely of the influence exerted on it by the organic nerves supplying the organ, and undergoing changes in consequence of modified states of this influence. Besides, as I have shown above (§ 4. *et seq.*), the views of these pathologists have been disputed in the more recent researches of Kölliker, who has inferred, if he has not fully proved, that the spleen does not discharge the function which they have imputed to this organ, but, on the contrary, a very opposite one, — that it produces a solution of the blood-globules, depriving them of their colouring matter, and preventing the excessive abundance of coloured globules in the blood, which might otherwise occur.

78. i. The Causes of organic lesions of the spleen are, chiefly and more remotely, those already mentioned (§ 14. *et seq.*); but there are others which more immediately and directly induce these lesions, and which consist of previous disease — of one or other of the affections already mentioned, or even of a combination of them—1st, of inflammatory action in some one of its grades, affecting chiefly the fibrous and muscular tissues of the organ; 2nd, of remarkable impairment of vital power and of organic cohesion; 3rd, of morbid states of the blood contained in, or circulating through, the viscus; and 4th, of various combinations of the preceding conditions. During the influence of depressing causes, moral or physical, the spleen often experiences a deficiency of vital contractile power; and it hence soon becomes turgescent, or inflamed if the causes commonly productive of inflammation are in operation, ad very soon afterwards engorged and enlarge or otherwise structurally altered. When the pipient symptoms are inflammatory, this state on passes into organic change; and it is gene lly impossible to ascertain during life when the fo er terminates and the latter begins; the one pa ng insensibly into the other. With these succe ve changes, the blood-globules become more and are altered or dissolved, and the fibrine in the b od, or the corpuscles constituting fibrine, more andant. During the changes of the blood, c sed either by agents acting primarily on this flu or by disorders of depurating organs, the splee lso early and manifestly undergoes important a rations, for, not only is it more or less congest or enlarged, but its vital cohesion is also remar bly impaired, as shown by its state after death om malignant or adynamic maladies. Many its organic changes, especially those which are ronic, may be imputed to the frequent occur nce of congestion, or of acute, sub-acute or c nic inflammatory action, or to the absorption of m bid matter, or to the accumulation of injuriou elements, owing to impaired excretion.

79. ii. Alterations of the Fibrous Stru ure of the Spleen. — *A. Lesions of the Caps of the Viscus.*—These consist — 1st, Of an u ual injection and congestion of its bloodvessels nd, Of softening, in various grades, which ma ven be so great as to occasion its rupture; 3rd, f its thickening, either with or without some de e of induration; 4th, Of its transformation into pro cartilaginous, cartilaginous, or even osseo substances. These changes are independent although very frequently connected with, ilar alterations in the peritoneal envelope of the gan and more especially with inflammatory ch ges as effusions of lymph and serum, false mem anes on the free surface, or thickening of th peritoneal covering, adhesions to adjoining gans or parts, &c.

80. *B. Alterations of the Trabecular or ibro Muscular Tissues and Parietes of the Splenic Cells.* —These are but imperfectly known. This rt of the fibrous structure of the organ has been und however, 1st, in a state of softening; 2n in state of enlargement, rendering the septa cker and more apparent than natural; 3rd, p ially changed, in rare cases, into a cartilagin s or osseous substance. From this it will be per ved that the changes of the internal fibrous st ture of the spleen are nearly the same as thos f its capsule. In respect of injection of the ssels ramified to it, and other inflammatory pearances, it may be remarked they cannot e so readily recognised in the internal, as in th xternal fibrous structure of the viscus.

81. iii. Lesions of the Spleen seat in both its containing and contained pa s.— The alterations observed in the coagulated atter contained in the cells of the spleen evide result from a change in the vital conditions the organ, by which the internal arrangement the particles composing this matter is modified The only question here is, whether this modi ation takes place subsequently to the formation this matter, or at the moment of its secretion? Most probably this modification results from t nfluence exerted by the nerves upon the ssels producing this matter, and is not the mote

quence of changes experienced by it sub- atly.

A. Altered consistence of the spleen is a very nt occurrence, and seems to depend upon— e state of its fibrous structure; and 2nd, changes in the consistence of the coagulated r and blood contained in its cells and capil- M. ANDRAL refers alterations in its con- e, as well as other lesions of this organ to be considered, to the state of the blood fills the splenic cells and capillaries. This stituting the effect for the cause, although, less, a dissolved state of the blood which the contains will materially diminish its natural ss. It is much more likely that changes of nd, as well as the greater number of the of this viscus, depend more upon the state rganic nervous influence, and upon the vital on of its fibrous structure, than upon the ion of the blood contained in its cells. It e allowed that the coagulated matter and ood contained in the spleen experience im- t changes; but these are surely not primary, e effects of that influence to which I have eferred them. This view of the subject is rted by the physiological researches of , TIEDEMANN, GMELIN, SCHMIDT, PROUT, ÉCLARD; and by the experiments of M. RMON.

a. Softening of the spleen is a very frequent ; particularly in fevers. In this state tural cohesion of the capsule and of the and muscular septa is diminished, and the lating matter and the blood contained in the pulp, and capillaries of the viscus, have lost atural crasis, so that they are readily washed aving the fibrous structure entire. In some the blood and the coagulating matter formed spleen are quite fluid, and the internal re of the viscus so weakened and injured, lly from its diminished cohesion and great sion, that an indistinct sense of fluctuation en upon examining the viscus externally. pleen, when softened, is seldom diminished ; it is generally either enlarged, sometimes , or it preserves its natural volume. Soften- th enlargement of this viscus is one of the requent lesions occasioned by adynamic or ant fevers.

b. Increased firmness or induration of the seems to result from augmented cohesion fibrous structure of the spleen and blood- , or from a modified state of the coagulating contained in the cells of the viscus. In cases of this description, the blood seems larly dense, and together with the coagu- matter, gives to the spleen, when divided, pearance of a slice of the liver. When the sed firmness of the organ amounts to *indu-* the change may be attributed partly to a ginous degeneration of portions of the fibrous re, to thickening or hypertrophy of this re consequent upon protracted inflamma- ritation, and partly to the formation of an sed or partially organised lymph, or to a us deposit in the parenchyma of the viscus. sed firmness or induration is frequently as- d with alterations of size, especially *enlarge-* *Alterations of the size* of the spleen are referable to the same causes as changes sistence, viz. to the vital cohesion of its structures, and of the blood and coagulated matte contained in it, and to the action of its differen vessels.

85. iv. ENLARGEMENTS OR TUMOURS OF THE SPLEEN may proceed — 1st, from the diminished cohesion and yielding state of the fibrous substance; 2nd, from diminished action of the veins and lymphatics; 3rd, from a greater quantity of blood being accumulated in the capillaries and cells than is carried out by the veins; and 4th, from a greater quantity of the coagulated matter being formed in, than is removed from, this organ. It is evident that the effect in question seldom proceeds from one only of the above causes, but generally depends, more or less, upon two or even a greater number of them.

86. *A.* When the spleen is much enlarged, it often ascends in the left hypochondrium, thrusts the diaphragm upwards, and, becoming more closely applied to the surface of the ribs, occasions as dull a sound on percussion as is heard in the right hypochondrium from the presence of the liver. Sometimes the enlarged spleen, pressing thus upwards, does not project beneath the margins of the ribs. In this case its enlargement can only be determined by percussion and auscultation. But more commonly it descends below the margins of the left ribs, occasioning a tumour, varying in dimensions and form. This tumour occupies the left hypochondrium, and may be so large as to extend to the left flank, to the epigastrium, and to the umbilical region. In some cases I have seen it so much enlarged as to extend to the right side of the abdomen. It should, however, be recollected that the spleen may form a tumour below the ribs without being materially enlarged, owing to the diaphragm being pressed downwards by an effusion of fluid into the pleural cavity. Instances of excessive enlargement of the spleen, with or without induration or increased firmness, have been recorded by authors. COLUMBUS and SCHENCK record cases in which the viscus weighed twenty pounds, the fibrous envelope being nearly cartilaginous. BURROWES saw one which weighed twelve pounds, and J. P. FRANK one that was sixteen pounds weight. The more chronic cases of enlargement are frequently attended by some degree of induration; whilst the more rapidly formed instances of enlargement, as frequently observed in the more pestilential or miasmal climates, are characterised by more or less softening or friability of the viscus.

87. *B. Chronic tumours or enlargements of the spleen* — vulgarly *ague-cakes* — are very different from the enlargements of the viscus which take place from *vascular congestion* (§ 22. *et seq.*), and which occur not infrequently in the course, or as a sequela of adynamic or exanthematic fevers, or other diseases. These tumours differ in character, and are owing partly to hyperæmia, partly to the deposition of the anomalous fibrous product already noticed in the parenchyma of the spleen. The consistence of the organ varies greatly. The tumour or enlargement is most probably at first soft, but becomes harder, according as the deposit is more coagulable, and as the more fluid parts are absorbed. The colour of the swollen or enlarged viscus is probably at first reddish, but becomes paler as the colouring matter is absorbed, and as increased vascularity yields, and gives place to the fibrous deposit.

88. *C. Diminished volume* of the spleen sometimes occurs, but much less frequently than increase of its size. Occasionally it is very much diminished. M. Andral has seen it no larger than a walnut. In cases of this description, the consistence of its fibrous structure, and of the contents of its cells, may be either increased or diminished. With the causes of atrophy of the spleen, and of the particular circumstances connected with it, we are altogether unacquainted.

89. *D. The colour* of the spleen is occasionally considerably changed. In some cases it is of a bright red, deepening through all the shades to a blackish hue. When this occurs in spots only, the organ presents a speckled appearance. It sometimes also assumes, in certain portions, a whitish or yellowish tint; these portions either retaining the same consistence as the rest of the organ, or being harder or softer than it. It is difficult to say whether this change of colour depends more upon diminished vascularity of the fibrous structure of the part thus affected, or on change of the colour and consistence of the coagulated matter and blood contained in the parenchyma and cells of the viscus. M. Andral imputes it entirely to the latter cause, and thinks it does not result from the formation of any new production.

90. v. Morbid Formations.—1st, *Purulent matter* is sometimes found in the spleen, either in isolated drops disseminated through its parenchyma, or in abscesses of various dimensions. These latter may here, as in the liver, be separated from the surrounding parts by a false membrane or cyst, or may be in immediate contact with, or pass insensibly into, the sound parts. Abscesses devoid of any cyst sometimes acquire a large size, occupying the greater part of the internal structure of the viscus. In these cases, the surrounding parenchyma is generally soft, pulpy, and readily breaks down notwithstanding the utmost care. In the parts most distant from the collected matter, the capsule and fibrous tissue generally remain unchanged; but when the capsule comes in contact with the purulent matter, it also loses its vital cohesion, and allows the collected matter to find its way through it, either into the peritoneal cavity, or, having formed adhesions to adjoining viscera, into them. Abscesses of the spleen may thus burst into the stomach, the colon, the thorax, and even into the urinary passages. Cases have also been described, wherein they have found their way, externally through either the anterior abdominal parietes, or the back, or even the loins; but such occurrences are extremely rare.

91. Infiltration of purulent matter into the parenchyma of the spleen, as well as its collection in distinct abscesses, may coexist with similar depositions in other parenchymatous organs. Thus pus has been found in the spleen, liver and lungs, and even in the brain also, of the same subject. It is sometimes found in one or more of these organs and in the cavities of the joints in the same case. In all these cases the pus is formed in some other part, as in the veins, in the sinuses and cavity of the uterus, &c., whence it passes into the current of the circulation, and is either deposited in these situations, or occasions an inflammatory state of these parts, rapidly followed by the suppurating process. For reasons assigned in another place (see arts. Absorption, Abscess, *symptomatic*, and Veins, *diseases of*), I believe that the latter more commonly obtains. In some instances, in phlebitis, metritis, &c., purulent matter is formed in the part primarily affected, and subsequently appears in the spleen only; but more generally it is also found in some other situations at the same time. The majority of instances, in which purulent matter is found in the spleen, are of the above description. Those instances in which the pus has proceeded from inflammation, acute, subacute or chronic, originally affecting the substance of this viscus, are not common, unless as a complication of remittent and intermittent fevers; but in these cases of primary formation of matter in the spleen, according to my experience, distinct abscess or abscesses are found, and rarely infiltration only, this latter being always a consecutive deposition or formation.

92. 2nd. *Tubercular matter* is not infrequently found in the parenchyma of the spleen, generally in the form of minute grains, either isolated or clustered together. Tubercles of this organ are much more common in children than in adults, but they seldom are found in it, at any age, unless they exist in other organs at the same time. Tubercles are very common in the spleen of the lower animals.

93. 3rd. *Cysts*, of various kinds, are occasionally found in this organ. Their simplest form is that of small vesicles filled with a serous fluid, existing either singly or in clusters. These vesicles are sometimes found in great numbers. M. Andral states, that they are not confined to the splenic cells, he having found them within the splenic veins, some floating loose, others attached by peduncles to the sides of the veins, and others again lodged between their coats. He has also observed cysts of a much more complicated structure in the spleen: these consist of a series of sero-fibrous tissue, containing either a horn-like matter, or a substance resembling suet, interspersed with hairs. *Hydatidic* cysts are sometimes found in the spleen, but not so frequently as in the liver. Their mode of development in the former is in every respect the same as in the latter (see art. Liver, § 232.).

94. As to *the origin* of the above formations, much difference of opinion exists. M. Andral supposes that they are nothing else than the blood contained in the splenic cells modified in its qualities. "The experiments of M. Gendrin," he observes, "seem to prove that the blood may be converted into pus. The result of my own observations has convinced me that, by a simple alteration of its colour and consistence, it may be converted into a substance perfectly analogous to the encephaloid tissue described by Laennec. Let us go a little further, and suppose the blood in small circumscribed masses deprived of its colour, and diminished in its consistence, so as to become curdy and friable, and we have then all the essential characters of tubercles." (*Anat. Path.*).

95. The changes which M. Andral supposes to commence in the blood contained in the spleen should rather be referred to an alteration of the coagulated matter or lymph formed by the vessels ramified on the parietes of the splenic cells, both because the morbid deposit is more immediately produced by the vital action of this viscus and of its vessels, and is not a fluid circulating merely

tugh it, and there arrested in its course; and buse the morbid productions to which this aior has referred, particularly tubercles and eephaloid tissue, have closer points of similarity tis particular coagulated matter than to the bd itself. Besides, we have no proofs that bd ever undergoes changes, similar to those for wch M. ANDRAL contends, from being contained i or circulating through, the capillaries or es of an erectile tissue. Whatever changes t splenic blood may undergo, must result eer from the state of organic nervous or vital ience, with which the spleen is endowed, or fm the condition of the blood circulating in it, orom the properties of the coagulated matter wch it is engaged in forming, supposing that t matter mixes with the blood taken up by the snic veins. These causes may combine to pduce the ultimate effect; but the first should b viewed as primarily and chiefly influential, a the latter as early results, inducing further ects.

6. The *proximate causes* of the foregoing lesions o he spleen may depend—1st, upon irritation in vous grades up to acute inflammation; such as ieased vascularity, induration, ossific change, piary formation of matter, &c.; 2nd, on a dinution of the nervous and vital influence of t organ, affecting the action of its vessels and iunctions, and the state of the blood contained i he capillaries of its proper structure and cells— a softening, changes of colour, congestion, enlement, &c.; 3rd, on obstructed return of blood tugh the veins, as from organic disease of the lir or of the heart, especially congestion, enlement, induration, &c.; 4th, on a tendency eting in the system to the formation of the nters found in the spleen — as pus, tubercles, cerous matter, cysts, &c. This tendency may dend on the local or general states of vital ience; or the substance found in the spleen n be conveyed through the channel of the cirction, and deposited or secreted in this situat. It is possible also that both these may coet.

7. vi. HÆMORRHAGE IN THE SPLEEN.—*Apoplexy o he spleen*, CRUVEILHIER. — This able pathologist has described the hæmorrhages sometimes n with in the substance of the spleen, especially i the course of intermittent fevers. Hæmorrgic deposits of various sizes, rounded in form, a exhibiting all the changes which the blood uergoes in apoplexy of the brain or other organs, a the appearances usually presented in cases o splenic apoplexy. Ochry-brown cicatrices a fibrous cysts of the same colour, observed i arer instances, may be viewed as the remains o rmer hæmorrhages, with breach of substance. Hmorrhagic effusion into the parenchyma of this vus should not be confounded with pulpy softeng of this viscus, from which it is altogether distt. M. CRUVEILHIER remarks, that, at every sng muscular effort, the blood rushes into the scture of the spleen, distending it, and thereby csing rupture. What renders this opinion the ne probable is the frequency of hæmorrhage in t spleen of the horse. M. BAILLY has also adced cases of spontaneous hæmorrhage into the sstance of the spleen from ague.

. vii. The DIAGNOSIS of organic diseases of the sen is extremely difficult as regards certain of them, and very easy as respects others. Enlargement and induration of this viscus are readily recognised, unless they be slight or incipient. The existence of *abscess* of the spleen is to be inferred from the history of the case and the symptoms mentioned above—especially when the acute disease has passed the sixteenth day, the viscus increasing in size, —if fever be exasperated towards night, with increased heat in the soles of the feet and palms of the hands, — if rigors appear, followed by flushes, perspirations, and a soft pulse, — and if the complexion become more pallid, leaden, or sallow, and the bowels more relaxed. The existence of the other organic lesions of the spleen is often not manifested during life, and can very rarely be inferred with the least precision, either from the history of the case or from the symptoms complained of. Pulpy softening, however, when accompanied with more or less tumefaction, may be suspected from the softness and tenderness of the swelling and the antecedents of the case, but the examination ought always in such instances to be conducted with gentleness and care; for the spleen may be ruptured during life by a rough examination, especially in the advanced stage of remittent fever, during which this state of the spleen chiefly occurs.

99. viii. The PROGNOSIS of structural changes of the spleen entirely depends upon the nature of these changes, many of which cannot be ascertained during life. The existence of *abscess* is always dangerous, but not always fatal, as recovery may take place in the manner already mentioned. *Enlargements* of the viscus are always serious maladies; but, when they are not excessive, are not associated with obstructed liver or disease of the heart, are not accompanied with a boggy or pulpy feel upon examination, or extreme hardness, they may either be removed, or the patient may live some years without change in the tumour or in his general state. If the enlargement be pulpy or boggy, if it be attended by much tenderness or pain, or by extreme hardness, or accompanied with protracted diarrhœa, or with exhausting hæmorrhages from either the stomach or bowels, or with disease in the liver or other organs, or with abdominal dropsy, the prognosis should be very unfavourable. In all cases of inferred alteration of the spleen, the constitutional symptoms and the complications should guide the prognosis, especially the apparent amount of vital power, of vascular fulness, or of anæmia, and the connection existing between it and diseases of other organs.

100. ix. The TREATMENT of structural diseases of the spleen has been in great measure stated when noticing the treatment of chronic splenitis. The chief and most common changes of this viscus, which come under the care of the physician, are *enlargement* and *induration*, and these are the usual consequences either of acute, sub-acute or chronitic splenitis, or of repeated attacks of congestion, caused by obstinate agues, especially in miasmal localities. After having recourse to purgatives, in the combinations already mentioned, more especially with sulphate of quina, sulphate of iron, &c. (§ 60. *et seq.*), and to liniments and embrocations applied over the splenic region, these morbid conditions generally disappear; but, if they still continue, the *iodide of potassium* may be prescribed in connection with such other means as

the peculiarities of the case may suggest, as with the compound decoction of aloes, or the compound mixture of iron, or with both; or the iodide of iron may be taken in the syrup of sarza. In those cases frictions of the surface of the body, especially over the hypochondria, with the liniments already mentioned, will prove very beneficial. During the treatment of these chronic and obstinate diseases of the spleen, due attention should be directed to the disorders which are so frequently associated with them, and more especially to obstructions or other affections of the liver, and disorders of the stomach and bowels.

101. In many cases of chronic enlargement or induration of the spleen, especially when associated, as either lesion very frequently is, with chronic disease or torpor of the liver, the *nitro-muriatic acid*, taken in the infusion of chereita or of calumba, with extract of taraxacum, and the external use of this acid, either as a bath to the extremities, or as lotion, wash, or epithem over the hypochondria, will prove most beneficial. If hæmatemesis or discharges of blood from the bowels occur, the state of the case should be duly weighed. If the patient have lived fully or richly, if he be young, plethoric or robust, the hæmorrhage may prove more or less critical, and should not be prematurely arrested. In different circumstances, or when it proceeds too far as respects the condition of the patient, the arrest of it may be generally accomplished almost immediately by the spirits of turpentine, taken either in a full, or in small and frequently repeated doses, as prescribed above (§§ 62. 69.).

102. When amenorrhœa or chlorosis is connected with enlargement of the spleen, the combination of the compound steel mixture with the decoction of aloes, or the aloes and myrrh pill with the compound galbanum pill, may be prescribed and continued for some time, or the other medicines just now recommended may be taken, but due reference should always be had to the history of the case, and its various morbid relations.

103. *Change of air* is the most important means of cure in all chronic affections of the spleen, and more especially when the patient resides in a low, humid or miasmal locality, or in a hot and aguish or sultry district. Change to a more healthy climate, as far as this may be effected, or even a sea voyage, is essentially necessary to a complete or permanent recovery. When change of air can be associated with the use of *chalybeate* and *deobstruent mineral springs*, or artificial mineral waters of this kind, then the advantages of change will be very materially enhanced. Many of the chalybeate, saline chalybeate and sulphureous waters of this country, of Scotland, Germany, &c., will prove very serviceable in completing a cure of splenic disease; but the particular spring which should be adopted ought to depend upon the peculiarities of particular cases.

104. The *diet* and *regimen* of the patient require strict attention, and should be duly regulated. If the patient live in, or have been removed to, a healthy air and locality, an abstemious or moderate and digestible diet, with temperance in the use of vinous or other beverages, will of itself, in due time, effect a cure; but this regimen should generally be only brought in aid of the treatment already advised, adapted with discrimination tc e circumstances of each case. Care ought to be ta n never to overload the stomach. Farinac ous articles of food should be taken in due proport n, and animal food only once in the day, in m erate quantity. Instead of the usual kinds of f h meats, the more digestible kinds of fish — w e fish — may be substituted twice or thrice in e week; but the fish ought never to be fi d. Cocoa should be preferred to tea or coffee. oderate exercise in the open air and in suns e ought not to be neglected, more especially w n splenic affections are accompanied with ana ia or chlorosis.

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MMERING—See art. Voice and Speech, sorders of.

ILITY—See Impotence and Sterility, , Pollution, Voluntary.

MACH, DISEASES OF, — Comprising rdia and Pylorus.—Synon. — Stomach, ρτὴρ, στομαχος;—*Ventriculus, Stomachus*;— *gen*, Germ.; —*Ventricule, Estomac*, Fr.;— *macho*, Ital.

The stomach not only sympathises most in- ely with other organs, but also exercises them a most powerful influence: it is not y a passive sufferer of disorder on numerous ions, but is, on many others, itself either ac- diseased, or the most influential agent of isorder of other organs. Hence, in many es, even of the most serious kind, the stomach ıer chiefly affected, or most intimately sym- es with the organ which is the seat of the e. (See art. Sympathy.)

In most affections of the stomach, and in diseases with which this organ sympathises, are certain prominent symptoms which may 1st, functional, or independent of any appre- structural change of the organ or of any part; 2nd, or be caused by inflammatory, organic lesion of the viscus; 3rd, or arise disease of some allied organ or part, or even e frame generally. These prominent and ent symptoms are—*flatulence, acidity, heart-* *acrid eructations, water-brash or pyrosis,* *ıation, gastrodynia, nausea, and vomiting,* and as several of these may depend upon ler of other viscera as well as of the stomach, ecial consideration of them has been assigned fferent heads, chiefly to Morbid Appetite, ulence, Indigestion, Digestive Canal, ro-enteric Disease, Pyrosis, Rumina- Vomiting, &c.; and to these articles I beg fer the reader for various topics intimately ected with those involved in the present ct.

In our investigations of diseases of the sto- , the organisation, the structural, the nervous, and the vascular connections of the organ, the viscera bounding, and in close contact with it, and the varying states of its fulness and vacuity, should severally receive attention, especially in connection with habits and modes of living, with diet and regimen, with age and sex, and with artificial or injurious modes of dress. These severally, or more or less associated, modify not only the states, but also the position, not of the stomach merely, but also of surrounding viscera. *The functional disorders* of the stomach have been duly discussed under certain of the heads now enumerated, especially *flatulence* and *indigestion*; but before I proceed to consider the inflammatory and structural diseases of the organ, I shall offer a few remarks on the more painful affections usually referred to this organ, and which have generally been termed *gastrodynia* and *gastralgia*.

4. I. Painful Affections of the Stomach.— Synon. — *Gastrodynia* (from γαστὴρ, stomach; and ὀδύνη, pain);—*Gastralgia* (from γαστὴρ, and ἀλγέω, I suffer pain); — *Cardialgia* καρδιαλγια, Sauvages, Darwin, Pinel, &c.;—*Spasmus ventriculi, Cardiaca passio*, Auct. — *Limosis Cardialgia*, Good; —*Morsus ventriculi, dolor ventriculi*, Auct. Var; — *Doleur de l'estomac, Colique d'estomac*, Fr.; — *Magenschmerz, Magenkrampf, Magendrücken*, Germ.;—*Mal di stomaco*, Ital.—*Pain in the stomach; cramp or spasms in the stomach; nervous affection of the stomach.*

Classif. — II. Class, III. Order (*Author in Preface*).

5. Definit.—*Severe, sometimes violent, pain in the region of the stomach, often of sudden occurrence, and, after an indefinite continuance, generally quickly ceasing; frequently eased by pressure, and unattended by tenderness or fever; commonly symptomatic, and very rarely primary, unless produced by injurious ingesta.*

6. The very painful seizures, commonly referred to the region of the stomach, and usually termed *gastrodynia*, or *gastralgia*, or *gastro-enteralgia*, are very generally viewed as affections of the nerves supplying this organ, such affections being often accompanied by more or less spasm of the muscular coats of the viscus. This view is probably correct, although the evidence in its support is by no means demonstrative; for the morbid sensibility constituting the seizure may have its origin either in the nerves distributed to the stomach, or in the ganglia or plexuses, whence these nerves proceed, or in those in the more immediate vicinity, as in the diaphragmatic nerves; or it may even be caused by the irritation and spasm produced by biliary calculi. The existence of spasm of the gastric muscular coats is often doubtful; in some cases the pain presents spasmodic features; in others, it is not thus characterised. That the pain occasionally extends to both stomach and bowels, as inferred by some writers, the affection being in such cases called *gastro-enteralgia*, may be admitted; as it is difficult in all instances to dissociate the affection of the nerves of the stomach from a similar affection of the intestinal nerves, either co-existing or supervening the one on the other. This more extended affection will thus very nearly approach to the severer forms of colic or ileus, especially when the suffering in this latter affection is more or less referred to the epigastrium.

7. *Gastrodynia* occurs under a variety of cir-

cumstances:—1st, it may be altogether nervous or functional, and unconnected with any evidence of inflammatory or structural lesion; 2nd, it may depend upon various grades or kinds of inflammatory action; 3rd, it may proceed from any of the structural lesions about to be considered; and 4th, it may be connected with gout, appearing in the form of atonic, misplaced, or metastatic gout, or even with rheumatism, although very rarely with this latter. It may, moreover, occur sympathetically of various other diseases, especially those which are seated in the abdominal viscera. The first of these manifestations of gastrodynia chiefly interest us at this place. In this state of the disease, as well as in the other, the secretions poured into the stomach are often much disordered, most frequently they are more or less acid. The acidity in these cases is either the cause of the pain, or the consequence, in the first instance, of the functional disorder, of which morbid sensibility constitutes a chief part, the pain being increased by the acid or morbid fluid and gaseous secretions produced during the impaired organic nervous or vital power of the stomach.*

8. This affection may occur in very different or even opposite states of the stomach. It may appear during inanition, or, at least, during an empty state of the viscus, or after repletion or an overloaded condition of the organ. It may be connected with anæmia, or with great vascular fulness. It may be referred to the nature o ncongruity of the ingesta, or to flatulent distens n; and it may be associated with any of the f ctional or structural affections of the stomac lready noticed (§§ 2, 7.). In its severer fo s; gastrodynia is sometimes associated with a mo id appetite or with gout, and in this latter state it en assumes the form of *cardialgia*, — a form w ch many writers have described as a combinati of gastrodynia with leipothymia, the distress ing referred equally to the epigastrium and the æcordia. Gastrodynia, in its less violent for is often an attendant upon difficult or scanty nstruation, but it still more frequently assume he form of gastro-enteralgia, or even of coli in females who experience catamenial or uterin isorder. The more sudden and violent acce ons of pains, with the shorter continuance, and ore rapid cessation of suffering, has been refer to cramp or spasm of the viscus; but, eve admitting this condition to exist in these ca , a neuralgic state of the nerves of the viscus, of those in the immediate vicinity, owing pro bly to some temporary irritant, may equally con ute the pathological condition; in either case t one morbid state will hardly exist, with muc violence, without the other. BROUSSAIS a his followers would not admit the existence of her of these conditions independently of inflamm tory action or structural change. This view the complaint is sufficiently controverted in the icle on GASTRO-ENTERIC DISEASE, and in wha will appear in the sequel; the most severe st s of gastrodynia often appearing under very di rent circumstances from those of inflammatory tion or structural lesion.

9. i. THE CAUSES of gastrodynia are rema ably numerous, and nevertheless it is sometime ifficult to assign the attack to any particular use. The affection is frequently connected, more less, with temperament and habit of body—w the nervous, irritable or bilious; and is hence mewhat hereditary. It is much more frequen the female, than in the male sex, especially ring uterine activity, and in the form of spa or of cramp; in the nervous and susce ble; in persons of sedentary habits; in the ufficiently or unhealthily fed; and in those w are subjected to anxieties of mind and to the d ressing emotions. Females are most liable to i bout the period of the catamenia, and during ges ion; also after large losses of blood, and pr nged leucorrhœa. It is often associated with a mia, or chlorosis. Gastrodynia, in its severer rms, is one of the most frequent consequences masturbation, in either sex; of a vegetable, p and indigestible food; of taking cold and aci beverages or fluids, especially during an over ated state of the system; or acid and unripe a stale fruits; of living in low, humid, and unwh some localities; of intemperance in the use of sp tuous or vinous liquors; and of the more indige le or incongruous articles of diet, or of excessiv epletion, produced either by food or drink The causes enumerated under the head of A TITE, MORBID, FLATULENCE, INDIGESTION, & , are equally productive of the affection no being considered.

10. ii. The SYMPTOMS of gastrodynia c ist of the character, mode of accession and du on of the pain, and of the associated phenomen The

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* The following remarks, pertinent to this subject, have been published by Dr. BENCE JONES, who has most ably investigated this and many other topics in animal chemistry.

"In 1785, CARMINATI first observed the acid reaction of the digestive fluid. WERNER, in 1800, confirmed the observation. PROUT proved, in 1824, the presence of hydrochloric acid during digestion and in indigestion. TIEDEMANN and GMELIN found, in 1826, by irritation of the stomach, that acid was secreted; chiefly hydrochloric acid. They found also traces of acetic acid; and in the horse they found also butyric acid. About 1830, BERZELIUS states that the acid reaction of the contents of the stomach is chiefly from hydrochloric acid; and the acids next in importance are the lactic and butyric. He concluded, from his own experiments, that lactic acid existed in all animal fluids, either free or combined. In 1844, LIEBIG showed that this conclusion was not correct, — that there was no lactic acid, even in milk, until it began to decompose; and this he showed to be true of other animal fluids. In 1845, I (Dr. BENCE JONES) observed that when much acid is secreted by the stomach, the urine is found to be alkaline. The excess of acid in the stomach was hydrochloric acid; and the free alkali in the urine was fixed alkali, and not ammonia. In extreme cases, the alkalescence lasted for four hours. As the free acid was absorbed from the stomach, the urine became acid, and this reaction increased until it was intensely acid to test paper. Thus, then, in health and disease, hydrochloric acid is liberated in the stomach. Acetic acid is sometimes present in small quantities, and perhaps lactic and butyric acids may occasionally be found. Phosphoric acid has not hitherto been proved to exist in the gastric fluid.

"The progress of animal chemistry leads to the expectation that many more organic acids will be found to be present in the stomach in disease. Starch and fat are two of the three great constituents of the food of man, and each gives origin to a long series of organic acids; the last of which in either case is carbonic acid, the product of respiration.

"The varying circumstances of disease render it probable that in disorders of the digestive organs, many of the intermediate acids may be produced; that, although in the state of health the starch passes readily into carbonic acid and water, yet in the state of disease, lactic acid, acetic acid, and formic acid, may be produced. So, also, one or many of the fatty acids will most probably be found to result from indigestion. Thus, butyric, caproic, and caprylic acids closely related to each other in composition, are not unlikely to be present in the secretions of the stomach in disease." (See Dr. SEYMOUR, *on the Nature and Treatment of several severe Diseases*, &c., vol. i. p. 3.)

may be acute, pungent, lacerating, cutting,
ing, or obtuse, dull or aching. It may be
en, rapid, or slow in accession; and after
nuing momentarily, or for a very short, or
an indefinite time, cease suddenly, quickly,
owly. It may remit or intermit, or recur at
ular or indeterminate periods. It may occur
y period of the day or night, especially the
er, and in every state of the stomach, more
cularly when empty or overloaded. It may
ttended by great distress and appearance of
ring; by constant restlessness, agitation, toss-
or even convulsive or spasmodic movements;
xtreme anxiety, anguish, palpitations, tumul-
s or irregular action of the heart, or by epi-
ic pulsations; by groaning, moaning, and irre-
states of respiration, both diaphragmatic
voluntary; by choking in the throat, eructa-
of flatus, or partly of flatus and of acid,
d or even alkaline matters, or the more for-
rejection of nidorous or variously disagree-
fluids. There are frequently borborygmi, fla-
t distension at the epigastrium, and often in the
abdominal regions, sometimes with irregular
nodic contractions, and efforts to vomit, the
pts being either abortive, or partially ineffi-
. The skin is often cool, especially the ex-
ties, and the sufferings occasion a free or cold
iration. Pressure of the gastric region gene-
affords a temporary ease. The countenance
xious or partially sunk; the tongue is not
rially changed from pre-existing states; the
ite may be morbid, ravenous, or lost, with
ithout nausea or retching. Thirst may or
not be experienced; and the bowels may be
e or irregular, and the stools more or less
id. The urine may be pale and abundant,
ially in females, when the gastrodynia is
iated with uterine disorder. The pulse may
e materially affected, or it may be slow, in-
ttent, or irregular; or it may be small, quick
irregular, whilst the action of the heart is
ed and tumultuous. Retchings or *vomitings*
or may not be present; but when the latter
bserved, they are such as are described in
rticle.

iii. Diagnosis. — It is often difficult to
nine whether the pain, attended by more
s of the above symptoms, be purely nervous,
e more prominent phenomenon, caused by
, or by inflammatory or organic disease of
omach, or of a closely adjoining part. The
y, the concomitants, and the grouping of
ymptoms of the case, will chiefly guide the
ian. The causes of the attack ought to be
lly investigated before a positive opinion be
d or given. Attention to these: the absence
er, of tenderness on pressure, or of tension,
increased heat near the seat of pain; the
of the urine, and of the secretions generally;
ee perspiration and coolness of the surface;
aracter of the pulse, and even of the pain in
instances; the existence of the nervous tem-
ent, or of the hysterical or gouty diathesis;
vantia and *lædentia*, the effects of treatment,
abits, modes of life, the cravings, and the
f the patient, will severally assist the diag-

When the pain is caused chiefly by, or
nected with, *spasm* or *cramp of the stomach*,
orbid action, as Dr. Macfarlane has shown, in a very excellent paper on this subject, is communicated by the nerves to the muscles, inducing the most acute pain, with a feeling of rigid contraction, violent twisting or tearing in the epigastrium, soon followed by painful or interrupted breathing, difficult articulation, pallid countenance, small, hurried and contracted pulse, and occasionally with coldness of the extremities, and rigid contraction of the recti abdominis and gastrocnemii muscles. Pressure on the gastric regions in these cases, instead of increasing the pain, as in inflammatory and organic diseases of the stomach, generally affords more or less relief in this affection, which in some instances is followed by an attack of hiccup.

13. In all cases of gastrodynia, the nature of the ingesta, not only for a few hours previously to the attack, but also for several days, ought to be ascertained as accurately as possible; for the poisonous, injurious or incongruous nature of these may have occasioned the attack; and, although inflammatory action may be the concomitant of the gastrodynia, this latter may be the chief lesion, the former being either asthenic, or of a kind which should be viewed as altogether subordinate. The nervous character of the complaint is sufficiently manifest in many cases; but in certain circumstances, especially when occurring in the gouty or rheumatic diathesis, or in the form of displaced gout, it is sometimes associated with congestion, or with asthenic inflammatory action; and much greater importance is frequently, in such cases, attached to these latter pathological conditions, than to the state of the organic nervous power and vital resistance, which are too often allowed to sink, or which are even hastened to collapse by lowering or inappropriate means.

14. iv. The Prognosis of gastrodynia is generally favourable when the attack is not attended by tumultuous, or irregular, or intermittent action of the heart, or by leipothymia, or by a sense of fatal sinking, or a presentiment of approaching dissolution. These often accompany misplaced or metastatic gout, or the occurrence of severe gastrodynia in the gouty diathesis, or an attack in a person who is already the subject of organic disease of the heart, and should be viewed as extremely dangerous symptoms, although no indications of inflammations or structural change be present, or may be detected in the stomach or collatitious viscera after death. Several instances of this kind have come before me, one of them in a medical man. If the attack occurs in a person far advanced in life, or addicted to the abuse of spirituous or vinous potations, the existence of organic disease in this organ, or in its collatitious viscera, may be inferred, especially if singultus be present, and a prognosis may be formed accordingly. Nevertheless, the attack may not be the less nervous, this being the most important part of the disease, as respects the existing suffering, and that to which immediate attention should be directed, as respects both the prognosis and the treatment. In the severer form of gastralgia, attended by the symptoms of cramp or spasm of the stomach, a cautious prognosis should be given. In a case published by Dr. Macfarlane (*Glasgow Med. Journ.* vol. ii. p. 182.), of cramp of this viscus, the coats at one part, were found completely torn asunder, so as to produce a large opening, no appearance of disease having been

detected in the vicinity or in the margins of the aperture.

15. v. Treatment.—The *indications* of cure are —1st, to allay the suffering of the patient; and 2nd, to prevent a return of the attack by ameliorating or removing the morbid conditions occasioning it.—*A.* The *first* of these is often best accomplished by ascertaining and expelling the cause of disorder, more especially when poisonous or injurious ingesta has produced it. In such cases, the treatment should be directed as very fully stated, with reference to the individual *poisons*, at the places where these are considered; for the removal of these, by an emetic, or by mechanical means, as there advised in respect of numerous injurious substances, or the neutralising or counteracting their actions, is most essential to the obtaining of relief, whenever the attack can be traced to these causes. If the attack be attended by vomiting, or by eructations, the state of the matters thrown off should receive attention; and if these furnish indications of acidity, the combination of antacids with emollients and anodynes are required. If the gastrodynia be characterised by cramp or spasms, rather than by acidity, antispasmodics and emollients should be given in frequent or large doses, with opium, camphor, æther, ammonia, &c. The following will generally afford relief:—

No. 342. ℞. Magnesiæ Calcin. ℈ij.; Tinct. Opii ♏xxxvj.; Spirit. Carui ʒij.; Aquæ Flor. Aurantii, Aquæ Pimentæ, āā ℥iijss. Misce. Capiat æger cochl. iij. larga, omni horâ, vel bihorio.

No. 343. ℞. Mist. Amygdal. dulc. ℥vss.; Acidi Hydrocyanici diluti. ʒss.; Tinct. Opii ʒss.; Spirit. Lavand. comp. ʒij. M. Fiat Mist. cujus sumantur cochl. iij. larga, secundis vel tertiis horis.

16. Whilst these or other appropriate medicines, as may be found in the Appendix (see *Form*, No. 357.), are being employed, either of the *embrocations* there prescribed (see *Form*, 311.), may be applied by means of warm flannels or spongiopiline over the epigastrium. When the pain is attended by retching, it is sometimes beneficial to promote vomiting by copious draughts of warm emollient fluids, in order to dilute and promote the discharge of irritating ingesta, or of morbid secretions. After these have been duly evacuated, it is often requisite to allay both the irritability and the morbid sensibility of the organ by giving, along with each dose of either of the above medicines, one of the pills now prescribed.

No. 344. ℞. Creasoti ♏ij.; Pulv. Cretæ comp. ℈ij.; Syrupi Papaveris q. s. M. Fiant Pilulæ xij. capiat unam vel duas, pro dose.

17. When the gastrodynia is accompanied with much flatulence, or assumes a milder and more chronic form, or recurs frequently, the following may be taken, and repeated according to circumstances.

No. 345. ℞. Magnesiæ Calcinatæ (vel Sodæ Carbon.) gr. xij.—xvj; Pulv. Rhei gr. viij.; Pulv. Cascarillæ (vel Pulv. Calumbæ) gr. v.; Pulv. Cinnamom. comp. gr. iij.; Aquæ puræ ℥iss. Misce. Fiat haustus.

No. 346. ℞. Bismuthi Nitratis, et Magnesiæ Carbonatis, āā gr. x. ad xij.; tere cum Mucilag. Acaciæ ʒjss. dein adde, Aquæ Flor. Aurantii ʒij.; Spirit. Anisi ʒj.; Tinct. Hyoscyami ♏xxv.; Aquæ puræ ℥x.; Syrupi Tolutani ʒss. Misce. Fiat Haustus statim sumendus et horas post tres repetendus.

18. If the pain in the stomach be connected with biliary disorder, a full dose of calomel and opium may be given at first — from five to ten grains of calomel, and from one to two of opium; and afterwards magnesia and rhubarb may be given in any aromatic water. If there be reason to infer that hydrochloric acid is present in the stomach, either vomiting should be provoked or absorbents exhibited previously to the calomel; and if the retention of the latter by the stomach be doubted, a drop of creasote may be given in addition to opium, or morphia. The gastrodynia caused by the retrocession or suppression of gout requires very decided means. I have seen several cases of this kind, and each one was somewhat different from the others in its features, and in the effects produced by treatment. In one case (of a medical man), the attack was associated with enteralgia; in another, it was complicated with marked biliary disorder; in a third, it was attended by great disorder of the urinary organs. For the first magnesia, camphor, cumin, and capsicum, were freely given in conjunction; for the second, magnesia, calomel, and camphor; and, for the third, the carbonate of soda with camphor, carbonate of ammonia, and hydrocyanic acid. For all of them, terebinthinate embrocations were directed to the abdomen, and mustard cataplasms to the feet. The results were favourable in all. The treatment should vary with the peculiarities of each case; and these are so many, and often so different, according as the [illegible] is associated with disorder of organs with which the stomach is connected by position or sympathy, that it is impossible to state all the means, or combination of means, which will be quite appropriate to all.

19. *B.* Having removed the present attack, it is requisite to ascertain, as fully as possible, the conditions of the several digestive and excreting functions, and to trace the influence which disorder of any of these may have in favouring the return of this affection. In most cases of gastrodynia, more or less indigestion or weakness of the digestive functions generally, or impaired action of the liver, and disorder of the excreting functions, are present, not merely for a short period, or contingently upon some manifest cause, but in a chronic or protracted form; and for these a well-devised course of treatment is necessary both to remove them and to prevent their recurrence. Biliary accumulations or obstructions should be removed by chologogue purgatives; weakness of the stomach, by bitter infusions, or other tonics; torpor of the liver, by mild mercurials, taraxacum, or the nitro-muriatic acids, according to circumstances; impaired excreting function, by diuretics, diaphoretics, aperients, emmenagogues, warm baths, &c. Acidity of the prima via ought to be prevented by antacids, as the fixed and volatile alkalies, magnesia, chalk, &c., conjoined with tonics or aperients, or even with both. Antispasmodics, carminatives, and anodynes may be added to these, according as indications for their use may appear, with a view of preventing, as well as of removing, an attack of gastrodynia, which may occur in females, especially about the period of the catamenia, or in nervous or irritable persons, from errors in diet, although no very manifest disorder of any of the abdominal organs can be detected.

20. There is no disorder for which a [illegible] regulated diet and regimen are more required than for gastrodynia. As to the *diet*, which is found

est in this complaint, it is most difficult to nine. Articles of food which agree well in cases, disagree in others. Pure cocoa, black small quantity; farinaceous articles of diet; l food in moderation, and chiefly mutton or ; and abstinence from saccharine substances, pastry and from heating beverages, are gene- deserving of adoption; but it is unnecessary l to what is already advanced on this subject, n *regimen* and the use of *mineral waters*, treating of INDIGESTION (see § 55. *et seq.*), which the complaint is so intimately allied, f which it so frequently forms the most dis- g part.

II. INFLAMMATIONS OF THE STOMACH. — N. — *Gastritis* (from γαστηρ, the stomach); *iculi Inflammatio*, Boerhaave; — *Febris Sto- ca Inflammatoria*, Hoffmann; — *Cardialgia amatoria*, Tralles; — *Gastritis*, Sauvages, l, Cullen, Parr, Pinel, &c.; — *Cauma itis*, Young; — *Empresma Gastritis*, Good; *astrite, Inflammation de l'Estomac* Fr.; — *indung des Magens, Magenentzündung*, .; — *Inflammazion des Stomaco*, Ital.

CLASSIF. — 1. *Class*, 2. *Order* (Cullen); — 3. *Class*, 2. *Order* (Good); — III. CLASS, I. ORDER (*Author in Preface*).

DEFIN. — *Anorexia, nausea, with pain in the of the stomach, with or without chills or ; followed by febrile symptoms, by vomitings after the ingestion of substances, by a desire ld fluids, by increased pain and tenderness on re, and, in the severer cases, attended by an al sense of heat or burning, by extreme anxiety ejection of mind, and by irrepressible vomitings chings.*

It is of some moment, upon entering on nsideration of inflammations of the stomach, p in recollection the organisation and the ctions of the organ, and more especially the ate structure of its villous coat, the nerves supply it, which actuate its vital functions, which forms the bonds of sympathy between l the brain, spinal cord, and associated vis- and the relations, functional and struc- between the enveloping serous covering surrounding viscera, on the one hand, and ternal surface of the other portions of the ntary canal on the other; — duly to consider ery intimate connection subsisting between iscus and the chief ganglial centre; the ana- presented by the digestive canal and vessels eding from it, to the roots of plants; and the al type of conformation existing, in respect is organ, throughout the whole animal crea-

Before proceeding to discuss the several or states in which gastritis occurs, I shall der the causes of the disease, as they are y concerned in producing or modifying these ; the morbid effects generally presenting a or less manifest relation to the causes or rrence of causes producing them.

i. CAUSES OF INFLAMMATIONS OF THE ACH. — These are often the same as occasion nmation of other organs; but there are many s which most frequently and especially pro- one or other of the forms of gastritis.

A. The *predisposing causes* of gastritis are especially such as favour the occurrence of nmation generally; as depression or exhaustion of organic nervous power, functional disorders of the digestive, assimilating and excreting organs; alterations of the circulating fluids, especially imperfect depuration of the blood, and vascular plethora; high ranges of temperature, in connection with a humid or malarious atmosphere; habitual excesses in food and spirituous or vinous liquors; sedentary employments, or occupations which are followed in a stooping position, mental application and the depressing emotions; the suppression of eruptions or accustomed discharges, of periodic losses of blood, or of external painful affections; convalescence from fevers or other acute maladies; sympathy with diseases of other organs or structures; and tight-lacing in females, or close cinctures, &c.

27. *B.* The *occasional exciting causes* are chiefly those which consist — 1st, of injurious ingesta; 2nd, pre-existing disease; and 3rd, mechanical agents or physical influences. — (*a*). Excesses in food or drink, beyond the usual quantity of either, or as regards the incongruous nature of the articles; irritating and indigestible food, especially dried, preserved, or long-kept animal substances; various kinds of fish, more particularly shell-fish, in certain idiosyncrasies; a too high or too low temperature of the articles taken into the stomach, especially when taken in large quantities, and in predisposed states of the frame, unnatural distension and oppletion of the stomach; the excessive use of any stimulant, particularly alcoholic liquors, tinctures, cordials, &c., of aromatics, spices, rich sauces, highly seasoned dishes, &c., or of vinous, saccharine, acid, or fermenting beverages; an inappropriate recourse to irritating emetics or purgatives, particularly in large doses, as when the former has been thus given in order to procure the expulsion of narcotic or other poisons; the ingestion of any of the numerous articles comprised in the classes of irritant, acrid and narcotico-irritant poisons (see art. POISONS); the use of various resinous, oleaginous, alkaline or acid medicines in too large or frequent doses, or of various vegetable or other concentrated principles; spoilt, putrid, or rancid or unwholesome kinds of food, or impure, stagnant, or contaminated water; rancid, fatty, or oleaginous articles; and unripe, acid, or stale vegetables or fruits.

28. (*b.*) Pre-existing disorders or diseases may run on to some form or other of gastritis, either by their increased severity, or by their extension to one or more of the tissues of the stomach. Thus, flatulence and other forms of indigestion, pyrosis, morbid appetite, or rumination, may pass into gastritis, either spontaneously, or more commonly after errors of diet or regimen, or after a recourse to injudicious remedial means, or to unwholesome or unsuitable food or drink. Biliary disorders, particularly accumulations of acrid bile in the gall-bladder or ducts, may occasion gastritis; the irruption of the bile into the duodenum, and partially into the stomach, irritating or inflaming both these viscera. Disease or severe injury of distant organs, with which the stomach is most disposed to sympathise, as the brain, kidneys, uterus, skin, &c., may not only predispose, but even excite this viscus to inflammatory action. More frequently, however, the stomach becomes implicated either by continuity of structure, or by contiguity of position. Thus inflammation of the œsophagus may extend to the stomach, or both

diseases may be co-etaneously induced, as when vomiting has been procured by large quantities of mustard, and of this result I have seen two or three instances. The villous coat of the stomach and small intestines may be effected either more or less extensively, or in a limited extent at first, the inflammation extending afterwards more or less in either direction, according to the predisposition and to the nature of the exciting cause. The stomach not infrequently also becomes implicated in the course of inflammations of the liver, diaphragm, peritoneum, spleen, gall-bladder, &c., chiefly in consequence of contiguity of position. In these cases, inflammatory action of a portion of the peritoneum extends to the opposite part of the peritoneal coat of the stomach, occasioning an exudation of lymph, and adhesion of the opposing surfaces, with more or less disease of this viscus. This succession or extension of inflammation from the surrounding viscera to the stomach, is often observed in warm climates, especially among Europeans who have migrated thither.

29. Gastritis may be induced by powerful mental emotions, or mental shocks; or by the suppression of rheumatism or gout, or of any accustomed discharge; and these diseases may either be a predisposing cause (§ 25.), some exciting cause having occasioned the gastric attack; or they may be the only efficient cause which can be detected, the gastritis even occurring without any circumstance which could account for the suppression or retro-cession of either of these maladies. Most commonly, however, the stomach is attacked in the course of these, owing to errors of diet or regimen, or to the exhibition of irritating or inappropriate medicines or doses. Gastritis becomes, moreover, a prominent feature or complication of several fevers, especially those which have been denominated bilious by some writers, or gastric, owing to this feature, by others; and which are common in autumn or summer, or in warm climates. These fevers may assume a bilio-gastric character at these seasons, and may be either continued or remittent,—the latter chiefly in malarious and warm climates. Indeed, there are few kinds of fever, especially in these seasons and climates, in which the stomach is not more or less prominently affected; and still more particularly in the exanthemata and in pestilential and malignant fevers. (See arts. FEVERS, § 387. *et seq.*, and PESTILENCES.)

30. (*c.*) Mechanical agents may produce gastritis, by having passed into the stomach, or by acting externally. Broken glass, or various sharp or rough substances accidentally or intentionally swallowed, have produced this disease; whilst blows on the epigastrium and region of the stomach; falls, bruises, &c., and the reaction consequent upon such physical shocks, have been followed by similar results. Atmospherical changes, and vicissitudes of temperature, especially when extreme; exposure to cold after the body has been overheated, and even any form of exposure when prolonged, have been considered sufficient to induce, what some authors have described as a catarrhal form of gastritis, affecting the villous surface of the organ,—various physical influences, as electrical states of the air, &c., being supposed by them to aid the operation of vicissitudes of temperature.

31. ii DESCRIPTION. — *Gastritis* has been variously considered, in respect of its *seats and v eties*, by different writers. It has been *divided* to the *phlegmonous* and *erysipelatous* or *erythem ic*; by CULLEN, PINEL, GOOD, and J. P. FR K; by some writers into the *acute* and *chronic* he phlegmonous being most frequently the for er, the erythematic the latter, but to this division ere are many objections; and to this corresponden of morbid states there are numerous except ns. HILDENBRAND admitted three species, nar y, the *phlegmonous*, the *catarrhal*, and the *rheum ic*, either of which may be *acute*, or *chronic*, se latter characteristics having reference only se-verity of attack and period of duration. Th a-tarrhal form of this writer, corresponded wit he erysipelatous of others. BROUSSAIS and M-STRONG distinguished two species, *sero-ga tis* and *muco-gastritis*, assuming the serous nd mucous coats of the stomach to be respect ly the seats of the phlegmonous and erythematic ms of the disease.

32. Of the accuracy of these divisions of as-tritis, very reasonable doubts may be entert ed, arising from the phenomena observed durin the life of the patient, and from the changes seen ter death. The manner in which the disease ap ars, the state of vital energy at the time of attac and the causes which have induced it, severally in determining the forms in which it may b ar-ranged. If the disease supervene upon infla ma-tion of the liver, or omentum, or peritone , it may be reasonably inferred that the serous ot of the stomach is first implicated, although it be difficult to determine how far the other tissu are affected. Or, if gastritis arise from irritatin ub-stances taken into the stomach, from the re rgi-tation of acrid bile, or in the course of a ere dyspepsia, it is obvious that the villous sur e is primarily and chiefly affected, although the her tissues constituting the parietes of the viscu ften subsequently become more or less impli ed. That inflammation may thus extend from her surface, to one or more of the several tiss , of which the parietes of the organ are forme will be admitted; and that this extension of the in ma-mation is more frequent than the simult ous seizure of all the tissues or coats of the viscu will also be allowed. But it is not improbabl hat this latter state of the disease may som nes occur in a most severe or intense form, and hen the causes are of an energetic or poisonous nd. In such cases, although the morbid impr ion may be directly made upon the villous s ce, the whole of the tissues may, through the m um of either the connecting cellular tissue or or-ganic nerves, soon become affected, the ous coat, however, generally displaying the ost marked alterations of structure, or the most e ent signs of inflammatory action.

33. *Phlegmonous*, or *acute*, or *active ga itis*, therefore, is not, as *post-mortem* examination lly prove, limited to the serous covering of th sto-mach, although often this coat is the tissue na-rily or chiefly affected, as when gastritis er-venes upon, or is complicated with, inflam ion of one or other of the adjoining viscera. I , in the majority of instances of acute gastritis, ur-ring primarily or spontaneously, nearly the coats of the organ are more or less affecte pro-bably in a part only of the parietes, and esp lly the cellular tissue uniting the coats, and f ing

matrix in which they as well as the nerves and dvessels are imbedded. That all cases of e gastritis, however, do not commence in this ner, but that many, and these even the most re, may originate in the villous surface, has stated above (§ 31.). Hence it follows, the *chronic* form of the disease is not the only which is seated in this surface; and that, ugh most frequently thus seated and even limited, inflammation of the other tissues may be possessed of this character.

4. Viewing, therefore, the several forms and s of gastritis, with reference to their causes, o the modifying influences of season, climate, titution, diathesis, and previous disease, it may ferred — 1st, that gastritis, either in its comement or progress, is not necessarily limited to gle tissue or coat of the stomach, although it originate in one or other, or affect one or two ore of these tissues in a more marked manner the rest; 2nd, that the terms, *phlegmonous, sive, erysipelatous, erythematic, catarrhal,* &c., not precise as respects the seat and nature of lisease, nor appropriate when we regard the ning usually attached to these terms; 3rd, *acute* and *chronic* have no reference to the cular tissue of the organ affected, but refer ly to the severity and duration of the disease; these terms are extremely arbitrary, and that ave no absolute and precise range of activity chronicity in respect of this disease, more than ny other; for gastritis may affect the more nal, or the more internal coats of the organ, ell as several or all of them, in every grade verity and of duration, between the opposite mes of activity and duration of existence.

. In the following description of gastritis, I consider — 1st, the slighter forms of the dis- especially as they occur in the villous surface e organ; 2nd, the sub-acute or severer states flammations, as either supervening on the er, or commencing primarily, and extending ore than one of the tissues of the viscus; 3rd, ost severe, malignant or exasperated attacks stritis; 4th, the more prolonged or chronic s of the disease; 5th, the complicated and con- ive states of gastritis; 6th, the terminations of c inflammations, &c. The diagnosis, prog- , and treatment of the disease, will afterwards nsidered in succession.

. *A.* The *milder or slighter form of gastritis* chiefly be referred to the villous or internal ce of the stomach. It is generally connected a weak and sensitive state of the nerves of rgan. It is often consequent upon indiges- especially when this affection is prolonged or operly treated; and is then, as well as when urs primarily, occasioned by errors of diet, by olesome articles, by excesses in food or sti- ting liquors, or by hot spices or sauces. In form of gastritis, the patient complains of al uneasiness, referrible chiefly to the sto- , and especially after having taken food; of a, flatulence, distension, sense of heat in the ; of thirst, dryness of the tongue or fauces; d, acrid, or rancid eructations, causing a tion of acridity or an unpleasant irritation e throat and fauces, and occasionally vomit- specially after fluids are taken into the sto- . The tongue is red at the point and edges, often loaded at the root and centre. Chilliness, general mal-aise, incapability of exertion, heat of the palms of the hands and soles of the feet, a slight acceleration of pulse, and tenderness at the epigastrium on firm pressure, costiveness, lowness of spirits, anorexia, loathing of food, excepting what is relishing or stimulating, and which, when taken, increases the complaint; sometimes vertigo, and palpitations, are more or less experienced.

37. This mild form of gastritis may occur primarily from the causes mentioned above (§§ 25, 26.) or consecutively upon indigestion; or in connection with severe catarrhal or bronchial attacks, with which, especially with catarrhal fever and influenza, it is often a more or less prominent *complication*. It also forms a very marked pathological condition, in connection with others, during the incubation and development of the exanthematous fevers, especially scarlatina and small-pox; and it is a more or less marked complication or pathological condition in gastric, in gastro-enteric, and bilious fevers, and at the commencement of several other fevers (see art. GASTRO-ENTERIC DISEASE).

38. In this form it is presumed that the villous or mucous membrane of the stomach is only affected, and that this tissue is merely in a state of irritation or hyperæmia, and either partially or to a greater or less extent as respects this surface of the organ. It is often relieved or entirely removed in the course of a few days by abstinence or the use merely of emollient articles of food taken in small quantities. But it is often also of much longer duration, either becoming *chronic*, or passing on to more serious disease — to either a sub-acute or an acute form of gastritis, or to very dangerous organic change. These results most commonly follow, more or less slowly or insidiously, although sometimes rapidly upon injudicious treatment, — upon the use of stimulants and tonics, or upon habitual excesses in food and intoxicating beverages. In many cases the disease continues for months without much increase; in others, the inflammatory action becomes more general over the villous surface, or extends more deeply in the parietes of the organ. The morbid irritation may, moreover, become concentrated in the mucous follicles, and, after an indefinite, but generally a protracted period, may lead to ulceration, and even to perforation of the viscus. In young subjects, especially those who are imperfectly nourished and respire an unhealthy atmosphere, the form of inflammation, existing in an asthenic state, may induce softening of the villous and sub-cellular tissues, with either thickening or even thinning of the coats of the organ.

39. Attacks of mild gastritis, in varying grades of severity, are frequent in persons subject to dyspepsia, or who are guilty of excesses in eating and drinking; and they often subside or disappear spontaneously, shortly after the causes are no longer in operation; the secretions and exhalations from the villous surface and follicles of the organ favouring the occurrence of resolution of the inflammatory condition. Hence abstinence or a moderate abstemiousness is the best mode of cure, unless medicines be prescribed with much caution, and be carefully suited to the morbid conditions, which are generally not merely inflammatory irritation or hyperæmia of the villous coat and follicles, but also weakened or exhausted

energy of the ganglial nerves actuating the organ. As respects either state, it is better that it should be allowed to recover itself, through the influence of vital resistance, than that it should be perpetuated by irritants or otherwise inappropriate means.

40. *B. Sub-acute gastritis* is generally limited to the villous surface, or probably is extended in parts to the sub-villous cellular tissue. It generally results from the same causes as have been already noticed (§§ 25, 26.); and may be present as a prominent affection or complication of the same exanthematous and febrile maladies (§ 28.), and in the advanced stages of tubercular consumption. It may occur primarily, although not frequently; or it may follow the milder form of gastritis, owing to errors of diet or regimen, or inappropriate treatment. It sometimes is consequent upon, or is associated with, œsophagitis, or pharyngitis, or both; and not infrequently it is accompanied with inflammatory irritation or action in the duodenum and small intestines (see art. Gastro-enteric Disease). It is in most respects, as regards its causes, associations, symptoms and terminations, similar to the mild form already described; the difference being only in the greater severity of the symptoms characterising this.

41. In sub-acute gastritis there are pain, or sense of heat at the epigastrium, frequent retchings and vomitings, especially after substances, in any considerable quantity, are taken into the stomach, and the matters brought off the stomach are generally ropy, colourless, and abundant, or coloured by bile of a yellowish or greenish hue. Chilliness or slight shiverings often precede and attend the pain and vomitings, with a sense of anxiety at the præcordia, and tenderness, fulness, or distension at the epigastrium, depression of spirits and of strength, a dark or sallow circle around the eyes, a loaded tongue, the point and edges being red or indented by the teeth, or the surface more generally red, and the papillæ elevated, with great thirst, and desire of cold fluids. The bowels are costive; and the urine is scanty, high-coloured, and generally presents an acid reaction. The pulse is frequent, soft or broad, open or compressible; the skin dry and feverish. The breathing is frequent and shallow; and the patient either sits up for a time or lies on his back in bed. All kinds of food, especially animal food, are loathed; or when tasted, excites nausea or vomiting, which generally also follows warm drinks, especially tea.

42. This form of gastritis is often *complicated* with inflammation of adjoining portions of the digestive villous surface; but it also sometimes occurs *primarily*, and in an uncomplicated form, especially in young subjects, after debauches, or the excessive ingestion of spirituous or vinous beverages; or after copious draughts of cold fluids when the body is perspiring, or even in other states of the frame. It generally subsides when a suitable abstemiousness or abstinence is enforced, or when otherwise judiciously treated. But it may lapse into a more *mild*, but often a more *chronic* state; and even go on to a more severe, or a disorganising form, ultimately *terminating* in some one or other of the structural lesions which will be described hereafter. When associated with inflammatory irritations of the intestinal villous surface, the bowels are more less relaxed, the febrile symptoms sometimes more marked and attended by frontal headache, and by pains in the back and limbs (see Gastro-enteric Disease). Sub-acute, as well as mild gastritis, although it may affect the coats of the organ to some depth, and in parts only, very seldom proceeds so far as to implicate the serous surface, unless the mucous follicles have become ulcerated, and the ulceration has reached the peritoneal membrane. In this case, the sub-acute state of disease has generally degenerated into the chronic before this advanced lesion has taken place.

43. *C. Acute or severe gastritis* occurs — 1st, primarily or directly from its occasional causes; 2nd, consecutively upon the milder forms of the disease already noticed, owing to the persistence of the causes, or to improper treatment; and 3rd, from the extension of inflammation from adjoining viscera. It may present various grades of severity or violence, owing to the greater or less extension, or intensity of the morbid action, and violence of the exciting cause, relatively to the state of constitutional power; and, in any of these grades, it may be a prominent affection in the course of the more malignant forms of the exanthemata, of fevers and pestilences. Acute gastritis is rare as an idiopathic malady, and unassociated with inflammation of any other organ, unless when it is produced by poisons, or by substances which, from their quantity or condition, act as poisons, as the ingurgitation of spirits, or of very cold or very hot fluids, &c. M. Andral records a case in which fatal gastritis followed a severe mental shock, the stomach alone presenting the results of inflammatory action.

44. (*a.*) When gastritis is produced by *irritant poisons* (see art. Poisons, § 109. *et seq.*), the local symptoms are instantly developed, and when the poisons are of an acrid or corroding nature, they assume the most intense features. The pain at the epigastrium is most violent, burning, pungent, or lacerating; often extends from the pit of the stomach to the spine, or to both hypochondria, and is attended by extreme anxiety, mental and physical depression; by constant retchings, the matters ejected varying with the contents of the stomach at the time of ingestion of the cause and with the nature of the cause (see Poisons, § [illegible].). The retchings aggravate the sufferings, and return on each occasion when the irrepressible thirst impels the patient to drink. The breathing is shallow, and increases the pain; the supine position, with the knees drawn up; or a semi-recumbent bent posture being generally assumed. The slightest pressure increases the patient's sufferings. The vomitings are most painful, and, after the contents of the stomach are thrown off, consist chiefly of the fluids last taken, sometimes coloured by bile, and containing a little mucus, or glairy matter streaked with blood. With the intensity of the symptoms, the prostration of the patient increases, and the features are more sunk, and expressive of greater anxiety. The epigastrium and hypochondria are generally tumid or tense, and the temperature of these regions is much augmented. The skin is hot, dry and harsh, at an early period, and the cheeks sometimes flushed, whilst a dark circle surrounds the eye, and sometimes also the mouth, the un-

nce being expressive of extreme anguish ; distressing anxiety is referred to the præ- lium and epigastrium. The tongue is either throughout, or only at the point and edges, middle and base being covered by a thick fur. pulse is frequent, and at first constricted or ll. The urine is scanty and high-coloured. bowels are costive ; but, when the cause, es- ally when it consists of some poisonous sub- ce, has passed the pylorus, and has inflamed intestinal mucous surface also, diarrhœa, and ing may accompany the retchings and vomit- .

5. As the disease proceeds, the symptoms as- e a worse character ; and, according to the nsity of the cause, especially when this is of an l or corrosive nature, the progress of the dis- is rapid, and its duration short ; a fatal ter- tion sometimes taking place in a few hours, ugh most frequently not until the second, or fourth day, unless in the most violent s. When the disease proceeds thus unfavour- , the pulse becomes rapid, very small and dy, sometimes irregular, intermittent or slow. extremities are clammy or cold, whilst the k is still hot and even dry. The features are or pinched, pallid or sallow. The thirst and ing heat in the region of the stomach con- , and the pain is attended and aggravated by ent flatulent eructations, or by hiccup ac- panied by eructation, and at intervals, or after fluids are taken, by vomiting without effort, or without retching, the matters wn off being as if eructated from the sto- . During the disease, the desire of cold s, or of iced water continues ; and ultimately hiccup has been present for a short time, the is diminished or altogether ceases ; but the res, pulse, and temperature, sink more and . The extremities and surface become clammy and cold, and the pulse disap- s. Death rapidly follows, the mental facul- eing unaffected, or continuing without mani- mpairment until the last, unless the cause of ttack has been of such a nature as not only to me the stomach, but also to disorder the ner- and mental manifestations. When the dis- and the operation of its cause are limited to tomach, or to this viscus and adjoining por- of the digestive canal, death is the result of xtent of lesion or disorganisation, being such haust or depress organic nervous and vital r to such a degree as is incompatible with ontinuance of the heart's action ; the intimate ection of the affected viscus with the centres ganic nervous power, rendering all severe af- ns of the former most depressing to the latter, ltimately annihilating its manifestations, when reach a certain grade.

. When acute gastritis is produced by less in- causes, or when it is consequent upon inflam- n of the liver, or of some other part, the serous brane becoming implicated, the history of the se is modified from the foregoing, gastric toms supervening, with more or less severity, those characterising the primary malady. consecutive gastritis thus developed, although both acute and severe, is seldom so intense e form now described ; and a fatal termina- which is very frequently the result, is gene- longer delayed, than when gastritis is produced by the more intense causes, especially by acrid or irritant ingesta. When the disease extends to the serous membrane from adjoining parts, a portion only of this membrane is at first attacked, although the inflammation may soon be much further extended. Whereas when a deleterious substance is taken into the stomach, the injurious effect is more widely extended, and more intense, unless this substance be in great measure intercepted by the contents of the viscus, and thrown off with these contents by vomiting (see art. POISONS, § 51. *et seq.*). When acute gastritis is consecutive of inflammation of adjoining parts, and is not arrested or relieved by treatment, it presents more or less of the characters described above (§§ 44—46.) generally in a somewhat less intense and less rapid form ; death, however, often occurring in the course of a few days, or sometimes being delayed to two or three weeks. In some cases the disease may lapse into a sub-acute or even chronic form, and be prolonged to some indefinite period.

47. Acute gastritis may supervene upon either the mild or the sub-acute form ; or gastritis in a slight and chronic state may have long existed, and ultimately an acute attack may be developed, owing to the operation of one or more of the causes already enumerated. In some cases, a judicious treatment may reduce the acute attack to the state which preceded it, but more frequently the severe symptoms depress and ultimately exhaust the patient. Primary acute gastritis, when early or judiciously treated, or even when treated in such a manner as may not interfere with the salutary changes brought about by the efforts of nature, and by vital resistance, terminates favourably in many cases, a cooling and soothing treatment with abstinence, bringing about resolution. But not infrequently, the disease either proceeds in the manner above described (§§ 45, 46.), or in a less intense or rapid form, to dissolution ; or it is so far ameliorated as to assume a sub-acute, or a mild form. In either of these latter cases, it may be further relieved or altogether removed, or it may continue in a chronic state.

48. *D. Chronic gastritis* is most frequently either the mild or sub-acute state of gastritis rendered obstinate, or prolonged by neglect, or errors of diet or regimen, or by injudicious treatment ; it more easily follows an acute attack. In whatever form gastritis occurs — whether mild, sub-acute, or acute — if the cause which produced it be removed, and judicious means be used, the natural secretions of the viscus, by their free and abundant exudation, favour the occurrence of resolution. But if food or drink of an exciting, heating, or irritating kind be administered, inflammatory action is increased or perpetuated, and continues in some one of various grades, and attended by diversified symptoms for a very indefinite period. In its course, moreover, further disorder or disease is developed, or pre-existing disorder is aggravated, and various complications arise.

49. The symptoms referrible to the stomach are often an aggravation of those characteristic of indigestion, or similar to those of the milder forms of gastritis. More or less pain is felt, is generally aggravated by food, or by much fluid, and is attended by heartburn, a sense of distension, and by tenderness on pressure. Anorexia and nausea are present, and occasionally vomiting occurs, the

matters consisting of such as have been more recently taken, or of a glairy fluid with mucus. Instead of pain, a sense of gnawing, of craving, or of sinking, is sometimes experienced; and either of these may be accompanied with flatulent or acrid eructations, with fulness or tension at the epigastrium, or with a feeling of distension, or of heat, and general discomfort. The appetite is either altogether lost, or it is craving, gnawing and morbid, articles which are most inappropriate being desired. These articles generally aggravate the pain, or occasion vomiting, and increase the thirst, which is generally present. A foul or loaded, or furred tongue, the point and edges being red, or indented by the teeth; an unpleasant taste in the mouth, or a vitiated taste; heartburn, or a sense of acidity of the stomach, with frequent acrid, acid, fœtid or rancid eructations; costiveness, or an irregular state of the bowels, the stools being often deficient in bile, or of a very dark bilious appearance, and offensive, are generally experienced. The urine is either scanty, clear and high-coloured, or paler, turbid, or phosphatic. Chilliness and feverishness, frequently with frontal headache; a dry, harsh or scaly state of the skin; general mal-aise, want of physical power, and defective mental energy and application, are commonly complained of.

50. With the continuance of the complaint, numerous sympathetic feelings and disorders are manifested. The several senses are often slightly affected. The mind is always engaged with the bodily feelings, which become exacerbated, or are exaggerated by the constant attention directed to them; the disorder often approaching the characters of hypochondriasis, or even passing into this complaint. The temper is irritable and uncertain. In many cases, the pharynx and fauces present a similar state of chronic irritation, with congestion or inflammation, as may be presumed to be present in the stomach, and the irritation sometimes extends to the epiglottis or larynx, and is perpetuated by the acrid eructations which occur. In these cases, a dry stomachic cough is complained of, a fit of which sometimes is followed by retching or even vomiting. Palpitations, with increased frequency or irregularity of the pulse, are often experienced. Occasionally the tongue presents patches as if deprived of its epithelium in parts. It is generally loaded or furred at its base, and the follicles swollen. Sometimes the surface is red, smooth and shining throughout; or it is variously fissured. The gums are swollen or spongy, and fall or recede from the teeth. According to the severity and duration of the disease, numerous other sympathetic affections are developed, continue for a time and disappear, or become permanent. The disease thus proceeds for an indefinite time, and is either ultimately relieved or removed, or it exhausts and emaciates the patient, and superinduces organic lesions of the stomach, especially at the cardia or pylorus, or disease of the liver, lungs, pancreas, or kidneys; the complication often terminating life.

51. ii. APPEARANCES ON DISSECTION. — The changes produced by the milder forms of gastritis — by the mild and sub-acute — are rarely observed unless when they occur at an advanced stage of some chronic disease, as tubercular consumption, hectic fever, &c. These changes, as well as those which are produced by acute gastritis, have been very fully described when treating of the morbid anatomy of the alimentary canal (see art. DIGESTIVE CANAL, § 21. *et seq.*), and of the effects of POISONS, under which head the alterations produced by the several corrosive, irritating and other poisons in the stomach are circumstantially detailed. In the more sub-acute and chronic states of gastritis, especially as observed in drunkards, or in persons addicted to excesses in eating, are chiefly a dark, reddish-brown, or slate-grey, or blackish blue discolouration of the villous membrane, thickening, increased condensation or induration of this membrane — an hypertrophy, presenting itself in various grades (see art. DIGESTIVE CANAL, § 27. *et seq.*). The pyloric portion of the stomach is generally the chief seat of the more chronic inflammation of the stomach, the sub-mucous cellular tissue, and the muscular coat, participating in the hypertrophy, in various degrees, the parietes of the viscus chiefly in and near this portion presenting increased thickness and hardness. In some of these cases, the stomach contains or presents on its internal surface, a greyish, or colourless, glairy mucous secretion, in considerable quantity. In cases of acute gastritis complicating exanthematic fevers, or caused by some kinds of poisons, flocculent exudation, or even partial formations of false membrane, are sometimes found on the mucous surface.

52. Idiopathic inflammation of the internal coats of the stomach, involving chiefly the sub-mucous and connecting cellular tissue, and terminating in suppuration, is very seldom observed. Inflammations thus seated and thus terminating are oftener met with consecutively of, or associated with, some other malady. In these cases, the parietes of the stomach are thickened, owing to the sub-mucous tissue being distended with pus; this tissue being softened and friable. The mucous membrane itself is generally injected and red. In some parts, this membrane is perforated by numerous irregular cribriform openings, through which the pus escapes into the cavity of the stomach. The various organic lesions of the stomach consequent upon gastritis, or upon constitutional or other causes, are fully described under the head DIGESTIVE CANAL (§ 18. *et seq.*), and, as respects their symptoms and treatment, are considered in the sequel.

53. iii. DIAGNOSIS OF GASTRITIS.— *Peritonitis*, especially when circumscribed or limited to the viscera or regions of the upper part of the abdomen, may be mistaken for gastritis, as the prostration, pain, vomitings, retchings, &c., may be as great in the one as in the other. But the situation of the pain, the great tenderness, especially at the epigastrium, the sense of burning there, the character of the thirst and desire of cold or iced fluids; the mucous and glairy or ropy matters vomited, sometimes streaked with blood, the appearance of the tongue, and the not infrequent recognition of the exciting cause, generally indicate the nature of the malady. When gastritis is consequent upon hepatitis, or splenitis, or enteritis, or diaphragmitis, as sometimes observed, especially upon the first of these, the diagnosis may be more difficult. But the history of the case, and the appearance of severe gastritic symptoms during the course of hepatic disease, or other inflammations, will indicate this extension of the morbid action. When more general sympto-

is present, the diagnosis is more manifest ;
uch as the painful symptoms extend much
, whilst in gastritis they ascend to the base
e thorax, and are generally attended by a
er amount of anxiety extending frequently to
ræcordia. When inflammation affects the
ing peritoneal surfaces of stomach and liver,
t infrequently found after death, especially
rm climates, the symptoms are often equi-
in respect of either organ. The complica-
ay, however, be inferred from the characters
early symptoms, and of those more recently
oped.

. The diagnosis of the milder and more chro-
ates of gastritis, is much more difficult than
f the acute. The not infrequent temporary
of pain and other symptoms of the former,
mulants and carminatives, frequently suggests
xistence merely of indigestion or morbid sen-
y of the organ, whereas a mild or chronic
of inflammation of the mucous surface may
nevertheless. But, when pain is present in
egion of the stomach, and is increased by
ure, or by food, and by warm fluids ; when
ing of a ropy and abundant mucus takes
; and when the throat, fauces and gums are
r inflamed, this form of gastritis may be truly
ed. The aggravation of pain, or the produc-
f vomiting, by warm tea, or other warm fluids ;
and scaly state of the skin ; the presence of
lar or other eruptions on the skin ; the relief
ving the use of cooling fluids, and an abstemi-
r low diet ; the spongy or inflamed gums ; the
apillated, aphthous, or fissured states of the
ue ; or a dry, red, or smooth and shining ap-
nce of this organ ; and heat in the palms of
ands, or soles of the feet, are severally in-
ions of mild or chronic gastritis, especially
observed in connection with slight febrile
toms, and an alteration in the secretions and
tions.

. iv. The Prognosis in the milder forms of gas-
and even in the chronic states, before serious
lications have been developed, is generally
or less favourable, provided that a judicious
ment, especially in respect of diet, regimen
air be adopted and persevered in. When,
ever, organic disease of some vital or im-
nt organ has either preceded, or been deve-
l in the course of, these states of gastritis, a
unfavourable issue may be anticipated, or
be near at hand ; mild, sub-acute, or chronic
itis, or gastro-enteritis, or even gastro-œso-
itis, with troublesome irritation of the pharynx
uces, very commonly characterising the far
nced stage of hectic and organic visceral dis-
s.

. In acute gastritis, the prognosis depends
h upon the exciting cause. When this is of a
corrosive or acrid nature ; when it has not
entirely removed from the stomach, and
n this viscus was empty when it was taken ;
n the injurious matter is not only acrid or irri-
, but also depressing to the organic nervous
gy, a very unfavourable issue may be ex-
ed, even at an early period of the disease. If,
ever, the cause be altogether removed, and a
nution of the sufferings, or of the vomiting be
arked ; and if appropriate means be retained
he stomach — if the painful symptoms abate,
none of the most dangerous appear — if the matters vomited be neither streaked with blood nor sanious—if neither singultus, or cold perspirations be present — if the anxiety, distress and restlessness be relieved — if the character of the pulse, respiration, and of the sympathetic disturbance improve ; and if the disease be primary or uncomplicated, a favourable issue may reasonably be expected, if no error in diet or regimen be committed, so as to increase or to rekindle the inflammatory action. When acute gastritis appears in the course of exanthematous or other fevers ; or when it is consecutive of hepatitis, or of inflammation of one or other of the adjoining viscera, the prognosis should be extremely guarded, for the extension and complication of disease may be attended by great danger, although the symptoms may not appear very severe. In these cases especially, the extent and exact seat of lesion are not easily determined, the degree of prostration, the character of the pulse, the state of the abdominal surface and of the extremities, the anxiety and appearance of the countenance, the position of the patient, and the nature of the retchings and matters vomited, severally guiding the prognosis.

57. v. Treatment.—The treatment of the several forms of gastritis should be conducted with the same intentions for each ; — namely, 1st, to remove the exciting cause ; 2ndly, to subdue the inflammatory action produced ; 3rdly, to avoid whatever may irritate or excite the stomach by its properties, or the quantity taken ; and, 4thly, to restore the healthy functions of the organ.—*A. The milder forms of gastritis* are generally caused by errors of regimen, especially in respect of food and drink, and, in many cases, they require merely abstinence, or a mild, farinaceous, and abstemious diet for their removal. But, in some constitutions, and in others where abstemiousness is not observed, the complaint, although mild at first, becomes either chronic or exasperated, and, in addition to a strict regimen, various other means are required. These means should be suited to the age, constitution, and power of the patient, and the severity of the disease. Generally, the application of leeches over the epigastrium, followed by rubefacients, especially the terebinthinate embrocation, and the administration of emollients, with refrigerants, &c. are sufficient to remove the milder states of disorder. Small doses of the nitrate of potass, given in the mistura amygdalæ, with hydrocyanic acid, are usually of service. The bowels should be kept freely open by means of cathartic enemata. A moderate dose of calomel may be given at bed-time, early in the disease, especially when the functions of the liver are impaired ; and its operation may be increased by about twenty or thirty grains of calcined magnesia in the morning, followed by a glass of lemonade immediately after the magnesia is taken ; or a drachm of citrate of magnesia may be prescribed in any mild vehicle. Even when retching or vomiting is present, the above means usually afford relief in a short time ; especially when the *third* indication is duly enforced, and abstinence is observed, the mildest farinaceous articles only being taken in small quantity.

58. *B.* In the more *acute* or *severe cases* of gastritis, the removal of the exciting cause should be instantly attempted ; and if this be of a poisonous nature, the means advised for this purpose

in the article Poisons ought to be employed. Vascular depletion should be promptly ordered, the amount being regulated by the age and strength of the patient, by the state of the pulse, and more especially by the nature of the exciting cause. In most acute cases, and at an early period, one general *bloodletting*, which may be followed by the application of leeches to the epigastrium, or by a repetition of the local bleeding, and by a blister, or a rubefacient embrocation or epithem, is requisite. In some cases, especially when the disease is not occasioned by poison, a full dose of calomel, at an early period, is of much service, and tends remarkably, especially when given with magnesia in the form of powder, to allay the irritability of the stomach: but medicines should be sparingly given by the mouth, those already mentioned (§ 57.) being the most appropriate. When the vomiting is urgent, and the sense of heat at the stomach great, the nitrate of potash may be given, as above combined, more frequently, and two or three drops of tinctura opii may be added to each dose. But the quantity of the vehicle should be small and emollient or mucilaginous, and effervescing mixtures or large draughts avoided. Small morsels of ice, and the citrate of ammonia, or of soda, or of magnesia, in weak solution and in small quantity, are generally beneficial, the latter especially when the bowels are not sufficiently open.

59. At an advanced stage of acute gastritis, when vomiting is almost constant and without much effort, or when blood is brought up with other matters, or when the pulse is sinking or irregular, it becomes a question what means should be adopted, or whether any can be of service. In these almost hopeless circumstances, where fatal disorganization of the stomach is expected, I have sometimes prescribed the spirits of turpentine by the mouth, in small and repeated doses, in the form of an electuary with aromatics (see art. Spleen, § 69.), and a turpentine epithem to be applied at the same time over the epigastrium and abdomen. In many instances, such doses of tinctura opii as the peculiarities of the case may suggest, and very small doses of creasote, may be added to the electuary. (*See Author on the Use of Terebinthinate Remedies in Disease; in Lond. Medical and Physical Journal for* 1821.) In several instances, when this treatment has been prescribed in these circumstances, the vomiting has ceased almost immediately, and the patient has ultimately recovered.

60. *C. The chronic states of gastritis* require means which their antecedents and causes chiefly should suggest. In some cases, especially when indications of exacerbation from errors in regimen present themselves, leeches applied on the epigastrium are necessary, and the repetition of them, after various intervals, should not be overlooked. Generally, a few leeches, and a frequent repetition of them, are more beneficial than a great number applied at one time. After these, warm embrocations, rubefacient plasters, or even blisters, are of service. But in most of the chronic states of the disease, whether simple or complicated, diet and regimen should receive the strictest attention. In some instances, the mild preparations of mercury suitably combined with gentle laxatives or aperients, are of great service, and when the liver is torpid, they can hardly be dispensed with. When chronic gastritis is complicated with largement of the liver, calomel, or other r mercurials, conjoined or alternated with pu tives, and aided by the deobstruents advised this state of the liver (see Liver, § 245. *et se*), should not be omitted.

61. *D.* In most cases, when *pain* or *spasm* is ferred to the stomach in the course of this stat of disease, hydrocyanic acid, in mucilaginous emollient mixtures, or with a weak solutio of any of the alkaline carbonates, or with li water and milk, is generally productive of nefit. In these cases, also, the nitrate of muth, or the oxide or nitrate of silver, comb with very small doses of ipecacuanha (from sixth to the quarter of a grain), and opiu henbane, is of great service. The oxide o sulphate of zinc, in small doses, is also very neficial, when combined with anodynes. Wood remarks, respecting the nitrate of si that from a quarter of a grain to a grain is administered two or three times a day with ad tage. Cures in most obstinate cases have obtained from this substance. It has appeared most serviceable in those cases which are atte by vomiting, and in which the tongue is sm and glossy, as if deprived of the papillary s ture. I have, for many years, been in the of prescribing the nitrate intimately triturated narcotics in these cases, and in the chronic stat of gastritis complicated with palpitation, or irritation of the intestinal mucous membrane

62. When convalescence commences an vances, the mild vegetable tonics, especiall infusion of calumba or of cheireita; subsequ the chalybeate preparations; and the diet, regi and mineral springs, or artificial mineral w advised when treating of Indigestion and H chondriasis, should be resorted to, accordi the circumstances of each case. In mos stances, travelling, change of air and of s gentle but agreeable mental occupation, r ation from the anxieties and mental tensi continued application to business, moderat ercise in the open air, and diversion of the from such feelings and slight dyspeptic disc as generally attend convalescence from gas are generally most beneficial, and alway quisite for a very considerable period aft flammatory affections of the stomach.

III. Organic Lesions of the Sto Classif. — IV. Class. I. Order (A *in Preface*).

63. *Alterations of structure* seated in th mach are frequently the consequences of infla tion; but they may, in other cases, result from nic irritation, and, in different circumstances vital depression, or from constitutional taint. cerous lesions proceed chiefly from this last aided probably, or at least in some instanc by prolonged irritation, or by impaired vital p Organic lesions of the stomach may th be viewed as the more or less remote results of *digestion*, of *Hypochondriasis*, of *Morbid Ap* of *Pyrosis*, and of the *Nervous*, *Spasmodic* an *flammatory affections* now passed in review. sequently, the Causes of these organic ch are those which are productive of the pr affections from which they spring.

64. The *Stomach* is liable in a very marke

ery special manner, to all the lesions which e fully described when treating of the *struc- alterations* of the DIGESTIVE CANAL. To rticle I must refer the reader, for a general iption of the lesions implicating the stomach; me of those are so frequently seated in this , or in its cardiac and pyloric orifices, and ion special forms of suffering, as to require ular consideration at this place. Of these s the most important are, *ulceration* and *per- on, softening* and *disorganization, thickening, ous degeneration*, and *carcinoma*, of the pa- or of the orifices of the stomach.

i. ULCERATION AND PERFORATION OF THE ACH.—*A*. Ulceration is very rarely an acute e when seated in the stomach, and it is ge- ly single, or very seldom consisting of more ne, unless when seated in the follicles. The of the ulcer is usually round or oval, but it metimes irregular, rarely linear. It may in any part of the viscus. Its *margin* is greyish, pale red, or of a deep brown, of natural thickness and consistence, or , thinner, harder, or thicker than natural. me cases the surrounding subvillous tissue ckened and indurated. The *bottom* of the consists of different tissues, according to the the ulceration may have penetrated. In instances, it is so slight, as to appear as an ion; more frequently, however, the villous is penetrated, and in some the submucous, uscular, and even the peritoneal coats, are ssively penetrated. When this last tunic is ed, as well as previously to this stage, various arances and changes are developed which ully described under the head DIGESTIVE AL (§ 37. *et seq.*). The ulceration may proceed to perforation, without or with ad- n of the opposite surfaces of the peritoneum, d the seat of perforation. In anæmied or ectic persons, and not infrequently in chlo- or anæmied females, adhesions are not often ed, and the ulceration proceeds, without ma- signs of inflammation or increased vascu- , and the coats are corroded, as in phage- ulceration, until the peritoneal lining is r softened, or ruptured from distension of the ach, or during an attack of vomiting fol- g a meal, and a portion of the contents of viscus passes into the peritoneal cavity, ing peritonitis and death in a short time. ulcer in many of the cases presents the ap- ance as if the ulcerated portion were punched amped out of the gastric parietes, the mar- often presenting no further changes than t discolouration or injection sometimes with ening of the cellular issue.

. The ulceration may be *cicatrised*, as shown e article just now referred to (§ 39.), or it proceed onwards, after adhesions have been ed between the opposite portions of the peri- al membrane, and thus the ulceration may eed not only to perforation of the stomach, also to perforation of a contiguous portion of digestive canal, as the colon, or to more or ulceration or perforation of another organ. In male under my care during two or three years severe dyspepsia, with recurring attacks of nic gastritis, attended by vomiting, the pa- sm of vomiting being ultimately accompanied discharges of blood, and the patient having been carried off by a violent attack of hæmatemesis, a large and deep ulceration was found in the stomach, which passed far into the substance of the liver, the peritoneal surfaces being firmly agglutinated around the perforation, and several of the vessels of the liver eroded. Where the bottom of the ulcer thus becomes agglutinated to an adjoining viscus, the contents of the stomach are thereby prevented from passing into the peritoneal cavity.

67. Of the various modes in which ulceration may take place, and of the consequences of this lesion, I cannot add anything to what I have minutely stated elsewhere (see DIGESTIVE CANAL, §§ 37—44.). I may, however, briefly remark, that, although usually commencing in the villous surface, ulceration and perforation may originate in a different situation, and proceed in an opposite direction, as when an abscess in the liver, or in the spleen, opens into the stomach, by the adhesions and perforations produced by the purulent collection. But there is even a *third* mode, not hitherto described, in which atheromatous or fatty deposits in the coats of an artery favour rupture of, or exudation of blood from, the diseased portion of vessel, whereby the villous coat is perforated or torn, and hæmorrhage into the stomach takes place. In rare cases, the hæmorrhage ceases, but the part from which it proceeded becomes the seat of ulceration, which may advance more or less, or even terminate in perforation. Ulceration and perforation of the stomach thus presents the following varieties:—1st, Erosion of the mucous membrane only, consequent upon chronic gastritis. 2d, Small ulcers, with red margins, more or less numerous, and scattered over an uninflamed surface, resulting from irritation or inflammation of follicles. 3d, Much larger ulcers, penetrating the muscular, or even the peritoneal coat, and often having the surface or substance of an adjoining viscus, as the liver, for their bottoms, or perforating a different portion of the canal, adhesions having formed around the ulcers: these are commonly single, oval, or round, are most frequently seated in the small curvature, or near the pylorus, and present no cancerous characters. 4th, Ulcers with ragged and inflamed margins, caused by corrosive poisons, and seldom penetrating the parieties of the stomach. 5th, Ulceration and perforation from without inwards, generally caused by an abscess of the liver opening into the stomach, adhesions of the peritoneum having formed around the ulcerated portion. 6th, One or more small ulcers, caused by atheromatous or fatty changes in the coats of the vessels, and by rupture of the villous membrane. 7th, Gelatiniform softening of the coats of the viscus. And 8th, Carcinomatous ulceration, &c. (§ 77. *et seq.*)

68. *B. The symptoms* of ulceration of the stomach are very equivocal. Several cases of this lesion have come under my observation; most frequently, however, when they have gone on to perforation and its consequences. They have occurred most frequently to females engaged in needlework, or as domestics. In most instances the patients have been more or less anæmied, or subjects of chlorosis, or of irregular, or painful, or scanty menstruation; and, although they had previously complained, for a longer or shorter period, of attacks of gastrodynia, or of spasm of

the stomach, or even of attacks of vomiting, or of hæmatemesis, they have generally been able to pursue their avocations, and to take their food, up even to the period of the fatal seizure. The painful symptoms in these cases, as well as the attacks of vomiting or of hæmatemesis, usually followed a meal; and even when anæmia or cachexia was very manifest, no emaciation was generally present, the patient presenting much plumpness with the anæmia. The forms of ulceration and perforation, from the external to the internal tunics, and from disease of the vessels, are seldom observed, unless in persons of middle age, or far advanced in life; whereas the foregoing occurs most frequently in young females, although it is also met with in persons far advanced in age, and in males. In these there are generally evidences of a cachectic condition, and of a poor or morbid state of the blood. In addition to the symptoms already mentioned, in some cases, a gnawing sensation at the epigastrium, emaciation, flatulence, and various other dyspeptic disorders are experienced; but the appetite is often not much impaired, and, in some instances, neither the pain nor the vomiting is severe until the peritoneal covering is reached, or until perforation and its consequences occur. The attacks of hæmorrhage, in connection with one or more of the symptoms already mentioned, are amongst the most certain indications of the lesion. But it should not be overlooked that hæmatemesis occurs chiefly when much blood is poured out from the ulcerated part in a short time; for when the hæmorrhage is slight, frequent, and prolonged, the blood may pass the pylorus, and either be partially digested or more or less changed, and, mixing with the stools, be altogether overlooked. In this way, much of the anæmia observed before the fatal issue may be produced, hæmatemesis being either slight or altogether absent. When the hæmorrhage is not great, the matters vomited often have the appearance of coffee-grounds; and, in most cases, even when vomiting does not occur, the stools present a black or pitchy hue. These symptoms also attend malignant ulceration or carcinoma of the organ; but the absence of circumscribed hardness or tumour, and of the other symptoms of this latter malady (§ 78. *et seq.*), will assist the diagnosis.

69. *C. Treatment.* — The indications of cure are the same as advised for chronic gastritis (§ 60. *et seq.*). Mild farinaceous articles of food, or such diet as the patient finds to agree the best, and a judicious recourse to sedatives or narcotics, are the means most generally appropriate. The vomitings, especially of blood, often require to be arrested, and, with this intention, the means advised for *hæmatemesis* (see art. HÆMORRHAGE, § 174. *et seq.*) may be resorted to; or the spirits of turpentine may be exhibited in any suitable form, with or without small doses of creasote. If indications of perforation are manifested, by the occurrence of the symptoms of circumscribed or general peritonitis, large or repeated doses of opium, as recommended by Dr. STOKES, are chiefly to be relied upon, with such other aids as are advised when treating of this subject in the article on PERITONITIS.

70. ii. SOFTENING AND DISORGANIZATION OF THE COATS OF THE STOMACH.—This subject has received attention when treating of the organic lesions of the DIGESTIVE CANAL (§ 35. *et seq.*).—*A.* his lesion occurs, as a primary disease, frequen in infants and children, most commonly soon ter weaning, or after change of diet; but it ay take place at any age, from two months nd upwards, in children that have been impro ly fed, or nursed by unhealthy females, espe ly in low, humid, close, and otherwise unw lesome localities. It supervenes also in the c se of other infantile diseases, by which it is en masked, or which it may to some extent rep e; and it is occasionally observed in the iseases of adults, but generally as a consequ ce or a contingency of their far advanced pro ss, as of tubercular consumption, &c. It is, in ildren, often a severe form of what has been mmonly called the "*Weaning Brash*," or he "*Atrophia Ablactorum*," of Dr. CHEYNE. his disease was first correctly described by M. uVEILHIER, and termed *gelatiniform softening he coats of the stomach*; and by Dr. JOHN G. DNER, of Edinburgh. About the same time i as also noticed by JAEGER, ZELLER, and othe referred to in the *Bibliography*. The softenin xtends, more or less, to all the coats of the v ls, and is most frequently observed in the vicin of the spleen. The coats may not be only soft ed, but they may even be so eroded as to give ise to *perforation* at one or more points. In ost cases, however, it is very difficult to deter ne how far the softening and disoganization ve existed during life, and how far they may ve been a *post-mortem* change. I have met th many cases of this malady, both primary an secondary, at the Infirmary for Diseases of Chil en, under the circumstances just mentioned, I believe that the softening often exists to a nsiderable degree previously to death; bu he advanced stage of disorganization, and re especially erosion and perforation, are early nsequences of dissolution, which the fluids o he stomach may have been, more or less, conc ed in producing.

71. *B.* This disease is met with most frequ tly in children between the ages of four and eig en months, owing to the causes just mentioned; nd it appears to be more prevalent in July, Au st, September, and October, than in the other m hs of the year. From the localities which f ur its development, and the seasons which influ ce its prevalence, this lesion may be said to b almost endemic in certain places, and epidem in some seasons. It may appear in the cou of infantile remittent fever, of hydrocephalus, of chronic bronchitis; or it may follow the ch ra infantum, or scarlet fever, or diarrhœa, espe ly after weaning, or when the infant has no njoyed the advantage of a healthy nurse, is being brought up by hand.

72. *B. The symptoms* of softening of the g ic tunics are, during the earlier stages, chiefly ss of appetite, mucous or muco-bilious vomiting nd diarrhœa, the stools being liquid, green, or c y, and offensive; excessive thirst, progressive ebility, prostration, pallor, flaccidity and coo ss of the skin; occasional flushes of heat, altern ng with chilliness; somnolency or lethargy, att ed by uneasiness; a disposition to dose, wit he eyes half shut, and the pupils turned upw ls, &c. When the disease is more fully forme he countenance expresses pain or uneasiness he

k is languishing or sorrowful; and the child ines frequently, and is fretful. He is roused m his somnolency by the slightest touch, and, if y one looks steadily at him, even from a dis-ice, he cries, and changes his position. His ulties and senses are unimpaired, but he is evish and distressed. The absorption of fat is cessive; the eyes are sunk in their sockets; pupils are contractile, and there is no stra-mus. Emaciation and flaccidity of muscles oceed rapidly; the lips and tongue become dry d cracked; and the vomiting of the food is quent; the stools still continuing green, with eds resembling spinach and slime: the urine is erally scanty. The pulse is at first slow, netimes intermitting, but it becomes very quick l small towards the close. Flatulence and cup sometimes accompany the vomiting, and igh is not infrequent. The respiration is not terially affected until near the termination of malady, when it becomes quick and laborious. e abdomen is rarely much swollen, although generally is flatulent, and resonant on percus-n. Ultimately, a pallid and shrunk counte-ice, red or inflamed eyelids, emaciated, flaccid, l cold extremities, a fluttering pulse, very ck breathing, restlessness, or somnolency, sing into insensibility, terminate life, generally a very few days, and sometimes even in a few irs.

3. *B. On Dissection*, the appearances observed y with the circumstances and associations of disease, — as it is primary or consecutive of ne other malady, — and with the period which elapsed from dissolution. Although the nges cannot be altogether ascribed to dissolu-, on the one hand, or to the action of the gas- juices on the other, they may be heightened either, or even by both. That they exist, to reater or less extent, in respect even of all the its of the stomach, but especially the villous l cellular tissues, and that they amount to a y manifest loss of the vital cohesion of these uctures, I have been convinced by a careful servation of the phenomena preceding death, l by examination made as early as ten or twelve urs after death. The softening and dissolution duced by the gastric juices after death have n described under the article DIGESTIVE CA-L (§ 41.), and are chiefly observed in the most pending parts of the viscus. But the gelatini-m softening found after death in cases which e presented the above symptoms, either as rimary malady, or as an epi-phenomenon in course, or at the close, of some other disease, evidently commenced with the development these symptoms, and has advanced until it was ompatible with the continuance of life. As it generally the only or chief lesion found on section in the primary cases, and as it has n found in a very marked form even when the amination has been made a few hours after th, there is every reason to infer that it has nmenced and existed previously, although it y have advanced further after death had taken ce. The situation of the softening, in some es, precludes the opinion that it could have n produced by the action of the gastric juices; l if it have been thus caused, to what other on can the severe, rapid, and fatal symptoms racterising the primary cases be imputed, seeing that none besides it can be detected either in the digestive organs or elsewhere, at least none sufficient to produce death? It should not be overlooked, also, that similar softening, although much less remarkable and extensive, is sometimes found, in these cases, in some portions of the duodenum or of the small intestines; and is to be referred to the same states of vital action, &c. (§ 74.) as produce this lesion in the stomach.

74. Viewing, therefore, this alteration of the coats of the stomach as a primary, as well as a consecutive disease, the question arises as to the nature of the change, — whether is it inflammatory, or is it the result of a vital impairment of the coats of the organ? or is it an association of both, a form of asthenic or cachectic inflammation? That it is not inflammatory is shown by the absence of vascular injection. That it proceeds chiefly from vital exhaustion, with impaired nutrition and cohesion of the tissues, may be inferred from the appearances after death; but it cannot be admitted that the whole amount of change is thus produced, as it may have been heightened immediately, or soon after death, especially when the change is most remarkable. This lesion, however, should be carefully distinguished from *solution of the coats of the stomach by the gastric juices after death.* This *post-mortem* change, which has been described when treating of the alteration found in the DIGESTIVE CANAL (§ 35. *et seq.*), may occur after death from any cause, and in cases that have presented none of the symptoms attending the disease now being considered; but it may take place also in cases of this disease, and may either increase the softening previously existing, or even attack another portion of the parietes of the organ to which the gastric juices have gravitated.

75. *C.* The *Treatment* of the combination and procession of morbid phenomena, constituting this disease, whatever may be the amount of organic change existing previously to death, or occurring subsequently, is the matter of chief importance. For cases frequently occur (and I have seen many of them, both in public and private practice) presenting all the symptoms of this disease, in greater or less severity, and proceeding with proportionate rapidity, for some of which treatment has been successful at an early period, others having gone on to a fatal issue, and manifested softening of the coats of the stomach, without either vascular injection or thickening, and often with diminished vascularity and unusual pallor of the tissues (*see* DIGESTIVE CANAL, § 35. *et seq.*). When an opportunity is afforded the physician to treat the early stage of the disease, or even a more advanced state, more or less benefit will be derived from a healthy and young wet-nurse, the infant always sleeping in her arms. If, however, such a nurse cannot be obtained, or if the child cannot take the breast, ass-milk, warm from the animal, slightly diluted either with simple water or with lime-water, should be given at regular intervals; and various tonics astringents, and antacids be exhibited in the intervals. The diet, consisting of various farinaceous articles, should be carefully attended to taking care not to load the stomach, so as to favour the occurrence of fermentation or acidity. When the ass-milk is taken in sufficient quantity, but little more food is required, and sweets

should always be avoided. The medicines which I have found most beneficial are cretaceous mixtures or powders, with small doses of cascarilla, cinnamon, and a very minute quantity either of creasote, or of tannin, or of capsicum. In some cases, especially when the urine has been ammoniacal, or contained much of the phosphates, I have prescribed small doses of the pyroligneous acid in an infusion of cascarilla or cinchona, or of the nitro-muriatic acids in the same or similar vehicles, or the muriated tincture of iron, with infusion or tincture of calumba. The great difficulty in these cases is to arrest the vomiting and diarrhœa; but this cannot be accomplished by sedatives, and narcotics are most injurious to young children. In some cases, however, especially in older children, the hydrocyanic acid may be given in suitable doses, with the sesquicarbonate of ammonia, and with tonics and astringents. The irritability of stomach in this disease is more readily relieved by stimulants and tonics than by other means; and even the oleum terebinthinæ will often arrest this state when other means have failed. In most instances, also, aromatics should be given with cretaceous and alkaline medicines, and a terebinthinate embrocation may be applied to the epigastrium. If these means should confine the bowels, the risk of increased irritability of the stomach may be thereby incurred, and therefore suitable enemata ought to be administered, if the stools be insufficient or much disordered. In other respects the treatment should be directed, and the regimen conducted, as advised for INDIGESTION, and above for nervous or functional affections of the stomach (*see* § 14. *et seq.*). In every instance, the more remote causes of this malady, arising either from the locality or the circumstances of the case, ought to be carefully ascertained and removed as far as possible, and change of air, especially to a temperate, pure, and dry air, should be advised, with the use of chalybeate medicines or waters, or such other means as are most likely to improve the vital cohesion and tone of the coats of the stomach.

76. When we have any reason to infer from the state of the stools, or other symptoms, that more or less softening, or loss of vital tone, extends to the mucous surface of the intestines, the means now advised, aided by such others as have been recommended when discussing the treatment of *chronic* DIARRHŒA (§ 29. *et seq.*), or of *asthenic* DYSENTERY (§ 88. *et seq.*), will often be found appropriate and successful.

77. iii. SCIRRHOUS, CANCEROUS, OR MALIGNANT LESIONS OF THE STOMACH. — *Cancerous and Canceroid Growths*, Prof. BENNETT.—*A. Carcinomatous and malignant formations of various kinds* are formed in the stomach, especially in or near the cardiac and pyloric orifices, and probably commence, especially the scirrhous and scirrho-carcinomatous kinds, as I have contended when describing them under the head DIGESTIVE CANAL (§§ 50, 51.), in hypertrophy of the subvillous cellular tissue. The scirrhous change either originates in, or is superinduced by, degeneration or modification of nutrition and secretion, consequent upon prolonged irritation, morbid diathesis, advancing age, and depressed vital power. The several kinds of malignant growths have been found in the coats of the stomach (*see*
arts. CANCER and SCIRRHOUS AND OTI
GROWTHS). The scirrhous forms are most
quent in the pyloric extremity of this visc
whilst the medullary, the milt-like, the fungo
the colloid, the hæmatoid, and other modificati
of the encephaloid form of cancer, may co
mence in the cardiac orifice, or in any part of
gastric parietes. Whilst scirrhous and scirr
carcinomatous degeneration is generally of s
progress, and occurs in advanced age, the
dullary, encephaloid, or fungo-hæmatoid (*see*
FUNGOID DISEASE), occurs at any age, but m
especially in early age, is more generally
veloped in the form of distinct tumour, is m
rapid in its progress, and often appears simu
neously or consecutively in different parts.
foration of the stomach may occur as a ter
nation of malignant disease, especially of
carcinomatous form of ulceration (*see* § 86. *et se*

78. *B. The symptoms* of malignant disease of
stomach are often very equivocal during the e
progress of its several varieties; and it is o
not until the lesion is far advanced that they
be relied upon. The chief symptoms are—
Pain at the epigastrium or its vicinity; 2d,
digestion, loss of appetite, flatulence, acrid e
tations, nausea, and vomiting; 3d, The prese
of a tumour in or near the gastric region;
4th, Emaciation and a cachectic or yellow
anæmic hue of the surface; and various o
constitutional phenomena.

79. (*a.*) The *pain* at the epigastrium is ge
rally gnawing or burning, sometimes lancinat
Occasionally, and at first, it is not much compla
of, unless pressure is made on the stomach;
often the slightest pressure cannot even ther
long endured, although no acute pain is the
produced. The pain may be increased eithe
an empty or by a full state of the viscus. So
times the pain recurs at intervals, and beco
remarkably severe. In many cases it extend
the hypochondria, or to the back, or along
œsophagus. In others, especially the cance
or carcinomatous, a lancinating pain is prese
an early period, and is amongst the first sy
toms to announce the nature of the malady.
the fungoid or encephaloid disease, pain is o
slight or almost wanting.

80. (*b.*) The *symptoms of indigestion*, as
rexia, nausea, vomiting, &c., are often amo
the earliest; but they cannot be relied upo
they may be absent to the very close of
malady. MM. CHARDEL, CRUVEILHIER,
DRAL, and FERRUS state, that they have
with cases in which no more severe symp
than those of slight indigestion had been pre
up to the period of dissolution. Such insta
are very rare; but I have seen cases in w
vomiting had not occurred until very sh
before death; the matters vomited having
then very dark and grumous, or sanious, from
exudation of blood from the diseased part.
vomitings which accompany malignant disea
the stomach have been ascribed to obstructio
the orifices of the viscus. They doubtless
often are dependent upon this cause, but
often also occur where these orifices are fre
where the lesion is seated in other parts of
parietes. When vomitings are not frequen
are absent, it may be presumed that the py
orifice is free. When, however, vomitings o

time after the ingestion of food, with marked ency or constancy, and nearly after the interval, then disease of this orifice may be cted.

When the ingesta are returned immedi- after having been swallowed; when deglu- is followed by a sensation of obstruction the lower part of the sternum, or by a feel- iat the food does not pass into the stomach; the aliments are ejected instantly without ge, and mixed with some glairy mucus; or there is much nausea, without much evacu- by the mouth, excepting glairy matters; then y be inferred that the disease is seated in the ac orifice of the stomach. In these cases ain is more limited to the epigastrium and th the sternum, often extending to the back.

The characters of the vomited matters with the seat, nature, and progress of the ma-

When the pylorus is the seat of lesion the rs thrown off may be more or less digested, t a far advanced period, or shortly before , the ejected matters contain altered blood, present numerous brown or black minute , ultimately passing into the appearance of -grounds, or nearly resembling the black of pestilential fever. In the fungoid or haloid form blood is often poured out in r quantity, and occurs in a purer form or ltered, in the ejected matters, thus closely bling the hæmatemesis of simple ulceration e stomach, from which, however, it is gene- distinguished by the existence of tumours in astric region, in this malignant form of lesion.

. (*c.*) The presence of *tumour* in or near the strium is an important symptom of malig- disease of the stomach. When scirrhous ation or other form of malignant tumour ex- the pylorus, then it may not be detected at pigastrium; but, owing to its density or size, o the extreme distension of the viscus, it may descended much lower, or even somewhat ther side, according to the position of the it. Malignant disease may, however, exist y portion of the parietes of the organ, with- ccasioning much tumour, and even when it to a moderate extent, it may not be detected, s when the patient is very much emaciated, is not always the case; and when it is ted, it is often difficult to distinguish it from ur of the pancreas, or of the liver, or spleen, the omentum.

. (*d.*) The *cachectic* and anæmied character countenance and general surface, and the iar earthy *odour* sometimes exhaled from the , are observed chiefly at an advanced stage of nant disease, and are to be attributed chiefly to nstitutional taint, and to the alteration and de- cy of the blood, these changes not being always ded by emaciation, although they are more ently thus attended. This appearance, how- very generally accompanies malignant le- of other organs; and it is, therefore, from the iation of it with the other symptoms already ed that the seat of the present malady can be ed.

. (*e.*) *During the progress* of the malady ymptoms often vary much: certain of them ne more severe, others are alleviated; and severity of the disease is for a period some- abated. But after an uncertain period, and after some error in diet and regimen, or after mental emotion, the symptoms recur with increased severity, or even additional phenomena are observed, especially aggravated pain, vomitings, eructations, borborygmi, hiccup, constipation of the bowels, colicky pains, &c. When the disease is seated in the pylorus, its progress is not merely slow, but the character of the vomiting is generally different. Food may not be thrown off the stomach during the early course of the malady, or not until the orifice becomes much contracted or obstructed, or nearly the close of life; and generally vomiting does not occur until a considerable period after food has been taken. Very frequently, also, articles which have been taken several or many hours previously are thrown up more or less digested, whilst those which have recently been taken are retained. This, very probably, is owing to the circumstance of the latter being directed to the fundus of the viscus, whilst the former having been digested, and having reached the diseased pylorus, are thrown backwards and upwards to the cardia.

86. (*f.*) The *duration* and progress of the malady depend much upon the seat and nature of the lesion. If it be seated in or near the cardia, and if it be the encephaloid or fungoid variety, the duration is much shorter than when it is of a scirrhous or scirrho-carcinomatous nature, and is seated in or near the pylorus. In the former, also, the pain is less acute, and the hæmorrhage is earlier and more distinct, than in the latter. Cancerous ulceration may supervene in either variety of malignant disease, and may go on to *perforation;* but in these, neither is lymph thrown out, nor are adhesions formed, so as to prevent a communication with the peritoneal cavity. Perforation, however, seldom occurs, death generally taking place before the carcinomatous ulceration has proceeded so far. During the progress of the malady, costiveness, or even constipation, is a most troublesome symptom; but occasionally when the pylorus is not obstructed, or when its valve is destroyed by ulceration, a portion of the sanious discharge from the ulcerated parts pass into the intestines and occasion colicky pains, diarrhœa, or dysenteric stools, and accelerate the fatal issue. When perforation of the parietes of the stomach is produced, violent peritoneal symptoms are immediately occasioned, and soon terminate life.

87. The duration of the malady can rarely be ascertained with precision; for dyspeptic symptoms, of greater or less severity, and more or less numerous, always precede the manifest development of malignant disease, which even may not be distinctly declared until shortly before death. The antecedent dyspeptic symptoms are generally thus present for years before the nature of the disease can be ascertained, and when ascertained death may ensue in a few weeks or even days. The duration of the malady is, however, rarely less than several months, and is generally as long as several years. When it is seated in the cardiac orifice, and nearly obliterates the passage into the stomach, the duration is much shorter, and the sufferings of the patient most distressing, and the emaciation greater. But several months or even years may elapse before the lesion has advanced so far as to amount to this extreme pitch.

88. C. The *Diagnosis* of cancer of the stomach is

sometimes very difficult; for when there is no tumour detected it may be mistaken for chronic gastritis, or for simple ulceration of the stomach; and when there is tumour, the pancreas, liver, or spleen may be its seat. For either instance it is impossible to assign infallible diagnostic signs. The history of the case, the association and procession of the symptoms, the nature of the causes and antecedents, the *juvantia* and *lædentia*, and the constitutional symptoms, in either state of disease, will chiefly guide the attentive observer. Generally, the discharge of blood from the stomach is much greater in simple ulceration than even in the hæmato-fungoid variety of malignant disease. In the great majority of cases, also, no blood is found until a far advanced stage, or until shortly before death, and then the blood presents the coffee-ground or minute flaky appearances already noticed, occasioned by its minute quantity and altered character. If considerable hæmorrhage occur in the advanced stage of fungo-hæmatoid cancer, or of other varieties, there is generally more or less tumour or hardness, which may often be detected upon a careful examination. But it must be admitted that hæmatemesis may, and does, often accompany tumour of the spleen, liver, and pancreas, more especially the spleen and liver. The various circumstances and peculiarities of the case, of its progress, and of its concomitants, will be duly considered by, and will guide, the cautious and observing physician.

89. *D.* The *Causes* of malignant disease of the stomach are chiefly those which I have fully stated when treating of CANCER (§ 23. *et seq.*) and FUNGOID DISEASE (§ 16. *et seq.*). To these places I refer the reader; but I may very briefly notice at this place the causes which act more especially on the stomach. Cancer of this viscus is much more frequent in males than in females, probably owing to intemperance, and to depressing emotions of the mind, being more frequently and more permanently experienced by the male sex. Scirrhous or scirrho-carcinomatous forms of malignant disease of the stomach are seldom observed before middle age; and are most frequent in the advanced epochs of life. Hereditary predisposition, or constitutional taint, derived from a parent, has evidently a considerable influence in favouring the occurrence of the malady when other causes concur to develope it. This predisposition was remarkable in the case of the great NAPOLEON. In what this diathesis consists is not clearly shown; but the temperaments, in which it has been supposed most frequently to occur, are the nervous and lymphatic, or those mixed with the sanguine or bilious. The ranks of life in which it is most frequently observed, are the middle and higher ranks, owing probably to their greater liability to anxieties of mind, and the depressing mental emotions, which, with inanition, protracted abstinence, excessive application to study, business, &c., are the most influential causes of the malady. Protracted functional disorders of the stomach, the air and water of certain localities, the abuse of spirituous liquors, frequent or constant pressure on the gastric region, and the other causes mentioned when treating of CANCER, frequently aid profound or prolonged chagrin and anxieties of mind. Various trades, professions, and occupations have been said to favour the occurrence of the malady, but with insufficient reason, or in no very appreciable degree. (See arts. CANCER FUNGOID DISEASE.)

90. *E.* TREATMENT.—During the commence of cancerous affections of the stomach, ther seldom sufficient evidence of the nature of disease to induce the physician to employ m for its arrest; and even when its nature is pected, or correctly inferred, there is no kn remedy which is capable of producing this ef At this period, when the symptoms are ch those of chronic indigestion, or of chronic gast the means which have been found most bene for these diseases, and such diet and regime the patient experiences the most benefit from also most serviceable in cancerous affectio the stomach. Even if these affections were re nised at this early period, there would be very difficulty in devising more suitable means those usually found most serviceable in funct disorders of the organ. If the malady be inf to exist at this early period, or if it have manifestly declared itself at an advanced s all that can be expected from treatment is— to alleviate the more distressing symptoms; 2ndly, to retard the progress of the malady; these ends may generally be partially attaine

91. It has been very justly remarked b GIBERT and adopted by DR. HOUGHTON, "our predecessors, who were less acquainted we with the fatal progress of organic lesions ceeded, perhaps, oftener than we do in pall the symptoms and prolonging the lives of pat by applying themselves incessantly to oppo most obvious symptoms. Their attention w entirely preoccupied, like that of the anat physicians of the present day, with the incur of the local lesion which is the source of th ease." But, whilst the fulfilment of the inte proposed to ourselves when treating this m should be kept in view, the predisposing an citing causes, mentioned above, and und article CANCER, ought to be removed or teracted by treatment, medical and regi as far as may be possible. Whenever ob or prolonged dyspepsia, or symptoms of c gastritis, occur in an individual whose or grandparent died of this malady, the picions of incipient cancer of the stomach be entertained, and the treatment ought directed accordingly. If these suspicions not be confirmed, the means advisable f more dangerous malady would not be in priate for the more slight; indeed they will rally prove the most rapidly beneficial.

92. There are few causes which mo juriously affect the digestive and assim functions than the depressing mental em and anxiety; and therefore these should be a by relinquishing avocations which involv emotions. The greatest care ought also to ercised in the choice of food. The patient be guided in this by his sensations and expe but generally the farinaceous articles o taken in moderate quantities, and not a long intervals, yet in sufficient quantity t nourish the frame and support organic power, will be found the most suitable. may be taken in, or with, animal broths or in small quantities, or with jellies, &c. often recommended new-laid eggs, merely and asses' milk, warm from the animal,

portion of lime-water, with much benefit.
reat object in the treatment of inferred cases
lignant disease of the stomach is to furnish
and unirritating nourishment in sufficient
ty, without exciting or distending the organ.
vhilst these and other articles of diet are
d, with such others as are mentioned when
g of Indigestion (§§ 42. 55. *et seq.*), or are
by the patient to agree with him, the more
l symptoms should be allayed by suitable
ics, or by hydrocyanic acid, prescribed in
action with emollients, demulcents, or mild
tonics. I have met with cases of inferred
l cancer, for which I have prescribed a
ble and farinaceous diet, distilled water for
purposes for which water is required, as
d by Dr. Lambe, and residence in a dry
ild air, and very great benefit has been de-
rom the treatment.

As to the use of the several narcotics, but little
added to what has been stated under the
Cancer (§ 30. *et seq.*). I have preferred
re common preparations of opium, to either
etate or muriate of morphia, in malignant
of the stomach, the latter frequently prov-
uriously depressing, without affording any
rvailing advantage. The combination of
ics, as of conium with henbane or poppy,
pium with hop, or the infusion of hop with
ne or hydrocyanic acid, has often been
able. As the disease advances, the ne-
of having recourse to palliative means
ses, and the doses of these require also to
mented. But it will be found that these
es, however great the dose, frequently fail
venting or arresting the vomiting in the
ed stages of the malady, if solely relied
They should, therefore, be conjoined with
timulants and aromatics as may be found
erviceable in such circumstances, as crea-
musk, sumbul, &c. I have very rarely
ed much benefit to accrue, beyond a very
ary relief, from aconite, belladonna, or
nium. Nevertheless they may be tried in
combinations to those just now mentioned.
ity or flatulence of the stomach be much
ined of, ammonia, magnesia, or other ant-
nay be given with narcotics and aromatics;
-water may be taken with boiled milk, or
ses' milk. The iodide of potash, in small
may also be tried in conjunction with the
ate of potash, or the solution of potash, or
ish's alkaline solution, and with narcotics
omatics; but I have seldom seen any benefit
l from it in malignant disease of the stomach.
norrhage from the stomach be indicated by
or pitchy stools, or if hæmatemesis occur,
rits of turpentine may be prescribed in such
or combinations as have been recommended
(§§ 59. 69. 75.), or where Hæmorrhages
kinds are considered.

9 The constipation attending malignant dis-
f the stomach often proves a great source of
or distress to the patient, and a great diffi-
the physician. Enemata should be daily
ed; but, however active the substances
may be administered in these, they often
producing satisfactory results. Calomel is
o depressing, as respects the vitality of the
h, especially when repeated, and irritating
ic purgatives ought to be avoided. The preparations of senna or of rhubarb may be conjoined with vegetable tonics, with magnesia, or with manna, or phosphate of soda, citrate of magnesia, &c., or with such other aperients as may be found to be retained by the stomach.

95. The thirst, heat at stomach, nausea, and vomitings, which are often so distressing in the course or near the termination of the malady, can seldom be altogether allayed, although they may be sometimes partially relieved, by exhibiting effervescing beverages with bland nutrients, or mild stimulants, as Seltzer-water with milk, and a small quantity of weak wine, as hock, Barsac, &c.; or soda-water, or effervescing lime-water, with the same articles; or spruce-beer, or small quantities of weak tar-water, with milk, &c.; and by making these the vehicles in which the medicines most appropriate to the case may be given. The retchings and vomitings are sometimes relieved by combining creasote with opium and cretaceous powders or mixtures; and epithems, with the vinum opii, or with one or other of the warm embrocations prescribed above (§ 59.), to which the opiate is added, may be applied over the epigastrium. If diarrhœa, or extreme vital depression, or spasms, supervene, these means, aided by the more powerful stimulants, absorbents, and astringents, may be administered; but no further advantage than a temporary relief can be expected from them.

96. iv. Other Organic Lesions of the Stomach are occasionally observed, but they can rarely be distinguished during life; and, when met with upon dissection, the only particulars which can generally be obtained as to their origin and the symptoms attending them, are such as usually accompany chronic gastritis, or scirrhous or malignant diseases of the organ. These lesions have been fully described in the article Digestive Canal (§§ 27. *et seq.*); and to that I beg to refer the reader. — *A.* Those alterations which are most frequently observed, are generally consequent upon prolonged irritation, and upon excesses in eating and drinking, and consist chiefly of *hypertrophy of the villous and muscular coats and of the connecting cellular tissue*, existing either singly or in combination. They may not be attended by any serious symptom, and be detected only after death from some other disease. When, however, they are seated in either the cardiac or pyloric orifices of the organ, and are attended by much thickening of the part, they occasion more or less disorder, according to the amount of obstruction they produce; and in such circumstances they may be mistaken for, although different from, malignant disease of the viscus. It is very rarely that very serious symptoms are occasioned by these alterations, unless ulceration supervene in some part of the thickened or hypertrophied structure; and in such cases, it is very difficult to determine whether or no the alteration be truly scirrhous, which it most probably often is, if the hypertrophy or thickening be chiefly seated in the submucous cellular tissue.

97. In these cases, whether they result merely from prolonged irritation, excitement, or inflammatory action, or whether they be incipient cancer, the *treatment* should not be materially different from that which has been advised for other diseases of the stomach, namely, to improve the general health, to promote the constitutional powers, and to remove or to relieve

the symptoms which are either most important or most urgent. With these intentions, change of air, travelling, the use of mineral springs, or waters suited to the symptoms most complained of, and attention to diet and regimen, should be recommended.

98. *B. Alterations of the Capacity of the Stomach* are sometimes observed (see Digestive Canal, § 52. *et seq.*).— *a. Increased capacity* is generally a consequence of more or less obstruction at the pyloric orifice or its vicinity. In cases of scirrhous or cancerous pylorus, the stomach is often remarkably increased in capacity; and when the pylorus or upper portion of the duodenum is constricted from other alterations, increased capacity of the viscus is also generally observed. In a case in which inflammation of the concave surface of the liver extended to the pylorus and head of the duodenum, and was followed by false membranes and adhesions of these parts, the subsequent organization and contraction of the morbid productions had so completely constricted the pylorus, as to prevent the passage of a quill through it; the patient having died under my care with symptoms, which were referred to scirrhous pylorus, and with enormous dilatation of the stomach. In some cases, the increase of capacity is attended by hypertrophy of the muscular and villous coats; but this is observed only in some of the more chronic cases of scirrhus of this orifice. In others, the increased capacity is attended by remarkable thinness of the coats. Greatly enlarged capacity of the organ, with hypertrophy of the coats, has been observed in some cases in which habitual gluttony had existed during life. In such instances, increased function or action had developed the growth of the structures and the size of the organ.

99. *b. Diminished capacity* of the stomach is also sometimes seen (see Digestive Canal, § 53.), but most frequently in consequence of inanition, or in connection with hypertrophy of the coats, or with scirrhous or other malignant diseases of the organ. It may be occasioned also, although very rarely, by the cicatrization of ulcers, or by the contraction of false membranes, or of organizable lymph thrown out upon the serous surface of the organ. Extreme diminution of capacity is caused by the passage of acrid, corrosive, or astringent poisons into the stomach, especially the mineral acids; and is then not infrequently attended by abrasions of the villous coat. Kiernander observed it after poisoning by nux vomica.

100. *C. Attenuation of the gastric tissues* is not often observed without any other change. It is most frequently seen in cases of obstruction of the pylorus, and then is often associated with increased capacity, especially at or near the fundus of the organ. But it is met with, also, without any increase of size. Several other alterations of structure have been found in the stomach, namely, *anomalous fibrous and fibro-cartilaginous formations, tubercular ulcerations, fatty or lipatomatous tumours in the connecting cellular tissue, fistulous openings through the coats of the stomach and parietes of the abdomen, or some other part of the digestive canal, and various displacements of the organ,* &c. But these are of very rare occurrence, and seldom admit of diagnosis or of relief during life. (See arts. Digestive Canal; Cancer; Disease, &c.)

101. *D. Rupture or laceration* of the coats of the
stomach has been observed after vomitir
retchings in the course of disease or of ul
tion, especially when the coats have been at
ated or softened in parts, or where ulceratio
penetrated the muscular coats, and nearly or
gether reached the peritoneal surface. The
result has followed from distension of the v
by ingesta, or more probably from the reacti
the parietes upon the distension. Rupture c
stomach is not infrequent after falls, or v
blows on the region of the stomach, espe
when distended by a full meal.

102. *E. Wounds* penetrating the walls of the
are generally fatal; but in some instanc
covery has taken place from them, either
or without a fistulous opening in the abdo
parietes. Whilst lacerations are always
wounds may fail of proving fatal, the coats co
ing so as to prevent the passage of the conte
the viscus into the peritoneal cavity, and c
up and ultimately cicatrizing; or if conti
open or fistulous, the lymph exuded arou
wounded peritoneal surfaces agglutinating
and preventing the consequences observ
other circumstances.

103. *F. Numerous foreign bodies,* which
been swallowed, may be retained for prolong
riods in the stomach, and produce various
according to their natures or their chemi
mechanical properties or conditions. The
irritate, inflame, ulcerate, or even perforate t
cus. The irritation may be soon followed b
rejection. Even blood, effused from ul
parts, or diseased vessels, of the organ,
which has passed into it from the nares,
or pharynx, when present in considerable qu
will be thrown off; but, when it is present
small quantity, it will pass the pylorus ir
intestines, and give the stools the charac
melæna. Cases on record are numerous in
foreign bodies have been retained for wee
even months in the stomach, and either hav
afterwards thrown up, or found there on
tion, or have caused ulceration and perfo
not only of the stomach, but sometimes alsc
adjoining viscera or parts.

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Bibliography and References to *Arts.* COLON, DIGESTIVE CANAL; DUODENUM; INDIGESTION; and PYROSIS.

STOMATITIS.—SYNON. *Stomatitis* (from *στόμα*, the mouth). *Stomacace, Oris Vitium, Buccitis. Buccite, Stomatite, Inflammation de la Bouche*, Fr. *Inflammation of the Mouth.*

CLASSIF.—III. CLASS. I. ORDER (*Author in preface*).

1. DEFIN.—*Inflammation affecting the mouth, especially the gums and cheeks, attended by more or less constitutional disturbance, and characterised, as respects the local changes, by the nature of this disturbance, by the causes, and by the state of vital power.*

2. Inflammation of the mouth, or stomatitis, may be either a primary or a secondary or sympathetic affection. It is rarely limited to the gums and cheeks; but extends, more or less, in most of its forms, to the fauces and pharynx, and even partially to the tongue and lips. According to the sthenic or asthenic character of the inflammation, — to the local changes and the constitutional disturbance,—to a previously healthy, or to a cachectic or contaminated state of the system, — and to the influence of the exciting causes, stomatitis presents several *species*, more or less distinct, and hence deserving of being treated of as specific affections, yet, owing to their seat, and not infrequently to their consequences, requiring to be viewed as generically related to each other. The several affections which may be classed under the present head appear, either primarily or consecutively, under so different circumstances, that it may be truly stated that there are few diseases affecting the same parts so dissimilar to each other as these are. This dissimilarity, arising, as just stated, from the different exciting causes of each, from the states of vital power and of the circulating fluids, from the nature of pre-existing disease, and from the age and various other circumstances of the patient, gives occasion for the arrangement of the several forms of stomatitis into the following *species:* — 1st, simple or erythematic, *stomatitis simplex;* 2d, vesicular, *st. vesiculosa;* 3d, pultaceous, *st. pultacea;* 4th, mercurial, *st. mercurialis;* 5th, pseudo-membranous, *st. pseudo-membranacea;* 6th, ulcerated, *st. ulcerata;* 7th, gangrenous or phagedenic, *st. phagedænica.* The *second* and the *third* of these *species* I shall describe under the head THRUSH, the term usually applied to them; the others will be briefly treated of at this place.

3. I. STOMATITIS SIMPLEX, *simple or erythematic inflammation of the mouth,*— *Buccite, Aphthes érythématiques,*—is characterised by redness, heat, dryness, pain, and slight swelling, of a part or of the whole of the mucous membrane lining the mouth. It is most frequently limited to either the arch of the palate, to the tongue, to the gums, or to the cheeks. It is often extended to two or more of these, but it more rarely invades the whole of the buccal surface. It frequently extends backwards to the isthmus of the fauces, to the pharynx, and even to the upper part of the œsophagus. It is not an infrequent complication of gastritis, or gastro-enteritis, or of bronchitis, and is generally more or less remarkable in the exanthematic fevers, and in an advanced stage of hectic. When the inflammation has followed a local irritant or poisonous substance, then the pain, heat, and swelling are often very severe, and the effect more diffused. In some instances the inflammation is attended by dryness, in otl by a discharge of a ropy mucus, mixed with sal more or less abundant, according to the natur the exciting cause. Occasionally the irrital extends along the Eustachian tube to the e and in many instances the tonsils are more or affected.

4. *A.* Simple stomatitis thus presents numer s phases or states, as it is more or less genera limited, or according to its severity, to its com cations, to the age of the patient, and more pa cularly to its cause. It may be general or diffu , or limited to patches, or to parts, or consistin numerous points. It may or may not be atter by the symptoms of general fever, which usu assumes either an asthenic or sthenic charac according to the severity of the attack and e constitutional power of the patient. It gener y presents acute features, and terminates in a days, by resolution, without either suppuratio ulceration, the epithelium being commonly tached. But suppuration is occasionally prod d when the inflammation has been intensely ex d by an energetic irritant poison, or even by e more common irritants in unusual quantities. I have thus seen a very general stomatitis, h profuse suppuration, follow the introduction a quantity of mustard into the mouth. Ulcer on is more frequent than suppuration, and is en chiefly in the gums, insides of the cheeks, an the surface of the tonsils. Generally, how er, the inflammation has become chronic before ation to any considerable extent takes place.

5. *B.* The *chronic state* of simple stomat is chiefly confined to the gums, and is often ke up by carious teeth or stumps of teeth. In the rst of such cases the gums not only ulcerate, bu he alveolar processes, either partially or more ne- rally, become absorbed, and the teeth fall ut. These cases are commonly symptomatic of ge ral cachexia, or of prolonged disorder of the es-tive organs, especially chronic dyspepsia or c nic gastritis.

6. *C.* The *treatment* of simple stomat is generally easy, when the affection is produc by a manifest irritant cause; for the removal o his cause, and rinsing the mouth frequently with ol-ing and demulcent fluids, will be efficacious he course of a few days. When this affectior a part only of a more general and a more s ous complaint, the local means can be subse ent only to more constitutional and energetic rem ies, and these must be such as the nature of the m-plaint will warrant. The state of the alim ary canal and of the digestive organs should r ive particular attention, and morbid secretion and excretions, and fæcal accumulations, be free va-cuated. In many cases, washing out the uth with camphor water, or with a decoction of r sh-mallows, containing a little nitrate of pot or sulphate of alumina, or, in more painful ses, holding the open mouth over the vapour hot water, into which some vinegar and scrape am-phor has been put, will be sufficient to r ove the disorder, especially when aided by s ble purgatives. In more chronic and obstinate ses, especially if ulceration have taken place, ong solutions of the nitrate of silver, or weak so ons of the bichloride of mercury, may be re red. Most of these states of the disorder, ever hen unconnected with secondary syphilitic asc,

d upon cachexia and chronic disorder of the
ive organs; and to these latter the treatment
d be mainly directed. For these obstinate
omplicated states, the means about to be
ribed for a severer variety of this complaint
e found appropriate (see §§ 31. *et seq*).

II. PSEUDO-MEMBRANOUS STOMATITIS. —
Pseudo-membranacea. — *Stomatite Couen-*
St. Diptheritique, *Dipthérite Buccale*, Fr.
is peculiar form of stomatitis, as it affects
the mouth or throat only, or as it extends
ly to both, but also to the pharynx, larynx,
ven to either the trachea or œsophagus, was
ccurately described by M. BRETONNEAU,
ubsequently by M. TROUSSEAU and Dr.
ENZIE, by whom it was observed to occur
epidemic form. In some districts of France,
ally the more extended or diffused state, it
n several occasions a remarkably prevalent
tal malady, and was considered by the best
ed writers to have been propagated by in-
. This very severe and epidemic form of
will receive due attention when the dis-
ffecting the THROAT are described. I shall,
re, notice at this place only the less severe
mited form of the malady, which affects the
primarily, and is most frequently confined
part.

A. Pseudo-membranous stomatitis has been
nded with various other affections of the
. It may assume either an *acute* or a *chronic*
and is generally more or less diffused when
and limited to one part when it assumes the
form. It is observed chiefly on the gums,
of the cheeks and lips, and on the point or
the tongue. In the *acute state* it first ap-
in the interior of the mouth in the form of
irregular, rounded or oblong membranous
s of a greyish-white colour. Around these
s the surface is red, and the parts are pain-
hot, a sense of heat or burning being com-
d of. The breath is fœtid, and the sub-
ary glands enlarge. As the disease proceeds,
tches of membranous exudation extend, be-
more or less detached, and are succeeded by
, and the intervening surfaces are red and
n. The tongue is swollen. The mouth is
ually open, allowing the escape of altered
The enlargement of the lymphatic glands
ses; the face swells; the breath becomes
fœtid; and the pulse more quick or rapid,
nerally soft, open, and full, or weak. With
creasing severity of the accompanying fever,
sease extends to the throat, and even to the
tory and digestive mucous surfaces, thereby
oning great or very imminent danger.

This form of stomatitis may be confounded
the THRUSH, or with *mercurial stomatitis*,
which latter it may be distinguished by ab-
of the cause, and of the mercurial fœtor
breath. It is more closely allied to the
, from which it differs chiefly in the larger
es of exudation at the commencement of the
e, in the more rapid and continuous exten-
f these patches, in the greater amount of
and of swelling of the adjoining parts, and
e more advanced age of the children most
ntly attacked, the thrush occurring gene-
or oftenest, in much younger children than
rm of stomatitis, commonly in infants during,
n after, lactation.

10. Pseudo-membranous stomatitis may terminate in resolution, the swelling and redness diminishing, and the membranous exudations being either detached or absorbed; or it may pass into the chronic state; or it may go on to ulceration, or even to gangrene. The first of these terminations is the most frequent, the parts healing without leaving any cicatrix. But the affection is not infrequently chronic, usually after a more or less acute state. In the acute form, it often extends to the pharynx and respiratory passages, and sometimes also to the digestive mucous surface; and, when thus complicated, it generally terminates fatally. In the chronic state, it is usually limited to the mouth; and may continue for several weeks or even months.

11. Relapses are frequently observed in weak cachectic children, especially when confined in an unwholesome air, or crowded apartment. M. GUERSENT states that the cases of this complaint in the hospital for children in Paris are very subject to relapses.

12. *B.* The *causes* of pseudo-membranous stomatitis, are chiefly those which lower the constitutional powers, and impair the assimilating functions. This complaint may occur at any age, but it is most frequent during the second dentition, and during the evolution of the molar teeth. It is very rare during lactation, but becomes more frequent from the first year of age, until the second dentition is completed. It is observed chiefly in autumn and winter; and in these seasons especially, and not infrequently also in the spring, it is almost endemic in some countries, whose climates are cold and humid, and in districts subject to inundations. In these particularly it may even become epidemic.

13. The *predisposing causes* are whatever impairs the general health, as impure air, unwholesome food, insufficient clothing, and want of cleanliness; living in cold, low, and humid cellars; crowded apartments and sleeping-places; want of exercise in the open air; and privation of light and sunshine and of due ventilation. M. GUERSENT states that this form of stomatitis is almost endemic in the hospital for children in Paris, especially in the wards appropriated to ophthalmic, cutaneous, and scrofulous affections; and that boys are more affected than girls. It has been supposed to have been propagated by contagion, in circumstances favourable to this mode of communication; but the evidence of the possession of this property by this affection is not always conclusive, although cases have appeared to warrant a belief in the existence of it, especially when the disease is prevalent.

14. *C. Treatment.* — VAN SWIETEN advised the application of the hydrochloric acid in a proportion of honey, varying with the severity of the case (from one-fourth or one third to three-fourths of the former), by means of a small piece of sponge attached to a small stick, to the membranous exudations. But care should be taken that this application should extend as far as the exudation. Generally one or two applications in the twenty-four hours are sufficient. At the same time a terebinthinate embrocation, such as No. 296. or No. 311. in the *Appendix*, should be applied by means of flannel or spongeo-piline around the throat, or along the sides of the lower jaw. After a few applications of the acid and honey, or, in the intervals between the application of them, a

gargle or wash, consisting of the decoction of cinchona and hydrochloric acid, or any other astringent gargle, may be employed. In some cases I have found a varying proportion of borax and honey efficacious; and when the patients have been old enough to use a gargle, then a saturated solution of borax, in any suitable vehicle, has also been used. A strong solution of alum, or alum in fine powder, with acacia-powder or mucilage, has also been recommended by BRETONNEAU and others; whilst the nitrate of silver, in various states of solution, or even in substance, has been advised by many. More recently, the chlorides, especially the chloride of lime and the chloride of zinc, in varying grades of solution, according to the severity of the disease, or in the state of powder conjoined with other substances, have been severally prescribed by myself and others.

15. If the disease have advanced to simple or to phagedenic ulceration, the above means should be employed in more energetic or concentrated forms; and such other means should be used as will support the vital powers and resistance, and thereby change the morbid action locally. In all cases, indeed, but in these especially, internal and constitutional means ought to be appropriately prescribed. Some writers have advised the application of leeches to the throat or neck, &c. I have often been called to patients after recourse has been had to them, but I have rarely seen much benefit derived from them. I would not say that they should not be applied in the more sthenic cases, or in robust or plethoric patients; but these latter are rarely attacked by the disease; and, when they are, the employment of leeches for them is likely to be of service, especially when the applications to the mouth and the embrocations to the throat and neck, advised above (§§ 14.), are also duly resorted to. In most cases, the preparations of cinchona, with ammonia, or with the fixed alkalies, or with diaphoretics, as the liquor ammoniæ acetatis and spiritus ætheris nitrici, are beneficial, especially when the pulse is quick and soft, and the flesh is flabby or soft. In some it will be requisite to administer the most powerful tonics and stimulants, as the preparations of cinchona with hydrochloric acid and hydrochloric æther, tincture of serpentaria, &c.; and even to allow a sufficient quantity of wine in arrow-root or sago. The bowels should be freely opened by the usual means, or by equal quantities of castor oil and oil of turpentine, administered by the mouth, or in enemata, or in both ways, according to the urgency of the case. If the disease assume *a chronic form*, internal or constitutional means are always required; and of these means, change of air, especially to a warm and dry locality, is one of the most important and successful, especially when aided by an appropriate use of one or more of the remedies already noticed.

16. III. STOMATITIS MERCURIALIS — *Mercurial stomatitis* is one of the more common forms in which the poisonous effects of mercurials manifest themselves. It has, therefore, been described, and fully treated of, in connection with other injurious effects of mercury, in the article POISONS, from §§ 562. to 594. inclusive; §§ 568. 580—587. and 593., more particularly relating to mercurial stomatitis.

17. IV. STOMATITIS ULCERATA — *Ulcer d Stomatitis*—*Cancrum Oris*—may be an advan d stage of either simple stomatitis or of pse o-membranous stomatitis. — *A*. It may also c m-mence with inflammation of the external sur e of one or more of the gums, most frequently o he lower jaw, and generally on both sides. Wh the inflammation, swelling and œdema are en very considerable; ulceration soon appea ng over the alveolæ and near the teeth. he cheeks and face are swollen; the sub-maxi ry glands are tumefied; the mouth is opened th great difficulty; and saliva with mucus fill he mouth, and prevents a satisfactory view of he diseased surface. A coppery, unpleasant ta is complained of, and a peculiar fœtor o he breath is remarked. Heat, tenderness, nd swelling of the face increase, and ulceratio x-tends over the gum, sometimes exposing he alveolar processes, and often to the cheeks, he disease be not early checked. It may be a-tionary for some days, especially when par ly controlled by treatment. In some cases mo or less hæmorrhage takes place from the ulce ed parts. The febrile symptoms are generally an asthenic or low character; the pulse being ft, weak, frequent, or small; and the skin co natural, excepting that of the face and k; and the bowels confined or irregular.

18. This form of stomatitis is most freq tly seen in children between the first and s nd dentition, after weaning, and during rec ery from exanthematous fevers, especially from ar-let fever. It generally occurs in cachecti nd debilitated subjects, and in the children the poor, that are ill-fed, and live in low, clos nd crowded and ill-ventilated apartments. It not infrequently superinduced by disorders the stomach and bowels, and should be viewe s a very serious malady, especially when it ap ars in the circumstances now mentioned, and ore particularly when it occurs after scarlet-f er; the prognosis, however, should depend chie on the constitutional symptoms, especially hen these are correctly interpreted, and upon ti ab-sence or presence of visceral complications.

19. *B*. A *variety* of ulcerative stomatitis ne-times occurs in adults, consecutively upo ex-hausting discharges, and as a sequela of her diseases. It occasionally appears in de ate females during lactation, and in the cou of debility, or of debility conjoined with cac xia, produced by other depressing or exha ing causes. The disease in these cases usually m-mences with inflammation of one, seldom of th, sides of the tongue, and extends to the ins of the cheek. In some cases, one or more ery small, hard, and painful sores first appear the side of the tongue, which ulcerate, with har nd elevated margins, and are followed by a ore extended inflammation; and in others ese ulcers supervene upon previously existing i m-mation. As the disease proceeds, the inte of the mouth appears red and inflamed, is ery painful, and so tender, that fluids only, and ese of the blandest kind, can be received i it. The tongue is red, smooth, or glossy, a copious flow of saliva takes place fro the mouth. There is at first neither loss of ap tite nor fever; but as the affection extends ov the internal surface of the mouth, cheeks, and to ue,

supervenes, and the stomach and bowels
me irritable, the morbid irritation extending
e pharynx and along the œsophagus to the
ach and bowels; diarrhœa, emaciation, and
me exhaustion, sometimes supervening, and
terminating in death. Drs. **Hale**, **Backus**,
son, and **Holt**, of the United States, have
ibed this variety of stomatitis, and state that
curs chiefly in women when suckling, or in
dvanced stage of pregnancy. But it is not
liar to them, cases of it occurring, on rare
sions, in the circumstances already stated,
ially when debility is associated with more
ss visceral disease.

. *C.* The *Treatment* of ulcerated stomatitis
d be mainly constitutional, means being used
prove the vital powers of resistance, and to
nt the extension of the local changes. The
of the excretions should be carefully as-
ned, especially of the urine, and the treat-
directed accordingly. In some cases, the
nent is beneficially commenced with an
c of sulphate of zinc; and a purgative pow-
r draught, suitable to the state of the bowels
ppearances of the stools, is often afterwards
red. The decoction of cinchona, with mu-
acid, and muriatic æther, or with the nitro-
tic acids, or with ammonia or the fixed al-
, according to the state of the urine, is always
or less of service. It may be necessary to
recourse to wine in addition to these or
tonics, or to the sulphate of quinine given in
ompound infusion of roses, &c. The bowels
d receive due attention during the progress
e case; and the occasional administration of
nema containing oleum terebinthinæ will
ally be of service, as respects not merely the
of the bowels, but also the system ge-
ly.

The local affection has too commonly been
d as local merely — as simply inflammatory;
e inflammation has too frequently been con-
d as of an ordinary sthenic kind, instead of
ic, and requiring very opposite means to
often employed. Because there have been
ng, increased redness, enlargement or en-
ment of the adjoining glands, leeches have
been prescribed. and have either increased
ischief or have had no beneficial influence
e disease. Cold applications to the neck or
roat have not been of greater service. I
generally employed, with benefit, embroca-
to these situations, consisting chiefly of the
nthinated and camphorated forms prescribed
ious parts of this work, and in the *Appendix;*
uch applications or gargles to the affected
as the age and circumstances of the case
sted. When the patient can use a gargle,
he decoction of cinchona, with hydrochloric
or with hydrochlorate of ammonia, or with
or with tincture of myrrh, or of krameria:
ong tar-water; or various fluids containing
te, or even the chloride of zinc, or of lime,
all quantities, may be severally tried, ac-
g to the peculiarities of the case, and the
s produced.

Washes, lotions, linctuses, &c., are likewise
at service, especially when the former are ap-
directly to the parts by means of a sponge
ed to a small stick or piece of whalebone.
es or lotions may contain either the nitrate
of silver, or the sulphate of zinc, or the chloride of lime, or the chloride of zinc. When a linctus is preferred, then the substance should be such as may be passed into the stomach not only without danger, but with benefit. Thus a linctus may be prescribed, containing either the hydrochloric acid, or the oleum terebinthinæ, or the tincture of cinchona or of myrrh, or red wine, &c.; and when an emetic effect is desired, then the sulphate of zinc may be given in this way.

23. The *variety* of ulcerated stomatitis described by the American physicians as peculiar to pregnant and puerperal females requires also a restorative and tonic treatment. Dr. **Backus** advises, as local applications, mild astringent infusions, or a solution of nitrate of silver. Suckling in these cases ought always to be relinquished. Dr. **Holt** states that the disease has invariably yielded to iodide of potassium, given in doses of five grains three times a day. a cure having been obtained in a very few days, often in two or three. Dr. **Wilcox** says that he has met with uniform success from the decoction of *Polygonum punctatum* of **Elliot**, made by boiling an ounce of the dried leaves and tops in a pint of water for twenty minutes, and employed as a gargle almost hourly.

24. V. **Stomatitis Phagedenica.** — **Synon.** — *Cancrum Oris — Cancer Aquaticus — Stomacace Maligna — Noma — Gangrenous Stomatitis — Water-Canker — Sloughing Phagedena of the Mouth.* — This most dangerous and very often fatal affection presents, from the commencement, very different characters from those of the other forms of stomatitis. The gangrene or sloughing which occurs consecutively of the forms of stomatitis already noticed is merely an occasional termination of these, owing either to neglect, or to general cachexia, or to extreme exhaustion or depression of vital power: but this malady is primarily and idiopathically distinct from the gangrena oris — from the gangrenous terminations of the other kinds of stomatitis.

25. *A.* The *literary history* of phagedenic stomatitis is briefly as follows. The disease appears to have been noticed by C. **Battus**, a physician in Amsterdam, as early as 1620; and **Vander Woorde** soon afterwards designated it by the term *water-kanker*. **Arnold Boot** in 1649 described it by the names of *labrosulcium* and *cheilocace*, very probably confounding it with other forms of stomatitis. **Van Ringh** assigned it the name of *scorbutic cancer;* and **Van Lill** called it *noma, ulcus noma*, and *stomacace*. **Callisen** designated this malady *stomacace gangrenosa;* **Lentin**, *ulocace*, and **Wendt**, *sphacelus of the mouth.* **Lund**, a Swedish physician, saw eleven children with this malady, which he named *noma*, and of these ten died. **Meza** described it as he observed it in Denmark. Drs. **Coates** and **Jackson** met with it in the United States, the former calling it *gangrenous ulcer* of the mouth, the latter, *gangagræpsis;* but they probably did not distinguish between it and other forms of stomatitis. It has also been noticed by C. F. **Fisher**, **Siebert**, C. G. **Hesse**, **Rust**, **Schmalz**, **Hildenbrand**, **Girtanner**, **Joerg**, **Reimann**, **Weigand**, **Hueter**, &c. The most detailed accounts of the disease have been furnished by A. L. **Richter**, **Guersent**, **Blache**, **Taupin**, **Rilliet** and **Barthez**. The first of these has described three varieties of

this malady — 1st, the *noma scorbutica;* 2ndly, the *noma metastatica;* and 3dly, the *noma gastrica* — divisions which are more imaginary than real. The two last of these writers have adduced twenty-one cases of the disease; and, as well as M. Guersent, have appropriated much of what has been advanced by Richter. M. Taupin has described thirty-six fatal cases which occurred in the hospital for children in Paris.

26. *B.* The *symptoms* of phagedenic stomatitis are commonly swelling and hardness of one cheek or lip, — of the cheek most frequently, — without marked increase of heat or redness, and without much tenderness or pain, even on examination. Owing to the absence of acute or active symptoms at the commencement, the disease is often overlooked at first, or until it has made a dangerous progress. The tumefaction externally is, however, early attended by a waxy and glossy appearance, which is so characteristic as to direct the instant attention of the physician to the disease, although it may have been overlooked or unattended to by the friends of the patient. On examining the mouth little or no redness or mark of inflammation is observed; but, in the internal surface of the swollen part, an ash-coloured or whitish eschar or slough of small size may be detected in the centre of the cheek, or in the commissure of the cheek and lower jaw, surrounded by hardness and swelling. The tongue is pale, flabby, or slightly loaded; the gums are pale and spongy. There are more or less marked indications of debility, exhaustion, and cachexia, with languor and fretfulness. The pulse is generally small, soft, and quick; but without much increase of temperature, until towards evening. The evacuations are unhealthy and offensive.

27. If the disease come under treatment at this early stage, a judicious treatment will frequently arrest its progress. But, as it advances from this stage, the danger increases. The slough or eschar on the inside of the cheek soon spreads, and even extends to the lips and gums; and is attended by a copious discharge of saliva, which is clear at first, but soon becomes turbid and mixed with mucus and a sanious matter. The breath is now very offensive. As the gangrenous disorganisation thus extends, the external appearances indicate the invasion of the integuments about the centre of the tumefaction. A vesicle or a pale or ashy spot appears in this situation, and soon becomes livid and sloughs. The discharge from the diseased parts is now remarkably contaminating and corroding, the lower lip, the angles of the mouth, and the alveolar processes, being not infrequently destroyed by it. The teeth often fall out, with dead portions of the alveolæ; and, if death does not previously occur, both sides of the face may become affected, or the gangrene may extend to all the soft parts of the mouth and face, and even to the maxillary, the palatal, and the nasal bones.

28. As the malady thus proceeds locally, the constitutional symptoms are chiefly those of increasing vital depression and contamination of the circulating fluids. The cachectic indications are more and more apparent; the pulse more rapid, feeble, and small; and the bowels, which at first were confined, generally become much relaxed and extremely offensive. The urine is offensive, alkaline or phosphatic, or soon becomes ammoniacal. The general surface is usually cool extremities become cold; and life gradually quickly, ceases. From an early period, the ease may be *complicated* with more or less int disease, more especially with latent or conge pneumonia, or with an asthenic gastro-ente but these are only contingent or occasional ciations.

29. *C.* The *diagnosis* of phagedenic stom is, from the commencement, sufficiently ev The hard, indolent swelling, and the pec glossy or waxy appearance of its outer su and the small slough in its internal surfac quite characteristic of this malady.—The *pro* should be unfavourable or stated with great tion from the first. If the disease be seen a early or œdematous stage, and be treated can be removed to, a wholesome situation, a cious treatment may arrest its progress; gangrene be established, although recovery take place, disfigurement cannot be preve and if sloughing and the constitutional sym have advanced and are severe, recovery c be expected. When the disease appears in pitals for children the issue is generally fata

30. *D.* The *causes* of phagedenic or gangr stomatitis are those already noticed, as occ ing the other forms of stomatitis, more espe pre-existent cachexia, depression of vital p or exhaustion by previous disease, by exant tous fevers, by protracted disorder of the p nary, the digestive, and assimilating organ by living on unwholesome and insufficient Low, cold, and humid apartments, partic cellars, ground floors, &c., are also not infre concurrent causes of the disease. The s action of mercury may favour or more d occasion it, although it more frequently a independently of this mineral, and when n its preparations have been taken. It occurs between the ages of two and nine years, bu frequently from three to six years of age. air of hospitals for children is most com productive of this malady; and, when trea the wards of these hospitals, recovery rarely place. M. Taupin has seen thirty-six ca the hospital for children in Paris, and they all fatal.

31. *E. Treatment.*—Prompt and decided sures are required for this form of stomatitis patient should be removed into a dry, warm well-ventilated apartment, and the causes disease as far as possible avoided. The s the cheeks and mouth should be very ca ascertained, and means appropriate to the ing changes instantly applied. If no sloug as yet appeared in the interior of the che terebinthinate embrocation (§§ 14. 21.) sho applied externally, and the internal surfa washed by a lotion of strong tar-water. latter cannot be readily obtained, one p oleum terebinthinæ ought to be mixed in th honey, and applied to the inside of the che gums twice or thrice daily. In some cases given a warm stimulating emetic of sulph zinc, and a small quantity of capsicum, marked advantage, and subsequently a sto aperient draught, the operation on the having been promoted by a terebinthinate e During the treatment of the early stage malady, the decoction of cinchona, with

acid and æther, or with ammonia, or with rate of potash, or the quinine or other tonics, dvised above (§§ 20.), should be given at y regulated periods, between the administra- of suitable nourishment.

2. In a further advanced stage, when a slough become very manifest in the mouth or cheek, part ought to have solid nitrate of silver, or ng hydrochloric acid, applied to it, the surface g frequently washed by the lotions already tioned, or by a strong solution of nitrate of r, or muriate of ammonia, or with washes taining the chloride of lime, or of zinc, or sote, with camphor and myrrh. These latter tend to arrest the sloughing, will correct the r, and will counteract the contaminating in- nce of the discharge from the diseased part. ing this period, cinchona and other tonics, in binations already mentioned, should be pre- bed; and beef tea, with rusks; the yolks of , with wine or brandy; turtle soup, and other rishing, digestible, and restorative articles ought e freely supplied. Instead of wine, or in ad- n to it, in the more extreme cases, the mistura tus vini Gallici may be administered in doses able to the age of the patient. From 1821 l 1825 or 1826 I frequently had recourse to chlorate of potash in this and in other asthenic ases, at the Infirmary for Children. But I om found it of great service when given alone dvanced stages of these maladies. It was, ever, often prescribed in conjunction with r remedies, with much benefit, and especially he forms stated in early parts of this work— the decoction and compound tincture of cin- na, or with cascarilla, camphor, &c.

3. When sloughing has made still further pro- s, the local means already advised ought to be e frequently employed, and in more concen- d forms. Turpentine mixed with honey, in al quantities, or thickened with liquorice pow- should be applied to the part, and if the ex- al surface of the swelling become livid, the e application ought to be made to it; or an sion should be made into it, and the incised frequently injected with either of the lotions washes already mentioned. MM. Baron, lard, and others, have recommended the al cautery, at a white heat, to be applied to incised part. Of this last I have no ex- ence and little hope. The other means I e found successful when the constitutional ers have been duly supported, and when the ase had not advanced to a hopeless condition re medical aid was obtained. When great ability and distress have appeared in cases of malady, I have generally conjoined some aration of opium with the local means, and scribed it internally with camphor and other edies, having due regard to the age of the ent, and directing it with much caution at an y age.

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STOMATORRHAGIA. — *Hæmorrhagia Oris.* — *Hæmorrhage from the Mouth.* — See art. Hæmorrhage, §§ 85, *et seq.*

SUCCUSSION. — Synon. — *Succussio;* — *Secousse, Succussion*, Fr.; — *das Schütteln, die Orschütteln*, Germ.; — *Hippocratic Succussion of the Trunk.*

Classif.: — General Pathology — Semeiology.

1. *Succussion of the trunk* of the body was mentioned by Hippocrates in several parts of his works, and was employed by him to ascertain the presence of purulent and other fluids in the cavities of the chest. Morgagni, in noticing this mode of diagnosis, admitted its frequent failure, but in such a way as evinced his ignorance of the circumstances to which failure is owing. Laennec first clearly demonstrated the conditions upon which the evidence furnished by succussion depends, and since his time this mode of investigating diseases of the chest has been resorted to whenever they have been supposed to have been attended by effusion of fluid into the thoracic cavities. It is chiefly in *pneumathorax* that succusion produces the *sound of fluctuation* in the pleural cavity, for it is necessary to the production of this sound that, along with the fluid, more or less air should also be present.

2. *Succussion* is performed, as recommended by Hippocrates, by seizing both shoulders of the patient, whilst he is seated, and, having applied the ear to the side of the thorax, by jerking the trunk, or by abruptly turning or shaking the trunk, a sound resembling the splashing or fluctuation of water is then heard, if a fluid and air be contained in the cavity. If the cavity contain no air, although filled by a liquid, no sound will be produced, for the collision of the fluid with air is requisite to the production of sound, and the greater the quantity of air the more distinct will be the sound of fluctuation or splashing. Care should be taken, during this mode of investigation, to distinguish between the sound of fluctuation produced by succussion in the stomach, when this organ contains much air and liquid, and that which is produced in one of the thoracic cavities. A mistake will be prevented by the slightest attention, for the seat of fluctuation is generally easily manifested. In many cases, the patient

himself can perform succussion; and it is often useful to cause him to perform it whilst the physician applies his ear to the presumed seat of effusion. Succussion is useful chiefly in the diagnosis of pneumo-hydrothorax or pneumathorax. (See art. Pneumathorax, § 17.)

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SUPPURATION.—See arts. Abscess and Inflammation, §§ 44, *et seq.*

SYCOSIS. — Synon. — *Sycoma; Sycon, Sycosis (from συκον, a fig);—Mentagra;—Ficus;—Sycosis menti;—S. barbæ;—Mentigo;—Varus Mentagra;—Phyma Sycosis;—Roseola ficosa;—Dartre pustuleuse mentagre,* Fr. — *Barber's Itch;—Chinwelk;—Whelk.*

Classif.—IV. Class, IV. Order (*Author*, in *Preface*).

1. Defin.—*A chronic pustular eruption, either scattered singly, or clustered, over the chin, upper lip, or lateral parts of the face; the pustules being pointed and seated chiefly in the hair-follicles and connected tissues, and being sometimes propagated by contagion.* (See art. Skin, § 78.)

2. i. Description.—This chronic eruption of the skin appears chiefly on the hairy parts of the face; and sometimes on the nape of the neck, and much resembles acne. It seems to be developed in the hair-follicles and sebaceous glands, and their connected tissues, giving rise to conical elevations, which become pustular. The pustules are generally traversed by the shaft of a hair; are of a pale yellow colour. Their evolution is usually attended by a sense of heat and tension of the affected parts. When *disseminated* they appear as very small red points, which gradually become more prominent, until about the third day, when their tops become white, and soon afterwards are filled with a yellowish pus. These pustules seldom much surpass the size of a millet-seed. From the fifth to the seventh day each pustule bursts spontaneously; its sides shrink, and a slight oozing takes place, producing a brownish crust, which is very slightly adherent, and passes at its edges into the epidermic exfoliation from the inflamed surface immediately surrounding the pustule.

3. When the pustules are *clustered* or grouped in numbers the inflammation then extends to the subjacent cellular tissue, and occasions small, hard, and red inflammatory tumours, covered with pustules, or incrustations of considerable thickness, and of a mixed yellowish and greenish-brown hue. Most frequently, sycosis appears, like rosacea, in repeated partial eruptions, succeeding each other at irregular intervals. When the pustules break out repeatedly on the same places, the inflammation of the subjacent tissue occasions indurations and thickenings, which, with similar changes in the corion, present the appearances of large tubercles. These are most frequently observed in aged, cachectic, or leuco-phlegmatic persons, in whom resolution of the pustular inflammation is imperfect. When the eruptions have been extensive, or have succeeded each other rapidly, these tubercles increase in number, and spread over the skin or other hairy parts of face. The pustules which continue to be evol on the surfaces of these tubercles, or in the tervals between them, evince the nature of affection. This advanced state of the eruption this admixture of pustules, tubercles, and incr tations, imparts a disgusting appearance; and this stage, sycosis is always obstinate, a c being never obtained but with great difficulty.

4. Sycosis may be confined to the upper l the agglomeration of pustules on this part oc sioning a thick brownish or blackish scab, gre elevated above the surface. When the diseas prolonged or extensive, the skin often beco much altered by it, and so swollen in parts a appear covered by moist and vegetating tumo The bulbs of the beard often participate in inflammation, and the hair falls out; but sul quently, when the disease is cured, lighter weaker hair is reproduced, and acquires gre strength. In very chronic and severe cases, loss of portions of the beard is permanent.

5. When the disease yields to treatment, pustules cease to appear; the incrustations detached, and the tubercles or small tumours cline in hardness and size. Slight desquamat occasionally take place from the points form affected, which continue for a long time re livid, especially in cachectic habits and aged sons, and in these particularly the affected p retain their thickened and tuberculated app ance through the rest of their lives.

6. The *duration* of this eruption is never than one, two, or three months: it often conti for years, notwithstanding the most rational t ment; and is apt to recur, after having been cu in persons of faulty constitution, in those adva in age, and after errors in diet and regimen. continuance or recurrence of the causes of eruption tends also either to prolong or to re duce it.

7. ii. Diagnosis.—The conical form of the tular elevations, the bright red of the bases, deep-seated connection of the pustules, and purplish and indolent tubercles which suc them, are characteristic of this eruption, wh however, may be mistaken for acne, ecthy impetigo, boils, and syphilitic eruptions. situation and the relations of the pustules of s sis to the hair distinguish them from *acne.* pustules of *ecthyma* are larger and more hi inflamed than those of sycosis. The scabs lowing ecthyma are also broader, thicker, more adherent, and are unconnected with tu cular elevations and indurations. The small tules of *impetigo figurata* hardly rise above level of the surface, and are not pointed like t of sycosis; they also differ from the latte the greater rapidity of their evolution, and more acute symptoms attending their prog Although both these pustular eruptions ma disposed in groups, those of sycosis are most quently isolated and distinct, whilst those impetigo *figurata* are generally clustered. pustules of the latter burst on the third or fo day, and the fluid from them is quickly cha into continuous yellowish incrustations, w increase in thickness in the course of a few Those of sycosis, on the contrary, do not until the fifth, sixth, or seventh day, and thes which succeed are thin, slight, and isolated.

features are, however, obscured when the ules of sycosis are copious and extensive, and rise to a pale yellowish-green secretion, or sycosis is severe and acute, and the pustules uent or crowded; but even then, the thickg, swelling, and induration of the sub-cutas cellular tissue and corion, imparting a rcular character to the affected part, will ent any mistake. In *furuncle* the inflammacommences in the cellular tissue and extends e skin, much pus and a sloughy core being lled through an opening which leaves a scar. in sycosis the inflammation first affects the follicles, and the pustules discharge only a l quantity of pus by a minute opening, which edily effaced without leaving a scar.

Syphilitic pustules very rarely are confined e lower or hairy parts of the face. They frequently appear on the alæ of the nose, ead, and near the angles of the mouth. They nuch flatter than those of sycosis, and instead rising from bright red bases, as the latter do, spring from coppery, dirty and almost flabby s; and they are not preceded by the smarting ainful tension ushering the eruption of sycosis. tubercles of sycosis may be more readily ounded with the tubercular syphilitic erup; but those of the former are more conoidal, bases are seated more deeply, whilst the ilitic are more rounded, have a shining apance, and are more superficial. They are, over, primary in their formation, whilst those ycosis are consecutive of the pustules. The ilitic eruptions are also preceded and attended variety of other morbid phenomena, which er serve to distinguish them, as sore throat, mmation of the conjunctivæ, nocturnal s, &c.

iii. The PROGNOSIS of sycosis is most uncer; for it is impossible to state with certainty the d of its duration; and even when the decrease e eruption and the appearance of the affected s promise a speedy cure, fresh pustules often k out, without any apparent cause. In other s, when the extent and severity of the eruplead to the expectation that the disease will e most obstinate, an active and judicious ment may remove it in a comparatively short . M. Rayer considers that those cases gene prove the most rebellious which, in the nic state, preserve the pustular and primitive .

. iv. Causes.—The contagious nature of sycosis been contended for by some writers, and denied thers. Pliny states that the disease, which escribed by the name of *Mentagra*, spread in y by contagion. If this disease was actually sycosis, it was very closely allied to it. M. ille states that he has seen several of the ne patients in the hospital of Rouen succesly attacked with this affection from having n shaved with the same razor. Admitting the ase to be contagious, circumstances cannot n favour such an occurrence, especially in a manner as will demonstratively manifest fact. Sycosis most frequently appears in adult es (very rarely in females) of a sanguine or ous temperament, who have thick and strong rds; and occasionally among the aged, more ecially among those who have been habitually d to strong heats, as cooks, founders, refiners, and workers in glass and metals. The abuse of spirituous liquors, indulgence in the luxuries of the table and highly-seasoned food, and similar causes, have been supposed to occasion it; but these may more rationally be considered as causes which concur to perpetuate it, or to render it more remarkably chronic than to originally produce it. The want of due cleanliness, irritating applications to, or rancid matters allowed to remain in contact with the parts affected, the use of a foul, or blunt, or rough-edged razor, are much more likely to excite this eruption than those other causes to which it has been sometimes imputed. It appears more frequently in spring and autumn than at other seasons.

11. Dr. Gruby, of Vienna, has lately contended that favus is occasioned by a vegetable formation, and that such a formation, of the cryptogamic kind, is found in the roots of the hair of the beard in this affection, and around that portion which is contained in the hair-follicle. The seeds of this vegetable formation, for which he proposes the name of *mentagrophite*, he believes to be the source of the contagious nature of the disease. On examining this affection with the microscope, the scales appear to be composed of epidermic cells, but the whole of the dermic portion of the hair is surrounded by cryptogamic formations, which constitute a vegetable sheath around it, in such manner, that the hair may be likened to the finger surrounded by a glove. These cryptogamia never rise above the surface of the epidermis: they originate in the matrix of the hair and in the cells of which the follicle is composed, and they ascend so as to surround all that portion of the hair included within the dermis. "They present everywhere a prodigious number of sporules, which are adherent on the one side with the internal surface of the follicle, and on the other with the cylinder of the hair: to the former they are very closely connected. Each plant is composed of a stem of several branches, and of sporules."

12. v. Treatment.—The causes, both exciting and concurring, should be removed; and the hair cut close with curved scissors, particularly if the use of the razor aggravate the affection. In some cases an emetic will be given with advantage, but it should be followed by stomachic purgatives. If the local inflammation be considerable, leeches may be applied; and if the patient be plethoric, a general blood-letting may precede them. Local emollient applications should be first employed, and these ought to be followed, especially as the disease becomes chronic, by applications which contain the chloride or bichloride, or the proto-nitrate, of mercury, in the form either of ointment or lotion. Ointments containing the iodide of sulphur, or the iodide of potash and sulphur, or even sulphur only, are most successful, especially when emollient applications, or vapour douches, or warm water douches, are used in the intervals between the employment of these ointments. In some cases a restorative or tonic constitutional treatment is required, and alterative mineral springs and waters are often of service. The hair, especially when it becomes loose, should be removed from the seat of eruption; and, if the affection become very chronic and obstinate, the application of the mineral acids, or of the caustic alkali, or the nitrate of silver, or even of the chloride of zinc, may severally be tried. Great care should be taken, in

this affection, as well as in others, for which ointments may be required, that they are recently made. In a case to which I was lately called, the zinc ointment was prescribed after the use of emollient applications, and was found quite rancid and most injurious *at five different chemists'* in the outskirts of the town where it was had; but when this ointment was procured from a respectable chemist in town, it was quite successful.

Bibliog. and Refer. — *Celsus*, De re Medica, L. vi. cap. iii. — *Plinii Secundi*, Natur. Hist. L. xxvi. cap. i-iv. — *Ætius*, Tetrab. i. serm. 5. cap. 80. 190. — *Pauli Æginetæ*, lib. ii. cap. 22. — *C. Johrenius*, De Mentagra, 4to. Franc. 1662. — See the Works of *Willan, Bateman, Rayer, Plumbe, E. Wilson*, and others referred to in the several Articles on Chronic Cutaneous Affections, and especially in that on the *Pathology of the Skin*.

SYMPATHY AND SYMPATHETIC ASSOCIATIONS OF DISORDER.

— Synon. — Morbid Sympathies. — Συμπαθια or συμπαθεια, (from συν, with; and παθεω, I feel or suffer; or παθος, feeling, affection, suffering); — *Sympathia*, Lat.; — *Consensus nervorum*; — *Partium Consentio*, Auct.; — *die Mitempfindung*, *Sympathie*, Germ.; — *Sympathie*, Fr.; — *Simpatia* Ital.; — *Morbid Sympathies.*

Classif. — Physiological Pathology; — General Pathology; — Semeiology.

1. Definit. — Sympathy cannot be more correctly defined as it has been by Dr. Klein Grant, as follows: — "*That relation of the organs and parts of a living body to each other, whereby an action excited in one part, induces a corresponding action in another part.*"

2. Baglivi attributed the sympathies to membranous connection; Bordeu to the cellular tissue; Willis and Vieusens to the agency of the nerves; and Whytt and Broussais chiefly to the brain. Rega divided the sympathies into those of sensibility and those of contractility — a division which has much to recommend it. Bichât made some excellent observations on the relations subsisting between the sympathies and the different parts of the nervous system; but, although these observations were calculated to lead to a more correct arrangement of the sympathies than had formerly been offered, they have not yet produced this result. The writings of Unzer, far in advance of their age, had previously furnished much that was calculated to increase our knowledge of sympathetic phenomena; but this was physiological rather than pathological, and without sufficient practical application. Bichât appears to have been ignorant of the works of Unzer. Contemporaneously with the former, Prochaska examined physiologically sympathetic phenomena, when treating of the sensorium commune and the consensus nervorum, in his treatise on the Functions of the Nervous System, and, whilst he recognised what had been done by Willis, Whytt, Stahl, Unzer, and others, explained the phenomena by means of the sensorium commune, to which he referred the consensus nervorum.

3. In 1824, I defined sympathy to be, *that state of an organ or texture having a certain relation to the condition of another organ or texture, in health and disease*; or, *a related state of the vital manifestations or actions in different organs or textures, as, when one part is excited or affected, others are likewise affected or disordered.* I then classed sympathies into the *reflex* and the *dir* ; the former taking place through the instrume a- lity of the sensorium, the latter being indepen nt of it, and occurring through means of the gan al nerves, and chiefly of those which form comm i- cating chords between the viscera and of t se which are distributed to the blood-vessels.

4. Subsequently Dr. M. Hall referred n y of the phenomena usually ascribed to symp y, especially those which I denominated reflex, a reflex function of the spinal chord, which fun n he considered to occur independently of the b , or even of the sensorium, that is, supposing e sensorium to be seated in the brain. But, at the sensorium commune is actually seated on the brain, has been, and still is, doubted. W s considered that there is a rational and a c - real sensorium; and Unzer long subsequ y adopted the same idea, or nearly the same i , which was more fully developed and modifie y Prochaska. This last writer subdivided is principle into two elements, namely, the s o- rium commune of the soul, which is seated i he brain only, and reflects those impressions of w h we are conscious, and the sensorium comr ne of the body, which is seated in the brain, s al cord and ganglia and plexuses of the sympat io system. But, wherever seated, there is i- dently only one sensorium commune, which es cognizance of impressions, and reflects the to distant parts, or, by means of which impress s, movements, &c., become sensations, or ob ts of consciousness or sentient operations, wh er lively or faint, thereby constituting the cla of reflex sympathies attended by conscious s. That this great principle may be seated i e basilar or central parts of the brain and me la oblongata is very probable; but that it ext ds also to other or more distant parts and is i e- pendent of these centres of conscious or sen nt actions, are not so admissible; for it is more a- sonable to infer that those movements or ac ns which are unattended by consciousness, ma e the results of a direct consensus of nervous ac n, or of a reflected consensus from ganglial or su r- dinate nervous centres, that either is not conv d to, or does not reach the seat of conscious se a- tions, or which, owing to the state of this i- ciple, or of its seat, fails to excite, rouse or e ct it.

5. It is obvious that, if we attempt to arr e those sympathies which depend upon a conse s of the nerves, the classification must be r e either independently of any reference to n- sciousness, or with so strict a regard to this i- ciple as to assign to it a higher attribute n that which a simple nerve-action involves. f, however, we neglect such reference, any arra - ment of nervous sympathies must be imperf ; and if we pay due regard to it, the difficult of classification is greatly increased, seeing that e simplest and most direct consensus, such as t e which concern the ganglial nerves, and w h ordinarily occur independently of sensation, y become objects of the most intense sensation, e same change also taking place in respect of - flected sympathies, which may or may not b - tended by consciousness, according to the in - sity of the cause producing them, or to the e of the sensorium or of its seat. Hence it ma e preferable to arrange sympathies with refer e

e superadded attribute of consciousness, but
assign an order of sympathies alone mani-
g this attribute or principle, seeing that there
w or no nervous sympathies, which may not,
tensity or otherwise, be attended by it, or
e it. Conformably with this view, therefore,
e offered the following arrangement, which
e more fully developed in the sequel — 1st,
t sympathies, transmitted directly either by
ous communications, or by continuity of
ture, &c.; 2nd, *indirect or mediate sympa-*
conveyed by vascular communication, by
of the fluids, &c.; 3rd, *reflected sympathies*,
ng through the media of the several orders
nervous system, with or without conscious-

From the time of WILLIS until those of
R and PROCHASKA, sympathy and consensus
nerves were generally viewed as synony-
; and this consensus being supposed to de-
upon the sensorium, it became a great diffi-
to explain how this consensus took place
consciousness in some cases, and without
iousness in others. It was therefore in-
l, that the consensus which involves this prin-
takes place in the brain, and excites or im-
s the mind or soul; and that the consensus
n fails of impressing the mind, is seated
ghout the frame in the several parts of the
us system; the former being the mental
nsus, and depending upon a mental or soul
rium, the latter being a corporeal consen-
and depending upon a bodily sensorium.
these physiologists divided the sensorium
wo essences or manifestations, the one with,
he other without consciousness, the latter,
ver, being only nerve-action, or the vital
estations of the nervous system, which are
ended by consciousness, and which constitute
portant, indeed the most extensive and im-
nt, part of those phenomena, which are com-
l under the head of morbid sympathies.

The subject cannot be better illustrated, nor
bservations I intend to offer on sympathy
introduced, than by adducing the remarks
OCHASKA respecting it; and these cannot be
clearly conveyed, than in the words of Dr.
OCK, who has most ably translated and
l the dissertation of this writer on the Ner-
System, for the *Sydenham Society*. "That
of the nervous system is termed the common
rium (*sensorium commune*), in which external
ssions meet, and from which internal im-
ons are diffused to all parts of our body;
hich, consequently, the consensus of the
s takes place that is necessary to life, and in
external impressions are reflected into in-
impressions, according to the law of self-
rvation, with or without consciousness.

"That sensorium in which impressions are
ted with the consciousness of the soul, may,
med the soul-sensorium; and the other, the
real sensorium; just as WILLIS has already
d it, into the rational and the corporeal soul.

"The brain, only, is the seat of the soul
rium; the seat of the body-sensorium is the
, spinal cord, and (as all observation shows)
nglia and plexuses of the nerves. That ex-
l impressions can also be reflected in the
, without consciousness, is shown by the in-
tary convulsions of voluntary muscles.
Monsters, born without brain and spinal chord, and which live up to the moment of birth, show that the consensus of the nerves necessary to this form of life, imperfect though it be, may take place, and that there may be a corporeal sensorium independently of the brain and spinal chord, and which, consequently, must be constituted by the plexuses and ganglia of the nerves. The movements observed to take place on irritating the nerves of a headless frog, and seen also in decapitated men, prove the same thing. The sympathetic nerve appears likewise to reflect its impressions in its ganglia and plexuses without the consciousness of the soul.

10. "In accordance with this consensus of the nerves, as well in the brain as in the spinal chord, ganglia, and plexuses, the operation of a stimulus is not limited to the nerves immediately irritated, but is extended to distant nerves, in known or unknown connection with the irritated nerves; and this is demonstrated by innumerable examples of consensus of nerves (consensus nervorum), as, for instance, the irritation in the pregnant uterus often causes nausea, vomiting, headache, toothache, &c.

11. "Both the soul-sensorium and body-sensorium operate according to the law of self-conservation, a truth which may be illustrated by numerous examples. For instance, the irritation or impression of too strong a light goes to the optic nerve, from whence it can only get at the ciliary nerves through the brain, and induce contraction of the pupil, so as to exclude the too vivid light from the eye, and obviate its unpleasant impression."

12. By most writers the term, consensus nervorum, has been viewed as synonymous with those nervous sympathies which occur in healthy persons, or which are not essentially morbid; whilst sympathy, according to its etymology, is considered by many as applicable only to associated morbid phenomena. The word *sympathy* has been viewed in both lights, and however correct the one may be, the other being the reverse, I shall respect common usage as regards it, and in order to prevent any misapprehension, use frequently the prefix, *morbid*, when discussing its numerous manifestations.

13. In attempting to illustrate *morbid sympathies, or those associated states of disorder which most frequently present themselves to the physician*, I shall first endeavour to classify them, conformably with the view above stated (§§ 5. 12.); and afterwards proceed to notice those which come more prominently before the medical practitioner, as fully as the plan and limits of my undertaking will permit. Many topics can be only briefly and imperfectly considered, whilst others may be barely enumerated, and offered to the reader, or to future inquirers, more fully to discuss or to illustrate.

14. ARRANGEMENT OF MORBID SYMPATHIES OR ASSOCIATED DISORDERS.

i. Definition of sympathies.
ii. Preliminary anatomical and physiological observations.
  A. The great extent and importance of the ganglial or the organic nervous system.
  B. The connections subsisting between the organic and cerebro-spinal nervous systems.

II. INQUIRY INTO THE MEDIA BY WHICH SYMPATHETIC AND SYMPTOMATIC PHENOMENA ARE EVOLVED, AND MORBID CONDITIONS ARE ASSOCIATED.

- i. *Direct or immediate sympathies.*
  - *A*, Direct communications by means of ganglial nerves.
  - *B*. Influence of ganglia on different organs or parts.
  - *C*. By direct communications by means of the cerebro-spinal nerves of sense and motion.
  - *D*. By continuity of surface or tissue.
  - *E*. By contiguity of organs and structure.
- ii. *Indirect or mediate sympathies.*
  - *A*. By vascular communications.
  - *B*. By states of the circulating fluids.
    - *a*. The chyle and other absorbed fluids.
    - *b*. The blood.
  - *C*. Owing to the conditions of the secretions and excretions.
    - *a*. By the various secretions.
    - *b*. By the excretions.
- iii. *Reflected sympathies.*
  - *A*. Reflected from nervous ganglia, often attended by spasm and altered sensibility of involuntary parts.
  - *B*. Reflected through the media of the ganglionated roots of the spinal nerves, and affecting the movements of voluntary parts.
  - *C*. Reflected through the medium of the spinal chord, and inducing morbid sensations or motions, or both.
  - *D*. Reflected through either the medulla oblongata or the brain, or both, and causing various disorders of sensation, of perception, and voluntary action, &c.

III. CIRCUMSTANCES INFLUENCING THE CHARACTER, NUMBER, AND INTENSITY OF SYMPATHETIC PHENOMENA.

- i. *Race and temperament.*
- ii. *Habit of body.*
- iii. *Sex.*
- iv. *Age.*
- v. *Physical power.*
- vi. *Occupations, &c.*

IIII. CLASSIFICATION OF MORBID SYMPATHIES, OR OF SYMPTOMATIC OR ASSOCIATED DISORDERS.

- i. ASSOCIATED AFFECTIONS OF DIGESTION AND ASSIMILATION.
  - *A*. *Disordered states of digestion and of assimilation associated with each other.*
    - *a*. Associated disorders of the stomach and liver.
    - *b*. Associated disorders of the liver with the intestines.
  - *B*. *Morbid sympathies between the digestive organs, and the secreting and excreting functions.*
    - *a*. Between the functions of digestion and the urinary functions.
    - *b*. Between the digestive functions and the skin.
    - *c*. Between the functions of digestion and fæcation.
  - *C*. *Sympathies between the digestive and the circulating and respiratory functions.*
  - *D*. *The sympathetic and symptomatic relations between the digestive organs, the brain, and the organ of sense.*
  - *E*. *Sympathies between the functions of dige and locomotion.*
  - *F*. *Associated disorders of the digestive and e sexual organs.*
- ii. SYMPATHETIC AND SYMPTOMATIC PHE- MENA CONNECTED WITH THE CIRCULA AND RESPIRATORY FUNCTIONS.
  - *A*. *Mutual influences of these functions.*
    - *a*. From nervous connections.
    - *b*. From the nature of the functions th selves.
    - *c*. From their actions on, and the reac ns of the blood.
    - *d*. From physical agents acting on the b d and on the respiratory and circul g organs.
    - *e*. From mechanical and other impedin ts to the circulating apparatus.
    - *f*. Influences of these functions, and ir symptomatic relations in acute dise es.
    - *g*. Symptomatic relations of these func ns in chronic diseases.
  - *B*. *Morbid sympathies of the circulatory nd respiratory functions with the dig ive functions.*
  - *C*. *Sympathy between the vascular and re ra- tory functions, and the brain and org of sense.*
  - *D*. Associated morbid states of circul secretion, and excretion.
  - *E*. Association of disordered excreting fun with disorder of the vascular, ne and muscular systems.
- iii. ASSOCIATED STATES OF DISORDERED SATION AND SENSIBILITY. 7.
  - *A*. *Sympathetic and symptomatic states the several senses.*
    - *a*. With the functions of digestion and tion.
    - *b*. With states of the brain and chord.
  - *B*. *Sympathetic relations of sensibility.*
    - *a*. With the organic functions.
    - *b*. With states of the cerebro-spinal ce es.
    - *c*. With the reproductive organs.
- iv. ASSOCIATED AFFECTIONS OF VOLU MOTION.
  - *A*. *Sympathy between the functions of sen and locomotion.*
  - *B*. *Associations of mental emotion and l mo- tion.*
    - *a*. Arising from the exciting emotions.
    - *b*. From depressing emotions.
  - *C*. *Sympathies between organic and ani or voluntary motions.*
    - *a*. Organic or involuntary motions ext ing to voluntary muscles or organ and rendering the actions of these in un- tary.
    - *b*. Voluntary motions affecting the o nic or involuntary actions.
    - *c*. Associations of the organic and vol ary motions in the functions of rep uc- tion.
- v. SYMPATHIES OF THE ORGANS OF I no- DUCTION.
  - *A*. *Sympathies between these and the di tive and assimilative functions.*
  - *B*. *Between the several organs and the c bro- spinal functions.*
    - *a*. Between these organs and the brai

Between these and the spinal chord and voluntary organs.

Between these organs and the functions of sense and general sensibility.

Concluding Remarks.—As to the import- f observing closely sympathetic and symp- c phenomena, and of tracing their origins lations, with reference not merely to diag- but also to prognosis and treatment.

A due recognition of morbid sympathies, or se associated states of disorder which most ntly present themselves in practice, of edia of their connection, of the modes of supervention, and of their extent, is of the t importance to the physician in enabling form a correct diagnosis and prognosis in f the diseases which come before him, and e at rational indications of cure.

i. Definition. — *Morbid sympathies may ied to be associated states of disordered func- of diseased action ; the disorder or disease system, or organ, or part, affecting other , organs, or parts, according to their organic ions, their functional relations, and their tendencies, or acquired or constitutional pre- ions ; the consecutive sympathetic disturb- ten being more prominently manifested than iginal or efficient morbid condition, and frequently concealing or masking this con-*

ii. Preliminary Observations. — It is ry to a due consideration of this subject, efore I proceed to notice the more remark- orbid associations occasionally presenting lves in practice, I should take *an anato- ysiological view of the media or channels by one organ or part sympathises with, or be- ffected by, the morbid conditions of another r part.*

The modes of explaining these morbid asso- s or sympathies, adopted by previous , are various and unsatisfactory, and have nerally based upon the prevalent doctrines lay; consequently the recognition of sym- c, symptomatic, or associated morbid states, n imperfect, the classification of them arbi- r conventional, and the chains of con- existing between them imperfectly or erro- traced.

Dismissing, therefore, all reference to the iters who have considered the subject, I iew it conformably with the inferences at I have arrived, from researches which ngaged my attention on various occasions the last thirty years.* But I can only ctly accomplish my intention within the o which I am confined, and must merely on certain points, which, to do them jus- ould require a much more extensive eluci-

A. There are certain circumstances in the *anatomy of the organic nervous system*, which, when kept in recollection, serve remarkably to explain many phenomena hitherto imperfectly accounted for. Much difficulty and misapprehension, in tracing the connexion of the sympathetic or associated morbid states, have arisen from the usual modes of viewing the large nervous masses, as giving origin to the nerves, or as being themselves a congeries of ganglia of a peculiar constitution. It would be much more conformable with a comprehensive view of the nervous system through the various grades of animal organisation, and with the development of this system in the more perfect animals, if the nerves, and especially the sensory and those of organic life, or ganglial nerves, were viewed as originating in the several tissues or structures themselves, more particularly in the organs of sense, in the cutaneous and mucous membranes, in the serous and fibrous tissues, &c. This idea, entertained and published by me many years ago, subsequent observations and reflections have tended to confirm.

21. Another important circumstance, one which I have also insisted upon for many years, which was formerly disbelieved, but is now fully confirmed by recent researches — namely, that all secreting organs are supplied with organic or ganglial nerves. The modes in which the viscera, both abdominal and thoracic, are supplied, are well known — namely, *first*, by fibres proceeding from numerous ganglia and plexuses, or, according to the view just stated, by fibrils originating in the organic or ganglial corpuscles, which, by microscopic aid, have been detected not only in the softer ganglia and nerves themselves, but also through the muscular tissue, the skin, the serous and the mucous surfaces; or, in other words, from fibrils originating in organic or ganglial corpuscles, and proceeding centripetally to form plexuses or ganglia in the various abdominal, thoracic, and pelvic viscera. *Secondly*, by the organic or ganglial febrils interlacing and surrounding the coats of arteries. As far back as Winslow, the soft or ganglial nerves were traced in the large arteries, and he represented them as forming a net work around these arteries. In 1816, 1817, and 1819, this subject engaged my attention; and I was enabled by the microscopes then in use, which were of weak power, to trace the ganglial nerves, when the parts had been macerated for a short time in spirits of turpentine or spirits of wine, or diluted acetic acid, as far down as the lower third of the femoral artery; and my more recent researches have shown that numerous fibres proceed from the sympathetic ganglia to the gangliated roots of the spinal nerves, and thence are ramified, on the one hand, to the chord itself, and on the other, along with the spinal nerves, to the extremities and general surface. When they reach the extremities, especially near the surface, and in the vicinity of the several joints, and even as low as the ankles and wrists, they become intimately associated with sensory nerves, forming with them, small or minute ganglia, and supplying with minute fibrils the synovial surfaces. The obvious intentions of this organisation may be inferred to be — 1st, that the sensory function and the ganglial functions should be associated; and, 2nd, the vessels furnishing the secretion to the synovial surface shall be rein-

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* I ould not now have here entered so fully as I have the present inquiry; but certain views com- y it, engaged much of my attention, and not a my time many years ago. And when they were lished (in 1822 and 1824), they were considered as heterodox and visionary. They have, how- ceived support from the more recent researches al eminent inquirers; and they alone of existing s are capable of accounting for the *sympathies ciations of morbid function and action*, although uctly and imperfectly considered in this article.

forced by organic nervous energy, for the promotion of synovial secretion. The communications of the ganglial nerves with the sensory nerves and spinal chord, the numerous branches proceeding from the splanchnic ganglia to the sympathetics, and thence to the ganglionated roots of the spinal cord, and to the cord itself, explain many of the phenomena remarked in the course of diseases of the abdominal viscera, on the one hand, and of diseases of the spine, spinal cord, and joints on the other. When diseases of the joint go on so far as to produce disorganisation of the parts, we commonly find that the digestive organs sympathise more or less with them, so that loss of appetite, and even vomiting, not unfrequently supervene.

22. I have elsewhere contended, that the nerves supplying the synovial and mucous surfaces and integuments should be viewed as originating in the nervous corpuscles distributed to these parts; or, in other words, that delicate fibrils arise in, and are connected with, these corpuscles, coalesce in the extremities with the sensitive fibres, form minute ganglia with these latter, and run thence, or rather converge, towards the spino-cerebral axis. Thus, whilst the *splanchnic and sensitive nerves* may be viewed as arising in, or commencing from, the nervous corpuscles already noticed as existing in the several surfaces, viscera, and organs, and as interlacing or communicating freely with each other, and with nerves of motion, as well as supplying the circulating systems, the *motory nerves* proceed in an opposite direction. The *former converge* towards the centre, communicating with the encephalon and nerves of sense; the *latter diverge* from the spinal centre to the periphery, also communicating with the brain, from which proceed the impulses of volition by which they are influenced. The *one* class is acted upon by mental impressions or volition; the *other*, by physical causes or agents.

23. The nerves may thus be divided into *three classes*, namely — 1st, the splanchnic or visceral, or those of digestion, assimilation, circulation, and secretion; 2nd, those of general and special sensation; and 3rd, those of volition, or muscular action or motion.

24. *B.* But it is important to bear in mind *the character of the communication between these orders of nerves*, inasmuch as such communications give rise to numerous states of healthy or morbid action, and occasion, mutually, various affections of the large or nervous centres. The connections between the organic nerves and the roots of the spinal nerves, and the nerves of sensation, have not been investigated till recently; and even now not so fully as is required. This much, however, may be remarked generally, that the organic or glanglial nerves are more or less connected with all the nerves of sensation; and where the connection is formed, or where these different nerves closely approach each other, we generally find minute ganglia.

25. It has been a subject of discussion, viewing the brain as the secreting organ, as it were, of the manifestations of the mind, how the brain itself is supplied with organic or ganglial nerves. We know that the vessels of the brain, the carotids and other arteries, are all surrounded by ganglial or soft nerves; still this is an insufficient supply of these nerves, if we consider the analogy existing between this organ and the other organs of the body, — if we view the brain to be like othe iscera; inasmuch as we find in other viscera, at, beside the ganglial nerves, thus distributed he blood-vessels, there are also special ganglia, ich are intended for the further supply of ne us energy to them. Take, for instance, the r; there are, besides the organic or soft nerve upplying the blood-vessels, several ganglia nd plexuses supplying the structure of the cus itself. Take the kidneys; there are also s ific ganglia devoted to the maintenance of a ain and constant amount of nervous energy, pr bly modified in kind, or suited to the functi of these organs. It is not, however, so m fest that the brain enjoys a similar supply of g glia and ganglial nerves, or that the supply of ese nerves, furnished through the medium the blood-vessels, is at all sufficient for the s ral functions or manifestations of the brain, vi ing these functions as depending upon the o nic nervous ganglia and ganglial ramificati, as observed in respect of secreting viscera a organs. Hitherto the sufficiency of the su y of ganglial nerves sent to the brain with the od-vessels has not been demonstrated, and dly admitted; and special sources of such su y as exist in connection with the other viscera, h not been satisfactorily shown, granting that organic nerves supplying the blood-vessels the brain are insufficient for the discharge the functions of this organ.

26. It has been considered, and most pr ably with truth — indeed I have on several oc ions contended — that the pituitary and the neal bodies are, in fact, organic nervous gangli nasmuch as there are communicating branc s of fibrils running between the other ganglia, the neck and about the base of the skull an hese bodies. But, in opposition to this view, has been argued that these bodies are differe from other ganglia in the body. However, as the ganglia may be considered to have a mini special organisation, according to the functio o be performed by the organ which they supp and as the functions of the brain are so very erent from those of other parts of the body, so y the ganglia, distributing their prolongations an ibres to this organ, be reasonably considered t iffer also from others. These bodies are co ected likewise with the soft commissures and gr substance of the brain. In fact, these bod, like the ganglia, as well as the grey substance f the brain and spinal chord, which are the act portions of these organs, abound with organic vous corpuscles; and they are connected, b eans of delicate grey fibrils with the plexuses su unding the arteries, and with the ganglia in t head, especially with the ganglia of Ribes, C uet, and Meckel. The difficulty has been trace this connection; and unless it be admit that these bodies are, in fact, ganglia, devote o the office of supplying vital energy to the n, to enable this organ to discharge its funct s, we are at a loss to account for their functions hese bodies are lodged more securely than otl parts from danger; they are placed near the se of the brain, and in situations the least ly to suffer from injury; and they are in co ection with the commissures of the brain, where s believed the functions of volition connect th elves with those of perception and intellect.

Although it is difficult to trace the connec- f the ganglial nerves with the brain and rves of special sense, it is not so difficult to in the connection of the ganglial nerves with nal chord and spinal nerves. The spinal , especially those of volition, are all white bular, and are not provided with the or- ervous corpuscles seen in the ganglia and erves; whilst the latter are soft, grey, and in an irregular and indeterminate manner, red with the former. Now the ganglial or erves, as already stated, may be traced e sympathetics into the gangliated roots of nal nerves, and fibrils proceed thence to the itself, whilst others may be traced in an e direction, or from these roots, along with nal nerves to the extremities and surface of ly. On the other hand, ramifications of ite or spinal nerves run to the ganglia of npathetic nerves, and in some situations, lly in the pelvis, may be traced into the nic ganglia. Thus there are — 1st, com- ting branches of grey nerves running from glial system to the spinal roots and chord; nd, communicating branches of white or nerves proceeding from the chord to the hetic and ganglia. Hence the functions of partment of the nervous system are mutu- led; and impressions made upon one part er system are extended in a more or less manner to other parts.

The ganglia placed on or near the pelvic , admit of the clear recognition not only of imate structure of the splanchnic ganglia, o of the presence of white nerves, which erminate in them, or proceed through them, ich come in greater numbers, or more pal- from the spinal chord to them, than to any anglia. Thus the generative and urinary are supplied not only with gangial or splan- erves, but also with spinal nerves, a supply es from both nervous systems being neces- the due discharge of their functions,—and ply of each of these different orders of to each of these organs is in due relation functions which each discharges. Thus, e generative organs are supplied not only e organic nervous influence, but also with vous influence generated by the brain and hord. And, moreover, the special ganglia to these organs are mutually connected ns of communicating branches, both with er splanchnic ganglia and with the cere- al axis.

29. have been thus particular in directing at- to the communications between the dif- ystems of nerves, because we are thereby to explain many phenomena which occur course of disease. It may be, therefore, l, in brief, that these different orders of communicate mutually by means of s going from one to the other; and gene- nglia or plexuses are formed at or near ts of communication. There thus arises change of influence, tending to the proper ge of function; and mutual sympathy is ed when an impression is made on any t of the circle formed by this communica- d organic connection, the effects varying e nature of the impression.

C. It is impossible to arrive at just conclusions as to the sympathy or mutual dependence of parts, without reference to *the vital property of irritability*, and the relations of this property with the nervous system. Almost up to the present day, especially from the days of HALLER, irritability was considered as a function of the muscular fibre, — as a *vis insita* in that fibre, and not dependent upon the nervous system. Many years ago (in 1819, 1820, and 1821), I directed particular attention to the subject of irritability of different structures, and tried many experiments, especially in some of the lower animals; and, from these experiments and observations, I then came to the conclusion, that the irritability of fibrous and muscular parts depends upon the organic nervous system; and much more recently, this doctrine was advocated by Dr. FLETCHER, in his works on Physiology, he making a due acknowledgment to me as having originated it.

31. In the first place, all irritable fibres present, when under the microscope, a more or less abundant supply of those corpuscles in which organic nerves may be said to originate, and, in fact, from which the organic nervous fibres have been detected by the microscope to take their origin, — from which they arise or proceed, and with which they abound. The involuntary muscles, and the fibrous membranes of the hollow or tubular viscera, are supplied only with soft nerves, — have no other nerves than ganglial; and they possess great power of contraction both in health and disease. This power may be traced, to a certain extent, even in the membranous portion of the trachea and bronchi; and if we refer to the comparative anatomy of these parts, especially to the trachea of some of the higher animals, we find a singular conformation of the cartilaginous rings, remarkably well calculated to antagonise the contractile force of the fibrous structure of the membranous portion of the tube. These rings are, indeed, the antagonists of the contractile power of the fibrous structure, preserving at the same time a patent state of these tubes, and admitting of a certain degree of contraction when this structure, or the soft nerves supplying it, are irritated. This conformation is very remarkable in ruminating animals, and well calculated to prevent the tracheal canal from being diminished or injuriously pressed upon during deglutition and rumination.

32. Although involuntary fibrous structures are supplied only with organic or soft nerves, and notwithstanding that the structures receive no white or voluntary nerves, nevertheless they are impressed or acted upon by the electro-galvanic influence. In 1820 and 1821, I instituted some experiments to determine the contractility of fibrous membranes, but the galvanic agency did not appear to produce much effect unless the power was very considerable. When, however, this agent is applied to the nerves of motion proceeding to voluntary muscles, the effect is very remarkable. It would appear that the voluntary muscles are supplied with voluntary or spinal nerves in addition to the supply of soft nerves received or possessed by all fibrous structures, bestowing thereby upon these muscles a voluntary and a greater power of contraction; the power and character of contraction thus varying with the nature and conformation of the muscular parts, and

with the nervous centres which supply these parts with nerves. I can scarcely follow this subject further inasmuch as I have to notice other topics that will occupy much of my limits; but it is more fully discussed in my notes to RICHERAND's *Elements of Physiology*, and in the articles "IRRITATION" and "IRRITABILITY." I have there contended that irritability depends on the organic or ganglial nervous system; and that it is exalted in the voluntary muscles, by the terminations of the motor or voluntary nerves.

33. The irritability of the heart is very remarkable. I have had opportunities of investigating it in the hearts of a number of animals, and in several fishes, — the halibut, the skate, the turbot, the cod, ling, &c. From all these, the heart may be cut out, and it will still contract for a short time after it has been separated from all nervous and vascular connections; thus showing, that not only does it take a considerable time for the influence of the ganglial nerves supplying an involuntary organ to be exhausted, but that the numerous plexuses and small ganglia, formed by these soft nerves under the serous linings and in the structure of the heart itself, and in the vicinity of blood vessels, still continue to supply nervous power to the muscular structure, and are of themselves sufficient for the continuance of the phenomena of irritability for a short time. Moreover, the heart appears to be plentifully supplied in its structure with those ganglionic corpuscles, which, as I have already stated, are intimately and organically connected with the soft, grey, or ganglial nerves; and which most probably also administer to its irritability. Owing to these provisions, a short period is required to exhaust the irritability of the organ, even when thus isolated or removed from all its connections. It is not surprising, therefore, when viewing the morbid relations of irritability, to find this vital property most remarkably modified — to observe it exalted, in one case, and depressed in another, or even otherwise altered in its condition, by agents which impress the organic nervous system, by changes in the vascular system, especially by alterations of the blood, and by the state of the cerebro-spinal nervous influence.

34. *D.* But it is not in connection with *irritability* only that the functions of the ganglial and sympathetic nervous system should be viewed. This part of the nervous system, or, more correctly, this distinct and separate system — this organic or primary nervous system — presides also over secretion and excretion, as I have already stated. If we view the digestive canal, which possesses both the vital property of irritability, and the no-less vital property of secretion — the former in connection with its muscular tunics, the latter with its villous coat and glandular apparatus — we shall find that every part of this canal, more especially the stomach, duodenum, &c., is supplied with soft or splanchnic nerves; and that this supply is not limited to those fibrils which surround the arteries of these viscera, or to others which proceed from the semilunar ganglion, and aortic plexus; but that these viscera, as well as other secreting viscera, possess, in addition, numerous minute ganglia and plexuses under their serous and proper coverings, and near to the situations of the principal blood-vessels, which minute ganglia and plexuses are more especially
devoted to the functions discharged by th
or part in which they are situated.

35. Whether the splanchnic or ganglial
originate in these corpuscles distributed t
an organ or membrane, and successivel
themselves, first into fibrils, next into plexu
minute ganglia, and afterwards into
branches and more manifest plexuses and
until they converge into the semi-lunar an
ganglia; or whether they originate, as b
heretofore, in the ganglia themselves, and
thence to their destinations in the tissu
not be readily decided; but it is indis
that they constitute a distinct system; th
send their fibres with the blood-vessels, a
the spinal nerves, to all parts of the bod
cially to secreting organs and parts; th
supply both the brain and the spinal chor
that they form more numerous plexu
minute ganglia in the several viscera, tha
hitherto been described or even supposed;
on the other hand, the intimate connectic
ing between these nerves and the cerebr
nerves is reciprocated by numerous rami
proceeding from the spinal nerves, — from
tercostal, lumbar, &c., — which run to the
and plexuses of the organic nerves, an
proceed through these, or terminate in t
accompany fibrils from them to various p
taining more or less evidently their white
bular appearance. In viscera possessing
less of voluntary power in addition to the
as the urinary and sexual organs, the vic
the sphincters, and the outlets of can
the supply of the white and tubular n
motor and sensory spinal nerves — to the
and plexuses more especially devoted to t
tions of these organs and parts, is more a
and more manifest than in others, these
combining and requiring the influence
these nervous systems in the discharge
functions.

36. II. MEDIA OF MORBID SYMPAT
Having thus directed attention to tho
minary topics which should be duly re
before we proceed to inquire into the
media by which one organ or part sym
with another, or by which the morbid c
of one organ affects another, I now proc
general view of the MEDIA AND MODES OF
SYMPATHY, for there are not only differe
but to a certain extent different *modes*, b
these sympathies take place. Associated
states, or sympathies, have been above
into—1st, the *direct*; 2nd, the *indirect*;
the *reflected*.

37. i. The FIRST CLASS has for its n
firstly, the *direct communication of nervo*
more particularly the organic nervous fib
here the influence of the nervous gangl
viscera becomes a matter of very interes
sideration: every important organ is supp
these ganglia and plexuses, which are,
every reason to believe, peculiar or modifi
form, and minute organisation, accordin
functions each organ has to perform; —
continuity of surface or tissue: thus the
the mucous membrane of the stomach a
mucous surface of the mouth, the fauces,
rynx, &c.; — and, *thirdly the contiguity*
gan or tissue to another: during a state c

the colon presses on the diaphragm, so as to the action of the heart and other parts ; and ence of the stomach disorders the functions heart and diaphragm, &c. These constitute hief direct media of sympathy between dif- t organs — namely, nervous communication, nuity of surface, and contiguity of situation.

. ii. The SECOND CLASS, or *indirect modes media* of morbid sympathy, are — *first*, by *lar communication.* It must be obvious that a portion of a vessel is affected, another por- f it will experience more or less of disorder. now, in cases of inflammation or irritation of phatic vessel, how readily the morbid condi- xtends along it and affects the glands. Here lar communication, even in these vessels, is dy medium for conveying morbid action ; is still more remarkably evinced in respect arteries and veins.

Secondly, by the states of the circulating This is one of the most important modes ich morbid action is propagated, and it is which forms, as it were, the basis — the dwork, of the system of *humoral pathology*, for many years was believed in so generally ghout the civilized world. When the mor- fections of the nervous system were so much d upon by HOFFMANN and CULLEN, the hu- pathology became obscured, but closer ob- ion and less addiction to theory, have shown, he circulating fluids are readily and early ered in the course of disease, and, being disordered, they become sources of a more al malady — of disease not limited to ular organs, but extending more or less to hole œconomy.

iii. The THIRD CLASS, under which I have ged morbid sympathies, is the *reflected.* his is not a very recently recognised class pathies, is shown by the fact that it was so inated and discussed by UNZER and PRO- A, and more fully by me, as early as 1824. eflected sympathies are propagated or deve- — *first*, by fibrils proceeding to, and commu- g with, ganglia or plexuses, and supplying ans of these sources contractile and secret- scera. Thus irritation occasions the con- on of a portion of intestine ; the irritation propagated most probably to a nervous on, and then reflected in the form of con- n. But it is not improbable, and my re- ion of the phenomena I have observed irritating visceral parts of the lower animals to warrant the inference, that irritation is ed by contraction in a more direct manner, least, in the manner less obviously indirect, hat now mentioned ; and contraction may irritation without the irritating impression conveyed to ganglia remote from the organ irritated. Thus, when the hearts of some are removed from all their connections, they ntract upon irritation for a short time, the ganglial and plexuses in the structure of gan thus enabling them to react ; and so on ards other hollow organs admitting of a sen- eaction upon irritation.

Secondly, the reflected sympathies are de- d by means of the communications of the c or ganglial, or soft nerves, with the roots spinal nerves. I was first led to describe ode in which sympathetic irritation is thus propagated to the muscles of voluntary motion by a singular case which came under my care in 1821, at the Surrey Dispensary. A female, of middle age, presented herself with violent contraction and relaxations of the abdominal muscles, alternating rapidly, regularly, and constantly. The spine evinced no tenderness when examined, no pain nor any other morbid phenomena ; and the functions of the extremities and of the urinary organs were unaffected. Conceiving that the affection might be sympathetic of worms in the intestines, I prescribed full doses of turpentine and castor oil, which brought away enormous quantities of lumbricus teres and fæces ; and as soon as these were evacuated the morbid action ceased. The irritation of the extremities of the nerves of the digestive canal evidently was in this case conveyed to the roots of the spinal nerves, and was thence reflected by the nerves of motion upon the abdominal muscles. It does not appear necessary to infer that, in this case, the irritation was conveyed to the spinal chord itself, inasmuch as neither morbid sensibility, nor other disorder could be traced to it. We can explain the phenomena by considering that morbid irritation was transmitted merely to the roots of the spinal nerves by the ganglial and sympathetic nerves, and that the irritation thus transmitted to these roots produced this affection of the abdominal muscles. The second class, then, of reflected sympathies are those reflected by the ganglionated roots of the spinal nerves.

42. *Thirdly*, irritations, or impressions, are reflected from internal viscera and internal parts, by means, or through the media, of the spinal chord and nerves to the voluntary muscles and extremities of spinal nerves, motion, or sensibility, or both being thereby affected, as shown in several diseases, more especially in hysteria, chorea, neuralgia, tetanus, &c.

43. The *fourth, or last order of reflected sympathies*, are those which take place through the medium of the *medulla oblongata or brain*, or of both. It has long been proved that impressions made on the organs of sense will occasion reflex actions. Indeed, all the phenomena of mind may be said, so far as they produce any sensible motion or action in the œconomy, to be reflected. This class of sympathies are attended generally in the waking state by consciousness, although not necessarily and uniformly; but during sleep, sensibility, or consciousness is only occasionally and obscurely excited.

44. III. CIRCUMSTANCES INFLUENCING SYMPATHETIC PHENOMENA. — Having sketched the several modes in which morbid actions or states become associated, and, at the same time, considering that these associations are often brought about through more than one channel, I proceed next briefly to advert to the well-ascertained fact, that irritations, or morbid conditions of any other kind, may exist in organs or parts without producing those sympathetic or symptomatic phenomena which we observe in other persons in a more or less marked degree ; and that *sympathetic phenomena vary not only in degree, but also in some measure in character and variety, or number, with the temperament, with the habit of body, with the sex, with the age, with the physical powers, and with the occupations of the individual.*

45. i. It is difficult to determine in what degree

or mode the various sympathetic phenomena, manifested by the human subject may vary in the *different races of the species*. Judging from my own observation, I am inclined to infer, that they are most diversified, numerous, and manifest amongst the most highly cultivated and luxurious of the Caucasian race, and that they are the least diversified, and the least manifest in the negro and the hyperborean races.

46. ii. *Temperament, idiosyncrasy, or diathesis*, has evidently a great influence upon the sympathies — the nervous and irritable temperaments evincing the most varied and most numerous and prominent sympathies; the phlegmatic limiting their range and diminishing their intensity. In nervous, impressible, and excitable persons, irritation or excitement, on the one hand, or depression or exhaustion on the other, in whatever part of the œconomy it may exist, but more especially in sensitive and vital parts, is soon followed by various sympathetic changes, which either would not appear, or not appear to the same extent, in phlegmatic, robust, and muscular persons.

47. iii. Much, however, depends upon the *habit of body* and the vascular conditions of the individual. It may be difficult to determine correctly whether or no fat or very lean persons evince the more prominent range of morbid sympathies. Most probably, thin or lean persons are not only more susceptible of sympathetic phenomena, but also evince them more prominently than those who are the subjects of greater or less obesity. A similar difficulty exists respecting the greater influence exerted by vascular plethora, or by deficiency of blood. Probably both extremes, or even an approach to either extreme, may favour the development of morbid sympathies much more than a healthy state of the vascular system — than when a due relation subsists between the contained fluid and the containing vessels—between the healthy quality of the circulating fluids and the tone and energy of the moving powers.

48. iv. *Sex* has a most manifest influence upon the number, character, and prominence of the sympathies. In females, especially those of a nervous and impressible temperament, both the range and the intensity of these phenomena are most striking, and the phenomena developed are most frequently connected with irritation of a particular organ or part, and are attended by more or less morbid sensibility; the nervous systems being generally the media by which their sympathetic affections are developed. In proportion as nervous power is impaired, exhausted, or originally defective in this sex, the more remarkably are susceptibility and excitability manifested, and their more remote consequences evolved. The same remark applies also to males, but the sympathetic phenomena are not so manifest in them, unless in cases of great exhaustion of nervous power.

49. v. *Age* has also a very manifest influence upon the sympathies; the earlier the age, the more readily and rapidly are they developed by the primary morbid affection, and the less frequently are they connected with organic lesions. As life advances, sympathetic phenomena are less frequently and less rapidly evolved; and structural changes either proceed further without producing them, or produce them less frequently, with less severity, and in less variety. This is especially the case after fifty years of age, after the latter climacteric age of females. the period of female puberty, and about the p of the latter sexual change in this sex, sympat affections are frequent, prominent, and va and in many they continue, at intervals, to take more or less of this character throughou whole epoch of uterine activity. After the pe of dentition are passed, when the sympathie most remarkable, owing to the relations subs between the state of the gums and both the glial and the cerebro-spinal nervous system: most important epoch of both healthy and m sympathy — or rather of synergy or physiolc sympathy — is the epoch of puberty; after v sympathetic affections diminish in frequency intensity in this sex, unless in crowded tow persons following sedentary occupations, a the debilitated.

50. vi. The state of *physical power* has festly no mean influence upon the sympa Where this power has been originally gre where it is associated with nervous energy with perfect states of the digestive and assimi functions — there sympathetic affections are frequently and least severely complained o the least complicated. When organic ne power is depressed or exhausted, more espe when the exhaustion has proceeded slowly continued long, a very different result is obse the irritation of a particular organ, or part developes various affections, sometimes c same, at other times of a different charact different or several parts of the frame. Nun instances illustrative of this pathological p present themselves in practice amongst both especially about puberty, and for many afterwards, more particularly in the female

51. vii. The *occupations* of life exert influence upon the liability to severe or plicated sympathies. It is obvious that tary persons, or those occupied in ways preclude the due exercise of the body in th air, more especially if they pass much of time in large towns, or in the impure air c tories, or in unhealthy localities, and those exert the mind upon abstruse or abstract sul will sooner or later acquire an increased sus bility of morbid impressions and irritation these irritations will in them develope a range, and a more intense grade, of symp affections than in others not similarly ci stanced, all other things being equal. It compatible with my limits to pursue this s further, or to illustrate my positions by re to acknowledged facts. This, as well as shall have hereafter to advance, must be rather as suggestive, than as sufficiently trative of the subject.

52. IV. SPECIAL CONSIDERATION OF PATHETIC OR ASSOCIATED DISORDERS. — proceed to consider, in a more special m some of the sympathies most frequently ob in practice, and briefly to notice, or me enumerate, others. In the view I am al take of *sympathetic* or *associated morbid s* shall consider in succession, *first*, the ass morbid states of digestion and assimilatic *condly*, the sympathetic phenomena connect the circulatory and respiratory functions; sympathies, or associated morbid states of

nd sensibility ; *fourthly*, associated functions, mpathies of animal motion ; and *lastly*, the athies, or morbid states of the organs of re- ction. I should not have directed attention s subject, if I had considered that former s had discussed it fully ; but I believe it will be found, upon referring to patho- l writings, that not much has hitherto been satisfactorily upon it. That morbid sym- s are propagated throught he channels, I ttempted to point out, receives so frequent a mation, and is indeed so constantly observed ctice, that we may conclude that a person ring under any specific disease, as described sological writers, is seldom seen without ting important morbid associations and sym- ic phenomena. We rarely meet, in the of medical practice, with a disease im- ng one particular tissue or organ, without ing, more or less during its progress, dis- although related (related in the manner I ttempted to point out), functions or organs hout displaying various sympathetic pheno- or associated morbid sensations, conditions, ions, owing to the several relations which I ere attempted to establish. I now proceed sider the *first Class*.

i. Associated Sympathies or Affections e Digestive or Assimilative Organs. — organs are most important as respects vi- ; they are observed throughout the animal m, and, as being intimately connected with igin and perpetuation of life, demand our immediate consideration. The sympathies, ociated states of digestion and assimilation, be referred, —*first*, to the circumstance of organs being supplied with the same system ler of nerves, the ganglial, and, even ac- g to the view I have suggested, of these partly originating in the villous surfaces renchyma of these organs, as shown by the scope ; and to the presence of the organic s corpuscles, and their incipient arrange- into fibres, in these tissues and organs. The nstance of the organic or soft nervous fibres ting thus, and the extension of these fibres xuses and ganglia, and thence to the ner- ystem of animal life, serve to show, or at go far to explain the fact, that disorders ng these organs, especially the alimentary affect more or less distant parts, re- organs or parts thereby sympathising with *Secondly*, to the similarity and continuity cture existing through a large portion of organs, particularly the digestive canal. *y*, to the contiguity of their position. *ly*, to the association of function and nor- tion. *Fifthly*, to the several vascular con- ns existing between them. Thus it is not h one channel only that these associations pt up, for no less than five may be con- l as contributing to the several states of d sympathies or associations which the di- e and assimilative organs present in prac-

First, the associations of the morbid states organs of digestion and assimilation with other are amongst the most frequent and nent in the human economy.—*A*. When we the intimate connections existing between gestive canal and its allied viscera, especially the liver and pancreas, by means of the splanchnic ganglia, plexuses, and ramifications, and of the vascular system, the frequency of these morbid associations cannot remain a matter of surprise. When we consider also the relations of the portal circulation, and view it (as it really is) as independent, in a great measure, of the action of the heart, indeed, so much so as that the return of blood from the liver is much more under the control of the heart, than the supply of blood to the organ by the portal vein, — or, in other words, that the return of blood from the hepatic vein is owing more to the action of the heart, than the circulation through the portal system is owing to this organ, — we must necessarily infer the operation of some other agency than the heart in carrying on this circulation. Now, the capsule of Glisson, and the ganglial nerves, with which both it and the portal vein are provided, are in my opinion the chief agents of this important and independent circulation, — agents which operate through the medium of their distributions throughout the organ along with this vein, and which influence not only the circulation of it, but also the circulation of the bile along the ducts. That this capsule at least contributes to, if it does not entirely discharge, this function, may be inferred from its organisation ; for it is abundantly supplied with ganglial corpuscles and fibrils, and it may therefore be considered as exercising important vital functions. When, therefore, we reflect upon the nervous and vascular connections of the digestive organs, we must admit that affections of one of the series will be readily propagated to others, and that disorder of the functions of one will necessarily affect more or less the rest. We frequently observe in practice, that disorders of the stomach or bowels impede or otherwise affect the functions of the liver ; and that torpor, obstructions, congestions, or other disorders of this organ, are followed by affections of the stomach, by congestions of the digestive mucous surface, and indeed of all the vessels which combine to form the portal system ; and we have, as more remote consequences, when the original mischief remains, increased exhalations, hæmorrhages, hæmorrhoidal affections, jaundice, and even serous effusion into the peritoneal cavity.

55. Morbid states of the intestinal canal also remarkably affect the functions of the liver, through the medium of the splanchnic nerves, and by influencing the states of the portal system. Irritation of the mucous surface of the intestines, especially of the duodenum and jejunum, is readily propagated to the portal system, and this effect is the most rapidly developed in warm climates, where active determination of blood to the liver, and congestive and other forms of inflammation of it, are thus observed frequently to supervene. The intimate connection subsisting between these viscera pathologically is evinced also in fevers ; and in these, both in the mode just adverted to, and in another of a different kind. In the course of fevers, hæmorrhages from the digestive mucous surface are not infrequent occurrences, and are most unfavourable as respects the vascular system generally, the portal circulation especially, and the vital powers. In yellow or hæmagastric fever, a fatal termination is generally by a black vomit, which consists chiefly of the blood that has exuded from

the mucous surface of the stomach, and often to such an extent as to leave the liver of a pale yellow colour, or altogether bloodless, upon dissection. In these cases, the blood, instead of being carried into the portal vein, is exuded from the digestive mucous surface, leaving the liver in a state of anæmia, especially as regards this vein. (See §§ 128, 129.)

56. *B. Contiguity or proximity of position* has a great effect in complicating diseases of the digestive organs. This is evidenced by inflammations and inflammatory fevers, more especially when the serous surface of either of these organs is affected. Owing to contiguity, the inflammation is rapidly propagated from one surface to another, not so much by continuity of surface as by contiguity of position. When making post-mortem examinations, I have often found that the opposite surfaces of different organs had become inflamed; that lymph had been thrown out from both at the place of contact, and yet the intervening portion of surface, where contact did not exist, presented no change — that is to say, the inflammation was not propagated by continuity, but by the contact of opposite surfaces: the lymph thrown out from the primarily-inflamed surface had acted as an irritant to the vessels of the opposite part, with which it came in contact, and given rise to inflammation; false membranes, or exudations of lymph, adhesions, &c., being the consequences.

57. Owing to continuity of surface, and similarity of structure, disease extends, — more especially erythematic, or asthenic, or cachectic inflammations, — along the mucous and serous surfaces, varying in severity in different viscera or situations. Thus inflammations extend not only downwards, but also upwards, — from the stomach to the intestines, — from the cæcum to the colon and rectum, — from the stomach to the œsophagus, pharynx, and fauces, — and from these latter to the trachea, bronchi, &c. Irritations or inflammations of the mucous surface of the duodenum may extend to the mucous surface covering the ducts, especially in weak or cachectic constitutions, in which this extension is most likely to occur; the extension of inflammatory action being most likely to take place in debilitated and cachectic persons, producing inflammation of the ducts, and even of the viscera, from which these ducts proceed; and the limitation of this action being equally favoured by vital or constitutional power.

58. *C.* The state of the muscular tunics of the digestive canal frequently gives rise to important sympathetic phenomena. When the colon is much distended with flatus, or irritated by sordes or morbid secretions, or accumulated fæcal matters, various changes occur, not only in the portion of the canal above the seat of these affections, but also in other parts in the vicinity. I have pointed out already, that, in such cases, owing to the nervous communication subsisting between the intestinal canal, the splanchnic ganglia, and the spinal nerves, numerous sympathetic disorders frequently also arise, especially pain in the joints, and various spasmodic affections. I refer merely to the very common phenomena of spasms of the limbs and lower extremities, occurring in bilious colic or in common cholera, and in poisoning by corrosive or irritating substances.

59. *D.* When the circulation is interr
through the liver, the digestive canal become
terially affected; and, when the latter is dera
then the former is disordered, and the porta
culation is also more or less deranged. Not
are the functions of the liver and digestive
thus mutually disturbed in a very remai
manner, but these disturbances also affe
urinary excretion and the kidneys. Whe
chyle is not sufficiently assimilated, or whe
ingesta are of a character likely to produce i
nate excitement, or other derangement
vasculari system, there are not only asso
affections of the liver, through the portal s
but also, in consequence of the morbid cl
taking place in the blood, further changes
or less extensive, occur in the urinary
tion and organs, particularly in the ki
When individuals are otherwise in health, a
kidneys are enabled by nervous power to e
their functions, morbid matters, carried in
blood, are readily eliminated from it by
organs, producing various changes in the
excretion; but when the vital powers are
either from lesion of the spinal chord or
or of the ganglia supplying those organs,
general nervous depression or exhaustion, the
will be observed more or less serious diso
the urine, or even of the kidneys themselv

60. Even in comparative health we find
intimate connection existing between the s
other excreting organs and the kidneys.
instance, when the functions of the kidn
but temporarily obstructed, the blood to a
degree becomes impure, and very import
deleterious elements, which should hav
eliminated from the blood by these chann
then either vicariously removed by other
tories, the circulation being the while often
less disordered, or the blood becomes c
nated and the vessels congested. Again
the function of the cutaneous surface is ma
deranged, — when it is suppressed, — if tl
vidual is otherwise healthy, — if there is
order connected with the urinary organs, -
organs perform an increased function, and
which should have been carried out of the
by the skin are removed by the kidne
often no severe disorder arises; but not
quently serious derangements take place, o
suppression of the cutaneous function.
disease of the skin, or suppressed perspira
disorder of the urinary functions, often p
a number of morbid actions, — at first
ously, — occasioning increased action of
emunctory as the action of the other is imp
obstructed, and subsequently very serious c
both of the blood and of vital organs an
if the impaired or suppressed function
restored.

61. The most serious and rapid deran
are produced in the circulating fluids, an
cutively in other parts of the economy, by i
or obstructed function of the kidneys.
lesions of these organs, especially in that
called "Bright's disease," very important
take place in the circulation; and, owing
further changes are produced in dist
different parts of the economy: the heart
liver, the mucous and serous membranes,
the state of the blood, and more particu

irculation of effete or injurious elements in
come irritated; and organic changes, espe-
asthenic or spreading inflammation, the
ution of lymph, and more frequently of a
s or albuminous fluid, take place on the
es of these organs and of these membranes.

In connection with disorder of the di-
e organs, we very frequently find the
rance of the skin more or less changed,
independently of the actual existence of
ice. It would appear that, when the liver
pid or inactive, or when affections of the
re connected with disorder of the stomach,
the spleen, or of the bowels, that the blood
es more or less impure, or even deficient in
lobules; and, consequently, the external
e and the countenance are more or less sal-
urid, or without the vital glow of health.
iver performs not only secreting but ex-
functions; it eliminates certain elements
he circulation, which, if allowed to remain,
produce more or less disorder: it thus de-
s the blood to some extent; and hence we
at, in torpid affections of the liver, these
ts accumulate in the blood, and, indepen-
of true jaundice, produce slight pseudo-jaun-
r a lurid state of the skin and countenance,
is attributable to the impaired excretion of
als, which usually contribute to the forma-
f bile. But in cases of jaundice, where
struction is more serious, owing to the ex-
of bile from the liver being impeded or
ted; or to the presence of calculi in the
or in the gall-bladder; or to numerous
c changes that take place in the organ,
re certain constituents of the bile absorbed
e circulation, and certain of these more
antly in some cases than in others. In some
es the colouring matter only is present,
in others, the resinous portion of the bile,
bilin of modern chemists, is carried into the
tion. It is very rarely that bile can be
d in the blood, but it has been detected in
ine; and we may therefore infer that it
ave passed through the circulation before
ved there, and that the kidneys, by the
discharge of their functions, have carried
before it could accumulate in the blood
to enable the chemist to detect it by the
f the blood, or by the usual tests. I have
y adverted to the effect of congestion, or
pted circulation in the liver, on the ab-
l organs generally, especially upon the
ve canal. I believe that this morbid associ-
s not sufficiently attended to, particularly
ect of the diseases most prevalent in mala-
nd warm climates, and in fevers and disor-
the bowels in temperate countries; but my
prevent me from pursuing this topic any
at this place.

6 i. THE SYMPATHY BETWEEN THE DIGESTIVE
S AND THE FUNCTIONS OF THE HEART AND
, owing to the media of association above
ed, is so marked, that disorder of any one
e organs naturally produces a reciprocative
r in the other organs. Thus, increased ex-
nt of the nervous system occasions excite-
f the vascular system; and exhaustion or
y of the organic nervous system produces a
state of all the organs which this system
s. It may be considered an axiom, that increased excitement, or its opposite, namely, exhaustion or debility, however produced, is attended by a co-ordinate grade of such state, in the several vital organs. So obviously is this the case, that it is unnecessary to enlarge upon it.

64. *A. By contiguity of position*, the digestive, circulating, and respiratory organs are often very materially affected. Distension of the stomach or alimentary canal mechanically impedes the function of the other organs, and heightens inflammatory or structural lesions. Hence arises a deranged state of the circulation and of respiration in individuals in whom the nervous energy is weak, and where the contractile power of the parietes of the heart is to a certain extent weakened also. The contractile actions of the heart are much influenced by the distension of contiguous viscera. Flatus distending the stomach, and rising to the œsophagus, often produces intermittent or irregular pulse and various consecutive phenomena. This is frequently seen in cases of flatulency of the digestive organs. Very serious affections supervene in the case of hysterical and nervous patients, where the flatus rises up in the form of globus hystericus, producing inordinate distension of the œsophagus, with spasm above or below, or both above and below, the seat of this distension. The phenomena remarked in hysteria, in colic, and in flatulent distensions of the colon, may further illustrate the influence of mechanical distensions of parts of the digestive canal upon the functions of the heart and lungs; and hence it is, when the nervous and muscular powers of the heart are impaired, or when the vital expansive power of the lungs is weakened, that flatulent distentions of the stomach or of the colon increase the mischief. The number of morbid sympathies that I shall have to mention in the confined space to which I am limited, prevents me from illustrating fully this subject.

65. *B.* In considering the relation of the circulating and respiratory functions, it is unnecessary to do more than to notice the very great influence which the latter exert upon the former; the remarkable changes produced by the atmosphere during respiration, and the advantages that acrue from respiring pure air, not only in promoting a normal state of the blood, but in strengthening the locomotive functions. Air and exercise are the best restoratives that we possess — the principal tonics that we can employ in removing disorder. Those medicinal tonics which are frequently substituted for these, owing either to the circumstances of the case, or to the views of the physician, are generally more or less stimulants also, and may be injurious, and indeed are often hurtful, when injudiciously employed. But when the patient can have change of air,—when he is able to undergo a change, and can be duly exposed to the air and to the sun's influence, and more especially when he can take sufficient exercise in the air,—due assimilation of the food, healthy changes in the blood by the respiratory organs and cutaneous surface, and the development of nervous and vital energies, are the usual results.

66. *C.* I need only briefly refer to the intimate sympathy between the *digestive and the respiratory functions, surfaces, and organs.* It rarely occurs that the respiratory mucous surface is much affected without the digestive mucous surface being also more or less disordered, or that the latter is

seriously deranged without some disorder or susceptibility of disorder being manifested by the former, the association being clearly referable to the nervous system in the more immediate effects, and to the vascular system in the progress of the disorder. But affections of the mucous or villous surfaces of these distinct organs, although often thus appearing in succession — the one arising or depending upon the other — often also occur contemporaneously and co-ordinately. This form of association frequently is the result of endemic causes, and of epidemic influences; the morbid impression of these causes often extending rapidly, and manifesting its effect upon the digestive organs soon after it has acted upon the respiratory functions. Catarrhs, influenzas, hooping-cough, and other epidemic disorders which proceed from or are influenced by the states or vicissitudes of the atmosphere, and prevail at certain seasons, especially manifest this association; and those more formidable epidemics which arise from an atmospheric contamination, caused by the emanations proceeding from the sick, or from numbers of living creatures confined in a limited space, or from dead vegetable and animal matter, evince the same association, although in a much more remarkable manner, and are greatly heightened by contamination of the fluids and soft solids of the body.

67. When the atmosphere contains only a small or moderate amount of malaria, or of animal emanations, or a quantity insufficient to contaminate it to a pestilential extent, or even to cause agues or remittents, then disorders of the digestive organs, associated with affections of the respiratory and circulating functions, frequently result. In large towns and cities, especially where a humid and close air is more or less contaminated with animal exhalations, the prevailing disorders of the digestive organs are very often associated with affections of the respiratory organs, more particularly with chronic or asthenic bronchitis, or with congested states of the lungs. This association is most frequent amongst the children of the poor; either affection predominating over or masking the other, owing to the intensity or combination of the causes.

68. Whether those causes affect children, adults, or the aged — more especially if the more ordinary physical conditions and vicissitudes of the atmosphere have added to them, animal emanations, putrid effluvia, and insufficient ventilation — the effects produced seldom consist of a simple or specific state of disease, but of an association of maladies; one or two assuming a more distinct or prominent form, according to the intensity of the efficient agent, to the nature of concurring influences, and to the state or predisposition of the patient's constitution. This complication becomes still greater, and much more serious, if these causes not only injuriously impress the organic or ganglial nervous system, but also, either through the medium of this system, or still more directly, contaminate the circulating fluids, — the contamination arising both from the impairment of depurating processes performed by the various emunctories, and from the passage of injurious agents into the blood during respiration.

69. Physicians who observe closely the morbid conditions constantly coming before them must have remarked, especially in large towns, where numerous injurious agents are in a continued operation, and amongst persons attend the least to the healthy states of tl gestive and excreting functions, that whe digestive functions are much impaired, or the digestive mucous surface presents phenomena which may rationally be refer chronic irritation, numerous associated dis soon present themselves. The hepatic fun are deranged; often also the bowels are aff and ultimately even the excretions from th and kidneys betray more or less disorder. results of these morbid conditions, or mo quently the contemporaneous mischiefs, co changes in the nervous and vascular syste functional changes in the organic nervous s being followed by impairment of the excre depurating actions, and this impairment altered state of the blood itself; this last upon the former, and aggravating them. A as vital power or resistance to the injurious is not entirely overthrown, various vicissitu cur in the course of functional disorder, in th which the several organs implicated prese in the consequences which accrue in res each, under the influence of either aided aided vitality. But not unfrequently serious phenomena, threatening the dura life, appear, owing to contingent causes an bid predispositions. It is thus we so fre observe in practice, among persons who ha previously out of health, who have been perate and dissipated, who have suffere functional disorders of the stomach, or li bowels, or kidneys, or from an association or more of these, that far more serious m are superinduced; that, owing to the state of the blood from impaired action emunctories, and to the disposition of irrit inflammation of membranous parts to sp these circumstances, erysipelas thus often in the seat of an abrasion or injury, es in certain atmospheric conditions; that tl rynx or fauces, or both, sometimes with th nected glands, become affected with a sp or asthenic inflammation, that the lesion, o continuity of texture and weakened vita ance, proceeds either along the œsophagu stomach, or, what is still worse, it exten the pharynx to the epiglottis, or even d trachea, causing distressing paroxysms of or threatening, and even causing suffocati closure of the glottis, or fatal conjestion lungs. The lesion, thus first manifesting the fauces or pharynx, may actually eve mence in the stomach, and extend upwar the œsophagus to the pharynx, without t phageal affection being either recognised minently developed, until the more sensi susceptible pharynx is reached. Indeed, unfrequently observed, that acrid eructati a dyspeptic stomach, or owing to a state o enteric irritation, excite an asthenic form flammation of the pharynx and posterio which sometimes spreads in one or othe directions just pointed out, either involving or chiefly, the upper portion of the œsoph implicating more especially the epiglo larynx, or even also the trachea. Th some of the more serious or extreme m sociations observed between the digest

ratory organs; but others of a slighter grade
much more common; these are stomach
h, the *catarrhus stomachicus, catarrhus sa-*
lis, &c. of older writers; the association of
o-intestinal irritation with catarrah, or with
chitis, or other affections of collatitious or
of distant viscera, &c.

. iii. THE SYMPATHIES OF THE DIGESTIVE
ANS WITH THE BRAIN AND WITH THE ORGANS
ENSE, AND OF THE LATTER WITH THE FOR-
are sufficiently manifest. But it is very
ently by no means easy, when the asso-
l morbid conditions come before us in prac-
to determine the organ primarily affected,
most probably the source or centre of the
iated affections.—*A.* The *media* of morbid
ation in many of these complications are
usly, and primarily, the ganglial and the
o-spinal nervous systems, as already ex-
ed. But cases are not few, which acknow-
, not only these media, but also the vascular
n — a morbid condition of the circulating
. When the blood is loaded with effete
rs, or is not sufficiently acted upon in the
or changed by the several depurating organs,
the lungs, or by the kidneys and skin, it
s the brain, producing, more or less, dis-
according to the nature of the existing im-
. This state of the blood, in its slighter
s, may give rise only to lassitude, or to a
f apathy, or more or less lethargy. It is not
bable that the lethargy observed after a full
is partly caused by the passage of chyle into
ood, which, to a certain extent, changes the
of this fluid, and affects the brain. When
ood is more seriously altered, when it is af-
by obstruction of the excretion of bile, and
it is still more remarkably changed, both in
ity and quality, by disease of the kidneys,
fect upon the brain is often serious, and in
tter case, even fatal. In more common
and circumstances, and in those of much
frequent occurrence, impaired digestion, is
ed by imperfect assimilation of the chyle;
tter, more or less, affects the blood, and the
f the blood thus produced often affects the
ility of the brain and nervous system, either
rarily, or at intervals, even before the ac-
f the emunctories are manifestly impeded or
vise disordered.

B. The organs of sense often sympathise with
ers of the digestive organs. Those of sight,
g, smell and taste, are severally weakened
dered more susceptible of impressions, in
instances, or less so in others, when the
ons of digestion are imperfectly performed,
to impairment of the ganglial nervous
, actuating the digestive organs, having ex-
d to the nerves and organs of sense, with
the ganglial nerves are intimately connected,
ially as respects the cerebral and cervical
ia and plexuses. Nor should it be over-
l, that, when the influence or power of the
al nerves, which supply the vessels and
ranes secreting the fluids which enable the
s of sense to perform their functions, is in-
ently exerted or is depressed, these fluids are
insufficiently secreted, the membranes im-
tly nourished; and consequently, the sen-
surfaces, and the terminations of the nerves
se in these surfaces, are not in a fit state to receive impressions, and are incapable of transmitting them so vividly and perfectly as if the organic or ganglial nervous system duly discharged its duty.

72. iv. THE LOCOMOTIVE APPARATUS SYMPATHISES MORE OR LESS WITH THE STATE OF THE DIGESTIVE AND ASSIMILATING ORGANS. — The former, however, may not be much affected when the latter are slightly disordered; but if the disorder of the digestive functions continue long, or if it be great, — if the organic nervous or vital energy of these organs be much reduced or exhausted by previous excitement, and, still more remarkably, if this depression of vital energy have, owing to its continuance or severity, given rise to a morbid condition of the circulating fluids, or to an excrementitial plethora, the locomotive power always suffers more or less. The joints are particularly disposed to manifest disorder when the digestive and assimilating functions are imperfectly performed, and the secreting apparatus of the joints then suffers more especially. When urea, or its elements, accumulate in the blood, or, indeed, when either these or other excrementitial elements accumulate in the circulation, or when mal-assimilated or other injurious matters are conveyed into the circulating fluids, and more particularly when the functions of the liver, of the bowels, and of the kidneys, betray disorder, the joints then often become seriously affected. If the history of various diseases affecting the joints be carefully traced, and their several morbid relations observed, it will very often be found that impaired digestion and assimilating function, as well as impeded excretion, has long preceded, and often still more remarkably attends, the affection of the joint. *Gout* furnishes the most remarkable instance of this morbid association; but rheumatism also displays it. Other disorders hereafter to be mentioned, as hysteria, also betray the connection between them and affections of both the joints and the digestive organs. The sympathy in these mordid associations is obviously dependent upon the ganglial nervous system and its connection with the sensory spinal nerves, and is increased and rendered more permanent, especially in gout, by changes in the circulating fluids, and by imperfect elimination of effete materials, or of the ultimate products of assimilation and animalization, by the several emunctories.

73. v. THE SYMPATHIES OF THE REPRODUCTIVE ORGANS WITH THE FUNCTIONS OF DIGESTION are often obvious. They will be more particularly noticed in the sequel; but I may now observe that debility of the latter often deranges the former, or predisposes to most of the disorders to which the reproductive organs, especially of the female, are liable. There is, however, a mutual action and reaction between disordered conditions of these organs and the organs of digestion; and even in these cases, which occur so frequently in practice, where the association of these disorders is very remarkable, it is often very difficult to determine which of these organs is primarily in fault. Many cases of chlorosis, of amenorrhœa or dysmenorrhœa, or even of menstrual obstruction, of hysteria, and of leucorrhœa, are more or less dependent upon disordered digestion and assimilation, whilst others originate, as will be mentioned hereafter, very differently, and consecutively derange the digestive functions.

74. V. THE SYMPATHETIC AND SYMPTOMATIC PHENOMENA CONNECTED WITH THE CIRCULATING AND RESPIRATORY FUNCTIONS.—I shall here offer some observations on the importance of considering morbid action with reference to the state of the circulating fluids. — i. Having discussed, as fully as my limits permit, the nervous connections giving rise to numerous and obvious sympathies, I shall now take a general view of *alterations of the blood itself*, as being productive of diseased action, either in succession or contemporaneously, in two or more distinct or distant organs, or more or less throughout the frame. In disorders of the circulating fluids, particularly of the blood, the most extensive and serious associations of disease often arise to which the animal economy is liable.

75. The circulating and respiratory functions are intimately associated with each other, not only by nervous and vascular connections, but also by position and by the nature of the functions themselves; a certain amount of change of the constituent elements of the blood always taking place during respiration, and also a reaction of the blood on the respiratory organs, and on the heart and blood-vessels. These vital functions, although presenting more or less prominent relations to disorders of other or distant organs, are often, owing to these circumstances, jointly and correlatively the affected.

76. *A*. Before I take a cursory view of the results of chemical researches into the morbid changes of the blood, I shall briefly notice the *healthy composition of this fluid*. From a series of analyses, SIMON considered that 1000 parts of healthy blood consist of $795\frac{3}{10}$ of water, and about $204\frac{3}{10}$ of solid residue. In the latter there are $2\frac{1}{10}$ of fibrin; $2\frac{3}{10}$ of fat; $76\frac{6}{10}$ of albumen; $109\frac{3}{10}$ of hæmato-globulin; and about 12 parts of salts and extractive matter. These being the mean proportions in health, it has been attempted to establish the deviations which take place in these constituents in disease. A number of chemists and physiologists have performed experiments on the blood both in health and in disease, but there is a considerable difference between the results at which they have arrived; still there is sufficient agreement to warrant the importance of attention being devoted to subject.

77. In *disease*, the water varies from 888 parts in 1000 to 750 parts; the solid residue from 250 to 112. Of the different matters forming the solid residue, fibrine varies from $9\frac{1}{10}$ to a trace merely; the fat, from $4\frac{3}{10}$ to only $\frac{7}{10}$; the albumen from 131 to $55\frac{1}{10}$; the hæmato-globulin, from $115\frac{4}{10}$ to $31\frac{2}{10}$; the extractive matter and salts from $16\frac{5}{10}$ to $7\frac{6}{10}$; these results thus showing a very considerable variation in the quantities of the several constituents of the blood in disease.

78. *Healthy blood*, again, according to LECANU, consists of 790 parts in each 1000 of water, and 210 parts of solid residue. Of the latter, 3 parts consist of fibrin, 127 of blood-corpuscles, 72 of albumen, and 8 of extractive matter and salts, or what he calls inorganic matter. According to ANDRAL and GAVARRET, taking this to be the standard of health, these constituents vary in *disease* as follows: — The water from 915 parts in each 1000, to 725; the solid residue from 275 to 85. Of the latter, the fibrin varies from $10\frac{5}{10}$ to $\frac{9}{10}$ only; the blood-corpuscles from 185 to 21; the albumen from 114 to 57.

79. It must be evident that the blood w ch is taken from young, healthy, or robust per s, especially those of the sanguine tempera ent and the phlogistic diathesis, will exhib a large proportion of blood-globules or co s-cles, and also of fibrin; whilst the bloc of leuco-phlegmatic or of chlorotic and anæ ed persons will furnish the smallest propo on of these constituents and the largest n-tity of water. When the blood is rem d, or being removed, from a vein, and especial as it circulates in the vessels, there certainly sts in it more or less carbonic acid, although th x-act quantity — probably of various amount , th the varying state of the system — can hard be shown by experiment. It is, doubtless, giv off so immediately, on being removed from a ng that its exact quantity scarcely admits of de n-stration. The blood also presents a certain ur either independently of, or connected wit he halitus, or vapour, or carbonic acid, which ex-hales, when drawn from a vein or artery nd this odour is very remarkable in malignar nd infectious diseases, and especially in pestil ial fevers.

80. It is very manifest that the blood, en circulating in the system, possesses a vit en-dowment, derived from the organic nerv in-fluence, bestowed by means of the organic ves on the blood-vessels, and on the tissues ar pa-renchyma of organs through which the od circulates. This vitality of the circulating ds, thus derived, may be traced in the chyle, is manifested by this fluid as soon as it beg to circulate in the lacteals, inasmuch as it pr nts analogous changes to those evinced by the od itself, as respects coagulation, when remove om these vessels.

81. The globules of the chyle present th rst appearances of organisation; or, in other rds, assimilation and organisation, commencing the chyle and manifesting themselves in the ou-formation of the globules formed in this uid, proceed as the chyle passes through the g ds, becoming more distinct and perfect as the yle advances and reaches the ducts convey it into the blood. The globules of the chyle, ing thus more perfect and more numerous the rer they approach the venous circulation, and fter having passed through lacteal glands and ing derived some vitality from the vessels and nds through which they have circulated, poss in consequence a vital relation with these rts, tending, not merely to promote their circu ion onwards to the blood-vessels, but preparing em also for further changes, — for a more adv ced grade of organisation, when they have re ned this goal, and for the assumption of the ch cter of perfect blood-globules.* It is not at a im-

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* Since this article was written, the resear s of Mr. WHARTON JONES, on the blood, have bee ub-lished in the Philosophical Transactions. From se it would appear that the chyle-corpuscles pass t ugh the following phases of development before or the time of their reaching the venous circulation: *first phase*, that of granular cell, the first stage of thi ase being coarsely granular, the second stage finely nu-lar: *second phase*, that of nucleated cell, the first e of this phase being uncoloured, the second being co red. He considers that the *nucleated cell*, in its ond or coloured stage, passes into the *red corpuscle*, the fully-formed blood of man and the mammalia, a that the nucleated cell is thus changed into the fully med

pr able that the assimilation or the organisation
of he globules of the chyle, as well as of those
ly h-globules, circulating in the lymphatics,
ei r originates in, or is advanced by, the glands
in he course of both lacteals and lymphatics;
an it may also be inferred that the further
or nisation of the lymph-globules — both those
ca ed into the blood from the lacteals, and those
fr the lymphatics — or their conversion into
th fully-formed red blood-corpuscles, is owing
to e vital operation of those glands which are
no rovided with excreting ducts; as the spleen,
th upra-renal glands, and the thymus, and pro-
ba y also of the liver. The facts long and fre-
qu tly remarked by me of anæmia, or deficiency
of d-globules, being always the consequence of
to r, enlargement, or other disease of the spleen
or er, favour this view of the influence of these
vis ra in the assimilation or development of the
ch e and lymph-globules into red blood-globules.
It ay therefore be inferred, from the organ-
isa n of the lacteal and lymphatic vessels and
gl ls, and of those non-excreting glands just
me ioned — from the circumstance of these or-
ga being abundantly provided with ganglial
ne es, blood-vessels, and absorbents, that the
flu s carried to, and circulating through them,
un rgo an assimilation, and that this assimila-
tio amounts to a progressively increasing organ-
isa n of the globular constituents of these
flu , — this being the function of the organs
no referred to.

2. Organisation thus commencing in the
ch e or lymph, as respects the perpetuation
of he individual animal, it must necessarily
fol v that these fluids participate in the vitality
ex ng in the vessels and organs through which
th circulate. This vital endowment, whether
ex ng in the fluids as a simple emanation from
the ontaining structures, or actuating them more
eff ently through the medium of their globules,
is idently concerned in the phenomena dis-
pla d by these fluids, as well as by the blood
wh removed from the vessels, as I contended
ma years ago; the changes observed to take
pla in these fluids, and more especially their
co lation, being the consequences chiefly of
the ss of the vitality, or of the organic nervous
inf ence or emanation endowing these fluids. If,
th fore, it be admitted — and it cannot be ra-
tio lly disputed, or with a due recognition of
he hy and of morbid phenomena — that the
cir lating fluids are thus vitally endowed, it
mu necessarily follow that this endowment is de-
pe ent upon, and co-ordinate with, the vitality
or he organic nervous energy of the frame;
an further, that whatever contaminates these
flu must necessarily co-ordinately affect the
vit ty of the frame through which the contami-
na fluids circulate.

. *B.* Contamination of the circulating fluids
ma commence — 1st, in the lacteals, through
the edium of the digestive canal; — 2nd, in the
lu s, through the medium of the respiratory
su ces; — 3rd, in any part of the external sur-
fa of the body; — and, 4th, in any part or tissue of the frame, by a self-contamination; and, thus originating, the contamination may manifest itself either generally, coëtaneously, and co-ordinately throughout the frame; or prominently, and especially upon particular organs or parts, other organs or parts betraying comparatively but little disturbance. Of these sources of contamination I shall take a very brief and passing view, as far as they may elucidate the associations of disease.

84. 1st. If the lacteals communicate with veins concurring to form the portal circulation, as some assert, and believe that they have demonstrated, and whether this communication take place before or after they have passed through their glands, or does not take place at all, the injurious influence of a contaminated or unwholesome chyle upon the circulation, and the organs through which it passes, will readily be admitted. If the contaminated chyle passes more directly into the blood circulating to the portal vessels, and without pursuing the longer route to the general venous circulation, it must necessarily follow that the functions and even the organisation of the liver and its vessels, will be placed in great jeopardy; and it may be further inferred that, whatever may be the route which the chyle takes, the globules will not undergo their wonted healthy advances towards complete organisation either before they reach the blood, or after they have entered into it. It is even very probable that the blood, thus abounding in an unwholesome or contaminated chyle, and with imperfectly assimilated or organised chyle or lymph-globules, will disorder the functions, and ultimately the organisation of those structures and organs more immediately concerned in perfecting these globules, or transmuting them into perfect red blood-globules.

85. 2d. The second channel of contamination, or that through the respiratory organs, hardly requires any notice, it being so obviously one through which the most injurious agents are conveyed into the blood itself, thereby infecting or contaminating this fluid, and, through its medium, either remote parts, with which the particular agent may have especial relations, or the whole frame. It is through the respiratory surfaces that the emanations from numerous sources infect the system — effluvia from the soil and its productions, and exhalations from dead animal matters and from diseased bodies; and although this source of contamination and infection is the most obvious to every one who is capable of speculating respecting the causation of disease, especially when considered in connection with the functions of the respiratory organs, yet it has been most frequently overlooked or insufficiently estimated. The blood is affected not only by the physical constitution of the air as respects temperature, humidity, electrical conditions, but also by those foreign gases, vapours, and emanations from living and dead organised bodies existing on the earth's surface. These severally, sometimes variously associated, affect both the vital conditions of the lungs — the organic nervous energy of the organ — and thus directly, as well as indirectly, modify the changes which take place in the blood circulating through the lungs, or otherwise contaminate this fluid in modes more or less specially related to the nature of the causes or agents which operate through this channel. (See art. INFECTION.)

86. 3d. The *third* or cutaneous channel of con-

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re lood-corpuscle, by the cellæform nucleus of the
nu ated cell being set free by the bursting of the cell
its , the nucleus having become filled and red by the
se ion of globuline and colouring matter into its
int or.

tamination is certainly less frequently influential than those already passed in review. Still all the physical conditions of the atmosphere, and all the foreign gases, vapours, and emanations floating in the air, which so readily and injuriously invade the system through the respiratory organs, also affect the functions of the skin, and thereby the conditions of the blood, and the states of the several internal viscera, and more particularly of the other excreting organs. The most serious contaminations of the circulating fluids, and of adjoining parts produced through the medium of the cutaneous surface, arise from the septic influence of a foul or infected air upon this surface when it is punctured, abraded, or deprived of that protection at any one point which the cuticle or epithelium is destined to afford, or when mucous surfaces, and especially serous surfaces, are exposed to this cause. In these circumstances, the skin itself, in some instances; the lymphatics or veins, or both, in other cases; or the cellular tissue, in some; and even all these, in a few, are seriously affected, and ultimately the blood itself is more or less contaminated; remote parts, and even the whole frame, becoming thereby implicated in the foul, septic, and disorganizing process thus commenced and most rapidly propagated. And here I may advert to the influence of the air in many situations, but more especially in towns and ill-ventilated places and houses, in extending disease originating in, or chiefly consisting of, lesion of the cutaneous surface; and the insufficient attention usually paid in practice to a due protection of exposed points of the cutaneous surface from the influence of the air, and to the exclusion of this fluid from deep-seated injuries or diseases. Nature provides a spontaneous remedy against the endosmosis or imbibition of infectious or contaminating agents existing in the air, by throwing out lymph, which, by coagulating, protects the exposed or injured point or surface; but the powers of life, as manifested by the capillary system, are not always adequate to this effect, and the consequences are the imbibition of septic matters, which contaminate the surrounding tissues and the fluids taken up by the absorbing vessels, and occasion a spreading, or asthenic, or diffusive inflammation of these vessels, of the lymphatic glands, and of the adjoining cellular tissue, the most manifest changes in the blood itself, and not infrequently extensive disorganization of remote organs and parts.

87. The changes thus arising in, and propagated from, the third channel of contamination, sometimes equally originate in and are propagated from deep-seated or internal parts, through the medium of circulating fluids and vessels, to distant situations, where they may be manifested only or chiefly. In the articles Abscess, Absorption, Blood, Disease, and Infection, I have fully shown the manner in which morbid secretions or other depositions may contaminate not only the adjoining tissues, but also the circulating fluids, and ultimately occasion disorganization, and the formation of puriform or other morbid collections or lesions in distant organs or parts. I have so fully enlarged, in the places just indicated, on the views and doctrines which these consecutive lesions involve, that I need not allude to them at this place, more especially as they have been adopted by subsequent and recent writers; not always, however, with a due acknowledgment of th ginal sources.

88. It having thus been shown that the forn and perfection of the chyle and lymph-gl are probably owing to the vital influence vessels and glands through which they circ and that the metamorphosis of these globu perfect red blood-globules is due to the fun of the glands not possessing excreting duct of the liver, it necessarily follows that the a tion or passage of injurious, imperfectly assimi or other morbid matters into this fluid, must sion disease in the organs more especially d to these functions; whilst impaired funct these organs, or structural lesions of them also impede or interrupt the progressive c of these globules, and the formation of blood-globules; the conditions of the blood becoming thus more or less imperfect or dis and incapable of undergoing in the lungs changes which are requisise to the due nu of the frame, and healthy condition of the s viscera.

89. What the exact conformation of the globules existing in the chyle, lpmph, and may be, is not, perhaps, yet fully determin at least, admitted, by the numerous observe have attempted to investigate the subject. it may, at least, be inferred that these gl undergo a progressive organisation, and tl organs already mentioned are instrumen producing it; but it should likewise be con that the changes produced in the blood lungs and in the general circulation, as the influence of the air upon the blood, a more or less intimately connected with the tion of these globules, as well as with wl alterations they may undergo subseque their full development. Neither microsco speculative physiologists have shown the of the relation existing between the atmo elements and the blood-globules and other tuents of the blood, so as to explain the phe of nutrition and the sustentation of nervous energy. Certain of the more manifest phe have been remarked, but not accurately tr irrefragably demonstrated. It may be a that the oxygen of the air combines with the globules, and gives rise to changes neces nutrition, to nervous endowment, and eve circulation of the blood itself. But it is difficult to prove as to disprove this prop with the subordinate relations between the bules and the several general systems and organs which this proposition involves.

90. At the present day, the chemical which occur in the blood have become s of discussion, and too generally with a neglect of those alterations which arise fr states of vital power. The former can sel recognised in practice, and are often una able even in the most dangerous diseases; the latter are generally the most manif characteristic, and present themselves in th ner to the unaided senses. To these latter fore, our attention should be directed, in as they indicate not merely the states of th itself, as respects its more important const but also the conditions of organic nervous power — conditions of the utmost import be correctly estimated by the physician. It

noreover, be overlooked that even the most
and evident chemical changes are merely
esults of vital power and vascular action con-
ig the changes which are imputed to chemi-
ffinities ; but which are truly the results of a
chemistry, or of affinities controlled by vital
s. Whatever may be the nature of the inti-
chemical changes which take place in the
d, either in the lungs, or in any other organ,
is every reason to assert, that these changes
not result, if the organic nervous influence
removed from the organ in which they take
in health ; and further, a close observation
e causation of the changes observed in the
during disease, leaves me to infer, that most
ose changes are more or less influenced or
iced by conditions of nervous energy or vital
r, chemical action or affinity having nothing
with the matter, further than in favouring
ombinations of alkaline bases with oxygen,
f these or other compounds with acids ; and
combinations even are favoured or controlled
e vital powers.

In speculating upon the changes taking
in the blood, the chief places are assigned,
ents, to the oxygen of the air, and to the
nic acid or its constituents, as existing in the
. What change, if any, may be affected by
itrogen of the atmosphere, is not ascertained.
supposed that azote produces little or no alte-
of the blood ; yet it is not unlikely that,
igh the amount may not be appreciated or
ciable — at least there is no admission of
ciation by chemists — there is, nevertheless,
nge produced by it, both on the fluids which
arried into, and on the fluids which circulate
system.

C. In the various speculations on the changes
ring in the blood in health and disease, until
ppearance of the article Blood in this work
832), and to which article some more recent
rs have been much more indebted than they
illing to admit, the alterations of the blood
pathology of the blood—have been very im-
ctly and worse than superficially treated of.
whilst physiologists and pathologists have
ed some attention to the processes of sangui-
n, they have altogether neglected to show how
estruction or waste of the hæmato-globuline or
orpuscles takes place, so as to prevent, during
ilation and nutrition, an exuberance—a mor-
lethora—of this constituent of the circulating
from occurring.—*a.* A topic which has not
considered with reference to the healthy
can hardly be supposed to have been inves-
d in connection with disease. But it cannot
ireasonable to infer, that in health the waste
proceed from the following sources : — 1st,
a partial vital decomposition and conver-
of the hæmato-globuline or red-corpuscles
pply by nutrition the waste of the several tis-
; 2nd. from the conversion of a portion of
lobules in the portal vessels into bile ; 3rd,
the action of the mucous follicles, espe-
y of those seated in the lower portion of the
l and in the whole of the large bowels, upon
lood conveyed to them ; 4th, from the opera-
of the other emunctories, although in a much
legree, especially the kidneys and skin ; the
elium cells, thrown off by these, being trans-
ed blood-globules, either before or after they
had acquired their colouring matter or property ; and 5th, from the elaboration of the sexual fluids and discharges in both sexes.

93. *b. During disease*, the waste of the hæmato-globuline or red-corpuscles may be either hastened, increased, or impeded, more rarely the latter. It may be hastened or *increased* — 1st, by insufficient assimilation owing to impaired organic nervous or vital power ; 2nd, by morbidly increased action of the liver ; 3rd, by increased action or elimination of the emunctories, especially of the intestinal follicles and surface of the skin and of the kidneys, owing to the impaired vital endowment of the globules and crasis of the blood having provided these emunctories with an increased pabulum, or material whereby their actions are augmented ; and 4th, by the morbid or increased action of the sexual organs in either sex. Owing to the excessive action of these sources of waste, the blood may become poor or deficient in hæmato-globuline and red corpuscles ; and accordingly we find, not only where assimilation is deficient, owing either to inanition or impaired vital power, but also where either of these sources becomes inordinate for any continuance, that a poor state of the blood or anæmia takes place. In low or adynamic fevers, in diarrhœa or dysentery, in some affections of the kidneys, in leucorrhœa, in self-pollution, and in excessive sexual intercourses, in acute rheumatism, especially when attended by excessive perspiration, this state of the blood generally supervenes. As respects rheumatism, this result escaped the observation of previous writers, until I mentioned it when treating of this disease. (See art. Rheumatism, §§ 84, *et seq.*)

94. *D.* During the process of circulation, in consequence of the changes that take place in the chyle and blood globules, of the absorption of chyle from the digestive canal, and of effete matters from the several tissues, considerable changes must necessarily take place in the blood, and, as the result of these, numerous phenomena must be produced in, and evinced by, the excreting organs — the skin, the lungs, the liver, the intestinal canal, and the kidneys. There appears to be a very intimate sympathy between the functions of these organs. Many years ago I had an opportunity of putting that subject to the test. In 1814 and 1815, I was engaged in a number of experiments on the effects of temperature upon respiration and the blood in different states of the system, and the results of those experiments were afterwards published. Subsequently when visiting an unhealthy and warm climate, I had an opportunity of observing the changes there produced in the air by the respiration of individuals of different races, and found that, during cold states of the atmosphere, and soon after digestion, the greatest changes took place in the blood,—the greatest consumption of oxygen, and the greatest amount of carbonic acid then appearing in the expired air ; while in a very warm state of the atmosphere, and several hours after a meal, when the vital powers are depressed, the smallest amount of oxygen was consumed, and of carbonic acid existed in the expired air ; and these latter effects were most manifest when the system was subjected to the influence of malaria. It was also further considered, that the cutaneous function was, to a certain extent, supplemental to the function of respiration ; that, in

fact, as observed in some of the lower animals, the cutaneous function is, to a considerable degree, one of respiration. This, even in the human species, appears to be the case, more especially as regards negroes. I made several experiments, in a very warm climate, on the respiratory functions of this race, and found that the quantity of carbonic acid given off from the lungs, in this variety of the species, was almost one-third less than that given off by the lungs of an European of the same size, and at the same temperature; whilst, in the former, the changes taking place on the cutaneous surface were greater in degree, and more extensive in kind, than in the latter, — the supplemental respiratory function of the skin of the negro being not only more remarkable as regarded the formation of carbonic acid and the exhalation of watery vapour, but also peculiar as respected the amount of animal matter and effluvium impregnating the exhaled vapour and watery fluid.

95. I attempted at that time to account for the prevalence of fevers, and disorders of the biliary functions, &c., so prevalent among Europeans migrating to a warm climate, by the state of the blood consequent upon the diminished changes produced by the air on the blood, and by the superabundance of the elements from which bile is formed existing in the circulation; the liver thus for a time performing a vicarious action to the lungs, — the deficient function of the lungs, in an European in warm climates, being made up by the greater activity of the liver. However, this exists in individuals only for some time after they arrive in a warm climate, and very frequently it is not so remarkable after a year's residence there. Active exercise also in a warm climate, by increasing the functions of respiration and cutaneous exhalation, remarkably relieves the increased function of the liver, and prevents many of the consequences of this disorder.

96. There is also a very intimate connection existing between the state of the blood and the depurating offices of the mucous surface of the intestines, especially of the large intestines. This surface, and more particularly the follicular glands, may be considered as eliminating from the blood, redundant or decomposed blood-globules (§ 92.), and much effete materials, and as thereby contributing, with the other emunctories, to the purity and healthy condition of this fluid. The connection subsisting between the functions of excreting viscera, not only as altering the condition of the blood, but also as affecting each other individually,—the influence which the state of one depurating function exerts upon the others, through the mediums of the blood, as well as through that of the organic nervous system, and the mutual and conjoint operation of all these functions, not merely in changing the physical appearances and constitution of the blood, and the states of vital influence, but also in occasioning structural alterations, are amongst the most important topics comprised by a rational system of pathology. Without due consideration being devoted to them, the morbid changes constituting the progressive periods of disease, the media of connection subsisting between affections of distant parts, and the passage of one alteration into another, cannot be traced; and the association of disease of one organ, with equal or even greater disease of an-
other organ, cannot be explained, and n
anticipated nor guarded against in practice.

97. *E.* It is of great importance to the phy
to observe closely the *physical appearances o*
sible characters of the blood, when removed
the subject of disease, both immediately upo
some time after its removal. It is hardly po
for him to devote his attention to the analy
chemical constitution of this fluid, inasmuch
requires considerable time and diversified e
ments to arrive at satisfactory conclusions;
besides, many of the changes observed are
vital, or at least the results of departing vi
and are either very imperfectly, or not at a
dicated by chemical analysis or tests, alt
frequently manifested by distinct physical ch
ters. The physical appearances of the
when removed from the body during the
the patient, are of the utmost importance,
dicating not only the conditions of this fluid
but also the states of vital power; and as fu
ing the chief indications of cure. My limit
not admit of my noticing, otherwise than in
general terms, the principal alterations o
blood, which tend both to associate alterati
distant parts, and even to contaminate m
less the soft solids of the body. The peru
what has been done by chemists, even down
present day, to demonstrate the chemical ch
of the blood, even in the advanced stages o
ease, will furnish but little information whic
be used practically, compared with attentiv
servation of the physical changes of this
These latter changes I have fully descri
another place (see article Blood), and
fore I shall not even briefly advert to them
but merely notice two or three topics con
with the subject more immediately under co
ration, some of which have not received suf
attention from other writers.

98. *a.* Various changes as respects the *col*
the blood, both at the time of removing it fro
vein and afterwards, have been observed.
blood may present every shade of colour, f
pinkish hue, or a pale or florid red, to a dee
or a brownish or dark red, or dark violet, or e
a brownish or black, or dark greenish hue.
first of these colours is observed chiefly in c
anæmia; the latter of them in congestive dis
and the last chiefly in pestilential or mal
maladies, or in cases of poisoning,—indicati
only a contaminated state of the blood, bu
impaired organic nervous influence of the v
and vital organs.

99. *b.* But it is not merely the colour
blood, but also the rapidity and mode of its
lation, and the *state of the coagulum*, that re
the attention of the physician. The relative p
tions of coagulum and serum; the firmness,
flaccidity or softness of the former; the prese
cupping of the coagulum, or of the buffy coa
the thickness and density of the buff, are c
stances which will be duly estimated by h
indications of organic nervous energy or excit
—of states of encreased vascular action and c
resistance. He will, from these conditions
blood, infer existing states of the whole va
system, and of the organic nervous system
tuating the vascular—viewing these conditi
the results of the states of these; and wh
estimates them all at their true value, he w

ute undue importance to any one condition from the rest. He will not, as in a case to I was recently called, after taking away een thirty and forty ounces of blood, again away nearly as much within a few hours, y because the latter cupfuls of the former ing were cupped and buffed, and thus nearly by the patient; but experience will soon him, if education have not taught him, that, lammatory affections of serous or fibrous tis- and in diseases attended by vascular excite-, without loss of vital power or resistance, or tious contamination of the blood, the fibrin nuing abundant, the coagulum may present appearances to the last, and even although y be relatively small to the amount of serum.

0. But, in different states of the organic ner- influence or vital power, and owing to these either primarily or consecutively, the blood nts very opposite physical characters. It lates more rapidly and more imperfectly, en hardly coagulates at all, or at least does eparate into any coagulum distinct from the . These characters are usually observed in ssed states of vital power and resistance, contaminated or poisoned conditions of the , and are owing either to absorption of con- ating and morbid matters, or to interrupted ration by the several emunctories. In some nant diseases characterised by extreme de- on of vital energy, with a rapid state of the lation, the change in the appearances of the has been most remarkable and sudden or y in its accession. In the worst form of puer- fever—a disease which I have seen go on to l issue within twenty-four hours from its ac- n, and for which blood-letting was often most perly and fatally employed, because it had recommended by some dangerous because ant writers — the blood has, in some in- es to which I was called, subsequently to its action, presented the appearance of a straw- red and very thin jelly, without any coagu- the colouring matter being precipitated to ottom of the vessel of a black hue, and in manner of a powder which had been me- cally mixed in the fluid which had suspended d without the least cohesion between its les. In these cases, as well as in some maladies characterised by extreme depres- of vital power, and a poisoned state of the , the coagulation is not only imperfect, but peculiar kind; the colouring matter being hed from the other constituents of the blood st as soon as the blood passes from the vein, brinous elements forming a thin jelly with erum of the blood. The small amount of ty possessed by the blood in these cases, is immediately upon its abstraction from the ; and the fibrin, although it may exist in ble quantity, is incapable of contracting or ing so as to form a coagulum, yet often g so loosely in the serum as to form a thin nous mass.

1. *F*. The *quantity* of blood in the system has a very important influence in associating dis- of distant organs or parts; and this influence nes still greater and more general if the blood abound in excrementitial elements, or be in way poisoned or contaminated. The quantity ood may be diminished as respects either the general amount, or the colouring constituents, or hæmato-globuline; and it may be deficient in a single organ. It is not unusual to observe in cases of general anæmia an irregular distribution of the blood, some organ or part experiencing an excess, whilst the diminution is still more remarkable in other parts. This is usually observed when, with anæmia, there exists local irritation, or excitement of the organic nervous influence of a particular organ. In this way distant parts often present consentaneous morbid phenomena, and the organ which has received to-day a more than proportionate supply of that blood which is deficient either in general amount, or in colouring matter, or in fibrin, or in all these together, may present on the morrow more than usual deficiency; and thus a new combination of disorders may arise. This is not unfrequently met with in nervous, susceptible, and hysterical persons, in whom the distribution of blood is always more or less under the control of the nervous system, more especially the ganglial.

102. If the influence of these states of the circulation be remarkable in associating disorders of distant parts, that produced by the opposite state, or too great fulness, is not the less so, more especially if the fulness be attended by an excess of effete or excrementitial elements. Vascular plethora, as long as the blood is duly changed by the emunctories, favours active determination to particular organs, especially to those liable to irritation or nervous excitement, — not infrequently also to acute inflammations and active hæmorrhages, according to the diathesis and the nature of exciting or concurring causes. But if excrementitial fulness supervene, owing to the imperfect discharge of some depurating function, as that of the kidneys, some distant organ is placed in great jeopardy, or effusion takes place in shut cavities, or in the cellular tissues. But these results may equally occur although the amount of blood in the system previously had been in due relation to the frame, and to the capacity and state of the vascular system. It frequently is observed in practice, that a previously healthy person, in respect of his vascular system especially, is exposed to causes which arrest the cutaneous excretions, and he experiences a slight attack of fever, or local determination to some predisposed organ, or diarrhœa, or some other affection, especially if the kidneys have not performed a vicarious office in supplying the suppressed function of the skin. A healthy person, also, is exposed to causes, as infections, which depress organic nervous energy, and thereby impair or suppress the more important depurating and secreting functions. The consequences as respects the blood are obvious. This fluid soon abounds in effete and injurious elements, increasing both the amount of vascular contents, and oppressing and irritating the whole vascular system, although certain organs may manifest these effects in a more prominent manner than others, until a salutary crisis is observed, and the morbid state of the blood is removed; or until the soft solids are changed, their vital cohesion is loosened, and disorganisation ensues.

103. *G*. I need not pursue this subject further, seeing that I have fully discussed it in several parts of this work; but I wish to direct attention to one topic more particularly connected with it, and

which, in its relations to various maladies, has been most unaccountably overlooked — namely, to the probable want of correspondence, on some occasions, between the capacity of the vascular system and the amount of its contents, between the area of the containing vessels and the amount of fluids contained. — *a.* This presumed want of adaptation, or of accordance, may be great, quite irrespective of the quality or condition of the circulating fluid; the tone of the containing vessels being so remarkably deficient, owing to depression of the organic nervous power, as not to occasion the due accommodation between the vessels and the blood circulating in them — as not to admit of that amount of vital contraction and adaptation of the vessels necessary to the due performance of the circulation, and to the retention in them of the more fluid parts of the blood, which, either alone or with more or less of the hæmato-globulin, readily escape from the relaxed capillaries in the more yielding surfaces and erectile tissues. Now, a due correspondence between the containing vessels and the contained fluids, and the mutual influences both vital and mechanical resulting from this correspondence, and from the healthy conditions of both the vessels and the fluids, are obviously wanting, in a more or less remarkable manner, in many maladies, especially in several malignant and pestilential fevers, more especially where the vital powers are remarkably depressed; and it is chiefly owing to this depression that the vascular system is incapable of accommodating itself to the amount of its contents. In these circumstances the pulse is at first broad, open, soft, and compressible, although it is subsequently small, feeble, creeping, or undulating; and the abstracting of even a small quantity of blood, or the loss of it by the passive hæmorrhages or exudations, which often occur very rapidly, sinks the patient, by increasing the want of correspondence, now pointed out, between the capacity of the vessels and the amount of blood they contain.

104. *b.* This want of correspondence, or of vital accordance, between the bloodvessels and their contents, may arise also from a different pathological condition, namely, from the blood being so deficient in quantity, as not to impart the requisite state of *tension* to the coats of the vessels: and hence, when the vital tone of the vessels is impaired at the same time that the blood is deficient in quantity, the current of the circulation is irregular and languid; and vascular action, which was already asthenic when the vital tone of the vessels was impaired, becomes much more asthenic when the blood is also deficient in quantity, fatal congestion and sinking of the vital powers ultimately supervening.

105. In pestilential maladies, and even in other malignant diseases, the tendency to death is to be imputed as much to this increasing want of accordance, — to the progressive defect of vital and mechanical adaptation, between the vessels and the blood, as to the changes which have actually taken place in the constitution of the blood; and several of the associated phenomena, characterising the advanced and last stages of these maladies, are to be ascribed to this circumstance, — to this pathological condition existing so generally throughout the vascular system. Thus, in the hæmagastric pestilence, or true yellow fever, the phenomena observed in its progress, and th celeration of death by passive hæmorrhage the black vomit, in its last stage, are readil plained according to this view; whilst the successful mode of treatment for this mala that which is directed to these changes i vascular system, and to the state of or nervous influence upon which these change ginally depend.

106. That this want of accordance betwee amount of blood in the vessels and the cap of the bloodvessels, this deficient vital adap of the vessels to the amount of their content most important pathological condition existi the progress of several malignant diseases associating the affections of distant organs; moreover, that death in these diseases is imputed rather to this circumstance, to this dition, than to the poisoned or altered consti of the blood, heightened as it often is, at a vanced stage, by passive hæmorrhages, are illustrated by the course of several maladies demonstrated by what is observed after from hæmorrhages and from hæmagastric lence. In the last stage of this latter m and as the altered blood — altered as rega vital condition, physical appearances, che condition, and in the loss of the greater p its fibrin — exudes from the mucous surface outlets, the circulation becomes remarkably the vessels appear and feel soft, relaxed, fl and imperfectly filled; the blood returns right side of the heart in deficient quanti celerity; absorption of fluid from the dig organs is arrested; and ultimately the action ceases, from an insufficient return or s of blood to the right auricle. Upon exami after death, the digestive canal contains black grumous matter, consisting chiefly tered blood, or of matters similar to those t off from the stomach and bowels for som before death; the abdominal vessels, and cially those contributing to the portal syste ramifications of the vena porta, and the h veins, are empty, and the liver is rema pale. The whole vascular system is defici blood. Analogous changes characterise t stage of other maladies, as pestilential c plague, &c., the chief difference being, t the former especially, the watery parts blood are those principally lost, the parts are left being not only insufficient for the tenance of a due correspondence between the vessels, but also unsuited to capillary c tion, and to the sustentation of the vital fun the soft solids being also more or less defici vital cohesion, and rapidly passing into lution, as I have shown on several occasion especially when treating of these maladies.

107. *H.* It being admitted, and the fact be disputed, that changes in the quantity and or state of the blood, and, still more remar changes in both quantity and quality, as disease of several organs, both those inti connected anatomically, and those more di related physiologically, it must necessari low that not merely functional disturba these several remote as well as proxim gans is thereby produced and associated, b structural changes and the most extensive ganisations of these organs often result. B

sufficient for us to take for granted these ges in the blood and vascular system, in thus licating or associating disorders and disers, and in developing various sympathetic nts: it is of importance to us to trace these ges to their sources, and to view their rela in order that we may the more fully comnd their extent, and hence be enabled the satisfactorily to prevent their accession, to their progress, or to counteract their effects. ve already pointed out, briefly and inadely, several of these sources and their pathol relations, and referred to the parts of this where these topics are more fully discussed, therefore I shall now merely enumerate the al conditions to which attention should be ted in our investigations of the sympathies or orbid associations and complications resultrom alterations of the blood and vascular n.

8. *Firstly*, the state of organic nervous influ in relation to the agents affecting it, and to esulting influences and changes upon the lar system and blood.

. *Secondly*, imperfect chymification and chylion, owing to the unwholesome nature of the ta, or to impaired digestive function, or to id states of the digestive mucous surface; hyle being either imperfectly elaborated, or unhealthy a constitution, as to affect the ls and viscera through which it circulates t passing onwards to the blood, and after it nixed with this fluid.

0. *Thirdly*. The absorption of morbid secre excretions, or other matters, either from the tive canal and mucous surfaces, or from cel parts, or parenchymatous organs or other ures, these matters often inflaming the blood s or the absorbents and glands, contamina he blood, producing chronic or hectic fever, ing or inflaming remote vessels and organs, ving rise to abscesses or purulent deposits, ed or encysted, primary or secondary, in nt parts, as more fully shown in the articles *cess*," "*Absorption*," "*Blood*," and "*Dis* in this work, and in my paper on the "*Pu y of the Veins*," in the MEDICAL GAZETTE.

1. *Fourthly*. Suppression, interruption, or ution of any of the eliminating or depuraunctions—of either of the excretory actions, hich effete materials are removed from the , and this fluid is preserved in a healthy tion; interruption of one or more of these ions, altering the state of the blood, changing ealthy relations subsisting between it and the and vascular system generally, disordering ther excreting organs, exciting general vas disturbance, and superinducing various ges, contaminations, effusions, and even disisations in several organs or parts, or general throughout the frame.

2. *Fifthly*. The exciting, or depressing emoof mind,—all influences, excitants, or agents, ing either the cerebral, or spinal, or the lial sensibility—all inordinate excitations of ind, passions, or sentiments; or of the senses muscular movements; or of any of the or requisite to the continuance of the life of the idual, or the perpetuation of the species, are to be followed by sympathetic disorder of nt but related parts, owing to the organic nervous connections already pointed out, to the changes frequently produced in the fluids—the chylous, lymphatic, and sanguineous—to the consecutive changes of nervous power, and electromotive conditions of the general systems of the body, and to the *unity*, as well as to the special systems and conditions, of the frame.

113. From one or other, or from two or more, of these, numerous associated morbid conditions result, some of which conditions have been variously estimated and classed, with the narrow but vain view of giving them the individuality and identity displayed by the genera and species of the animal and vegetable kingdoms, characteristics which they are altogether incapable of evincing, owing to the diversified features, associations, and complications resulting from these five great sources, and their innumerable states, modifications, and progressive changes. The most common, at the same time the most uniform of the special results, proceeding from these sources, the most frequent of these sympathetic associations and morbid complications, in which changes throughout the whole frame are most remarkably produced, and most intimately dependent upon each other, through the *media* especially of the organic nervous system, and of the vascular system and blood, are the following:—

114. 1st. Sympathetic or symptomatic states of vascular excitement or action, resulting from changes in the organic or cerebro-spinal sensibility of parts; or from local injury, or from inflammation, pressure, or other local changes,—*symptomatic fevers*. The media of general disorder in these are, firstly, the nervous systems, and consecutively the vascular system and blood, the several concomitant and intercurrent changes, varying in different cases with the nature of the causes, and the numerous circumstances connected with these causes, and with the individual affected.

115. 2ndly. Chronic or hectic febrile conditions, resulting generally from a persistent source of irritation implicating primarily the organic nervous function, and consecutively changing the nutrition and secretions of the part, and ultimately altering the states of vascular action and of the blood; followed frequently by absorption of morbid or puriform or tubercular matters into the circulation, by consecutive deposits, abscesses, &c. *Hectic and chronic fevers*, consequent upon local irritations, tubercular deposits, encysted abscesses, carious bones, and malignant formations, &c., are all of this description, and are ultimately accompanied by altered conditions of the blood, imperfect assimilation, anæmia, &c.

116. 3rdly. Periodic fevers, or febrile and painful states of the system, arising from malaria, and varying in character with the concentration of the effluvium, and with the proportion or amount of emanation from dead animal matter which is conjoined with it. The morbid impression in these diseases is made primarily upon the organic nervous system, the vascular system and blood being consecutively affected, and various visceral affections often ultimately resulting.

117. 4thly. Adynamic, typhoid, and putrid fevers, or those arising from the emanations proceeding from living or dead animal matter. The morbid impression is made by those emanations primarily and principally upon the organic nervous system, although the blood may also be primarily con-

taminated, as it obviously is consecutively, the soft solids generally becoming, through these media, ultimately more or less implicated.

118. 5thly. Exanthematous and pestilential fevers, or those fevers arising from specific morbid poisons. The morbid impression is generally made in these distempers in ways similar to those now stated, §. 117., and the results are equally general and serious, often most rapidly fatal, particular fevers presenting peculiar characters.

119. In all these maladies, although the organic nervous system, in the usual mode of exposure to these exciting causes, receives the first morbid impression, especially when the poison is inhaled with the air into the lungs, the blood soon becomes contaminated, owing either to the absorption of a portion of that poison, or to the influence of the primarily induced morbid condition of the organic nervous system, in impairing the several secreting and excreting functions, and in altering in this way not merely the healthy constitution of the blood, but also the vital adaptation of the vascular system generally and of the amount of blood to each other; and, moreover, in destroying, both by the primary impression on the organic nervous system, and by the consecutive effects, the vital cohesion of the several simple tissues, structures, and compound organs.

120. These several classes of disease, whether viewed individually or in the aggregate, remarkably illustrate the great extent to which not merely functional disorder, but structural disease, and even more or less general disorganisation, may be associated, when a poisonous influence impresses any one portion of the congeries of ganglia and plexuses constituting the organic nervous system, or contaminates the circulating fluids; the effects being the more rapid, the more general, and the more fatal, the more concentrated or intense the poison, and the more unequivocally and immediately the primary changes are produced, both in this system and in the blood and vascular system.

121. The influences affecting the circulating fluids may therefore be classed under four heads: *first*, that of the nervous systems, more especially the organic nervous influence; *secondly*, the state of the chyle resulting from the nature of the ingesta; *thirdly*, the absorption of morbid or poisonous matters into the circulation, from any surface, organ, or part; *fourthly*, interrupted excretion.

122. Important and extensive changes are produced on the blood by the several eliminating organs, by the liver, the digestive mucous canal, the respiratory surface, especially the lungs, the skin, and the kidneys. An interruption to either or several of the functions of these organs, more or less alters the circulating fluids; but when the constitutional powers are not materially affected or depressed, a slight interruption to the discharge of one excreting function is very frequently followed by vicariously increased action of another excreting function, and thus the system is preserved without experiencing much detriment, in many cases of such interruption.

123. *I.* The importance of considering the state of the blood, with reference to the causes affecting it, is remarkably great, particularly with reference to fevers. In the different forms of fever, where disorders of function, and ultimately structural changes in the organs themselves, become the most extensive, it is seldom that we find e organ implicated alone, but several in rapid - cession, or contemporaneously. Inflamma y lesion of a particular tissue or organ, with w h the system sympathises through the chan s pointed out, namely, nervous organic influe , the blood, continuity and contiguity of sur e or structure, implicates the whole frame. e functions of the most remote organs bec e affected thereby, and generally, in proportio o the extent to which the circulating fluids e disordered. If vascular action, and especial if the circulating fluids be materially affected - ordinate disorder of the urinary and dige e organs, and also of the functions of the b , generally ensues. Owing to the bonds w h unite the frame into a whole, and intimatel - sociate all the viscera, it has been supposed t all fevers are merely the general or sympat c disturbance of this whole, arising from a mor r less prominent affection of one organ. Se l writers have attempted thus to localise all f s of fever; and to consider them merely as m i- fications of inflammatory fever; but I need t allude to these attempts, as they have been - proved when treating of the pathology of feve

124. It would be interesting, if space allo d, to trace the manner in which the several sys ns of the frame become affected during the pro ss of fevers. In respect of periodic fevers, or t e which arise from malaria, it may be brief e- marked, that the causes producing them see to affect primarily and especially the organic ne us system; and that the fluids and abdominal s- cera become more or less disordered second y. Intermittent and remittent fevers may not a ar until weeks after the individual has been expos to malaria, and then the paroxysms occur at inte s. We know that morbid impressions, or irritatio or other morbid conditions of nervous parts, us ly assume a periodic character. If it were the b od which is primarily affected in these cases, it st follow that the state of the blood which ex ed during the paroxysm would continue during t n- termission, until removed; and that, instead o e- senting intervals when comparatively little r- der is felt, the disease would be continued; f in proportion as the blood becomes affected in r, so does the disease assume a more and more n- tinued type. There are various lesions p i- nently affecting particular organs, and which ve fevers a variety of character: thus we have s- tric fever, intestinal fever, bilious fever, and s n. If we proceed to the consideration of the st forms of fever,—for instance, typhus, or pes - tial fever,—not only is the nervous system aff d, the organic nervous system being probabl e first to be impressed with the cause of the dis ; but also the blood itself soon becomes more o ss contaminated and altered — becomes physi ly changed.

125. Now the question is, whether this ch c, produced so early in the blood in typhoid d pestilential fevers, arises primarily from th - sorption of the cause into the blood, or wh r it proceeds from the morbid impression mad i- marily on the organic nervous system, owi to which impression the excreting or depur g functions, which are under the influence o is system, are impaired or arrested, and the c - lating vessels and fluids become thereby aff d,

an ultimately changed? I have shown how copi ly the vascular system is supplied by the or nic nervous or ganglial system, and hence we ay expect, *à priori*, that causes affecting this sy m will, to a co-ordinate extent, affect the vascu system and the fluids circulating in the ve ls. We find that, in the progress of fevers, th lood becomes changed; and the change may ari partly from the impression made by the em ations causing the fever upon the organic ne ous system, and partly from the absorption of th manation — of the morbid poison itself—into the irculating mass. I believe that the infecting or rbid effluvium being received into the lungs wi the air, injuriously effects the organic nervo system supplying these organs; hence the bl in the lungs is not sufficiently changed by res ation. Possibly, also, partial absorption of thi ffluvium may take place into the blood itself; bu f it does not, there is a still stronger reason to fer that the morbid impression extends thr ghout the organic nervous system, impairing or herwise altering the influence of this system up the vascular system, and in the secreting, ass ilating, and excreting viscera. The organic ne us power being depressed, it naturally follow that the organs supplied by this system beco impaired in function; and hence we find tha n the first days, or within the first twenty-fou ours of fever, the functions of the excreting org s are very remarkably diminished, or even sup essed, and the consequence is, that the blood, wh may have been hitherto unaffected, is more or s changed; or, if it have been already affec by the cause of the disease, or by the impre on on the ganglial system, becomes still fur r changed. Thus the one change reacts on the her, and promotes it, until at last the changes in organic or vital nervous influence, in the vas lar system, and in the circulating fluids, beco so great, that the blood is not only altered sen ly as respects both its physical characters an ts chemical qualities, but the tissues and org s themselves become more and more disorgan d, or evince a remarkable loss of their natur vital cohesion, especially in putro-adynamic fev and in distempers of a malignant character. Th subject is so fully illustrated in the articles BL , DISEASE, INFECTION, FEVERS, and PESTILEN , that it is unnecessary to pursue it further at t place.

1 . ii. *The influence of obstructed circulation thr h, or of other lesions of, the heart itself, ind ndently of any material change in the constit n of the blood in complicating diseases,* and the timate connection existing between the circul on through the heart and that through the lun have been already adverted to; but so mu have we been in the habit, in consequence of modes of teaching and writing generally ado d, of viewing disease nosologically, and of reg ing one species as being altogether distinct fro nother; and so injuriously has this acted in the ractice of medicine, that we have been the y actually prevented from seeing the connec n subsisting between different diseases, and of erving how intimately they are associated, and w readily the disorder of one organ induces, or ses into, that of another, until experience and peated observation have destroyed the impre ons of erroneous education and of false precepts. We often observe persons with short or hurried respiration on the least exertion, which has often been considered as a form of asthma, and the disease has been looked for in the respiratory organs. The patient has been said to have spasm of the bronchi or the trachea, or some disorder of the respiratory passages, which has produced this disordered respiration. But now that we have traced out more intimately the relation of the disorder of one organ to another, we have found that in these cases the lungs may be free from disease, further than congestion arising from interruption to the circulation through the heart; and we have discovered that, in the majority of such cases, the lungs are only secondarily effected, and that the heart is primarily in fault. This condition of the respiration is most frequently owing to this cause, even where there is but slight disease in the heart. Thus in weakened, nervous, and susceptible persons, the affection of either organ soon extends to the other. If the lungs are disordered, the heart becomes affected; or if the heart is primarily affected, the lungs become disordered — the least excitement of one organ extends to the other. In many persons of lax fibre, or of a lymphatic or leuco-phlegmatic constitution, the parietes of the heart are deficient in tone, or are partially changed in their intimate structure, and dilatation of the cavities, or other alterations, often take place, so as to give rise to imperfect or irregular or interrupted circulation and consequent congestion, with or without effusion, either in the vicinity of the congested viscera or in more distant parts; *the subordinate circulating apparatuses, or the subordinate orders of the vascular system, namely, the vascular apparatuses of the liver, brain, and lungs, especially suffering derangement.* Numerous instances present themselves in practice of consecutive affections, of a complicated character, appearing as the disease advances, during hooping-cough, dry catarrh, asthma, &c.; the heart, the brain and spinal cord, and their membranes, the portal circulation, &c., becoming secondarily affected, in addition to organic changes, often also produced in the lungs themselves, and in their investing membranes.

127. The connection subsisting between dilatations, often slight, of one or more of the cavites of the heart, and betwen lesions of the valves and orifices, and congestions of the subordinate orders of the vascular system just specified, more especially those of the lungs, liver and brain, is sufficiently obvious, particularly when the heart betrays any of these lesions. But there is every reason to infer that congestions of the lungs may actually take place to even a fatal extent, without any very obvious organic lesion of the heart, or lesion of such an extent as can account for the occurrence. Thus severe shocks to the nervous system, mental or physical, severe injuries of vital parts, and agents acting with great intensity, and either inordinately depressing or exhausting vital power, occasion remarkable congestion of the lungs, sometimes also of the other subordinate orders of the vascular system, more especially in persons already the subjects of a fatty, dilated, or relaxed state of the parietes of the heart's cavities. Congestion of the lungs, however induced, even in slighter grades, is a serious morbid condition, inasmuch as it arises

from, or is connected with, various other lesions, either of vital action or of structural change, especially of the parts now stated; and as it generally leads on to further alterations, to inflammatory action, to hæmorrhages, and various organic lesions, especially when neglected or improperly treated.

128. iii. *The sympathies between states of the circulation and those of the digestive organs* are so obvious as hardly to deserve notice. The functions of digestion and assimilation languish when those of circulation and respiration are impaired; and when the respiratory, and especially the circulating actions, are morbidly excited, distaste of food, nausea, thirst, and costiveness are common consequences. In these circumstances the digestive villous surfaces become injected or congested, and the vascular disorder is often imputed to, instead of being viewed as causing, this change. Wherefore, it may be asked, are these surfaces often so prominently affected in cases of general vascular excitement? Because the vascular excitement does not always extend to the portal circulation, and the return of blood from the related viscera through the portal and hepatic veins is not so rapid and complete as the circulation through the arteries supplying the digestive canal; hence the congestion in many acute and chronic diseases of the digestive villous surface, and the rapid disorganisation often consequent upon it, especially when organic nervous power is depressed, as in malignant or pestilential fevers, in gastric remittents, and in typhoid, adynamic, and intestinal fevers.

129. The liver also often experiences consequent congestion or other disorder when the general circulation is either much accelerated, as above, or much impeded, as in cases of cardiac or pulmonary disease. The frequent occurrence of congestion of the liver in the course of these and other maladies, especially of those affecting the organic nervous influence, is a matter deserving notice. This congestion may be, in a great measure, owing to the circumstance of the circulation through the portal vessels being almost entirely removed from the influence of the heart. The circulation through these vessels appears to be owing to the organic nerves which supply them, and when the influence of these nerves is depressed, the circulation in the liver is co-ordinately impaired or impeded. I believe also that the capsule of Glisson is also very influential in promoting this circulation, and this capsule is abundantly supplied with soft ganglial nerves, whereby the vital action of the portal vessels is reinforced with nervous influence. In all cases where there is cardiac disease, and congestion of the lungs consequent upon it, there is generally congestion of the liver. Both organs are intimately associated by means not only of the vascular system and the circulating fluids, but also of organic nervous influence, both organs being supplied by the same class of nerves. Again, the circulation through the liver, to which I have already partially adverted, is very much influenced by the state of the fluids and matters absorbed into the circulation even from the stomach itself, but principally from the intestinal canal. Stimulating, irritating, or imperfectly assimilated matters, when carried into the portal circulation, must necessarily irritate or excite the liver, and thereby ultimately produce changes of its structure.

130. iv. *The sympathy existing between the car c and pulmonary circulation and the brain* need y be mentioned to be admitted. The effect of s- ordered circulation through the heart upon e brain is a matter of very great importance, d one which, until recently, has not been sufficie y adverted to. The subject, however, has b n fully discussed in the articles on Apoplexy d Diseases of the Heart, where it was shown, at a number of cases of congestive apoplexy, of -morrhagic apoplexy, and of palsy, are occasi d by interruption to the return of blood from head, owing to lesions of the parietes of the he 's cavities, or of the valves and orifices of the he t, with or without congestion of the lungs, acc d-ing to the side of the heart in which the prin y lesions are seated. This is a complication of y great importance, inasmuch as the symptoms e usually referred to disease of the brain, and e often considered premonitory of apoplexy or pa y, and are often treated as such without referenc o the state of the heart, the pulse being toler y regular; and yet, on examining the heart by s-cultation, serious disease of this organ is fo d. I have had many patients who have long c -plained of symptoms referable entirely to e brain, the heart betraying to them not the st disorder, and yet in this latter organ was se d the primary, and often the most extensive dis e.

131. Owing to insufficiency of the valve, to dilatation of the right aurico-ventricular or e, or to what is a still more rare occurrence, to s-ease of the valves at the commencement of e pulmonary artery, occasioning obstructed cir a-tion, there is regurgitation of blood from e ventricle into the auricle, and then a seri of changes supervene, as respects the circulatio ot only in the brain, but also in the liver and d-neys. At first, lesion of the functions of se organs, or of one of them in a more prom nt manner, is observed, with more or less remark le congestion; and subsequently structural ch e, with either serous or sanguineous effusion, a-sarca, hæmorrhages, &c. The blood being p ly thrown back at each contraction of the ven le into the auricle, the regurgitation into the na cava superior and inferior occasions congesti of the brain, liver, and kidneys, and its conseque s, as just assigned. When there is dilatatio of the right auriculo-ventricular orifice, or in fi-ciency of the valve, the effect upon the ve us circulation is made manifest in the pulsati of the jugular veins, and the consecutive lesions st mentioned soon supervene. I have observed se associated changes in the cases of three em nt medical men who were under my care, and i wo of whom I had an opportunity of making a t-mortem examination.

132. When these lesions occur in the left e of the heart, and which situation is much the t frequent, they interrupt the circulation thr h the lungs: congestion of the lungs takes p e, and, in consequence of it, I have seen the ch es supervene that I have now mentioned with r-ence to the right side of the heart. The co s-tion is usually to a great extent, and there is e er effusion into the pleural cavities, or hæmor ge of the lungs, or pulmonary apoplexy. The re other associated changes which require mer to be mentioned, but I shall allude only to or ic diseases of the heart and kidneys. When tr g

the article Kidney, on granular degenerations this organ, I fully showed that they were the ults of a cachectic inflammation of the secreting ucture of the kidney, especially of the Malpig- n tufts, consequent upon a morbid state of the od, and were sometimes also connected with anic changes in the heart and other viscera.*

133. In briefly adverting to *the association of rder of the circulating, nervous, and muscular s ems*, I need only remark that, when the chyle blood is disordered, these other systems are all more or less affected—the muscular system chiefly, through the medium of the nervous. Irritation of lymphatic or lacteal vessels, either at their origins, or by the fluids which they imbibe and transmit, affects the glands through which they pass, or in which they terminate. When the lacteals are irritated, especially at their origins in the small intestines, the irritation is often propagated to the mesenteric glands, or to the portal veins and liver. Indeed, the digestive mucous membrane is seldom affected, especially in children, without causing disease of the mesenteric glands, particularly if the malady goes on to ulceration. It has been believed that, not only under these latter circumstances, but also in chronic dysentery, more especially as it occurs in warm climates, the consecutive abscess of the liver, frequently met with, is not merely owing to the absorption of morbid matters, purulent or acrid, from the digestive mucous canal, which irritate or inflame the liver or its vessels, but is actually the result of a true phlebitis, commencing in the veins of the mucous surface, and propagated along the veins contributing to the portal system, and thence to the ramifications of the vena portæ. In disordered states of the blood, when this fluid becomes vitiated, not only the muscular system, but the joints are also often affected. I have already hinted at this connection, as arising from the circumstance of the ganglial nerves not merely supplying the blood-vessels of the extremities, but also being distributed to the joints, in the vicinity of which they form minute ganglia; and hence, when the organic nervous system is much depressed or weakened, there is always great weakness of the joints. In this way may various phenomena that occur in many diseases be explained. Thus, gout and rheumatism arise not merely from the morbid condition of the blood, but also from the state of the organic or ganglial nerves supplying those parts, and from the connection of these nerves with the cerebro-spinal sensory nerves.

134. V. Sympathies of Sensation and Sensibility, or Associated States of Morbid Sensation and Sensibility.—After my endeavours to point out the intimate association of the ganglial with the spinal nerves and nerves of sense, it will be unnecessary to revert to the channel of communication in the associated affection of this class. It is only requisite to notice certain of these associations. Owing to the intimate connection of the fifth pair of nerves with the nerves of sense—with the optic, lingual, auditory, and olfactory—a change affecting the roots or trunk, or even the ramifications of the fifth pair of nerves, to a certain extent impairs one or more of the senses on that side on which this nerve may be affected or implicated. Thus, in cases of tumor or abscess pressing upon the gangliated portion of the fifth pair of nerves, not only is the sensibility of the surface affected, but also the circulation and secretions of the organs of sense on that side are either disordered or impaired. Inflammation of the conjunctiva readily supervenes, and the senses of smell and taste are affected partly in consequence of diminished secretion from the surfaces of their respective organs. All the functions of sense are more or less affected, not only by disease implicating associated nerves, or parts from which the nerves take their origin, but often also by disease in distant situations. Even depressed

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The article Kidney was published in 1840, and since t publication of that article views entirely identical w those which I then stated and illustrated have been b ight forward by some very recent writers, as previ- o y unpromulgated by any other. I think it therefore d to myself to state, and to refer to the parts and the s *ons* of this work, and to the *dates* where my states- n ts as to the topics connected with albuminous urine a granular disease of the kidney, or *Cachectic Nephritis*, a have termed this disease, may be referred to; the g ular degeneration being the advanced stage of the c ectic inflammation. In 1832, I stated, when de- s bing the states of the urine in connection with d sies, that "renal disease may exist without the u e being albuminous; and the urine may be albumi- n without the kidneys being particularly implicated." A , that I have often found the urine albuminous in th cute diseases of children, where no alteration of the k eys existed; and that this condition of the urine is fr uently observed after the exanthemata. (*See Art.* D psy, §§ 34—36.)

hen treating of the Diseases of the Kidney, in 1840, I ered very fully on the consideration of the patho- lo of the changes, which, when advanced, have been ca d "granular degeneration" of this organ; and sh ed that these changes, and consequently this de- ge ration, depend upon, or are intimately connected w a morbid state of the blood; that, therefore, this pa cular disease of the kidney should be called, " *chectic Nephritis, Nephritis Cachectica; or Nephritis Sc ta, associated or complicated Nephritis; or Nephritis fr constitutional vice; or Nephritis from a morbid state of blood, or Inflammation of the Malpighian bodies or tu*" rather then the appellations conferred on it. (*S the Synonymes adduced under this head.*) And co rmably with this doctrine I have defined the dis- ea *pathologically*, as follows:—"*A morbid state of the bl , characterised chiefly by the presence of urea and de ncy of albumen and of hematosine, in connection wi sion of the circulation in the minute glandular or M ighian bodies and structure of the kidneys, with va us organic changes in other viscera, and generally wi serous effusion into the cellular tissue and shut ca es.*" (*See Art.* Kidneys, § 81.)

fterwards proceeded to investigate and to describe va s topics connected with the pathology, complica- tio and treatment of this malady, especially the par- tic r tissue of the kidneys primarily affected; the con- ne on subsisting between this disease and morbid states of blood; and between it and other visceral maladies, an e origin of the changes of the blood, on which this dis e of the kidneys is consequent (*see* § 82). I next des bed the physical appearances and states, and the che cal changes, of the blood in the several stages of the ute and chronic forms of this disease (§§ 93—97.); an fterwards noticed the sources and causes of this sta of the blood (§§ 140, 141.). I would most particu- lar efer to *par.* 142. of that article, where the reader wil ind this topic explained, and the reason of both kid ys being always affected in Cachectic Nephritis.

y Dr. Finger, of Prague, Dr. Walshe, and Dr. Ge ge Johnson, have, long after the publication of the art on the diseases of the kidneys, adopted my views as to s malady, without any reference to them whatever; Dr inger stating that "the blood is first diseased;" and r. Walshe (*Lancet*, July, 1849) that the lesions of kidneys are the consequences of previous altera- tion of the blood. Still more recently, Dr. George Jo on, in his Gulstonian lectures (*see Medical Times an azette* for March and April, 1852), has adduced the sam doctrine of the origin of this disease; and I am the ore entitled to conclude, that the adoption of my vie and of the results of my investigations, by these ver ble pathologists, is a strong confirmation of their ger l accuracy. The several associations and compli- cat s of this malady, in connection with the progres- sive anges of the blood and of the kidneys, were more full escribed in that part of this work than they had pre usly been.

energy of the organic nervous system generally, and especially of those parts of it which preside over digestion and assimilation, impairs the functions of sense. This association of remote organs — this unity of the frame — is displayed not only by one class of functions, but by all the manifestations of life in the different organs constituting the individual living being. I need not advert to the association of morbid sensibility of different parts of the cerebro-spinal nervous system. We are all aware that, when irritation exists at the origins of nerves, it is not there that we may expect to find sensibility principally affected. When the irritation even is greatest at the roots of the nerves, little or no pain or alteration of sensibility may exist there: it will be felt chiefly at the sentient extremities of those nerves. This is manifested by *tic doloureux*, in which the morbid condition exists near the base of the brain, or is connected with the duramater, or is caused by exostosis of some portion of the bones of the cranium. There may be pressure, or irritation caused by ossific deposits, but the morbid change is evinced principally at the remote or distal extremities of the nerves.

135. The same circumstance obtains with regard to the spine. In cases where the individual may not suffer the least uneasiness in the seat of pressure, or in any part of the spine, yet there may be extreme pain in the surface of some part supplied by nerves from that portion of the spinal cord which is implicated in the existing irritation or other change. Although the patient may not feel pain in the part especially affected, yet he may be suffering under inflammatory irritation, or congestion, or other organic changes implicating the spinal cord and membranes or the roots of the nerves. The suffering experienced in the extremities in gouty persons is not always owing to the changes in the extremities only, but partly also to congestion of the venous sinuses of the spine; and the partial palsy of the extremities, especially the lower, generally passing on to complete palsy, arises often from congestion of these sinuses, followed by effusion, or other organic changes. These are facts which I have had occasion to verify in several instances by inspection after death. When the change implicating the cord, its membranes, or origins of the nerves, is such as irritate, excite or similarly affect these parts, pain is usually manifested in the extremities of the corresponding nerves, and sometimes also by other nerves more or less intimately connected with them; but when the primary change goes on to the production of pressure, or to the destruction of parts, then loss of function, impaired sensibility, or difficult or impaired motion, or a combination of these, supervenes, and increases with the augmenting organic change.

136. Not only may irritation or pressure at or near the origins or roots of the nerves of sense and of motion affect the senses, the sensibility, and the motions, even to the remotest parts, but irritation, originating in or affecting the ganglial nerves, will produce serious disorder not only in the seat of irritation, but also in most distant places, which places often evince the chief disturbance, either in respect of their sensibility or their movements, or both. These occurrences are not infrequently verified by post-mortem examinations, the existing lesion being sometimes found in parts which evinced but little or no disorder during life, the severity of the sympathetic affection having tracted the entire attention of both patient d physician. The irritation produced by a calcu s in the kidney, by sabulous matter in the tubul f the organ, often produces disturbance of the gans supplied with nerves from the ganglion d organic nervous plexuses of the organ, extend g even to the associated ganglia, and affects t only the urinary functions generally, but o the digestive, occasioning nausea, vomit , constipation, colicky pains, &c.; and the ex t of disorder is sometimes even not so limited, t still further extended. By means of the bran s or fibrils of ganglial nerves proceeding from e renal ganglion to the roots of the spinal ner s, and even to the cord itself, as well as by m s of spinal nerves proceeding to the sympat ic nerves and ganglia, a sympathetic affection — e consisting chiefly of pain, or morbid sensibili of a painful kind — is sometimes also experience in various parts of the external surface, or in e course of a nerve, as it ascends to the should or arm of that side, or more frequently down e lower extremity; occasionally with a pec ar numbness or imperfection of the voluntary m ements. I have had opportunities of obse ng such cases, in some of which the pain wa as severe as in neuralgia, where also the cause as suspected during life, and no appropriate t atment had previously been adopted. In tw instances of recent occurrence, an examinatio as made after death, and large calculi were fou in the kidney. Irritations of the ovaria or ut us, as will be noticed hereafter, develope even till wider range of sympathies.

137. VI. SYMPATHETIC DISORDERS OF AN AL MOTION.—These are of great importance, an resent the same relations as have now been p ted out; but I can only imperfectly advert to th at this place. Many disorders, even several hat are seated in the abdominal cavity, may affe the locomotive functions; of this we observe ily proofs. Fæcal accumulations, or morbid atters, or worms, in the intestinal canal, ofte ritate the ganglial nerves, and the irritation is ropagated to the roots of the spinal nerves, or en to the spinal cord itself, and is thence ref ted by these nerves to the voluntary muscles, t the extremities, or to the external surface. I his way, chorea, infantile convulsions, and v ous symptomatic disorders, often of an anom ous character, implicating the muscles of volu ary motion, alterations of sensibility on the s ace and in the extremities, various affections the organs of sense, and many of the phenome observed in cases of intestinal and gastric di se, are frequently developed. (See Arts. CH EA, CONVULSIONS, EPILEPSY, &c.)

138. There are numerous sympathies or a ciated morbid states indicated in the *synopsis* or *ssification* (§ 14.) of the topics comprised in th ery extensive subject here attempted to be disc ed, but I must content myself with the mere i cation of them thus afforded. The pathologi will readily recognise the importance of most o em, and the medical practitioner will readily f ish illustrations of them from his own expe nce. One of the chief objects I have in view is, t oint out the principal channels of sympathy, the media by which disorders become associa or complicated; the channels or media havin een

cognised, the resulting phenomena, as actually curring in practice, may more readily be referd to their sources, although they are too various d numerous to be adduced and illustrated in e space to which I am limited. Passing over, erefore, some of the subordinate orders of symthies which may be ranked under the preceding sses, I shall conclude with a brief consideration a class of sympathies to which sufficient imrtance has not always been attached, and ich, indeed, has not always been rightly interted or understood.

139. VII. The Sympathies evolved by the productive Organs appear about the period of roaching or fully-developed puberty. The i uence of the sexual organs upon the economy i vinced at this period by the more rapid growth the whole body, and by the more complete elopment of all the structures and organs, and ll the manifestations of mind: and this evolut of the physical and mental constitution of the i vidual is the more perfect and complete when, umstances being favourable in all other res ts, these organs have not been prematurely e ited, exhausted, or abused; for accurate obs ation will confirm the position, that abuse, or p ature excitement of these organs, or excess o uch excitement, diminishes or weakens the g vth of the body, or impairs the energy of both t rganic and the cerebro-spinal nervous systems; a with other injurious effects, often carried to an a ming extent, impairs or even altogether dest ys the chief manifestations of mind, and develo s several constitutional maladies and numerous s ial diseases, with their still more numerous sy pathetic associations. The evil is not limited to e delinquent alone, but extends to the offsp g of him or her who has indulged in the vi to which reference is now especially directed — indeed, such creatures be capable of reprod g their species. If this power be still retained, it generally manifested weakly, imperfectly and in ficiently, as regards the constitution, physical ar moral, of the offspring.

0. Whilst the perfection of mental and bodily fu ion, as well as of corporeal development, th results from the full evolution of the sexual or s, or from the reciprocal influence exerted be en them and the nervous systems, numerous di ders, evincing more or less extensive sympath and associations, are produced by the causes no lluded to — by abuses of these organs. The ex stion thereby caused affects not one organ me y, but the whole frame. This generally exter d sympathy — this universally diffused state of order — is to be explained partly by the exha ion consequent upon inordinate excitement, an artly by the excessive secretion and excretio f a recrementitious fluid — of a secretion int led not merely for the perpetuation of the spe s, but also for the support and development of structures, and of the nervous power of the ind lual. This functional abuse extends its co uences thus generally, through the medium of h the organic and the cerebro-spinal nervous sys s, impairing digestion, vital action and tone, sen ion, perception, memory, volition, muscular mo , &c., and hence all these functions not me languish, but also betray, in varying forms and sociations, numerous sympathetic disorders, inc sed susceptibility of impressions, morbidly increased irritability, &c., whilst nervous power, and endurance, and vital resistance are diminished. Impaired assimilation and nutrition, and a general cachexia, are also among the usual results, even when no particular or specific form of disease is developed. Ultimately the organs, thus prematurely or inordinately excited, either have their functions entirely exhausted or assume an increased susceptibility of irritation, and become the seats either of very frequent or constant disorder, or of organic lesions, whence numerous sympathies irradiate. The morbid state of one of these organs partially extends to all: that of the ovaria affects the uterus and the mammæ, or that of the latter extends to the former. Irritation of either of these organs extends through the medium of the ganglial nervous system to the urinary organs, to the digestive canal, and to the secreting and excreting organs generally. Thus we perceive disorders supervene of the secretion or excretion of urine, flatulence, borborygmi, the globus hystericus, with other affections of the bowels and stomach, and even interruptions of the cutaneous, biliary, and intestinal secretions and excretions.

141. These disorders are almost universally experienced in these circumstances, and as the irritation of the sexual organs increases either in duration or intensity, or as the causes which occasion the irritation are persisted in, the sympathetic disturbances advance still further and more generally by means of the nervous communications already described; and ultimately, in consequence of superinduced alterations of the vascular system and circulating fluids, they are manifested in numerous modes in distant parts of the economy. The individual who has thus devoted himself or herself — it may be said to the infernal gods — soon afterwards, and owing to the sympathy manifested by the ganglial system, complains of palpitations or irregularities of the heart's action, of shortness of breathing, and other signs of pulmonary or cardiac disease, of indigestion or morbid states of the appetite, and of various anomalous pains or alterations of sensibility in different parts of the body. Owing to the connexions subsisting between the organic nervous system, the spinal nerves and cord, and the brain and nerves of sense, and owing to the association of the ganglial and spinal nerves in the organization of the reproductive organs, disorder in various forms is extended to, or is manifested by, the organs of sense, and the muscular and tendinous structures. Volition is often languidly or imperfectly transmitted by the voluntary nerves; the muscles become more and more unable to execute the weak or inadequate volitions; the fibrous and tendinous structures evince impaired vital tone, whilst sensibility and irritability present various aberrations. In conjunction often with these, or more or less independently of some of them, various congestions in different places, either in succession or coetaneously, or irregular distributions or determinations of blood, take place, and either heighten preceding ailments or develope novel forms or combinations of disorder. Congestions of the venous sinuses of the spinal column frequently occur, and disorder the urinary functions or affect the sensibility or movements of the extremities, producing partial, or even complete palsy, either of sensation or of motion, most frequently of the latter. The irritation existing in the primary seat

of disorder is often propagated to the roots of the spinal nerves or to the cord itself, and is thence reflected upon the surface of the body, or in the extremities, in the form of neuralgia, or in other states of altered sensibility, or in various forms of hysterical spasm, convulsion, or disorders of motion. The senses, especially sight, hearing, and touch, are variously obscured or modified, and the mind becomes more or less disordered. The individual whose organic and mental energies have become weakened by the causes alluded to, is envious of those who possess powers which he either never had or has lost; is censorious; indulges in scandal or in the depreciation of others; is mean, spiteful, or sanctimonious; or he becomes the subject of some variety of partial or even of general insanity, or of idiotcy and general palsy.

142. The most dangerous and advanced maladies resulting from the morbid condition referred to — the most serious and complicated mischief thus produced — varies with the constitution, predisposition, and concurring causes and circumstances affecting the individual. In many, asthmatic or pulmonary affections, tubercular consumption, and tubercular formations in different organs; in others, various forms of insanity; in some, organic disease of the heart; and in some, structural change in the brain or its membranes, occasioning epilepsy, palsy, &c., are the more remote consequences. Indeed, almost every form of special disease, with their numerous sympathetic associations, may be simulated, and actually produced, especially when aided by concurring causes, when irritation of the reproductive organs is either frequently repeated or inordinately perpetrated. At first numerous functional disorders are developed, which are continually changing their aspects and their associations, and varying in severity and character. Subsequently, and as these are neglected, or as the cause is continued, or as the original morbid condition increases, disorders which were formerly functional become ultimately organic or structural, chiefly in consequence of the influence which disordered states of organic or cerebro-spinal nervous influence exert upon the vascular actions, upon the assimilating and nutrient functions, and upon the several secreting and excreting organs.

143. Having thus attempted to direct attention to the sympathetic relations of disease, and to the channels through which diseases become associated or complicated, — my limits, however, obliging me to leave many topics connected with the subject altogether untouched, — I wish to impress upon the reader the advantages to be derived in practice, from tracing, as accurately as possible, the bonds of connection which associate or complicate the more specific and primary states of disease, and render morbid phenomena often difficult of interpretation, and as often difficult of removal. Having ascertained as accurately as possible the primary source of disorder; having traced the succession as well as relations of morbid manifestations, and the connection of the whole with antecedent and existing causes; having, moreover considered the probable extent of nervous disorder and of vascular disease, and of alteration or contamination of the circulating fluids, a rational basis is thereby formed for therapeutical indications and remedial measures; and, as respects both the general intentions and the particular means, these will be the more appropriately nd successfully adopted.

144. I believe that the physician who thus e ers on the study of each case which comes b ore him, and endeavours to connect the effects resented to his view with their causes, and to ce the bonds of union subsisting between thos requently distant effects, will generally exercis his profession successfully and honourably; for l ng acquainted, as he should undoubtedly be, wit he nature and operation of the remedies he emp ys, he will apply them appropriately to the ren val of those morbid conditions which he ratio lly infers to be present. A physician whose mi is thus tutored and practically engaged will be either sceptical of the effects of medicine on th ne hand, nor empirical and rash in the use of on the other. This extensive and practical k wledge, being always appropriately applied, vill prevent him from lapsing into a scepticism w h, entertained by any member of our professi , is not degrading to the profession itself — for ath and honour cannot be degraded — but whi is most degrading to the sceptic himself, inas ch as he admits himself to be deluding the p ic, whilst he boasts that he is not himself del ed, and thus vaunts his own dishonesty. N er will the enlightened and rational physician pse into a state of blind empiricism, and wiel the weapons employed against disease in su a manner as will not only endanger the life the patient, but also injure his own reputation.

145. I have been anxious to entertain the bject now imperfectly discussed, because has hitherto failed of obtaining an attention i ny way commensurate with its importance. My limits have obliged me to omit several topics ore or less intimately connected with it. The ervations, therefore, which I have offered, w , I hope, be viewed as *suggestive* only, especia in respect of various subordinate topics, for a my space did not allow me to illustrate, I could uggest merely.

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MPTOMATOLOGY, *comprising* DIAGNOSIS *and* PROGNOSIS. — SYNON. — *Symptomaology*, *Symptomatologia* (from συμπτωμα, a ymptom, and λόγος, a treatise); — *Semeiology* from σημεῖον, a sign); — *Semeiologia*, — *Semeitice*; — *Symptomatologie*, *Semeiologie*, *Semeiotique*, Fr.: — *die Zeichenlehre, die Sympomatologie*, Germ.

IAGNOSIS. — SYNON. — Διαγνωσις (from διαγνωσκω, I distinguish); — *Diagnosticks*; — *Diastic*; — *Diagnose*, Fr.; — *Kennzeichen, Erkeng der Krankheit*, Germ.; — *Diagnostica*, . —

ROGNOSIS. — SYNON. — *Prognosis* (from προ, ore, and γινωσκω, I know); — προγνωσ ικον, pocrates; — *Præcognitio*, *Prænotio*, *Prætia*, *Prædictio*, Auct.; — *Prognostic*, Fr. *Die Vorhersagung, die Prognose*, Germ.

CLASSIF.: — GENERAL PATHOLOGY.

. In the article DISEASE, I gave an ample ch of the *Causation of Disease*, or *Ætiology*, only mentioning the several occasions of diser, but also arranging them and showing their les of operation. I afterwards considered the *ral doctrine of disease*, or PATHOGENY, and ribed the changes constituting disease, as they eeded more immediately from the causes proing them; noticing in succession the simpler lynamic changes, the more complicated or qualitative alterations, and the effects of these changes upon the secretions and excretions, upon the circulating fluids, and upon the nutrition of the several structures. After a sufficient consideration of the numerous topics comprised under these heads, I noticed the *Procession and duration of morbid phenomena*, the *Types or forms of disease*; the *Terminations of disease*; the *Relations, successions and complications of disease*; the *Metastases or conversions of disease*; and, lastly, the *circumstances modifying the Form, complication, duration and terminations of disease*. I thus developed, under the article Disease, a *system of pathology*, which, in certain of its parts, is more fully illustrated in the several articles on special topics — on the *blood*, on the *structural lesions* of the several tissues and organs of the body, &c.; and which, when connected with others, and with the article now commenced, will furnish the reader with comprehensive views of morbid actions, will demonstrate the relations and connections of these actions, and will enable him to arrive at rational conclusions as to their natures, and as to the indications and the means most appropriate for their removal, for their alleviation, or for their control. Having discussed the numerous topics referred to, I have now to notice the *symptoms and signs*, by which the *forms and states of morbid action* are recognized and duly estimated, especially as respects the *seats*, the *natures* and the *results* of such actions.

2. A knowledge of disease comprises not only a recognition of existing symptoms and signs, but also a due estimation of the value, importance, and source of each, the comparison of one with the others, the relations subsisting between them, the connections between them and their antecedents and causes, and the results which may be expected from them, and their various combinations and groupings. In estimating the importance of symptoms, as showing the seats, the limitations, and issues of morbid action, they require due consideration both in the aggregate and individually, and not merely as regards the associations they present, but also as respects the absence of others, which are indicative of the seat, nature, extension or issue of other special diseases, or of distinct but allied or similar states of morbid action; — absent manifestations of disease should be taken into account in our estimation of the value or importance of those which are present.

3. *The Manifestations of disease*—the symptoms and signs by which the seats and natures of diseases are indicated — are, 1st., vital or spontaneous, or strictly sympathetic and symptomatic; or 2d., physical or artificial. The former of these only are comprised in this article, the latter have been fully discussed in the articles ABDOMEN, AUSCULTATION, CHEST, SUCCUSSION, &c. In treating of *the Sympathetic and Symptomatic Manifestations of disease*, or of *Symptoms* more especially, I shall *first* notice those which appertain to the *appearance* and *attitude of the body*, and to the *Animal, Loco-motive, and Sensory functions*; *secondly*, those which belong to the *Respiratory and Circulating Organs*; *thirdly*, those which are manifested by the *Digestive and Assimilating Organs*; and, *lastly*, those which concern the *Urinary and Sexual functions and organs*.

4. I. Symptoms and Signs appertaining to the Attitude and Appearance of the Body, and of the Animal Functions.—Numerous changes in the attitude and appearance of a patient at once strike the experienced observer, and suggest a general and often a correct idea of the nature of the disease which he is called upon to treat. — i. The Attitude and general Appearance of the Body furnish signs both of the nature and of the tendency of the disease. A constantly retained position on the back indicates depression of vital power, and, in febrile diseases, extreme exhaustion or asthenia. It is most remarkable in low, typhoid, adynamic or pestilential fevers, and in the last stage of acute maladies, especially when, with extreme exhaustion of organic nervous power, there is either low or muttering delirium, or unconsciousness, or coma, or more or less contamination of the circulating fluids. When this position is long retained, especially without due attention to cleanliness or dryness of the surface, the more prominent parts or those most pressed upon, become inflamed, ulcerated or gangrenous; and the results are often fatal, unless the local and constitutional treatment be active and appropriate. If this position be attended by a sinking or falling down in bed, owing to a tendency of the body to gravitate to the lower or more depending parts of the bed, and to lost power of the extensor muscles, the positions of flexible parts being somewhat bent, and the head gravitating in the direction where the support is the least, the exhaustion of vital power and the consequent danger are the greatest, especially in the maladies just named. When the patient becomes capable of recovering his position when he feels himself falling down in his bed, or falling from his pillow, and especially when he is able to turn to either side, and to retain for a time a position on his side, or even partially on his side, it is one of the earliest indications of returning powers in low or adynamic febrile maladies. The supine position, with the knees drawn up, so as partially to relax the abdominal muscles, and to keep off the pressure of the bed-clothes, indicates morbid sensibility or inflammation, or both, of one or more viscera in the abdominal cavity, and more especially peritonitis, enteritis, gastritis, &c. In these cases, the supine position is retained, not so much in consequence of exhaustion, as in order to remove the pressure of the contiguous viscera from the diseased parts.

5. The sitting attitude, the inability to lie down in bed, the necessity of being shored up in bed, and various sitting positions, are important indications of the diseases to which the physician's investigations should be particularly directed. The sitting position can hardly be relinquished in dyspnœa, asthma, in organic diseases of the heart, in extensive effusion into the pleural cavities, in bronchitis of both lungs, in laryngitis, in many cases of congestive or asthenic pneumonia, and in severe or complicated cases of epidemic influenza. In the worst states of these especially, the patient is unable to repose on either side, without great increase of his sufferings, inasmuch as the weight of the upper regions of the trunk upon the side, on which he rests, greatly impairs the respiratory functions of that side, whilst the action of the side left free is insufficient for the respiratory changes, and for the purposes of the economy.—In less severe or urgent cases, the patient retains a semi-supine position, by having the shoulders and head elevated by pillows. In the more extreme cases of these maladies, the patient is obliged to lean forwards, and often to place his elbows or arms on the table in order to procure a fixed point for a stronger contraction of the muscles of respiration. In protracted cases of this kind, the shoulders acquire an unnatural elevation, and are directed upwards and to the ears.

6. A restless mode of lying down accompanies severe states of thoracic inflammation and acute rheumatism, and several organic maladies. A quiet position on lying down, with perfect consciousness and returning strength, indicates a favourable termination. This position, however, is retained in rheumatism in order to avoid the pain occasioned by moving. Lying on the abdomen, and tossing from the prone to the supine position, or from side to side, attend violent colicky pains, and ileus, or the passage of gall-stones, and hysteria. Patients often prefer to lie on the right side in health, and generally in pneumonia, in bronchitis, and in cases of pleuritic effusion, of this side, after pain, or the more acute symptoms have subsided; also in splenitis and psoitis of the left side. They generally lie on the left side, in pneumonia, bronchitis, and when effusion has taken place into the pleura of this side, and the pain has ceased. At the commencement of pleurisy, patients lie either on the back or in the semi-recumbent position, or on the side opposite to that affected, whilst the pain continues, and before effusion has become great; they also frequently prefer to lie on the back, or in a raised position in organic affections of the heart and large vessels.

7. ii. The Expression of the Face and state of the Features.—The facial expression is of great importance in recognition, diagnosis and prognosis of disease; and sometimes, especially in *children*, it is the chief means of evincing the nature of the malady. In them the appearances of the countenance may be observed with advantage whilst they are asleep, as well as when they are awake; and, in many cases, it is of use to observe the expression immediately upon awakening them. Although the experienced observer will be guided in his diagnosis by the expression of the face of children, yet he will generally find great difficulty in describing the appearances which thus influence his opinion. — *a*. The knitting of the *brows*, or frowning, in children usually indicates inflammatory irritation of the brain or membranes, or of both. And with this expression are often conjoined a contraction or approximation of the eyebrows and zygomatic arch. Relaxation of these parts, with a relaxation, drooping, or falling of the eye-lids, is a sign of vital exhaustion, or of effusion or pressure on the brain.

8. *b*. A *dark circle* surrounding the eyes, and most remarkable beneath the eyes, often with more or less sinking of these organs into their orbits, is often observed in connection with organic diseases, especially those of a malignant or contaminating nature. It is also very manifest in females who are subject to uterine or ovarian diseases, or to severe or prolonged leucorrhœa, or who addict themselves to masturbation. A *flabby or œdematous* appearance of the eye-lids, or below

eyes, is observed in diseases of the heart, es-
ially those implicating the valves, and in
nular lesions of the kidneys, as well as in
nection with several forms or seats of dropsy.
lden or rapid *sinking of the eyes* inwards, with
rease of the dark circle surrounding the eyes,
most remarkable and most unfavourable sign
he stage of collapse of pestilential cholera, in
advanced stage of adynamic, hectic and malig-
t fevers, and in the last or most unfavourable
ods of gastritis, enteritis, dysentery, and of
ulent, tubercular, or cancerous contamination
e circulating fluids.

c. The *nose*, especially in connection with the
ks—the *nasal* and *genal* expression—furnishes
h information as to the seat and issue of dis-
, especially in children. A pinched appear-
of the nose, with a retraction or dimpled
of the cheeks, often is observed in an ad-
ed, or in an unfavourable, course of diseases
e digestive organs; and a remarkable dilata-
and contraction of alæ nasi—a working of
nostrils, with or without retraction of the
es of the mouth,—attend not only the most
erous forms or stages of disease of the respira-
organs; but most of those maladies in which
rgans of respiration become more or less im-
ted at an advanced period, or towards a fatal
ination. In severe or dangerous inflammation
e diaphragm, or of the serous membranes re-
d over this part, those signs are most promi-
ly manifested. The alæ nasi and cheeks are
n upwards and outwards in the most painful
spasmodic affections of the digestive canal
diaphragm, especially in spasmodic gas-
a and enteralgia, in colic, ileus, and during
assage of biliary calculi.

d. The *lips* and *mouth*, with the chin, furnish
rtant indications,—the *Labial signs.*—Re-
on of the corners of the mouth, so as to
ice the sardonic grin, is very remarkable
the diaphragm is inflamed or implicated in
anner just now stated, and in very painful
angerous affections of the stomach, bowels,
endinous aponeurosis. The lips are thin,
ted, or apparently stretched over the teeth
ums, in the last stage of hectic, especially
caused by pulmonary disease; the actions
e nostrils being also remarkable and un-
l. The face in these cases, particularly
emaciation has made great progress, is
ed in, retracted, and diminished, the chin
ing sharper and more prominent. The
ften are surrounded by a dark circle in
ic affections of the stomach, bowels, or
The lips lose their ruddy hue, or become
or less *pallid*, in anæmia, however produced,
æmorrhages, in chlorosis, in diseases of the
, and in uterine and ovarian maladies.
often, at the same time, present a less erec-
tumid appearance, and are more disposed
ck, or become irritated or sore. Soreness
lips and eruptions on them externally, are
ntly observed in the course of chronic affec-
of the digestive canal, and abdominal vis-
especially in children at a far advanced
of those diseases. The lips are often simi-
mplicated, but in a slighter degree and in a
ugitive manner, in connection with catar-
fections. They often *swel'*, especially the
lip, in connection with latent or developed
scrofula and tuberculosis; and in cases of intestinal worms. A *dark*, or a *purple hue*, of the lips, is generally present, when the blood is imperfectly changed to the arterial state, owing to disease of the lungs or heart, or of the respiratory passages, especially congestive bronchitis and broncho-pneumonia, or to effusions of fluid into the thoracic cavities. When this change of colour is observed in those maladies, it ought always to be viewed as a most dangerous appearance.

11. *e.* The *general expression* of the countenance may be bashful, down-cast, painful, anxious, terrified, enraged or joyful.—A bashful, downcast appearance, or an inability to look the person addressed fully in the face, is a certain indication of nervous exhaustion by masturbation and of impotency. This down-look in patients complaining of chronic disorders, or of diseases of debility, at once indicate the cause in which they have originated.—The expressions of pain and anxiety are readily recognised in connection with pain, extreme soreness, difficult respiration, palpitations of the heart, injuries, and inflammations of vital organs or parts. The expression of terror or extreme fear is observed chiefly after severe or dangerous accidents or operations, during excessive hæmorrhages, in rabies, in delirium tremens and insanity. The expression of rage occurs chiefly in mania, rabies, phrenitic delirium, and monomania. The countenance is vacant or unconcerned in true hæmagastric pestilence when it becomes also of a pale lemon colour, in amentia or idiotcy, and in general paralysis. It is tumid or bloated, all the features often appearing enlarged and exaggerated, in congestive and sanguineous apoplexy, in obstructive circulation from disease of the heart or valves, and in connection with dropsical effusions from such disease, and from diseased kidneys.

12. *f.* The *tint, hue,* or *colour* of the countenance furnishes important signs of disease. A pallid or anæmied hue of the countenance attends deficiency, thinness or poverty of blood, especially when observed in connection with pallor of the lips, gums and tongue; this state of the circulating fluid being either a primary ailment, or variously associated, or consecutive of numerous maladies—being thus either a *primary*, an *associated* or a *consecutive anœmia.*—*Primary* owing to inanition, to want of sunshine, light and pure air;—*Associated* with torpor, inactivity or exhaustion of the sexual organs, and characterized by a pale greenish yellow tint of the face, as in chlorosis; with disease of the uterus or ovaria; with tuberculosis of the mesenteric or bronchial glands, with disease of the spleen, or with wasting or structural lesions of the testes;—*Consecutive* of all fevers, of acute rheumatism, of inflammatory and structural diseases of the digestive organs, and of the absorbent system; and of tubercular and cancerous maladies.

13. A *dark, lurid,* or *murky tint* of the countenance is commonly attended by a similar hue of the general surface, especially in low, adynamic, typhoid or malignant forms of fever. It indicates a morbid condition of the circulating fluids, the blood being more or less contaminated and insufficiently changed from the venous to the arterial state. Along with this hue other tints may be associated, as that of *lemon tint*, as in

the hæmagastric pestilence, the features still retaining their fulness or plumpness; or a deeper *yellow* or jaundiced hue, as in severe bilious remittents, the features being more or less sunk; or a *greenish yellow*, or dark *green hue*, when the liver and biliary passages are completely obstructed, or the former disorganized throughout. A continued *sallowness*, or *murky pallor* of the countenance, is commonly an attendant upon torpor and chronic affections of the liver, and upon disease of the spleen. The face, the general surface, and especially the extremities and nails of the fingers and toes, assume a *leaden* or *lurid tint* in the stage of collapse of pestilential cholera; and this tint often becomes deeper and darker as the patient sinks, the features being collapsed, and the eyes sunk deep in their sockets. A livid hue of the countenance, most remarkable in the lips, and commonly with lividity of the nails and fingers, occurs in the last stage of pneumonia and general bronchitis, in congestion of the lungs, in obstructive diseases of the heart, and in dropsy of the thoracic cavities; and it is always a most dangerous, and generally a fatal sign.

14. A *pink hue* of the cheek, or a *pinkish red*, sometimes limited to the more prominent part of the cheek, is usually seen in hectic, especially the hectic of pulmonary disease. A generally diffused redness of the face attends inflammatory fevers, and is often observed during inflammation of the lungs, and occasionally in phrenitis. A persistent redness of the face sometimes occurs in persons advanced in life, who are accustomed to live fully or to drink port wine too freely, the features being usually at the same time large or developed. Redness of the face, with unusual fulness of the features, is often present in sanguineous apoplexy. The redness of the features which accompanies eruptive fevers is readily distinguished by the history and circumstances of the case, by the pulse and by the state of the general surface. A circumscribed patch of redness on one, or on both cheeks, is sometimes observed in chronic visceral diseases, and in low or hectic fever attended by alteration of the blood.

15. *g*. The *size* of the features generally—of the whole face—is often very considerably altered in disease. It is apparently *augmented* in sanguineous or congestive apoplexy, in acute mania, in phrenitis, and in convulsive diseases, especially epilepsy, in obstructive diseases of the heart, particularly those accompanied with dropsy, in acute and congestive pneumonia, and in the acute states of vascular action, observed in the hot stages of fevers,—periodic, continued, or exanthematous.—The size of the face is *diminished;* the features being shrunk or pinched, in the cold stage of periodic fevers, in pestilential cholera, in the advanced states of visceral disease attended by emaciation, especially of phthisis, and of hectic fevers. When the shrinking of the features becomes very remarkable in the advanced stages of either acute or chronic maladies, or approaches to what has been termed the *facies Hippocratica*, it is always a most unfavourable, and commonly a fatal sign.

16. iii. State of the General Surface of the Body.—*A*. The *colour* or *hue* of the surface frequently partakes of that of the countenance. Where the latter is ruddy, healthy and animated, the former is neither altogether pallid or ite; nor dusky, lurid or dark, unless in the rker races. In the European, particularly of n hern latitudes, the hue of the surface is that o white animated by a slight tint of carnation o pink. In the anæmied and chlorotic, and often the leuco phlegmatic and anasarcous it is palli or a dead-white, sometimes slightly tinted by llow or pale yellowish green. The colour of t skin is more than naturally sallow, pallid or mu y, in functional and organic diseases of the liver, leen, often in chronic diarrhœa and dysentery, ob- structions of the mesenteric glands, and ome- times in organic diseases of the uterine gans. In the several forms of jaundice noticed bove (§. 13.), the hue of the general surface yel- low, of various grades to a yellowish g n, or even to a murky or deep green. A pale llow, or lemon tint, with greenish or livid st ks or patches as the malady advances, chara rizes hæmagastric pestilence; whilst a jaundic yel- low often attends remittent fevers, the t be- coming more deep or lurid, as the disease umes more and more of a putro-adynamic ch acter. The hue of the surface is dark, dirty or id in continued fevers of an asthenic or ac amic type; and it becomes darker or more al as the disease advances, and as the powers f life sink. In the cold or formative stage of fev s, the hue is pallid, and the surface rugose, pr nting the *goose-skin* appearance. As reaction uper- venes, this disappears, and passes, with e in- crease of reaction, into the warm and c ation glow of health. When, however, n such healthy reaction occurs, as in adynar , ty- phoid, putro-adynamic and pestilential evers, the pallid hue of the general surface passes into a lurid, harsh or foul appearance; t this, either becomes deeper and more remark e, or, as in the choleric pestilence, assumes a culiar leaden or livid aspect, as the malady appr ches fatal issue.

17. *Deeper or other discolourations* of e skin are either partial — in spots or patches; more marked in some situations than in others. These consist either of very limited exudation of the colouring particles of the blood under the ticle in one or other of the tissues composing skin or of exanthematous or other eruption The former constitute the characteristic of pura of scurvy, and of some forms of fever. W n the vital cohesion or tone of the capillaries is laxed in certain tissues, as in the vascular ret of the skin; and when, at the same time, the ealthy crasis of the blood is much impaired, as those maladies, minute exudations, containing re or less of the colouring matter of the blo take place, in the form either of punctæ or large spots or even patches; and, according o the states of vital power, and of the exud fluid present various hues, from a bright or sc t red to a livid or blackish colour — *petechiæ, vi s, &c.* (*See Art.* Fever, §§ 470, 471.). Thes eldom undergo further changes unless in the ext nities where, from neglect or improper treat t, the exudations may be followed by ulcera n, es- pecially in scurvy, and by sphacelation, in the putro-adynamic states of fever.

18. *B. The Eruptions* on the surface of body furnish most important indications as res ts no merely the nature of the disease, but als pro

ss and issue. Exanthematous, acute and onic, eruptions have been very fully discussed the several articles on the diseases which are racterised by them. It is hence unnecessary take further notice of them, than to remark, in neral terms, that the less general or copious the ption, and the less the functions of the skin are paired by it, the more may the result be con- ered favourable; and that the more diffused, neral and confluent the eruption, and the per the colour, the more unfavourable should the opinion as to the issue. As respects all ptions, but more particularly as regards the nthematous, deepness of hue, — lividity or kness of colour, — should be viewed as being ch more dangerous than the amount or extent of ption; for, even when extensive, the risk may be materially increased as long as the hue is of a lively red; but in proportion to the pness of the tint, and as it approaches to lity or blackness, the danger becomes ex- ne.

9. *C. The temperature of the surface* varies re- kably with the grades of vital power and of cular action; and the character of the tempe- re is much modified by the state of the per- atory function. — (*a.*) A general *depression* of perature often attends sinking of vital power; when this sinking becomes extreme it is com- ly accompanied with cold perspirations, which most remarkable in the extremities, as in the or fatal period of most diseases, and over the le surface in the choleric pestilence; the de- sion of temperature being also great, especially his malady, and manifestly increased by the poration of the perspired fluid. — Coldness of surface ushers in many febrile and inflam- ory diseases — especially the cold stage of odic fevers, and of visceral inflammations; the coldness in these maladies exists more he mind of the patient, than to the perception e physician; and it is generally attended by uliar phenomena and sensations — by chilli- , horripilation, shivering, rigors or horrors, ch may be viewed as grades of the same sen- on, and which are accompanied with a re- kable feeling of cold extending from the put along the spine, and with constriction dryness of the integuments. In these cases, sensation of coldness, when thus characterised by horripilation or shivering — is altogether bid, the temperature of the general surface er not being depressed, unless in the extremi- or being sometimes even much increased, cially over the trunk. The sensation of cold- and the shivering, both in these maladies, in cases of internal abscess, or where matter eing formed, are to be imputed chiefly to the entration of the morbid action internally, or he determination of the circulating fluids to in- al or vital organs, and but partially to the nished temperature of the extremities and ace, and to the constriction of the integu- ts; for, even when the sensation of coldness hilliness is very considerable, and the horripi- ons amounting even to shivering, the heat of , especially over the trunk, may be excessive; in these cases the surface is not only hot, but dry and constricted; and either reaction is g about to be developed, or a copious perspi- on is about to supervene, as when these symptoms indicate the formation of an internal abscess. When they occur in very aged persons, and depend neither upon the invasion of a febrile paroxysm, nor upon any visceral irritation or *inflammation;* and even when, in those persons, they recur at intervals, and alternate with sensations of heat or flushing, they are dangerous symptoms, generally issuing in dissolution.

20. (*b.*) The coldness of the surface, whether actual, or existing chiefly in the sensations of the patient, whether marking the invasion of a febrile paroxysm, or the commencement of inflammatory action, or the formation of abscess in an inflamed organ or part, should be viewed chiefly as a change in the state of organic nervous power or influence upon the vascular system; this influence being more or less depressed or impaired in the extremities and periphery of the frame, and either determined to, or increased in vital or internal organs, the vascular system being similarly affected, owing to the organic nervous influence on it. If this influence be so powerfully impressed as to be incapable of restoration, or so overwhelmed by the cause impressing it as to sink progressively, coldness of the surface becomes more general, more manifest and actual, and death ultimately takes place; but, when the organic nervous or vital influence is morbidly impressed, without being overwhelmed or destroyed altogether, the concentration of that influence in vital organs, or the remains of it in these, enable them to react upon the blood which is superabundantly returned or determined to them, and thus the circulation is kept up, and secretion and excretion are promoted, until the morbid impression and its various consequences are removed. One of the earliest of these consequences is depression of the animal temperature, with constriction of the integuments, which is followed by reaction when the vital influence is not altogether overpowered. According to the nature of the morbid impression, or of the irritating cause, the temperature of the surface, and the sensations and other phenomena characterising the state of the cutaneous surface, vary remarkably: and, whilst the temperature may be absolutely lowered, with or without a sense of chillness or coldness, or horripilations, in some cases, with shivering or rigors in others, and even with horrors and distressing tremors; it may not be materially depressed, unless in the extremities, these attendant phenomena occurring nevertheless. The rigors, and the still more severe manifestations of tremors or horrors, are indications of the severity of the morbid impression, or of the cause of irritation on the nervous system, and more especially upon the spinal chord and nerves proceeding from it. We often observe irritation of mucous or serous surfaces, by various causes, as by the passage of a calculus along a duct, and even by the introduction of a catheter or bougie along the urethra followed by constriction and coldness of the surface, by horripilations or rigors. In these cases the cause of irritation, acting upon a single part of the circle of organic nervous endowment and influence, disturbs the healthy distribution of the blood, depresses or diminishes the circulation in the periphery of the frame, concentrates it towards internal parts, whilst the irritation existing in a part of the organic nervous system is propagated by communicating nerves to the spinal chord, or to

the roots of the spinal nerves, and is reflected thence by the spinal nerves to the muscles of voluntary motion, occasioning rigors, tremors and horrors, which cannot be controlled by volition, until the more general diffusion of the primary morbid impression or irritation, and the reaction and the consequent equalisation of the circulation remove the morbid effects extended to the spinal nerves and the muscles supplied by these nerves. (See §§ 22. *et seq.*)

21. Coldness of the surface of the body is attended by various modifications, as respects both the sensations of the patient and the perception of the physician, according to the cause which produces it, and to the function or state of the skin at the time. When the coldness proceeds from depression or irritation of organic nervous influence, in connection with manifest disturbance of the circulation, then the surface is generally also dry and constricted, as in the invasion of diseases proceeding from causes which primarily simply depress or irritate; but when, with this change in the nervous system of organic life, there is also loss of vital tone or cohesion — when, owing to the excessive irritation or depression, or to the loss of vital cohesion, or to poisonous contamination, there are also relaxation of the integuments, and increased perspiration, then the coldness of the surface is not merely augmented, but it is characterised by a peculiar sense of rawness as well as of coldness — partly augmented by evaporation, and partly by impaired circulation. Colliquative perspirations which are not consequent upon heats or flushings, and the state of the surface in the last stages of low fevers, in the choleric pestilence, and after poisoning by numerous depressing, contaminating and irritant poisons, furnish various modifications of this condition.

22. (*c.*) *Increased temperature* of the surface is an important sign of disease, whether it occurs primarily, or consecutively of more or less depression; and, according to the character of the increased heat, so may not only the state of vascular action be partly inferred, but also the condition or amount of vital power and resistance. Heat of the skin is rarely so great, when it occurs primarily as when it supervenes upon chills or rigors. In the former case, it is more moderate, generally subsides sooner; and, unless when it is caused by the infection of some animal poison, is more free from other morbid phenomena manifested in the general surface. When heat of skin follows rigors, the reaction of the vascular system, upon which it chiefly depends, influenced however by the organic nervous power, carries the temperature several degrees above the standard of health, and this high range is often increased or prolonged by the constriction and dryness of the skin, and by the morbid state of the blood itself — morbid in consequence of deficient action of the emunctories during the preceding depression, coldness, chills and rigors; the augmented quantity of effete materials in the blood irritating the blood-vessels and vital organs, and morbidly exciting the nervous system of organic life. The result, as respects the surface and integuments, is not merely an increase of temperature, but also, and chiefly, owing to the dryness of the skin, and to the state of the circulation now mentioned, a peculiar sensation imparted to the hand of the observer, and characterised by a harshness, acridity or burning, and sometimes by a feeling of stinging or tingling to the patient himself.

23. When the circulating fluids are not greatly altered or contaminated, and the organic nervous influence not seriously depressed or perverted, the excitement of the vascular system, producing augmented heat of surface, gradually subsides, and with it this particular effect. As the excited vascular action abates so the skin relaxes, secretion and excretion, in the several emunctories, either returning or increasing, and with the return of the functions of the skin, the temperature of the surface falls. A fit of ague furnishes an apt illustration of the states of the surface of the body in different febrile and other morbid conditions of the frame; and of the succession of these states, and of the influence of the antecedent in producing the consequent condition.

24. A harsh, fiery or burning heat of surface is always an unfavourable sign, especially in visceral inflammation; and if, at the same time, the patient complains of a sense of burning at the præcordia, or of internal heat, with anxiety, jactitation or restlessness, the extremities becoming cool or cold, or being covered by a cold perspiration, a fatal result, especially by gangrene, may be expected. Increased heat of head indicates frequently a disposition to apoplexy in the aged, to inflammation of the brain or its membranes in the young and middle-aged, and to convulsions or meningitis in children. A burning or arid heat of surface in the hot stage of periodic, and of hectic fevers, augurs a malignant or dangerous form of the one, and a fatal termination of the other, especially when diarrhœa is also present, or when the heat of skin is followed by excessive colliquative perspiration. The temperature of the surface is always highest over a sthenically inflamed organ; and, as respects the extremities, it differs more or less in different sides in hemiplegic or partial paralysis, as shown when treating of that malady.

25. iv. The Perspiratory Functions of the skin are variously affected by disease, and aid more or less in evincing the nature and the result of the malady. Interruption to, or entire suppression of, the perspiration, as shown by dryness of the skin in the earlier stages of fevers, and of inflammations, is of much importance as respects the states of the circulating fluid and of vascular action. This state of the surface may be attended by depression of temperature (§§ 19. *et seq.*), as in the cold stage, or in the invasion of these diseases, or by increased temperature (§§ 22. *et seq.*), as in the hot stage or when vascular action is excited; but, however associated, or accompanied by each in succession, suppression of the perspiration is indicative of the invasion or commencement of fever or of inflammation, when attended by coldness of surface or by chills or rigors, and of a farther advanced state of these maladies when the skin is not only dry but also hot. The amount of dryness, and of either coldness or heat with which dryness is associated, and the duration of these states of the surface, are matters of much importance in our estimation of the nature and extent of disease, and of the probable issue; for if the suppression of the excreting function of the skin be more or less complete, and of considerable du-

and no other excreting organ or emunctory ly vicariously the defective function, — if the ious elements and materials usually elimi- d by the skin, are not partially or altogether ed out of the blood by other organs, it must ssarily follow, that the prolonged suppression ie perspiratory function will contaminate or n the blood; and that the primary or local se will be thereby exasperated, or a morbid of general vascular action will be developed, ng with the changes produced on the blood e other emunctories, and giving rise to further ations, both functional and organic.

A. *A perspirable* and *humid state* of the cuta- s surface, when attended by a soft, natural, tly unctuous and moderately warm condition , is always a very favourable sign, especially it is general, and not limited to a single region rt; but, when the perspiration is spontaneously sive, and results not from unusual exertion om medicine, &c., more or less disorder, times of a very dangerous nature, is then nt. The *quality* and *odour* of the perspiration re attention, as well as the quantity; and the mstances and occasions of excess ought also noted. It should not be overlooked, also, he cutaneous perspiration is not always or ether suppressed when it is no longer mani- o the senses; for an insensible perspiration ally exists, which may vary with the state of atient, with the temperature of the skin, and the dryness, humidity, and electrical states of r. The perspiration which may be insensible y states of the air, may become sensible, or t on the surface, in the form of sweat, when ir is moist and relaxing. During health the iration is more insensible than sensible, and with the exhalation of fluid from the sur- a secretion takes place from the follicular atus of the skin, which softens, and even lly lubricates the cuticle, especially in the race, and promotes both the insensible and le perspiration by disposing the surface to ransmission of its accustomed exhalation. sensible and the chemical qualities of the iration vary considerably in different regions body, owing partly to the greater admixture secretion from the follicular or sebaceous atus. The difference is most manifest in t of the perspiration from the axillæ and oins, &c., the organic or solid constituents most abundant in the sweat of these regions. efore any notice should be taken of morbid of the perspiration, the healthy condition excretion ought to be mentioned.

B. *In health*, the perspiration, when too co- to be carried off in the atmosphere, without ning sensible, or in the state of insensible r, is condensed in the form of fluid, or ; 1000 parts of which consist of from 993 ½ of water (Anselmino, Berzelius, Simon, The remaining solid constituents consist— Of substances soluble in water, — watery t, phosphate of lime, and occasionally an e sulphate. — 2nd. Substances insoluble in , — desquamated epithelium, and, after the val of free lactic acid by alcohol, phosphate e, with a little peroxide of iron. — 3rd. Sub- s soluble in ether, — traces of fat, some- including butyric acid. — 4th. Substances e in alcohol, — alcoholic extract, free lactic acid, and acetic acid, chloride of sodium, lactates and acetates of potash and soda, lactate and hydrochlorate of ammonia. In addition to carbonic acid, nitrogen is exhaled from the surface in constant but varying proportions, according to the nature of the diet and the amount of exercise. The functions of the skin may be divided into— 1st. The *Physical*, — the exhalation of pure water and gas. — 2nd. The *Organic*, — the product of animal excretion, or the secretion of cells. The cutaneous excretion is in antagonism with the pulmonary, with the urinary, and with the intestinal; an excess of either diminishes more or less the amount of it.

28. *C.* The *amount* of the insensible and sensible (sweat) perspiration has been variously estimated in health, but not with that approach to precision which would warrant a positive statement. It it very remarkably increased or diminished *in disease*, the diminution being more difficult of estimation, than the increase. In the cold states of disease, the diminution may be very remarkable, or scarcely to be estimated, and, in some cases, as in those characterised by sinking vitality, the perspiration may be excessive, as observed in pestilential cholera. In hot states of the surface, the temperature may prevent a more than natural transpiration from being condensed into a sensible fluid, the perspiration being excessive and yet being insensible. But whether sensible or insensible — whether diminished or increased, but more remarkably when increased, the perspiration is attended by very different kinds of *odour*, the odour often depending upon the chemical constitution and organic constituents or elements of the excretion, and being generally peculiar to each specific disease, although different observers have described the odours differently, or have assigned to them different resemblances.

29. The *increase of sweat* is very remarkable, not only in different maladies, but also in different periods of the same malady. Thus, while perspiration is diminished or almost suppressed in the cold and hot stages of ague, it is remarkably increased in the sweating stage. The same is observed in the paroxysms of hectic, in remittent fevers, and in continued fevers, but in prolonged stages, and even in inflammations. The most remarkable increase occurs in acute rheumatism, in the advanced stages of pulmonary consumption, in pestilential fevers, and in most maladies characterised by sanguineous contamination or poisoning, or infection of the fluids; and, in these especially, the *quality* and the *odour* of the perspiration are much altered.

30. *D.* The *quality* of the sweat is changed in most febrile diseases; but the change of quality, with reference to each, has not been satisfactorily shown.— *a.* The free *acids* may be much increased. Lactic acid, the ordinary free acid, is usually more abundant than in health, in cases of rheumatism and gout, and probably, also, uric and acetic acids. Dr. Prout detected the last in hectic fever, and both it and lactic acid may be present in the puerperal states of fever and in erysipelas. Anselmino found free acetic acid in women during their confinement, and Stark, an increase of the lactic acid in scrofula, rickets, and in several cutaneous eruptions.

31. *b. Ammonia* does not appear to exist in the

sweat in a free state, but chiefly in the state of lactate or hydrochlorate, although it may be found soon after the fluid is excreted, and during its retention in the armpits and groins. As to the actual presence of ammonia in the perspiration during disease, the statements of chemists and other observers are devoid of precision; for we still require to know whether or no the ammonia exists in a free state at the time, or even after the formation of the sweat, or, whether it is evolved by the combination of the acid which neutralizes it with another base. Anselmino found a larger proportion of ammonia in the sweat after an attack of gout than in any other case. Berend states, that the sweat in putrid and typhoid fevers is ammoniacal. That it sooner becomes ammoniacal in these maladies than in any others, owing to a greater amount of animal matter contained in the perspiration, appears to be nearer to the truth. It may, however, be admitted, that all sweat of a putrid odour either contains free ammonia, or sooner becomes ammoniacal. According to Nauche, the sweat in nervous diseases soon becomes alkaline. On this, and other topics connected with the chemistry of the secretions and excretions, Simon and others are loose in their statements and in their authorities.

32. *c.* The *salts* are often much increased. Prout observed a great increase of the chloride of sodium. After attacks of gout, and in the gouty and rheumatic diathesis, the phosphates of lime, as well as the urates, are increased as respects either their proportions in the sweat, or the absolute quantity excreted. In critical, and in colliquative sweats, the proportion of the usual solid constituents differs remarkably, although the amount of difference is not ascertained; and there is every reason to infer, that in these, and in exanthematous, low, putrid, and pestilential maladies, there is a considerable change, especially an increase in the fatty, extractive, and saline ingredients of the perspiration; and that, moreover, substances not usually found in the sweat, may, in these diseases particularly, be detected in it. Anselmino and Stark say, that *Albumen* has been found in the perspiration in cases of rheumatism, and in gastric, putrid, and hectic fevers. *Fat* has been found in the perspiration in colliquative and low maladies by myself in several cases; *uric acid* and urate of soda have been detected in the sweat of arthritic persons, and cases of gravel; *bilin* and *biliphæin*, in the perspiration of persons who are jaundiced; and the red colouring matter of the urine, *Uroerythrin*, in the perspiration in rare cases of fever. The colouring particles of the blood have been seen in the perspiration in scorbutic cases, and in putrid and pestilential maladies, in rare instances.

33. *d.* Various substances foreign to the œconomy have been detected in the perspiration after their ingestion. The chief of those are sulphur, mercury, iodine and iodides, assafœtida, garlic, saffron, indigo, prussian blue, turpentine, &c. These may be partially altered, or combined with other materials; and many other substances, even when digested, during their partial excretion by the perspiration, or by means of certain of their constituents, impart an odour to this excretion, by which even the nature of these substances may be recognised. Although these circumstances are of little importance as signs of disease, yet they should be held in recollection when the *odour* of the perspiration is estima as a means of recognising certain maladies, an hey ought to be viewed as furnishing proofs the part which the skin performs as an exc ing organ.

34. *E.* The *odour* of the sensible and inse ible perspiration has not been sufficiently attend to, in the recognition and diagnosis of disease An experienced and closely observing physicia will often at once perceive the nature of the m dy, from the *odour* of the effluvium proceeding fr the body of the patient, even before he may hav een it or approached it. This is especially anifested by exanthematous and pestilential f ers; and although many, whose sense of smell not acute, are incapable of distinguishing dise by this sense, others are often at once thus enab d to recognise the nature and even the progress the malady. Most of those specific diseases ich are propagated by the effluvia proceeding rom those already suffering from them by inf ion, impart a more or less peculiar, and genera an offensive odour; and although this odour its resemblances may be familiar to the observ yet he will rarely be able to describe it in rms which will make it accurately known to an her. The effluvium from persons in pestilential c lera is especially offensive and sickening, and it ays imparts a sense of depression to those wh perceive it. That from small-pox, or scarlet ver, or measles, differs from each other, or is pecu ar to each. The odour of the sweat of pers in putro-adynamic fever and scurvy is general of a putrid character. That of rheumatic and uty persons is usually acid. Females in pue eral fevers exhale a peculiar sweetish acid our. Persons whose intestinal excreting functic are insufficiently performed — whose bowels are uch confined, are often subject to a particula offensive, as well as an increased perspiration The determination of the odours of the perspira n in diseases is, however, quite subjective, and di rent observers generally describe them by di rent resemblances, which are not always as ned with accuracy. Thus the perspiration of p sons with itch is said to have a mouldy odour; it of scrofula to resemble the smell of sour beer that of syphilitic patients to have a sweet odour and that of ague is said to smell like fresh-baked own bread. The odour of the perspiration in d ase, especially in respect of infection, has bee imperfectly attended to, although deserving attentive observation.

35. *F.* The *other sensible or physical qual s of* the perspiration consist chiefly in those ich have been partly noticed when describi its chemical conditions. An acid or an a line state of the sweat may readily be ascer ned by the usual test-papers; but the acid or kali present is determined with much greater diff lty. The appearance of the linen generally sho the presence or absence of the colouring ma of the bile; and even common bibulous pape will often demonstrate the existence of fatty or eaginous matters. A watery and copious s t is commonly produced, in the previously he hy, by exertion, by increased temperature, a by diseases of simple vascular excitement, wh the other emunctories are duly discharging eir functions. In these circumstances, the pe ration is warm, copious, watery, and without or-

odour. In low, putro-adynamic, colliquative, pestilential maladies, the sweat may be abun- t, thick, clammy, cold, and variously altered hemical constitution, especially in the amount nimal extractive matters, in epithelium scales, line ingredients, in odour, and in the changes inces soon after being collected ; but in all e particulars, further and more accurate ob- ations than we yet possess are required.

6. v. THE NUTRITION OF THE BODY is one of first circumstances which attracts the atten- of the physician ; the character as well as amount of nutrition appearing to him of great rtance. The diminution or abundance of ose substance ; the amount of emaciation or esity ; the size and tone of the muscles ; the ity, firmness or flaccidity of the flesh ; the r and state of the integuments, and the pre- or absence of intumescence, œdema, ana- or leucophlegmasia, are appearances which ys interest the medical observer. — *A. Ema- n* is, when very remarkable or excessive, of consequence in our estimation of the nature ultimate issue of disease. In all cases when it nsiderable, and especially when very great, it res close consideration in respect both of its s and of its morbid relations. — *a.* Emaciation ses rapidly in low, continued, remittent, and fevers, the degree of emaciation, and the ity of its progress indicating the severity and r of the malady. In organic diseases of ungs, stomach, and digestive organs gene- emaciation is always present, the accele- of its course, and the degree to which it dvanced, furnishing proofs of the danger to pected, especially when it is attended by ness of pulse and other febrile symptoms. ute or febrile phthisis, the rapidity and the ne degree of emaciation are amongst the prominent and fatal indications furnished e malady, and may be the most remarkable cough and expectoration are the least ob- l. In all diseases which tend to inanition — structural changes in the œsophagus, cardiac yloric orifices of the stomach, and in the teric glands, emaciation advances more , but to an equally great extent. In the chronic states of phthisis, in diseases at- by augmented secretion or morbid dis- s, emaciation is slower in its progress, but becomes extreme, if the malady receives no or is not removed by treatment. In con- fever emaciation seldom is apparent until riod of vascular excitement subsides, but is period it advances rapidly — the more the greater the danger, more especially in testinal or gastric complications of fever. with rapid or extreme emaciation there is dusky, lurid or livid hue of the surface, the is very great ; and if eschars, &c., form rts which are pressed upon, it is still .

3 . *Partial emaciation* is observed chiefly in ed limbs or diseased parts, and depends he inaction of the muscles of these parts ng period. In many cases the muscular tion is concealed by a degree of œdema or legmasia, which often affects the para- mb. In all cases, therefore, it is of use to o what extent the emaciation is that of the tissue, or of the muscular structures. In the slighter forms the adipose tissue only is diminished, whilst the muscles are but little diminished, but in extreme cases the muscles also become extremely flabby and ultimately wasted.

38. *c. Arrest of the progress* of emaciation, and a more or less marked restoration of the flesh, and especially if there also be a restoration of strength and of the natural hue of the surface, are amongst the most favourable indications of returning health, and of the removal of the pathological conditions upon which emaciation depended. *The superabundance* of adipose tissue is noticed in the articles ADIPOSE TISSUE, and OBESITY.

39. *B. Flaccidity* of the soft-solids of the body may precede or accompany emaciation, or even œdema, anasarca, &c. But, however attended, it is always an indication of debility or exhaustion, and often in connection with impaired nutrition. In fevers, especially flaccidity of flesh, is attended by discolouration of the surface (§§ 16, 17.), and, as they proceed, by alteration of the blood, especially as respects the hæmato-globuline and saline constituents, by anæmia, by absorption of the adipose substance and emaciation. During low fevers, and in the more inflammatory states of fever, after the stage of vascular excitement has abated, flaccidity of muscles, absorption and emaciation proceed rapidly. Nutrition is arrested from the commencement of the malady ; and, although the arrest is not manifest at an early stage, it has nevertheless taken place, the capillary turgescence, arising from febrile or vascular excitement, preventing it from being apparent.

40. Where flaccidity is most remarkable, emaciation not having advanced far, the flesh has often unnatural *softness*, especially in the leucophlegmatic temperament ; and in some cases, the softness and flaccidity are either unattended by apparent emaciation, or characterised by turgescence, the unanimated or partially discoloured hue of the surface, suggesting the idea of an unhealthy, watery, or semi-liquid state of the adipose and cellular parts below the integuments. This condition is intermediate between the natural and the œdematous or anasarcous state, and is aptly called *leucophlegmasia.* When partial it often passes into œdema, intumescence being then very considerable, the surface *pitting* from pressure ; and when more general it may pass into *anasarca,* the watery effusion into the cellular and adipose tissues being such as to produce great distension of the integuments, with pitting, &c. This *leucophlegasia* is always an important sign of disease ; and is often attended by anæmia, or rather by poorness of the blood — by a deficiency of hæmato-globuline. When this state is very marked, whether there be emaciation or intumescence, chronic disease of the digestive and assimilating organs may be inferred, and consequently impaired or morbid nutrition. Attention, in these cases, ought to be directed not only to these organs, but also to the functions of the kidneys and to the cardiac signs. In females, the uterine functions are generally more or less disordered, when this sign of disease is present, and when there is also a yellowish or jaundiced tint of surface, organic change in the biliary apparatus may be inferred, which commonly terminates in ascites, or even in more general dropsy.

41. vi. The ORGANS OF VOLUNTARY MOTION—

the locomotive organs — are variously and seriously affected by disease, owing chiefly to the states of the nervous centres, by which the muscular apparatus is actuated, but, in many maladies, to the conditions also of organic nervous energy of the muscles themselves, and of the blood. Loss of motion or of sensibility, or of both, in a part, or in one-half, or in the whole of the body, has been fully treated of under the head PARALYSIS. But the locomotive organs may be more or less paralysed, or similarly affected, in maladies which have not been usually termed paralytic. — *A*. In adynamic, putro-adynamic, typhoid, typhus, and exanthematous fevers, the loss of muscular power is very marked, even from the commencement; and in these maladies it is not to be so much imputed to the state of the brain, spinal chord, and their envelopes, as to that of the organic nervous system, the muscles themselves, and ultimately the blood, being influenced by this system. So remarkably are the locomotive organs affected, in these, and in all low or malignant fevers, as to render them incapable of retaining the standing or sitting positions, or even a position on either side, the patient being constantly supine. The degree in which voluntary muscular power is prostrated is remarkably great in all these fevers, the amount of danger being partly manifested by the degree of prostration, and the inability to lie on, or turn to, either side. Amongst the most favourable and earliest signs of recovery is the return of the power to lie upon either side, and afterwards the capability of turning from the one to the other. (§§ 4, 5, 6.)

42. *B*. But muscular power is not only *lost* or *prostrated*, in the modes evinced by palsy and low fevers, but is also otherwise affected, and in various ways. Owing to changes implicating the nervous centres of animal life, the muscles are frequently capable only of imperfect, uncertain, indeterminate, or irregular contractions; the motions of the limbs or members being similarly characterised. These morbid states of voluntary motion are apparent only upon efforts at locomotion, or on volition; but other morbid states of motion occur and continue in opposition to volition, and consist — 1st. Of continued tremor; — 2nd. Of frequent, or continued contraction and relaxation, with uncertain or imperfect voluntary motion, as in chorea; — 3rd. Of spasm or cramp, of short or momentary duration; — 4th. Of spastic or permanent or continued contraction of one or more muscles; — 5th. Of more or less general spasm, followed by partial or more general relaxation or irregular action, as in epileptic and convulsive seizures; — and 6th. Of continued general spasm, as in tetanus. These states of locomotive function present numerous associations and relations, which serve both to characterise specific forms of disease, and to indicate the issue of the disease in which they are observed.

43. (*a.*) The *prostration* of muscular power observed in low fevers is always attended by flaccidity of the muscles, indicating impaired rigidity and tone of the muscular fibres, and loss of irritability; and by a harsh, discoloured, or lurid hue of the surface, evincing a morbid state of the blood, and of the functions of the capillaries. These states show the propriety of having recourse to such agents as will most efficiently promote or rouse organic nervous energy, restore the excreting or depurating functions, and un teract the morbid or contaminating cl ges taking place in the blood. Unless the c servative influence of life be supported by ese measures — unless vital resistance to co minating or hurtful influences be thus pro ted, prostration of muscular power, and sink o vital function, proceed with increased ce ity, and soon terminate in dissolution; a favo ble crisis, taking place on some occasions on by means of vital resistance, and the spont ous action of an important emunctory therel developed under the favourable circumstan of locality, of constitution and age.

44. (*b.*) The *imperfect and indetermina ontractions* which follow volition are general occasioned by exhausting discharges, by mas bation or premature or excessive sexual indulg ces, and are followed by general palsy, and oft also by imbecility. The general palsy of the ane is of this nature, and, although life may b protracted for years, it is generally shortened the manner shown in the articles on INSANITY (§ 70.) and PALSY (§§ 65. *et seq.*).—In these cases cerebro-spinal centres are often more or less sted or altered in their intimate organization; a frequently little or no aid is derived from n ical treatment, or even from diet or regimen.

45. (*c.*) *Continued tremors*, or constant s king of a part — of the head, of an extremity o mb, &c., — or frequent twitchings of a muscle art; are commonly indications of irritation at t origins of the nerves supplying the affected p s, or of some changes disturbing these nerves. hen this sign consists of either shaking or tre r, it may continue for many years, the patien ften reaching the usual duration of human exis ce; but it is rarely or never controlled by ical treatment, although life may be prolonge by a regular and abstemious regimen and diet The *twitchings* which sometimes affect one o more muscles, especially the muscles of the fa are generally much more serious signs, and al ugh they may continue for years, yet they ge ally terminate sooner or later in apoplexy or p y.

46. (*d.*) *Cramps or spasms* may depen pon irritation of the bowels by acidity or flat nce, and, when they affect the lower extremitie the gouty diathesis, they generally proceed fr this source, and are often connected with the p ence of morbid or effete matters in the circ ion. More *permanent or protracted spasms* ge ally proceed from inflammatory action in tho portions of the nervous centres where the rves originate that supply the contracted musc and these are often the forerunners of palsy, ar metimes associated with palsy of adjoining p , or of opposite limbs, and are often followed apoplexy or coma.

47. Cramps or spasms, varying in ch cter with existing pathological conditions, o r in various diseases. They often effect the cles of the lower extremities, when the intestin nal is violently irritated, and often also the ab inal muscles. Although indicating a severe e of disease, they are seldom attended by dan un less they extend to the superior extremi , or are symptomatic of pestilential cholera, o the ingestion of acrid, or of irritant and dep sing poisons (see Art. POISONS, *pleuries*). Wh they occur in the course of phrenitis, of apopl , or

of ilsy, they are unfavourable symptoms, and ind ate at least a severe form of disease, passing int organic changes in parts of the nervous ce es. They are also most serious indications wh they occur in fevers and in puerpural fer es. The same remarks apply to *convulsio* appearing in the circumstances now mentio l, unless they are symptomatic of hysteria. (S Arts. CONVULSIONS, EPILEPSY, HYSTERIA, &c

Muscles are sometimes singly affected, or the ffection extends merely to such muscles as are pplied by a single or by a pair of nerves ; an he affection may be either that of *paralysis*, or *spasm*, or the latter followed by the former. Th partial or limited affections are often impor t indications of the early stages of structural cha es in those parts of the nervous centres connec l with the origins of the nerves supplying the fected muscles. When one or more of the mu es of the face are thus affected, unless a ma est cause exists in the course of the nerves sup ying them, then more serious results may be exp ed, in the form either of apoplexy, or of con lsive coma, or of more complete or general pal If the muscles of the tongue or of the pha nx be implicated, in either of the modes ust ated, structural changes at the origins, or in he urse of their nerves, may be inferred, which wil ooner or later terminate in an apoplectic eiz , or in hemiplegia. When these muscles re affected as to prevent articulation, or delut on, or both, an apoplectic attack, rapidly er ating in death, generally ensues after no er ong interval. Prolonged spasm or contracion the hands or feet, or of both, is observed i nts and children, in connection with cereral sease, and often also with laryngismus: it a ys a very dangerous symptom.

4 Muscular movements are affected by ise in every form or grade from complete oss the power of contraction, to impaired eat or irregular or uncertain contraction, involu ary twitchings, clonic or atonic spasms, or on sive movements, spastic or protracted conac ns, and tonic or tetanic contractions of a rol ged and general kind. These grades of ise d muscular action are not progressive ; they e lom consecutive or progressive, but one or the enerally appears independently of the rest, nd, one state or form supervenes on the other, hat spasm is most frequently followed by ara is, this latter being rarely followed by pas These several and very different forms of us ar affection are common in infants, in hil n, and are not infrequent in adults and ged ersons. In young subjects, especially in hil n, they are more frequently sympathetic, i ation of the digestive canal, of teething, i stinal worms, although sometimes proeed more directly from alterations in the erv s centres or their envelopes ; whilst in ul and aged persons they more frequently ise om these latter morbid conditions. But hat er changes of a structural nature may ince em, they may severally appear in different ev in opposite states of the vascular system — st s of anæmia or deficiency of blood, or of tu fulness, or of excessive plethora ; and ese ifferent conditions of the vascular system e especially allied to particular forms of disordered muscular action, for, with vascular anæmia, loss of motion, or impaired or uncertain motion, or clonic spasm, or convulsions, or even protracted spasm, may take place, although clonic or atonic spasm or convulsion is the most common. The same remark applies to other states of the vascular system, for, even when loss of motion may be most complete, vascular fulness may be greatest, and, even when spasms are most general and protracted, as in tetanus, and in its several modifications, the vascular system may be equally exempt from deficiency and fulness of blood. All disorders of the muscular movements require close observation and most particular investigations into the pathological states producing them. They are of most serious import, especially in adult and aged subjects, unless when symptomatic of hysteria or gout, and even then they ought not to be undervalued ; and, unless they are referred to inflammatory action in some part of the nervous centres or thin envelopes, they are seldom benefited by large vascular depletions ; or, if depletions be indicated, they ought to be employed with caution, those which are local or derivative being the most serviceable. Much more frequently very opposite means to vascular depletions are required, especially tonics, antispasmodics, stimulants, &c., variously conjoined with other means, according to the changes inferred in each form of these disorders, and in each case which comes under treatment.

50. *C. The joints and ligaments* furnish signs which are intimately connected with constitutional diathesis, and with disorders of the digestive and vital organs. In the gouty and rheumatic diathesis, they are not only the most frequent seats of disease, but also the parts to which attention should be directed in forming an opinion as to the recurrence of disorder or the means of averting it. A tumid condition of the joints, and relaxation of their ligaments, whether appearing singly or in conjunction, are certain indications of predisposition to disease, even when little disorder besides is manifest. The former of these, especially when associated with a marked development of the lymphatic system, or with enlargement of the glands, or fairness of skin, &c., is a certain sign of the scrofulous diathesis; whilst the latter is connected with constitutional debility ; and is very frequently the consequence of masturbation. Primary debility and consecutive exhaustion, in these manifold conditions, are always attended by a weak or unusually flexed state of the joints ; and whether appearing in childhood, or in later periods of life, the joints and ligaments most prominently betray these conditions. The more vigorously the joints and ligaments perform their offices, the more perfectly are the several vital functions performed. When the joints swell, or are puffed, in the advanced course of the severer cases of small-pox, or of scarlet fever ; or at an advanced stage of puerperal phlebitis, or even in other forms of phlebitis, or in erysipelas, secondary inflammation and consecutive suppuration, in these parts may be considered to have either commenced or somewhat advanced. There are no external parts, which more certainly evince depression of organic nervous or vital power, or more frequently experience the injurious effects of infection or contamination of the blood — whether animal or external infec-

tion, or self-contamination by suppressed excretion or morbid absorption — than the joints, as I have shown and explained when treating of the Sympathetic Associations of Disease (§§ 21, 72.).

51. Not only the large, but also the small joints are objects of attention in disease. The latter are often the seats of painful affections, especially in females after the menstrual epoch of life, or during far advanced age, these affections partaking more or less of a rheumatic or of a gouty character, or of both. They are generally dependent upon disorder of the digestive and biliary organs and impairment of the excreting functions of the skin and kidneys. The last joints of the fingers are often enlarged in phthisis, whilst their ultimate extremities are wasted, and the nails are uncated or bent over the wasted tips of the fingers. In most diseases of debility or exhaustion, and in febrile maladies, the motions of the joints, and especially the remarkably impaired power of sustaining the weight of parts superimposed when the limbs are extended in attempting to stand erect, evince the degree of vital depression, and the loss of muscular and nervous energy.

52. The extremities also beyond the larger *joints* become the seats of *emaciation*, or of *œdema* — of the *former* in protracted chronic diseases and in those just named, of the *latter* especially when the limbs are depending, or when the venous or lymphatic circulation is interrupted by pressure, or by vital exhaustion or other causes. When œdema or swelling of one or more extremities occurs from the pressure of internal tumours, or appears in the last stage of phthisis, it is an unfavourable sign; in the latter disease especially, it generally ushers in a fatal issue. It is a very prominent sign of inflammation of the lymphatics, or of the veins, or of both; and it sometimes occurs in artereitis. In phlegmasia alba dolens, the swelling is very great, with little or no pitting by pressure, the veins and lymphatics being generally obstructed, and the adipose and cellular tissues loaded with a semi-coagulated lymph. Œdematous swellings of the extremities are always unfavourable signs when they appear in the course of prolonged internal maladies, especially upon diseases of the heart, kidneys, lungs, liver, or spleen; or upon ovarian disease, or aneurism, or internal abscess, or tumour. If œdema affect one arm, it is generally unfavourable, although no disease of the heart, lungs or pleura can be detected. Swelling of the arm is a very important sign of tumours, especially cancerous diseases of the mamma, as showing that the lymphatics, or even the veins, have become affected. Œdema of the lower extremities, when owing chiefly to debility, or to a depending position, or to both, or to the pressure of the gravid uterus, or of fæcal accumulations in the cæcum or sigmoid flexure of the colon, generally disappears after the removal of the cause.

53. The *nails* of the fingers and toes, and the *hair* are often affected by internal as well as external maladies. The *nails* frequently manifest cachectic states of the system. They become elongated and uncated, or bent over the wasted tips of the fingers in phthisis; often also blue in this malady and in other diseases of the lungs and air-passages, when the blood is not sufficiently changed by respiration, and in congestion of the heart or lungs. They, with the fingers, assume a still more livid hue towards the fatal termination of these diseases, and during the collapse of pestilential cholera. The nails and matrix, or secreting structure of the nails are altered, the former becoming thick, or brittle, dry, &c., in several chronic cutaneous affections, especially in psoriasis, lepra, pityriasis, &c., evincing an obstinate form of these affections. The nails partake, to some extent, of the alterations of the cuticle, in acute and chronic diseases attended by exfoliation of this tissue; the hair also becoming implicated.

54. In acute or febrile phthisis, in exanthematous and in continued fevers, the *hair* falls out, becomes thin, dry, weak and straight. This affection of the hair is not very marked in chronic phthisis, and it does not occur until the most advanced stages of, or in the course of convalescence from these fevers. The hair falls out more slowly in consequence of the syphilitic and mercurial poisons, of masturbation, of premature or excessive sexual indulgences, of mental exertions, and the depressing passions. It becomes prematurely *grey* from pityriasis, from sudden mental shocks, from the depressing emotions, from excesses of all kinds. Loss of the hair, premature greyness, and exuberance of the hair, are severally more or less hereditary in families. The loss, greyness, or want of lustre of the hair, depends upon defective nutrition or atrophy of the follicular bulbs of the hair. (See Art. Hair.)

55. II. Symptoms and Signs furnished by the Senses and Nervous System of Animal Life. — The *signs* furnished by *the organs of sense*, are dependent on the states of the brain, although often more or less influenced by the organic nervous system. The intimate dependence of the senses upon the brain is evinced most remarkably by the *eyes*, and less so by the function of *hearing*. The sense of *smell* is influenced by the respiratory functions and states of the brain and respiratory passages, whilst the brain is often affected through the medium of this sense. *Taste* is very closely connected with the digestive and organic functions. The sense of *touch*, whilst depending on the brain, requires the medium of transmission to the brain to be capable of conveying the impression which touch produces. In all cases, it is necessary to *perception* through the medium of any of the senses — 1st, that an impression be made on the sense; — 2nd, that the nerves of sense should be in a state capable of transmitting the impression to the brain; — and, 3rd, that the brain should be able to perceive the impression which has thus been made. The impression made on the senses may fail in either of those quarters or channels. — (*a*). The impression may fail owing to the *organ* of sense not being in a state to receive it at all, or to receive it in a normal manner, — as the eye or ear from defect or disease; or the organs of smell and of taste from diseases of the respiratory and digestive organs, with which they are connected. — (*b*.) It may not be perceived from the circumstance of the nerves of sense not being capable of transmitting the impression to the brain, as in cases of atrophy, injury, wounds, &c., of these nerves, or of tumours, morbid deposits, &c., pressing upon them: — and, (*c*.), the impression may not be perceived, although received and transmitted, owing to the condition of the brain at the origins of these

ner s in the brain, or at the seat of conscious
sen ion. — (*d.*) While these are the requisites
for e discharge of the functions of sense, diseases
of ier organs influence these functions, in one
or er of these three quarters — by implicating
or ordering either the organ of sense, or the
ner communicating with the brain, or the brain
itse

5 Disorders of the functions of sense are of
imp tance according to the sources to which they
ma e traced. They are most serious or danger-
ous ien they can be referred to the brain ; much
less when they proceed from the nerves of sense
or f n the states of the organs of sense, and least
so w en they are sympathetic, or depend upon the
dige ve functions. Owing to diseases of one or
mor of these quarters or sources, the functions
of s e may be suspended, destroyed, diminished,
dep ed, or exalted ; these several conditions de-
pen g upon any one of these sources, or upon
two more of them. They may be abolished or
sus ded in fevers, apoplexy, palsy, &c. ; they
ma e depraved or altered in nervous fevers,
and diseases of the respiratory and digestive
org ; they may be diminished or impaired, in
thes nd many other maladies, and they may be
exa early in fevers, in inflammations of the brain,
spin chord, or their membranes, and even in
hyst a and hypochondriasis. It is so far favour-
able hen the senses continue unaffected in acute
dise s ; and a return of their functions after a
cris in these diseases, or in conjunction with
othe early favourable symptoms, is a fortunate
con rence.

5 i. The Signs presented by the Eye are
amo t the most important which are furnished
by t senses. The volume, the position, the mo-
tion the colour, the brightness and expression,
the tes of the several tissues, and the functions
of eyes demand a particular notice. The
path gical changes of the organ are described
in t article Eye, the sympathetic and sympto-
mat ndications furnished by it are now only to
be nsidered. — (*a.*) The *size* of the eye is
cha d chiefly in hyperæmia of the tissues of the
orga in congestions of the brain or of the heart
or l gs, by impending suffocation ; in apoplexy
in p nitis, in the paroxysms of epilepsy and con-
vuls , in delirium tremens, &c. ; but the increased
size not great, the apparent increase being
caus more by the prominence given to the organ
by c gestion or turgescence of parts posterior to
it, t by the distension of its tissues. In these
case he volume and prominence of the globe are
rapi or acutely increased ; but they may be
aug ted in a much slower and more remark-
able nner, in several chronic structural changes
of th rgan. (See Art. Eye, *pluries.*)

58 *b.*) The eye may be *protruded* slightly by
turg y of the tissues behind it, giving it also an
appa t increase of size ; and more remarkably
by t ours, by aneurisms, by exostosis or osteo-
sarc a, by disease of the periosteum, or of the
lach nal gland ; by structural changes of the
mem anes, bones, &c., and by inflammation of
the ose tissue behind the eye. The position
of t organ may be variously altered by these
mala s. The eye may be directly protruded, or
it m be forced, or turned to one side.—*Sinking*
of th ye (§§ 8.), is caused by absorption of the
adip substance behind the globe, by diminished turgescence of the vessels, and partially by an atrophy or lessened fulness of the tissues and humours of the organ. Sinking of the eyes is generally equal as to both, as it depends upon constitutional causes, and, when very remarkable, it is always a sign of a severe or dangerous malady. Where only one eye is sunk, a local affection of the brain, or atrophy of the nerves of the eye, or paralysis of these nerves may be inferred.

59. (*c.*) The *motions* of the eye may be affected by paralysis, or spasm, or by debility, exhaustion, &c. Immobility and wrong direction of the globe, may arise either from paralysis or spasm, and are signs of disease of the brain or of its membranes, especially congestion, effusion of fluid, hæmorrhage, softening, or any of the alterations productive of apoplexy, palsy, coma, convulsions, &c. Immobility is observed chiefly in catalepsy, apoplexy, and profound coma, and indicates a severe or very dangerous state of the latter. A faulty direction of the eye-ball, when permanent, depends chiefly on paralysis of the muscles on the side opposite to that to which the eye is turned, and more rarely to contraction of the muscles of that side. Squinting is a sign of organic alteration of the membranes or substance of the brain ; is most frequently seen in hydrocephalus, in convulsions, apoplexy, cerebral inflammations, palsies ; and is a most unfavourable or fatal sign of these maladies, the exceptions to this issue being few. During crises, or when it is observed in cases of worms, or in the paroxysm of epilepsy or hysteria, it is not so dangerous as in the foregoing maladies. Congenital or acquired squinting — acquired from habit — has no semeiological import.

60. Distortions of the eyes, of a passing or temporary kind, are produced chiefly by spasms of the ocular muscles, and occur chiefly in convulsive affections, in the diseases just mentioned, and in several acute maladies. When they are observed on the invasion of acute diseases, especially in any of the exanthemata, as small-pox, a most severe or dangerous attack is then indicated. If they appear in an advanced stage of cerebral diseases, of exanthematous or continued fevers, or in low or putro-adynamic fevers, the prognosis is still more unfavourable, or even fatal.

61. (*d.*) The *colour* of the conjunctiva should not be overlooked: redness of this coat is a sign of congestion or inflammation, either of it, or of congestion or inflammation of the brain or its membranes. The redness is most frequently the result of irritation from mechanical causes, or of catarrhal inflammation. When it is produced by acute sthenic inflammation then the conjunctiva is also much swollen. In the asthenic states of conjunctivitis, and in scurvy, the colour is a dark red. In apoplexy, in cerebral fevers, and in typhus, the conjunctiva is generally more or less congested and red ; and frequently also in cases of vascular determination to the brain, especially in the morning before leaving bed. *Ecchymoses* of the conjunctiva are sometimes also observed in these maladies, and after epileptic or other convulsive attacks, these changes of this coat indicating a severe or dangerous disease. If the injection or congestion of the conjunctiva present a dirty brownish, or livid hue, not only cerebral congestion, but also alteration of the blood may be inferred, and a most unfavourable or fatal prognosis may be formed, especially in putro-adynamic

fever, typhus, small-pox, scarlet fever and measles. Other changes in the eye connected with simple, gouty or rheumatic inflammation, and the several alterations of structure of this organ, are described in the article Eye.

62. (*e.*) The *form and size of the pupil* are much affected in cerebral diseases, and in other maladies, through the medium of the sympathetic nervous system. A *contracted* pupil is observed in active vascular determination to the brain, in inflammation of this organ or of its membranes, in the early stage of irritation or scrofulous disease of the brain, before passing into effusion, in retinitis, and in poisoning by opium. When it occurs in apoplexy, or when one pupil is contracted whilst the other is dilated, either in apoplexy, palsy, or epilepsy, an unfavourable prognosis may be formed. A *dilated* pupil occurs in an advanced stage of hydrocephalus, in coma, and in all diseases of the brain attended by effusion or pressure, as apoplexy, the last stages of phrenitis, and meningitis. It may occur also after epilepsy, convulsions and hysterical fits; and it may be produced by some narcotic poisons. Its connection with amaurosis and cataract should also be recollected. Dilatation of the pupil is observed in cases of intestinal worms, and often in scrofula, the early stage of phthisis, and in several chronic abdominal affections, especially in children. When it follows rapidly on a contracted pupil, during cerebral affections, effusion or organic alterations may be inferred, the latter especially if any difference in the state of both pupils be remarked.

63. The *motions* of the *iris* should always be noticed in connection with the size of the pupil. The iris may be unaffected by light, owing either to spasm or paralysis; this want of motion being most frequently remarked in the cerebral maladies already mentioned, and in typhoid and low fevers. In these, as well as in other maladies, of a severe or dangerous nature, this is a most unfavourable sign. Increased sensibility of the iris, with quick dilatation or contraction, is observed chiefly in hysterical and irritable or sensitive states of the frame; and in the early periods of exanthematous or other fevers. It is also remarkable in diseases of debility, or in cases of vital depression, when the functions of the brain are unimpaired.

64. (*f.*) The *lustre* of the eye depends chiefly on the state of the brain. It is increased in active determination of blood to, and in inflammations of, the brain or its membranes, until effusion, exhaustion or coma supervene. Increased lustre is sometimes observed in apoplexy; it precedes and accompanies the delirium of fevers; and attends several states of insanity. The lustre of the eye is impaired on the invasion of most infectious maladies; in congestive affections of the heart, lungs or brain, and in severe diseases of the abdominal organs. The lack of lustre is further increased in the last stages of acute diseases, especially when the blood is contaminated, as in malignant or pestilential maladies; and is always a very unfavourable sign. It is often a fatal indication in inflammations of abdominal organs, and in these it evinces the occurrence of gangrene or fatal sinking. A glazed appearance of the eyes generally precedes dissolution.

65. (*g.*) The *expression* or *look* of the eye, or the impression made by the eyes of the patient on the observer, is generally either that which is natural or usual, or that of anxiety, o fright or despair, or of wildness or madne expression of the eye generally harmoni that of the countenance. The *natura* a patient's eye is always a favourable stance in both acute and chronic dise *timid* or *mild expression* is observed or vasion of acute diseases, and before reaction is developed, and towards the ter of dangerous chronic maladies. It is a in hysteria, in disorders caused by self-p and hypochondriasis. A *timid, furtiv cast*, or *unsteady* look is common in tl ders of the mind. An *anxious expr* observed in diseases of the heart, an respiratory passages, when the respirato are difficult, and in inflammations of the s bowels or liver. A look of *fright* or occurs in alarming cases of hæmorrhage lent colic or ileus, in strangulation of th in pestilential cholera, sometimes in acut mations of the digestive canal, and in a poisoning. It is always an unfavourable quently a fatal sign. A *wild, terrified* or n expression characterises the paroxysm of the accession of delirium and mania, deli mens, and phrenitis or meningitis.

66. (*h.*) The *function of vision* is affected in disease, either with, or wit *creased* or *diminished sensibility of the eye Increased sensibility* to light (*Photophobi* served in many diseases, — 1st, in diseas eye, especially in inflammations of the tissues, and in scrofulous, gouty and r affections of the organ; — 2nd, in dis which affections of the eye become p phenomena, as small-pox, measles, catar — 3rd, in affections of the brain or of branes, especially in inflammations or i of, and vascular determinations to, th whether primary or associated with f other maladies. Photophobia is gene served during the early stages, and pr these, and before effusion or other organic consequent upon inflammatory action, or have supervened. It also occurs in del mania and several states of insanity; — in various diseases, in which the nervous generally, both organic and animal, e creased susceptibility and sensibility, as hypochondriasis, rabies, and during recov many acute maladies. *Impaired sensibili* eye to light often occurs in far advanced the diseases, in the earlier periods of w creased sensibility is observed. The *sens* the eye to light, whether increased or di should not be confounded with increase the power of vision; for vision may be markably impaired, when the sensibility is most acute, and the reverse is as frequ served.

67. (*i.*) *Diminution or loss of vision* r from a variety of pathological states. — 1 changes in the tissues and humours o itself; — 2nd, from disease of the brai membranes, or of the optic nerves, or of implicating either these nerves or the op branches of the fifth pair of nerves; — from sympathy with disease of any of the nal organs: from intestinal worms; fro cal hypochondriacal and of the nervous a

aintings, and from general or local debility aaustion (see Arts. Eye and Amaurosis). loss, or even diminution of sight occurs delirium, or in the course of fevers, and in ons of the brain, the supervention of coma, ıpoplexy or palsy, or of both, may be ex-.

6 (*k.*) *Morbid* or *altered vision* presents various ınd phases. — *Near* or *far sight* depends on ferent degrees of convexity of the cornea, the states of the anterior humours or parts eye-ball. Near sight (*Myopia*) is often con- and continues through life, or nearly so. , however, be acquired from the constant uent use of the eyes at near objects, or at ıe near focus. Far sight (*Presbyopia*) may rom habitually directing the eyes to distant , and is common in sailors. It is still more n in advanced age. It is owing chiefly to hed convexity of the cornea. *Interrupted f vision* occurs either from a partial para- the retina, which is sometimes temporary mpathetic, or from a more permanent in the humours or nerves of the eye. enerally symptomatic of disorder of the e functions when it is not continued; but t is constant or increases, it is caused by e in the optic nerve or optic thalamus.

69 *Double vision* generally proceeds from dis- the brain or membranes, from effusion of ithin the cranium, or from alterations im- g the medulla oblongata or base of the It is an unfavourable sign whenever l disease is indicated, especially phrenitis, y, palsy, epilepsy, &c. It may usher in rous attack of apoplexy or palsy, or pre- maurosis, or it may follow the severer sms of epilepsy or convulsions. It some- ccurs on metastasis of rheumatism or gout rain; and it occasionally supervenes upon, ds disease, especially inflammation of the hord or its membranes, and it is then a ngerous sign, inasmuch as it evinces the on of disease to the base of the brain. vision may accompany intoxication, in- worms and disorders of the digestive or- ecal accumulations, hysteria, &c. But it associated with symptoms which indicate re, and is commonly temporary or soon l.

70 *Vision* may be deformed, — objects being inverted, crooked, disfigured, or distorted This state of vision occurs chiefly in cases nic organic diseases of the brain, mem- or bones of the cranium. Objects may pear brighter or darker than they really different colours, or certain colours may distinguished. A *brighter* or redder ap- e of objects than natural sometimes ac- ies irritation or inflammation of the brain embranes. A *dim* or *dark* state of vision ceed from debility of the retina, or from rbidity of the humours, or congestion of erior structures of the eyes. An inability nguish colours, or to perceive certain , indicates congestion, or alteration of the e structure, of the retina. *Scintillations,* lights, or little fiery balls (*Photopsia*), oc- congestions, hyperæmia, and inflamma- the brain or membranes, and they some- recede epistaxis, apoplexy, palsy, amaurosis, epilepsy, &c.; but they may also proceed from irritation of the retina and optic nerve, and from congestion or inflammation of the more internal tissues of the eye.

71. *Dark points*, figures or nets, or reticulated spots (*Muscæ volitantes*), before the eyes, sometimes proceed from congestion, irritation, or inflammation of the retina and adjoining parts, but more frequently from slight capillary congestion of the interior structures, especially the capsules of the humours, or turbidity of the humours, or varicose states of the extreme or lymphatic vessels. These appearances, as well as others of a similar kind, may sometimes depend upon congestions within the cranium. The states of the organ from which they chiefly proceed are generally sympathetic of disorders of the digestive organs, and are often associated with chronic cutaneous eruptions. They are also symptomatic of intestinal worms, of hypochondriasis, and hysteria. They are most frequently experienced by persons who have strained or over-exerted their sight on small or near objects. These disorders of vision may be more or less manifest for many years, — for thirty or forty years, — according to my experience, without much disorder of the general health, when they are not made the subjects of local treatment, by speciality doctors or surgeons, to whom, owing to the alarm of patients, they have often furnished rich harvests.

72. (*l.*) *The seeing of objects which have no existence—Illusions of sight*—are common in delirium, especially the delirium of fever, in states of fright or terror, in morbid states of the imagination, in delirium tremens, in states of intoxication, in the several states of acute or chronic insanity, in meningitis, and in rabies. It occurs chiefly from irritation or congestion of the cineritious portions of the brain, and is common in typhoid, low, continued, and exanthematous fevers, and in the last moments of sinking vitality, in acute and chronic maladies.

73. (*m.*) The functions of the *lachrymal glands* are often disordered in disease. The secretion of tears is generally impeded in fevers, especially during the early stages, when all the secretions are scanty; the dryness of the conjunctiva in these diseases, as well as in exanthematous fevers, favouring the occurrence of inflammation of this membrane. Increased secretion of tears may be either apparent only or real. It is often the former, when the carunculæ lacrymales are red, swollen, or partially obstructed by inflammation, catarrh, &c. It is the latter in hysteria, hypochondriasis, in low and mentally depressed states of disease, in nervous fevers, and in the depressing mental emotions. An increased flow of tears is often most beneficial in severe mental shocks, and on occasions of mental distress: it is, however, frequently produced at pleasure, or in paroxysms of temper, by females.

74. ii. The Sense of Hearing furnishes signs, which have reference,—1st, to diseases of the organ itself; 2nd, to diseases of the brain, with which this sense holds intimate relations; and 3rd, to diseases of more distant and less obviously related organs. The *first* of these have been treated of in the article Ear, and *diminution or loss of hearing*, from diseases of the *organ*, or of the *brain*, or of more *distant parts*, has been fully considered in the article Hearing. There

remains, therefore, but little further to say respecting the signs of disease furnished by this sense. *Noises* in the ears, and *ear-ache*, are also severally symptoms of disease, either of the ear itself, or of parts in the vicinity, as of the throat or pharynx, or of distant parts, or of the system generally, especially continued fevers.—*a.* The *former* often precede the accession of delirium, and attend and aggravate delirium tremens. Noises in the ears also accompany anæmia, especially that consequent upon protracted rheumatism occurring in far advanced life; and they frequently attend diseases of the uterine organs, or large losses of blood either by hæmorrhage or by excessive blood-letting. In plethoric persons, they sometimes usher in an attack of apoplexy, or of epistaxis; and they should be viewed as unfavourable signs. When they are experienced in very aged persons, especially in females, who pass sedentary lives, without exercise in the open air, although not indicating danger, they resist all means of cure, if exercise in the open air be not regularly and perseveringly taken. (See Art. Ear, *Nervous affections of.*)

75. *b. Earache* is an unfavourable symptom in continued and exanthematous fevers, especially in scarlet-fever and small-pox. In these, as well as in other constitutional maladies, and even in secondary syphilis, it indicates the supervention of a local inflammatory complication, generally extending from the throat, along the Eustachian tube to the ear, and frequently either destroying the organ, or, after effecting this, extending to the membranes and substance of the brain, as I have shown to occur on many occasions, in connection with these and other maladies (see Art. Brain, §§ 146. *et seq.*). The importance of giving due attention to earache, and other affections of the ear, with reference to their pathological and semeiological relations, is more fully shown in the articles on Earache, and on *Inflammation of the* Ear.

76. iv. The Sense of Smell has intimate relations with the brain and respiratory functions.—*A. Acuteness of smell* (hyperosmia) is often present at the commencement of irritation or inflammation of the brain or its membranes, or of nervous, typhoid and exanthematous fevers, and in hypochondriasis, hysteria, uterine affections, and often in epilepsy. It sometimes precedes the accession of mania or delirium.—*B. Want of smell* (anosmia) is occasioned by affections of the nasal-membrane, in catarrhs, influenza, inflammations, &c.; and by chronic diseases of the brain, or of the membranes, or of the bones of the cranium; or by secondary syphilis, or by the progress of low or exanthematous fevers.—*C. Perversion* of this sense, or smells which are different from those perceived by other persons, or which are peculiar, or unusual, sometimes precede an attack of apoplexy or of epistaxis, or of paralysis. It sometimes attends disorders of the digestive organs, hypochondriasis, hysteria, uterine diseases, secondary syphilis, and organic diseases of the brain and cranial bones.

77. *D. The secretions* of the nose are affected in catarrh, influenza, in scrofulous affections, in continued and exanthematous fevers, in syphilis, in worms, and in various disorders of the respiratory and digestive organs.—*a. Itching* of the nostrils is a sign of the presence of intestinal worms, especially of the small worm; and in females, of irritation of the organs, often connected with masturbatic occasionally precedes epistaxis, and in age sons it sometimes is a prelude of dangerou bral disease.—*b. Hæmorrhage* from the nos *taxis*) occurs under circumstances which ha fully described in the article Hæmorrhage *et seq.*). It is often a critical discharge in inflammatory and congestive diseases, esp in congestions of the heart, lungs or brain, active determinations of blood to the last organ. The occurrence of it may avert an of apoplexy or of palsy, when not injudi suppressed, especially at advanced periods Passive epistaxis, the vessels being defec tone, and the blood deficient in crasis, or p contaminated, as often observed in ca habits, or in putro-adynamic states of fe scurvy, purpura, &c., is often attended b risk, especially when these conditions of th and of vital power are prominently marke decided measures the most calculated to ar discharge are then required. (See Art. H rhage, §§ 15. 16. 17. *et seq.*)

78. v. The Sense of Taste is often affe connection with disorder of the sense of It is either acute, impaired, lost or vitiated ease.—*a.* It is rarely more *acute* than n Acuteness of taste is most frequently obse hysteria, hypochondriasis, in nervous aff and occasionally in nervous fevers.—*b.* *impaired* or *lost* in catarrhs, catarrhal fev fluenza, in acute or inflammatory indiges chronic gastritis, or gastro-enteritis; in a or saburral state of the digestive mucous In congestive or inflammatory states of the and in low, continued and exanthematous When taste is restored early during convale from these maladies, a favourable issue expected; when it does not return duri vanced convalescence from apoplexy, o diseases of the brain, or from gastric or c fevers, a renewed attack or a relapse dreaded, especially if the sense of smell al not return.

79. *c.* A *vitiated taste* is very common disorders of the digestive organs; freque nervous disorders, and often in affections respiratory passages.—*d.* The taste may *sipid* in catarrhal affections, in periodic fe mucous fevers, and in cases of intestinal —*e.* It may be *bitter*, in biliary disorders, in fevers, in jaundice, and in chronic and str diseases of the liver, spleen or pancreas, es if it continue notwithstanding the inges wholesome food.—*f. An acid taste* is expe during heart-burn, indigestion, and disor the digestive organs generally. It is often by gout, or rheumatism, or calculous aff by flatulence, or by eructations from the st *g.* A *salt* or a *sweetish-salt taste* is occasione presence of small quantities of blood in the and by the expectoration of matters from th containing either blood or purulent matte is thus present even in the early stages of nary disease, especially phthisis.—*h.* A *p* *foul state* occurs in gangrene of the lungs, syphilitic and scorbutic affections of the gums or throat. It is caused also by carie teeth or gums, by the expectoration of p

, and by the discharge of abscesses by the
It is an unfavourable sign, in pulmonary,
tional and cachectic diseases, and in
maladies, especially when there is much
or emaciation. It may occur in gan-
f any part of the digestive canal, and in
ic dysentery, and then it should be
as a fatal indication.—*i.* A *metallic taste*
ed by the constitutional operation of mer-
nd it often precedes the accession of saliva-
mercurial affection of the gums. It is
metimes produced by other metallic poi-
nd, in rare instances, it is experienced in
nd in chronic abdominal disorders. The
f the *tongue* are various, with or without
ve alterations of taste, but they will be
in the sequel (§§ 101. *et seq.*).

vi. The Sense of Touch may be more or
ered, either in one limb or extremity, or in
more.—(*a.*) *Acuteness* of the sense of
s observed in irritation or inflammation
brain, spinal chord, or their membranes.
times precedes mania, delirium and apo-
and often attends hysteria, rheumatism,
d hypochondriasis.—(*b.*) *Diminution* of
e of touch, in various degrees, is observed
ic diseases of the brain, spinal chord, or
embranes, and especially when these
are consequent upon inflammatory ac-
fusion or softening, or tumours. When
touch proceeds from these pathological
the result is generally unfavourable. It
cur in hysteria, hypochondriasis, in chronic
ns of the skin, epilepsy, delirium, syncope,
d then a less unfavourable opinion may be
ned. It may precede a crisis in fevers.
dependence should be placed upon it as
in these cases.—*c. Perversion* of this sense
in chronic changes in the brain, spinal
r their membranes, in nervous affections,
misplaced gout affecting the brain, or its
anes. In these cases of perversion, the
n of some body intervening between the
of the fingers and the objects touched is
ly experienced.

vii. The Signs furnished by Sensation
sibility, depend, as those evinced by the
either upon the state of the affected part,
e channels transmitting sensation, or upon
lulla oblongata and parts in the centre or
the brain, which are more especially con-
with the perception of sensation, or with
us sensation. *Sensation,* whether *animal*
nic, is either exalted, impaired, or per-
or suspended in disease. It may, more-
e variously exalted and perverted in the
se, this conjoined alteration giving rise to
y of feelings which have been recognised
nctive appellations. These may severally
l from the same pathological conditions as
een mentioned in connection with altera-
the sense of touch.—*a. Exaltation* of sen-
is observed in irritation and inflammation
spinal membranes, medulla oblongata and
in similar affections of the cineritious
re of the brain, in hysteria, hypochondria-
ies, &c.

. Diminished or *suspended,* or *lost sensation*
in apoplectic, convulsive, paralytic, epi-
nd catalyptic seizures, during syncope, and
hanges of the brain, medulla oblongata,
spinal chord and membranes, occasioning temporary or more permanent loss of consciousness, or anæsthesia. It may accompany, in its less manifest states, continued fevers; and in its more extreme grades, it may follow delirium in the form of *sopor* or *coma,* in these and all other fevers. In all these maladies it is an unfavourable, and in many a most dangerous sign. Impaired or lost sensibility to the common wants of the economy, or to the usual or natural irritants or stimulants, or the loss of sensibility in parts not liable to the deprivation of it, is always a dangerous indication.

83. *c. Perverted sensibility,* or depraved sensation, is more generally associated with exaltation, than with diminution, of sensation. Whilst exalted and impaired sensation should be referred chiefly to the cerebro-spinal nervous system — to *animal sensibility,* depraved sensation, as respects its chief manifestations, depends upon *organic sensibility* — upon the state of the organic or ganglial nervous system. Perverted sensations referrible chiefly to animal sensibility, are itching, formication, stinging, tingling, pricking, tickling, burning, &c. They are felt in the integuments, and in the extremities — in the latter, during organic affections of the brain, spinal chord, and their membranes; and previously to, or upon recovery from, an attack of apoplexy, palsy, epilepsy, convulsions, gout, &c.; — in the former, in exanthematous fevers, either previously to, or during the appearance of the eruption, and in numerous acute and chronic cutaneous diseases. Tickling or titillation, or a sensation intermediate between this and itching, is often experienced in the soles of the feet or palms of the hands, and sometimes in other places, without any disease being either present or expected. The former of these situations may, however, be artificially tickled so as to induce violent convulsions; and, if this cause be persisted in, the result may even be fatal. Spontaneous sensations of itching and tickling may also become so distressing as to occasion convulsions, delirium, or even mania, in hysterical and nervous persons, but this is very rarely observed. A sense of burning in the soles of the feet and palms of the hands is frequent in the gouty and rheumatic diathesis, in hectic and in morbid states of the circulating fluids.

84. *B. Perverted sensations,* which are referrible chiefly to the organic nervous system — or *perverted organic sensibility* — vary very remarkably, from a sense of uneasiness and restlessness, to that of distress, anxiety, and acute pain.—(*a.*) *Uneasiness* or *discomfort* occurs in the invasion of most acute maladies, and more especially of those produced by infection; but it also is observed after the suppression of any of the secretions and excretions, and on the appearance of any eruptive disorder. It also attends most chronic complaints, especially hysteria and hypochondriasis. *Restlessness* may be considered as a higher degree of discomfort, and is generally present in the circumstances just stated, or it follows uneasiness, during the accession of disease. A most distressing state of restlessness, or that attended by more or less anxiety, is observed at a far advanced stage of chronic and often also of acute diseases. Restlessness at the commencement or at an early period of acute disease is always an indication of a most severe or dangerous attack. If it appear

in the course of febrile complaints, it is often occasioned by the accession of some important complication, especially in children, as inflammation of the brain, spinal chord or membranes, or carditis or pericarditis. It may, however, usher in a critical discharge; but if it continue, or appear after a crisis, in acute maladies, or at a far advanced period of either acute or chronic diseases in connexion with vital depression or exhaustion, or with frequent or difficult or anxious respiration, it is always a very unfavourable or fatal sign — usually fatal when it is referred to a state of internal feeling of distress or anxiety.

85. (*b.*) Discomfort may proceed to restlessness, thence to distress, and thence to a feeling of *anxiety*, which is merely a more extreme sensation of distress. These grades of morbid organic sensibility vary somewhat in character and severity, according to the region or organ chiefly affected. The distress or anxiety attending asthma, pneumonia, effusion into the pleural cavities —*anxietas pulmonalis*— is different, and distinguished by the patient as different, from that which proceeds from disease of the heart, pericardium and large vessels —*anxietas cardiaca* — and from that which is occasioned by acute disease of the stomach, liver, diaphragm, or by the ingestion of acrid poisons, or any of the more dangerous maladies of the abdominal viscera — *anxietas præcordialis*. Always keeping in recollection the differences between mental and bodily distress or anxiety, the latter should be referred especially to the morbid impression, or suffering, experienced by the organic nerves of the affected organ. This suffering may either exist in one of the organs just noticed, or be extended to several of them, or it may also implicate the nervous system of animal life, and occasion the *anxietas nervosa*, as in hysteria, hypochondriasis, rabies, tetanus, nervous fevers, &c. A feeling of *anxiety, distress*, or *suffering*, may accompany the cold stage of periodic fevers, or the invasion of malignant or pestilential maladies, or it may accompany the accession of a crisis. In these cases, although a most severe attack may be expected, inasmuch as this sign is an indication of the serious morbid impression made upon the organic nervous system, one of the prime factors of life, yet the danger is not so great as in those cases, in which this feeling supervenes in a far advanced stage of the diseases above mentioned. When it thus occurs in this stage, when it follows closely upon acute inflammation, or when it is of long duration, the danger is very great, and even extreme in pestilential maladies — *anxietas moribundorum*.

86. (*c.*) *A feeling of cold*, as already shown (§ 19.), may exist independently of any depression, and sometimes even in connection with an increase of the animal temperature. It may be attended by shiverings, shudderings, rigors or even horrors, according to the grade or intensity of this feeling. The severity of this sensation is generally an indication of the severity of the consecutive attack when it ushers in an acute disease — either inflammatory or febrile; and it is no less an indication of danger when it occurs in the advanced course of inflammations, of eruptive fevers, and even of chronic visceral disease. Rigors are often the forerunners of dissolution when they occur in diseases, in which debility or exhaustion is very remarkable (see ab , §§ 20. *et seq.*). An internal feeling of cold ex perienced on the accession of disease ndi cates a very severe and dangerous att ; it felt at a far advanced stage, it proceeds fro fatal sinking.

87. (*d.*) *An internal sensation of unusu heat* is frequent in acute or inflammatory diseas and it may be present when the surface is a ally cooler than natural. The feeling of he may depend upon states of internal or centra parts which do not reach the periphery even th trunk; and it, as well as the feeling of col is to be referred chiefly to the changes in the o n of part in which the sensation is felt, the anic nervous system participating in these cha es in an especial manner, inasmuch as it is instru ental in the performance of the calorific proc A sensation of heat, or even of burning he ma be concentrated in internal or central par may accompany either open or latent inflam tory attacks, and may exist, especially in the tter although the external surface or the ext itie be cool or even cold. Local feelings of h t ar indications of irritation and local vascula eter minations of blood, or of inflammation, r o approaching hæmorrhages. A general fe ng heat attends the more sthenic forms of feve bot periodic and continued, especially in the ge vascular excitement. A local sensation o eat much more dangerous in these fevers an general feeling of heat, and when it is expe nce in these diseases it should be viewed eithe s th precursor of a crisis by hæmorrhage, or a n in dication of the supervention of a prominer ffe tion or complication. If the cessation of rn heat be attended by free secretion or ex tion the prognosis is favourable; but if it occ sud denly, or is followed by a feeling of c th prognosis is bad. The sensation of he may change its seat, especially in nervous ver influenza, hysteria, hypochondriasis, and ease of the abdominal viscera; but the am nt danger in these complaints depends u the concomitant symptoms and signs; and iefly upon the other conditions of the surfac with which the sensation of heat or of cold is ge rally associated (see §§ 22. *et seq.*).

87. (*e.*) Feelings of *muscular fatigue*, ene *ral malaise*, or of *exhaustion*, or of *vital dep* sion, or of *sinking*, are chiefly modified grades the depression of vital power accompanying the the invasion of acute diseases, or the bility consequent upon great excitement. Whe hese feelings are very remarkable on the inva n of acute maladies, they augur a very dange s at tack; and when they become extreme a fa advanced period they are then attended b grea danger, and they require the administra n of very active restoratives, appropriately to t cir cumstances of the case. (See Arts. D LITY and DISEASE (§ 67.).

88. *C.* PAIN is a most important sy om, as indicating the seat, the nature, and e the probable result, of disease. It is a warn fur nished by nature to convey this informa ; it both puts the patient on his guard to rem the cause of suffering, and disposes him to the means for this purpose. It further tends use the conservative influence of life — to ex the vital resistance — against the extension of ease

to vent dangerous or fatal sinking, and to bring abo a salutary reaction. In order, however, tha pain should have these salutary effects, it sho l not be allowed to be excessive or inten for a prolonged period, or without having rec rse to means to assuage it; the expression of when excessive, ought not to be suppressed; and e effect of its continuance, as well as the sev l phenomena which accompany it, should be sely observed and carefully compared and esti ted. In our investigations into the nature and sea f pain, there are several things to be ascertai , especially its *duration* and mode of *accession* ts exact *seat* and *relations*, its *character* and *seve y*, and the influence produced upon it by diff nt degrees of *pressure*, *percussion* and *temper re.*

8 a. *Pain* may be either *dull*, *obtuse*, or *hea* or *aching*, in connection with congestions and hronic inflammations, or with acute or chr c inflammations of parenchymatous organs, and ucous membranes, in cases of effusion into inte al cavities, or of internal tumour, and sometim in the congestions and vascular determination receding hæmorrhages.

9 *b.* A *gnawing* or *lacerating pain* generally acc panies rheumatism, gout, cancerous diseas &c. A *perforating* or *boring pain* is felt whic in diseases of the periosteum and bones, in s ndary or tertiary syphilis, in scurvy, especial at night, in the long bones and joints. A *burn g pain* attends gout, severe or intense inflam ation of the integuments, erysipelas, carbun s. A *pungent* or *tensive pain*, often with mor or less of a sensation of burning, is experi ced in acute inflammations of serous membra ; and in its most violent or stabbing form, n i mmation of fibrous, or sero-fibrous tissues, and those affections of the nerves, which have usu y been termed neuralgic, and which proceed with from inflammation of the sheath or neurilem , or from irritation at or near the origin of the rve. This kind of pain, also, especially whe occurring at short intervals, and of brief dur n, and characterised by violent dartings, acc panies the passing of gall stones, or of calculi ong the ureters. A *cutting* or *darting pain* also tends cancer, and inflammation of nerves, in whic latter it is often accompanied with a sense of n bness in the parts distant from the seat of pain ud is often, in this as well as in the other mal es just mentioned, characterised by a feeling heat or burning.

9 *c.* A *pulsating pain* indicates extreme cong tion of a parenchymatous organ, or the pass of inflammation into suppuration — common this latter when it is attended by horripilation hills, or rigors (§§ 19.). When this pain is p eded by a feeling of tension, the existence of a cess, or of effusion into a shut cavity may be infe l. A *pricking*, *stinging*, or *tickling pain*, may company acute eruptions on the skin, gout, orga diseases of the brain, spinal chord, or their mem anes, especially when these pains are felt in th extremities, and are attended, or are interrupt , by a feeling of numbness (§§ 41.), also hyst a, and hypochondriasis. A *violent twisting*, *spas lic*, or *griping pain* accompanies dysentery, ileus astralgia, enteralgia, strangulated hernia, and structions in the bowels. A *forcing*, *acute pain* ten also attends these maladies, the passage of concretions along canals, and diseases of the uterus and ovaria.

92. *d. The seat and duration of pain* suggest interesting considerations. The *seat*, however, should not always be received as a correct indication of the seat or origin of the disease: for, even in inflammations, the pain may be referred to parts at a distance from the seat of disease: thus, in pleuritis, the pain may be felt in the iliac regions, or below the false ribs; and, when a limited portion of the spinal chord or membranes is influenced, the pain may be referred to the distant extremities of nerves having relations with the seat of disease. This topic, is however, more fully illustrated in the article Sympathy.

93. The *duration* or continuance of pain is most various. It may be *transient*, *wandering*, *intermittent*, *remittent*, or *permanent*. *Transient pains* occur in hysteria, in gout, rheumatism, hypochondriasis, in catarrhal fevers and influenza, from irritation of the digestive organs, from accumulations of bile in the ducts or gall-bladder, and from irritation of the nervous centres of animal life. *Intermittence* or *remittence* of pain shows its seat in the nervous system, especially of animal life, and occurs chiefly in those diseases, in which this system in some part of its ramifications is more or less implicated, as in neuralgia, periodic fevers, rheumatism, gout, hysteria, &c. *Continued* or fixed pain indicates the more or less permanent nature of the malady, as inflammation, disorganization, rheumatism, syphilis. *Wandering pains* occur during the accession of acute or febrile diseases, in hysteria, hypochondriasis, syphilis, rheumatism, atonic gout, and in functional disorders of the digestive organs, especially he liver and stomach.

94. *e. Pressure* and *percussion* produce certain effects on pain which are extremely important in diagnosis. *Tenderness*, or incapability of enduring pressure, or increase of pain on pressure, is a sign of inflammation or of organic change. But in nervous, hysterical and hypochondriacal persons, the tenderness may not be connected with increase of pain on pressure — may be merely a morbid, superficial sensation, or an intolerance of touch; for, when pressure is made, when the patient's attention is distracted, or firmly or forcibly, the pain is either not increased or is diminished, showing the true nervous character of the tenderness or pain in these. *Diminution* of pain on pressure characterises colic, chronic rheumatism, and nervous pains or pure neuralgia, when not occasioned by inflammation of the nerve or its sheath. *Increased pain* on pressure attends inflammation, organic changes, the results of, or the attendants of inflammation, and vascular congestion. Increased or continued pain, the skin being hot or dry, and the pulse hard, or rapid, is a sign of progressive inflammatory action; and if the pain become pulsating with chills, heats and sweats; the sweats not diminishing the pain or changing its pulsating character, suppuration may be inferred. *Prolonged pain*, with more or less tenderness on pressure, indicates organic change, especially if emaciation advances, and if the secretions or excretions be disordered. A *decrease* of pain after the secretions and excretions become free or augmented is always a favourable sign. A *cessation* of pain coinciding with remission of fever and increase of the natural discharges

is also a favourable symptom; but a sudden cessation, without abatement of the other symptoms, or with the appearance of others which are unfavourable, indicates the occurrence of gangrene, or of rapid vital sinking. *Pain* or *spasm*, or the association of both, in parts which are paralysed either as to motion or sensation, is an indication of inflammatory action, or of inflammatory softening in or near those parts of the nervous centres, with which the nerves of the affected parts have intimate relations. Severe pains or spasms in a different extremity or part from that which is paralysed, indicate the presence or extension of inflammatory action to those parts of the nervous centres connected with the origins of the nerves of the pained extremity. (See Arts. Headache, Irritation, Neuralgia, Paralysis, Spasm, &c.)

95. ix. The Mental Manifestations furnish numerous signs, in respect both of their individual conditions and morbid associations, and of their connections with acute and chronic physical disease. But these have been noticed. as far as my limits admit, when treating of Delirium, Coma, Sleeping and Sleeplessness, and of the different grades and forms of Insanity, in which latter especially, as well as in the other articles, I believe these subjects have been fully discussed.

96. III. The Symptoms and Signs of the digestive Functions and Organs.—These functions and organs are essentially vital, and are under the dominion of the organic nervous system — the primary or chief factor of life — excepting at the entrance to, and outlet from these organs; and to these situations, accessory influences are imparted from the cerebro-spinal or animal nervous system. The states and disorders of these functions and organs, from the entrance to them by the mouth to the outlet by the anus, are intimately connected with the conditions of the organic nervous system; whilst this entrance and this outlet are controlled by the cerebro-spinal nervous influence. Thus the functions of the several digestive organs are manifestations of the conditions of organic nervous power, and the functions of these portals are indications of states of cerebro-spinal influence. The symptoms and signs furnished by the digestive functions and organs, comprise those evinced by the *teeth* and *gums*, by the *tongue* and *throat*, by *deglutition*, by the *appetite for food* or *drink*; by the functions of *digestion*, by *fæcation* and *defæcation*, and by the *abdominal regions*.

97. *A.* The Mouth *&c.*—(*a*). *The Teeth* are perfect and enduring in persons of sound constitution, their soundness often continuing to advanced age. Their early decay indicates either constitutional vice, or impaired constitutional power, or prolonged disorder of the digestive functions. The teeth are variously affected by acute and chronic maladies.—*Chattering* of the teeth occurs in the cold stage of fevers and invasion of acute diseases, and indicates a severe form of the supervening malady. It is also observed in hysteria, but in rare instances; and in dangerous shocks of the nervous system. It is most remarkable in the cold stage of agues. *Grinding* of the teeth during sleep, is common in children, and is a sign either of intestinal worms or of cerebral disease. If it occur in children in connection with brightness of the eyes, contr ted pupils, flushing of the cheeks, or startings in ep, then convulsions, cerebral meningitis, scro us softening of the brain, or other changes m be apprehended. In aged persons it sometime re- cedes an attack of apoplexy or palsy. If it cur in continued or in exanthematous fevers, it en- ders the prognosis more unfavourable, as evi ing a serious cerebral complication. It may, how er, take place in irritable persons and chi en, without any serious disorder, especially ing dentition in children.

98. The teeth are often covered with a g ish mucus in catarrhal fevers, in gastric disorder and in inflammations of the digestive and respi ory organs. They are more copiously cover by mucus or sordes of a dark or brown colour, ten extending to the lips and gums, in low, adyn nic or putro-adynamic fevers; the quantity and rk ness of the colour evincing the amount of d er The accumulation of tartar or cretaceous ter around the teeth, at the margins of the ms shows a disposition to calculous, gravel or gouty affections.

99. The teeth sometimes become inordi ely sensitive in nervous disorders, in disorders the digestive organs, and in acidity of the sto ch. They are loose in scurvy, in purpura, and in er- curial salivation. They appear elongated, ing to retraction of the gums, in scurvy, someti s in scrofula, and often in chronic gastritis and her prolonged disorders of the digestive organs. hey become carious owing to the excessive of saccharine and acid substances, especially in rly life, to the abuse of mercury, to chronic in es tion, and to ricketty and scrofulous hab of body. Improper diet, at an early age, favou the occurrence of this change in the teeth; di sed teeth are always an indication of pre-existin dis- order of the digestive organs, often con ted with the abuse of spirituous liquors, or of su in its various uses; and they generally evinc im- paired vital power and resistance.

100. (*b.*) *The Gums* and lips are pale in æ- mia and chlorosis, and after excessive ha ur- rhage, or injudicious bloodletting. When hey are covered by a similar mucus to that ob ved on the teeth (§ 98.), the diagnosis and pro osis are as above stated. They present a blue ar- gin in cases of slow poisoning or contaminati by the preparations of lead; and a red, spong and swollen appearance from the use of mercury on prolonged disorder of the digestive orga in diabetes, in incipient scurvy, and in pu ra. They become of a darker hue, more sp gy, more retracted, and more disposed to bl in scurvy and in chronic stomatitis. They a till more seriously affected in the ulcerative, ga re- nous, and phagedenic forms of this malady. See Art. Stomatitis.)

101. *B.* The Tongue presents diversifi ap- pearances depending — 1st. Upon the sta of the several digestive functions; — 2d. Up the nature of the disease; and 3d. Upon the ex ing constitutional disturbance, chiefly as respec or- ganic nervous power, vascular action, an an- guineous contamination. In estimating the gns furnished by the tongue it should not be er- looked, that it may be coloured by medicin by food and by drink, and be rendered drier an natural by breathing through the mouth; it

is uch less disposed to be affected by these ca es in health than in disease.

1 . *a. The mode of protruding*, of holding out, and of ithdrawing, the tongue is always deserving atte on. The tougue is protruded with difficulty in matose, apoplectic and paralytic cases, owing ch ly to a weakened or paralysed state of the or n; and, in the more dangerous states of these di ses, it is either imperfectly protruded or not at l. In this latter case, either the existing insensi ty prevents any attempt to execute the comma l, or the muscular power is so paralysed as to pr ent the act of volition from being performed; an f it be executed, the tongue often remains pr uded. A slow or tremulous protrusion; or tre or during the protrusion, of the tongue, is obser d in many nervous complaints attended by de ty or exhaustion, and more especially in low, typ id or adynamic fevers. A ready, quick and ste y protrusion and withdrawal of the tongue oc in diseases of excitement, in inflammatory aff ions, and whenever organic nervous power is t materially depressed, or when the cerebrospi l influence is not impaired or suppressed, as in e stupor or sopor of low fever, or in comatose sta . As long as the perceptive faculty is unim ired and muscular power is not remarkably rec ed or paralysed, these acts are usually na ally performed. The tongue is protruded to e side in cases of paralysis, especially in he plegia; but there is no certain corresponde e between the side to which it is protruded an he affected side.

3. *b. The size* of the tongue varies in different dis ses, and with variation in size there is often als ariation in *form*. *Increased size* is caused by flammatory action chiefly, this action being eit *primary* (See Tongue, *inflammation of*) or *secutive*. It is the latter chiefly as a compli ion of angina, of scarlet fever, small-pox, of steria, epilepsy, syphilis, and as a consequ e of mercurial action, or of poisons. The enl gement may, instead of being acute as in the cases, be chronic and the result of an by trophy or increased irritation of its tissues. W the enlargement may be connected several oth appearances, which indicate prolonged chr ic or visceral disease, as well as impaired con tutional or organic nervous power. The chi of these are—1st. A broad, flabby state, with mo or less intumescence, and with indentations by e teeth on the edges of the tongue; — 2d. A fiss d or sulcated condition, the tongue appearing bulated as well as enlarged; and 3d. A tun and livid state, the surface being covered by a y owish load, or a milk or cream-like mucus. Th irst and second of these occur chiefly in prolon d disorder of the digestive organs, or as conseq nces of mercurial action, or in connection wit hepatic disease, &c.; the third more frequ ly as a result of diseases of the lungs, heart, and rinary and uterine organs. Swelling of the ton e is a dangerous sign in cerebral affections, and n cases of poisoning. It is also very unfav rable in exanthematous or continued fevers, esp ially the putro-adynamic and pestilential, and n scurvy, particularly when the swelling is gre , or when the tongue is dark or livid, or is co ed by a sanguineous or sanious exudation.

4. *c. Diminution* of the size of the tongue is usu ly much less remarkable than enlargement. The diminution may be more apparent than real, owing to contraction of the organ laterally, as well as to a partial retraction. In these cases the tongue is narrow and pointed, and indicates a most dangerous state of typhus, typhoid and adynamic fevers, of acute irritation or inflammation of the digestive organs, or of the brain or membranes, especially when it is also dry and red at the point and edges. Actual diminution of the size of the tongue is comparatively rare, as emaciation, even when extreme, affects but little this organ.

105. *d. The form* of the tongue is not materially different from that already stated — the chief modifications being in the breadth of the organ in relation to the length, in the narrowness and thickness of it, and in the fissured or lobulated appearance of its upper surface. But this surface may present other conditions. It may be so deeply indented or furrowed, or fissured, along the centre, from the root to nearly the point, as to appear almost divided into two halves, the sides of this indentation sometimes being more or less furred (§ 110.). This state occurs chiefly in chronic disease of the abdominal viscera, especially of the digestive organs, and indicates a most obstinate, although not a dangerous disease. The tongue when protruded may present either a convex or a concave appearance of its superior surface, or a double convexity, owing to the furrow along the centre. When either of these states is very remarkable then more or less irritation or inflammatory action of the abdominal organs is very frequently present. The lobulated state of the upper surface of the tongue is caused by more or less numerous fissures or indentations in various directions. It is generally connected with a tumid and convex condition of this surface, and is most frequently seen in chronic diseases of the liver or other digestive organs, in diseases of the heart, and in disorders of the female sexual organs.

106. *e. The humidity* of the tongue proceeds from the salivary secretion poured into the mouth, and very partially from the mucous secretions in the vicinity, and from the exhalations taking place in the surface of this part and the vicinity. The presence or absence of this humidity — the moisture or dryness of the tongue, is most important as respects the other states of this organ, and as regards the secretions and excretions, and the conditions of vital power, and of the circulating fluids. *Humidity* of the tongue is often very remarkable in cases of debility when all the secretions are free, and the blood uncontaminated. When it is very considerable, and is attended by *softness* of the organ, and by a flattened state of the fur, when fur has been present, as in convalescence from acute diseases, either tonics are required or lowering means should be avoided. When the tongue has been dry or furred, or both, then returning humidity and softness are always excellent signs, and especially when the surface becomes also more clean, or when the fur disappears or is flattened, the tongue and mouth being sufficiently moist, &c. In acute diseases, the humidity appears first at the sides of the tongue, and gradually extends, the other changes advancing with the increase of humidity, and being favoured by the state of the salivary secretion. As long as the tongue and mouth continue moist, in acute

maladies, a favourable opinion as to the issue may be entertained.

107. *f. Dryness* of the tongue is as unfavourable a sign as humidity is favourable. Dryness, however, may be occasioned by breathing through the mouth; but this will seldom produce it in a very marked degree, if febrile, or inflammatory action be not present. Dryness is most common in continued fevers, in the exanthemata, in inflammation of the abdominal viscera and of serous membranes, and in various other diseases of an acute and febrile nature. It is most remarkable, and presents either roughness, owing to the parched state of the papillæ, or fur, or a fissured or burnt appearance, often with a deeper or darker hue, in the most dangerous states of these maladies. The more extreme of these conditions of the tongue, and especially when they are not attended by thirst, are generally fatal indications. When the tongue has been furred and loaded, and subsequently becomes dry, rough or hard, and at the same time very dark, the furred surface being both dry and dark, or even black, a malignant or almost hopeless state may be inferred, owing chiefly to exhaustion of vital power and contamination of the circulating fluids, with arrest of the secretions. Humidity of the tongue rarely supervenes upon this extreme state, unless this dark appearance has been heightened by the substances taken into the mouth; but, in the less remarkable cases, the occurrence of humidity often takes place, and is a most favourable sign, inasmuch as it shows a return of the salivary secretion and of the secreting functions generally, especially when the skin also becomes less hot and dry, or more natural or perspirable.

108. *g. The colour* of the tongue should always be observed. The *natural* hue is favourable, and a return to it is an indication of a favourable crisis or change. The tongue may be more or less *pale*, and the pallor is commonly associated with a similar hue of the gums and lips, in cases of anæmia, of chlorosis, after large blood-lettings or hæmorrhages, and during prolonged chronic diseases, and affections of the spleen, owing either to a deficiency or to a poorness of blood. A very *red* tongue occurs chiefly in inflammations of the throat and pharynx, and in the exanthemata. A limitation of the redness to the point and edges is very general in acute irritation or inflammation of the digestive mucous surface, in gastric and bilious fevers, and in remittent and continued fevers, but in those latter, the surface and base of the tongue is at the same time loaded, coated or furred. If the tongue, after having been coated or furred, becomes *very red and clean*, in gastric fevers, and inflammatory or other acute diseases of the digestive or abdominal viscera, without returning strength or other favourable symptoms, a dangerous prognosis may be inferred; and more especially if the febrile symptoms be not abated, if the tongue be dry, and if the redness assume a glossy or varnished appearance. If, with this change, the tongue presents a yellowish red hue, and becomes glossy, dry and clean, great danger should be anticipated, especially in severe remittents, in bilious fevers, in putro-remittent or adynamic fevers, and in acute diseases of the liver and digestive canal. If the redness pass into a *brown*, *livid*, or *bluish* or deep *leaden hue*, whether the surface of the tongue be also moist or dry, or soft or hard, or furred or coated, or r gh, or smooth and glossy, &c., an imperfectly cha ed, an insufficiently oxygenated, or a contam ted state of the blood may be inferred. This a arance, thus variously associated, according the nature and stage of the malady, is observed the most dangerous cases of asthenic or cong ive pneumonia and bronchitis, especially wher oth lungs are affected, in organic diseases the heart, in asthma, hydrothorax, in dangerous ses of hooping-cough, in the malignant or putr dynamic, or asthenic forms of exanthematou and continued fevers, in pestilential maladie in scurvy, and in the last stages of other di ses, or shortly before dissolution. especially in

109. *h.* A *white* tongue is common in cat hal and febrile disorders, in functional disturban of the digestive and respiratory organs, and in t premonitory and invading stages of fevers — pe dic, exanthematous, and continued — and of i mmations. A *clammy* state of the tongue, h a whitish, or yellowish-white, or milky load the surface and base, with more or less humid , is frequently seen in visceral diseases, in infla matory affections of mucous surfaces, in the rly stages of fevers, in connection with redness the point and edges, and in puerperal fevers a ompanied with a flabby and lurid appearance the organ. A *loaded* tongue, the load vary in quantity, colour and consistence, occurs in ous diseases, in the early stages of periodic an continued fevers, and in most of the malad in which a clammy state is observed. These tes, especially a loaded condition, are frequentl complained of in the morning, soon after waki by persons who are dyspeptic, or whose digest organs, — stomach, liver or bowels, — hav een much disordered; or who have been in th abit of taking suppers, or of smoking, or of d king malt or other liquors previously to retiring bed.

110. *i. A furred* tongue is always a seriou indication. The fur resembles the pile on the face of cotton velvets; and varies in length and ickness. It is often covered by a clammy o irty mucus, the tongue being also coated on the face and base by a load of fur and mucus. The our of the fur varies from a greyish white to a own or black, the surface generally becomin hus coated and dry or parched before the darke ues are observed. The origin of the fur has n een satisfactorily explained; but it may be att ted to a morbid development of the filiform pap e of the tongue which become elongated dur the progress of disease, and covered by the insp ted and dark mucus, which generally collects the mouth during the diseases in which the to e is furred. The surface of the fur, especially hen thus coated, presents a more or less dark br , or black hue, according to the duration, sever and danger of the disease, the deepness of th ue, however, being often much increased the colouring properties of the substances take into the mouth.

111. A furred state of the tongue is com n in inflammations, especially of parenchymat organs; in severe irritation of mucous surfac and canals; in continued, exanthematous, typ or adynamic fevers; in diseases of the brain or its membranes, and in most other acute m lies which advance to a dangerous condition. the early stages of inflammations and co ued

f rs, the filiform papillæ are merely erect and s ewhat developed in length, giving the tongue a hitish hue. In the early stages of the exant nata, especially in scarlatina, the fungiform p illæ on the sides, point, and middle, are very n h enlarged, and appear very manifestly disp ed through the fur produced by the filiform p llæ. This appearance is also observed in m y of the diseases of children, more particul y in those of the digestive organs. The dirty o lammy mucus, so frequently accompanying a f ed tongue, loads the papillæ; and, with the p ress of these maladies, especially as they p eed to an unfavourable or dangerous state, fo s a darker or deeper coat, which often covers th whole upper surface of the organ, either in a c inuous crust, or with more or less slight fissu s in various directions.

12. The depth of colour, the dryness, the contr ion or diminution of the surface of this fur a coating, and of the tongue itself, are importa circumstances, and require close attention in th progress of acute diseases. An increase of ei r, and especially of all, of these indicates a p ortionate increase of danger; whereas a di nution of these appearances, evinces a favo able issue, more particularly if the tongue be mes more moist and more clean, the fur and lo disappearing from the point and sides, and p ressively from the surface and base, the colour of e organ becoming at the same time more na ral. If the coat or crust formed on the to ue be rapidly removed the surface thereby ex sed being glossy, smooth, or fissured, and d -coloured, or having a raw appearance, the p nosis is not improved by the occurrence. T change often proceeds from self-contaminati of the blood in the course of the disease; the to ue frequently becoming still more dark, contr ed, dry and even hard, towards a fatal issue.

3. With slight development of the filiform pa læ, the tongue sometimes presents *patches* wi h appear partially deprived either of papillæ, or the epithelium covering the upper surface, wi h, at the same time, is broad or flabby, the ed s of the tongue being occasionally also inde d by the teeth. This appearance is observed ch y in protracted disorders of the digestive orga and in hypochondriasis, hysteria, and disea of the uterine organs. It is always an indi ion of protracted and intractable disorder.

4. *k. An aphthous state* of the tongue, affecting ch y the point and edges, is often observed in th st or fatal stage of tubercular consumption, an f several other visceral diseases. It is alwa a serious indication in the diseases of adults, ev when unconnected with phthisis, especially in seases of the digestive and urinary organs. (S Arts. STOMATITIS, THRUSH, and TONGUE, *dis es of*.)

5. *l. The temperature* of the tongue is seldom ma rially affected. It is somewhat *increased* in in nmatory fevers, and in the early stages of exan matous and continued fevers. It is diminished in diseases, or towards the fatal issue of all ma dies, in which the tongue presents a livid or da hue. It is most diminished, becoming cool or ld, as pestilential cholera proceeds to a fatal ter nation.

6. *C.* THE SALIVARY SECRETION is intimately co ected with the state of the tongue and mouth in disease, and with the indications furnished by the latter.—*a. Diminution* of the secretion both of saliva and mucus occurs at the commencement, and during the greater part of the progress of febrile and acute diseases; and with this diminution, which often amounts almost to suppression, these secretions become thick, viscid, or clammy, especially in continued, exanthematous, and low fevers, and in affections of the brain. They often assume a dark or dirty hue, thereby loading the tongue, and often collecting about the teeth, gums and lips. The bloody or sanious appearance of the interior of the mouth observed in scurvy and hæmagastric pestilence, is not produced by the saliva and mucus, but by the admixture with these of the semi-dissolved blood, exuded from the surfaces of the tongue and gums. A return of the salivary and mucous secretions, after their diminution or suppression, is always a very favourable sign, the detachment of the fur and load on the tongue during incipient convalescence being thereby favoured.

117. *b. Increased* salivary secretion—*ptyalism*—may be produced by any stimulus taken, or retained for a time in the mouth. It accompanies various affections of the gums and mouth, and the natural processes of teething in childhood. Whilst it is a salutary indication of teething, the sudden interruption or suppression of it is a very serious occurrence, and is very often a sign of incipient or advanced disease of the brain or its membranes. Ptyalism is produced by the constitutional or local operation of mercurials, iodine and iodides, and various other metallic and poisonous substances. (See Art. POISONS, *pluries.*) It attends, as a contingent, or intercurrent phenomenon, several diseases, as gastric catarrhs, chronic dyspepsia, hypochondriasis, hysteria, diseases of the pancreas, and occasionally small-pox. In the confluent form of this last malady, it is often a favourable symptom; but if it cease suddenly or prematurely it is generally a fatal indication.

118. *D.* The THROAT *and fauces* present signs of disease not merely of the digestive canal, but also of the constitution.—*a. Relaxation* of the *uvula* is a symptom of general debility, in connection either with disorder of the stomach, or with catarrh, or with gastric catarrh or that state of catarrhal irritation of the digestive and respiratory mucous surfaces which often appears in spring and autumn, in connection with or even constituting catarrhal fevers. The elongation of the uvula, the result of relaxation, is often a cause of irritation to the epiglottis, and occasions or aggravates cough. And this having been admitted, to more than its full extent, it became a fashion to extirpate the uvula, without any regard to its functions, and without reference to the fact that the want of an uvula may be quite as injurious as an excess of it.

119. *b.* The *tonsils* or amygdalæ are often enlarged, either by acute disease—*tonsillitis*—or by a chronic congestion. Sometimes they are enlarged in connection with elongation of the uvula, and redness or chronic inflammation or irritation of the fauces, and pharynx. Chronic enlargement of the tonsils is not so frequently a sign of disorder of the digestive organs, as of a scrofulous diathesis, or of general derangement of health. In connection with redness of the fauces, palate, and pharynx, enlargement or redness of

the tonsils, is an indication of disorder or disease of the digestive organs, of exanthematous and gastric or bilious fevers, and often also of continued and typhoid fevers. This redness of the several parts of the throat, with redness of the point and edges of the tongue, and development of the fungiform papillæ, is very remarkable in the early periods of scarlatina, and frequently also of measles and small-pox. (See also Arts. Throat and Tonsils.)

120. *c. The secretions* of the throat are often materially affected. With increased redness they may be either diminished or augmented. *Dryness* of the throat attends the commencement or early stage of inflammation of the parts just mentioned (§ 119.). And, in cases where an injudicious and officious treatment has removed either the uvula, or the tonsils; dryness of the throat, and roughness or change of voice, have rewarded the confiding or credulous patient; the parts concerned in secreting, and in distributing, a lubricating mucus to the surface of the throat having been extirpated, as if nature had formed them for no purpose. During the more advanced stages of inflammatory irritation, the mucous secretion and watery exhalation from the throat are much *increased;* the same effect follows catarrh, catarrhal fevers and influenza; in which, as well as contingently on several diseases, increased secretion and exhalation are prominent affections.

121. *E.* Deglutition is often affected owing to disease either of the passages—of the throat, pharynx and œsophagus—which convey substances into the stomach; or of the brain, or of the structures surrounding and protecting it, especially the base of the brain and medulla oblongata. The diseases of the passages leading to the stomach, and the attending symptoms of difficult and interrupted deglutition, are considered in the articles Œsophagus, Throat, and Tonsils. *Dysphagia*, or difficult deglutition, and *Aphagia*, or impossibility of swallowing, are caused not only by lesions of these parts, but also by diseases of the brain or medulla oblongata, or of their envelopes, and by structural changes implicating the nerves supplying the tongue, pharynx and upper portion of the œsophagus. When swallowing is materially affected by these latter pathological conditions, then speech and voice are generally more or less disordered, or both deglutition and speech may be altogether lost. I saw a gentleman who had lost the faculties of deglutition, speech and voice. He complained of no other symptoms referrible to the head or cervical region; and was otherwise in good health. Deglutition partially returned after a time, but the power of articulation was never restored. He died suddenly. The body was not allowed to be inspected. Impaired or lost power of swallowing, with or without loss of speech but most commonly with partial or complete loss of this faculty, may either be the precursors of a more general attack of palsy or of apoplexy, or be the consequences of an attack of either or of both. But whether ushering in, or following a cerebral attack, it is always a most dangerous symptom. When a fatal issue does not supervene, the power of swallowing generally returns, either partially or altogether, before speech or articulation is restored.

122. In all these cases deglutition is impaired or lost owing to paralysis of the muscles concerned in this function, but it may be difficult, pain impaired or impossible, in consequence of spa of these muscles, or of some portion of the œ- phagus, as in rabies canina or hydrophobia, in hysteria, hypochondriasis, &c., in all wh the difficulty of swallowing liquids is greater th that of taking more consistent substances. dysphagia accompanying hysteria and other fu- tional nervous affections is not further unfav- able, than that it indicates a greater severit f these affections. The aphagia of rabies is alw s a fatal sign, although it generally disappears - fore dissolution. Painful, difficult or impa l deglutition is often a symptom of the presenc f flatus in the œsophagus, and in these cases, sp a of portions of the œsophagus often takes pl e. When swallowing is affected by this cause, fl - lent eructations either precede, accompany n follow the act; and the patient is generally s- ject to one or other of the forms of *indigestion* r to *flatulence* during empty states of the stoma

123. ii. The Appetites for Drink and Foo e generally affected by disease.—*A. a. The desir or drink* is *diminished* in several diseases, and in most of these a very unfavourable symptom, re especially when the tongue and mouth are y, and other febrile symptoms are severe. In e advanced stages of fever, especially in conti d and typhoid fevers, and in the advanced pe ls of inflammations, particularly of the brain or ts membranes, the absence of thirst or of a d re for fluids or drinks of any kind is a most da r- ous, although not necessarily a fatal sign, espec ly in fever. In chronic diseases, the absence a desire of drink is often present, and is mere an indication of the absence of febrile excitem ; but, in the last stages of acute diseases and fe s, it shows the existence of a state of sensibility w h is either associated with delirium, or about to ss into it, or into unconsciousness or coma.

124. *b. Increased desire* of drinks is gene ly present in all diseases caused by irritation o n- flammation—in febrile maladies during the e er stages, and before sensibility or consciousnes e- comes impaired. The supervention of thir or an increase of it, in the course of chronic dis se, is an indication of intercurrent irritation or in m- matory action. Its continuance after cr al evacuations is an unfavourable circumst ce. Thirst, in its extreme state, is present i he most dangerous cases of choleric pestilence nd in inflammations of the stomach, &c. Thirst, th an inability of drinking, is characteristic of ra s; and sometimes occurs in hysteria, hypochond is, but in a much less marked, and in a diff nt form. The sudden cessation of thirst, or ab ce, of the desire of drink, after thirst had been u it, precedes unconsciousness or coma.

125. *c.* An appetite for *certain kinds of* k, in preference to others, is observed in s al maladies,—for iced water, or cold water, or ice, in the stages of vascular excitement in f rs, inflammations, &c., especially in choleric sti- lence and inflammations of the digestive can — for demulcent and emollient drinks, in affe ons of the respiratory organs;—for acid or a ous fluids, in chlorosis and disorders of the f ale sexual organs;—for vinous and restorative nks in diseases of debility, in nervous disorder nd during convalescence from fevers. The a ite for these several kinds of drink, is an indica of

th nature of the malady, and is, in many cases, in ccordance with the intentions of cure which sh ld be adopted. The desire for intoxicating d ks is of itself a malady, which, when not g fied, is attended by distressing symptoms of ex ustion and nervousness.

6. B. *Desire of food* when moderate or natural is favourable symptom in chronic affections.—a *diminution* or entire *loss* of this desire is prese in most acute, and in many chronic diseases. W increased desire of drink diminished or lost de e for food is evinced. *Anorexia*, or loss of ap tite, is often an indication of the impropriety of king food, inasmuch as it occurs either in fe s, or in inflammations, or in other diseases of th stomach and digestive organs, in all which fo would either be thrown off, or not digested, or e a cause of increased disorder. A diminution m ly of the appetite is often caused by want of ex ise, especially in the open air, and in aged or ralysed persons, for whom the demands of nu tion are neither great nor urgent. It is also ob ved in chronic affections, often, however, wi a return of the desire, or with cravings after in vals. The loss of appetite is always complete at e commencement and early stages of fevers an acute diseases. If it continue during conva cence, a relapse, or some important sequela, or uctural change, should be inferred.

7. *b. Increased appetite* is, in its various degrees, no nly a symptom of disease, but often also a sig of approaching disease. Extremely increased ap ite — *Bulimia* — *fames canina* — has been tre d of in the article Appetite. These states, on of increase which are observed as a symptom of ease will be noticed at this place. Increased ap ite is most frequently a consequence,—1st. of an creased demand for support and nutrition, as curs during pregnancy, and in convalescence fro acute or exhausting maladies, — 2d., or of a sta of erythism, or irritation of the stomach and dig ive organs, — 3d., or of irritation or disease of e nervous centres of animal life. Increased ap ite in the early stages of fever, or of other acu diseases, is unfavourable, but if it occur in con ction with other signs of improvement it is a f urable indication. If it be present without oth signs of improvement, after anorexia has exi d, a dangerous sequela is indicated. Incre d appetite is frequent in all verminous diseas owing to the irritation they produce, and the nsumption of nutritious elements; and it is ofte caused by the use of stimulants — of wine, spi , hot sauces, &c. A great increase of appetite or a keen, or ravenous, or craving appetite — en ushers in, or precedes for a short period, an ack of apoplexy, or of epilepsy, or palsy, or ma or phrenitis. Increased appetite very generall ttends epilepsy in the intervals between the fits, d is the greatest before a severe paroxysm. It en also accompanies hemiplegia, and it indicat either an attack of apoplexy, or an exasperati of the paralytic seizure, at no very distant per . A craving for particular kinds or articles of d is observed in the course of both acute and hronic diseases, and is often suggested to the agination of the patient by recollections of the st, or by the attendants; but whether these cra gs convey a favourable or unfavourable impor epends upon the effects they produce when the tient is allowed food. A craving for unnatural or improper kinds of food — *Pica* — or for articles that are not commonly used for food, sometimes occurs during pregnancy, in chlorosis, and in the course of several disorders of the female sexual organs. (See Art. Appetite, Vitiated.)

128. If increased appetite become changed to loss of appetite, or to loathing of food upon taking a small portion only, chronic gastritis or structural change in the stomach may be inferred. A desire for animal food early in febrile diseases, or previously to convalescence, is an unfavourable sign. A keen appetite is generally produced by exercise in the open air; but it is also often the result of habit, and of want of occupation either mental or physical, especially when indulged. Excessive use of animal food is often progressive, the uses of certain kinds creating an increased desire for them, especially of pork. Persons who have thus indulged their appetite generally die prematurely, or seldom live beyond middle age, and are either carried off by apoplexy, by a mixed epileptic and apoplectic seizure, or become hemiplegic. If attacked by continued fever, or by small-pox or scarlet fever, they seldom recover, the malady assuming either a comatose, or a putro-adynamic form.

129. *c. Loathing of food*, and *nausea* excited by certain kinds of food, are generally observed in the premonitory period of fevers and acute diseases, also in affections of the stomach. A dislike of flesh meats is very remarkable in these cases. A loathing of certain kinds of food is frequent in delicate, nervous, hysterical, and hypochondriacal persons. When it depends upon disorder of the digestive organs, nausea, horripilations, and even vomitings or retchings, often supervene. Prolonged loathing of food in chronic diseases augurs the presence of organic lesions. The occurrence of loathing in convalescence indicates either a relapse or the supervention of visceral change.

130. *d. Nausea* may proceed either from the state of the digestive organs, especially of the stomach, or from the nervous systems of organic and animal life. The digestive organs sympathise, through the medium chiefly of the organic nerves, with all the other abdominal and pelvic viscera, the stomach evincing this sympathy more particularly by nausea, or vomiting. The nausea sometimes observed in hysteria, in pregnancy, and in hypochondriasis, is generally also sympathetic of irritation transmitted through the medium of the ganglial nerves to the stomach. Nausea on the invasion, or at an early stage, of continued and exanthematous fevers is only an indication of the marked participation in the disorder of the whole œconomy, which the stomach generally evinces. Nausea, often attended by vomiting, accompanies epileptic seizures and diseases of the brain; and in these it is always a very serious or even a most dangerous symptom. Nausea may be produced by a disgusting sight, or even by the recollection of such; and, in these cases, the impression is conveyed from the brain, as in cases of organic lesions of the brain, by the communicating nerves to the organic nerves or ganglia supplying the stomach. The nausea and sickness produced by sea-voyages have been attributed to affection of the brain sympathetically conveyed to the stomach, but they appear to be more directly owing to an affection of the semilunar and other ganglia,

than to the state of the brain, which seldom betrays much disorder in cases of sea-sickness. Vomiting consequent upon fæcal obstruction is a most dangerous symptom, and is always fatal when the vomited matters have a fæcal odour. (See Art. Vomiting.)

131. *e. Various other symptomatic affections* of the stomach occur and furnish important information as to the nature, seat, and issue of disease. These affections are eructations, heart-burning, retchings and rumination, and are described, with their various relations, in the articles Flatulence, Indigestion, Pyrosis, Rumination, and Vomiting. To these I must refer the reader; and only adduce at this place a few remarks respecting flatulent and other eructations as a symptom of disease. *Eructations* either are flatulent, or consist of fluids, or of semi-digested articles, which may be sour or acid, or saltish, or alkaline, but very rarely the latter. Flatulent eructations occur not only in most affections of the stomach, but also in congestions and torpor of the liver, and in obstructions to the functions of this organ. They frequently depend upon a gouty diathesis, and attend, but more generally precede, an attack of this disease. They are common also in hysteria and hypochondriasis; the flatulence often rising in the œsophagus, and remaining for a time confined there by spasm, increasing disorder by pressing upon the heart and large vessels. Even when flatulence and flatulent eructations depend upon the diseases now mentioned, and especially when connected with biliary obstruction, it is more or less associated with acidity of the prima via. Fluid eructations often proceed from over-loading the stomach, and from organic lesions of the stomach, or liver, or spleen, or pancreas; and in these diseases they may be either tasteless, or sour, or saltish. These may also precede an attack of gout, or accompany calculous affections; but, when they are of long continuance, or are not materially influenced by treatment, they should be then referred to organic lesions either of the stomach, or of one of the collatitious organs. It should, however, not be overlooked, that the most dangerous diseases of these may occur without these eructations appearing in a very prominent form. As to the signs furnished by appearances of matters thrown off the stomach, see the article Vomiting.

132. iii. Intestinal Flatulence, as well as gastric flatulence, should not be imputed to decomposition of the ingesta, or of the contents of the canal, owing to their retention; but rather to irritation of the mucous surface, in connection with impaired tone of the muscular coat, and with general debility. Although certain ingesta may favour the generation of flatulence, or even furnish a portion of the gases producing it, especially in cases of intestinal flatulence, yet it cannot be disputed, that the gases which accumulate in the digestive canal are chiefly an exhalation from the villous surface. In some cases, especially at an advanced stage of diseases of the digestive tube, the accumulation of gas occasions a tense and tympanitic state of the abdomen, and generally increases the severity of the disease and the sufferings of the patient. Gaseous collections in the stomach or bowels, or in both, are apt to occur, in many diseases, as a contingent and intercurrent phenomenon; but in other maladies they are more distinctive symptoms, and should receive due attention, as evincing not merely the nature, also the issue of the disease. These collecti are most frequently formed in very young and aged subjects, in persons of sedentary habits, catarrhal irritation of the stomach and bowels; the several affections and maladies of these v cera, and of the associated and connected orga in the gouty diathesis and in the atonic forms gout, in hysteria and hypochondriasis; in pu peral and adynamic fevers, and in obstructions the intestines by any mechanical or other cau These symptoms are aggravated by certain ki of ingesta, especially by raw or bulky vegetab and by peas, beans, or any preparations of th also by hot spices, or by irritating and indigesti substances.

133. When the gaseous exhalation is attend by rumbling noises — by *borborygmi* — as in h teria, a spasmodic or an irregular action of muscular coats of the canal is present, propell the distending flatus in various directions. B borygmi in the course of low fevers someti precede a favourable crisis. The discharge flatus by eructation is often of service in more severe diseases in which gastric or intesti flatulence are prominent symptoms; but the cape of it *per anum* is much more favoura especially in ileus, in colicky affections, and in structions of the bowels. Intestinal, as well gastric, flatulence is generally connected w acidity of the bowels, and often also with structed or morbid states of the biliary and testinal secretions and excretions, and not with these, but often also with a self-contamin state of the circulating fluids, especially in portal vessels. These states are more particul manifested in the atonic forms of gout, in ad mic fevers, and occasionally in calculous or velly affections. In these diseases and con gently in many cases of other complaints, deficiency of a healthy bile not merely ren the villous surface more prone to exhale a gas fluid, but also favours morbid changes in the testinal contents, the fæcal excretions being bid in colour, consistence, and smell; the o being sour and offensive.

134. iv. The Intestinal Evacuations sh receive the most attentive examinations in all eases, but particularly in those which are se or obstinate; and these examinations shoul made in respect of the successive evacuati passed from the period of the previous visit. inspection of the tongue, mouth, and throat, an examination of the several regions of the ab men, by pressure and percussion, should als made, either immediately after or before, gene after, the stools have been examined, inasmuc the state of these may suggest modification the examination of the abdomen.

135. The intestinal evacuations may be ei too few, or too frequent — after protracted i vals, or at unusually short intervals. They be variously disordered or unhealthy; and discharge of them may be preceded and atte by much and diversified disorder. These seve as well as in connection will direct the diag and prognosis of the physician. The dera ments of defæcation — the disorders in w either the retention, or the frequent discharg the fæces, depend chiefly upon the states of th gestive canal, have been fully described in

es Costiveness and Constipation, Colic, s, Concretions in the intestines, &c. and in on Diarrhœa, Cholera, and Dysentery. diseases being considered in connection with ore important complications they present in ice, and with the states of the intestinal ations, comparatively little remains to be ed at this place.

6. *A. Retention or delayed evacuation* of the nal contents is observed in various diseases important symptom, independently of being a distressing disorder. — 1st. It is often a tom of serious diseases of the digestive , of the liver, spleen, kidneys, and sexual s; — 2d. It is frequently caused by me- cal obstructions furnished either by the pa- of some portion of the canal, or by sub- s retained in, or obstructing the passage gh, the canal; — 3d. It may be entirely omatic of disease of the brain, spinal chord, hin membranes, of hysteria, melancholy, , &c. — (*a.*) The remarks offered when g of Costiveness and Constipation, of and of diseases of the Cæcum and of the , sufficiently elucidate many of the most tant topics connected with constipation from ers of the bowels themselves; and in gas- enteritis, hepatitis, and in other diseases of dominal viscera, costiveness and the ap- nce of the evacuations claim strict attention; ontaneous return, or the easy production of al evacuations, and a more natural or y appearance of them furnishing a most able indication; whilst a more obstinate on, either with increase of painful symp- or with painful but abortive efforts at tion, evinces an increase of danger. In is, the fæcal retention is occasioned chiefly of the muscular or peristaltic action of the ed portion of bowel, and by the consequent ion of that and adjoining portions by flatus. currence of evacuations indicates the re- either partially or altogether, of these and pathological conditions which caused the on, and the subsidence of the inflammation, h these conditions were the consequences.

(*b.*) The mechanical impediments fur- by portions of the parietes of the diges- nal, are either *spasmodic* or *structural.* of portions of the canal interrupting the of the fæcal contents towards the anus is equently observed in the course of Dysen- Colic, Lead Colic, Hysteria, Gout, hondriasis, &c., and sometimes contin- on other maladies. In many of these the fæcal discharges are hard, lumpy, us, &c., and are evacuated with ante- or coëtaneous pain or gripings, and often th flatus. In these complaints free and evacuations and a more natural state of harges are favourable circumstances. In these, the obstruction to evacuation is not the spasmodic state of portions of the but also partially in the inactive condi- other portions, or in the distension of these s by flatus. *Structural changes* often take the parietes of the intestinal tube, and ot the passage of the fæces along the by contracting or stricturing the intestine. s lesions, external to the bowel, by press- n or strangulating a portion of it, produce a similar, or even more rapidly dangerous results. These alterations are severally described in the articles Colon, Digestive Canal and Duodenum, and when treating of Colic, Ileus, Constipation, Dysentery, &c.

138. Various substances, either formed in the digestive organs or passed into the stomach or bowels, and even intus-susceptions of portions of the intestines themselves, occasion fæcal obstruction, and always dangerous, and very often fatal consequences, as fully shown in the places just referred to, and when treating of Concretions, Biliary and Intestinal. Several indigestible substances may be swallowed, owing to a vitiated appetite, and be formed into masses more or less concrete or consistent, causing dangerous or even fatal results. A lady was in the habit of chewing and swallowing sealing-wax, and persisted in the practice for many months. Another, to whom I was also called, swallowed wax in every form, but chiefly as it existed in candles. Three young ladies came under my care who had long been in the habit of chewing and eating paper of various kinds. In all these, at first costiveness, and afterwards constipation, with colicky symptoms, and severe suffering, supervened. The perverted appetite was suspected and admitted. The means used to remove the obstruction were successful in all these cases, and brought away large and concrete masses of the substances thus unnaturally taken, mixed with mucus and fæcal accumulations. It is chiefly when intestinal obstructions are produced by one or other of the causes now mentioned, and, in much rarer instances, by intestinal worms, collected in large balls in hardened fæces and mucus, that the most dangerous consequences are to be dreaded from them.

139. (*c.*) In all inflammatory and organic diseases of the brain, spinal chord, or their membranes, constipation is a common symptom; but the danger does not depend upon the obstruction to fæcal evacuations in these cases, although it may be increased thereby. In these diseases the obstruction is generally overcome by medicine, but returns if the means for procuring evacuation be not frequently repeated. When vomiting accompanies constipation in these, the danger is increased, yet not in consequence of the latter being more obstinate or irremovable, but of a greater severity of the disease of which this is merely a symptom.

140. When obstruction to fæcal evacuation is followed by vomitings, the prognosis is unfavourable, especially if the obstruction have continued long. The danger increases in these cases if distension and tension of the abdomen, if pain or tenderness, or increased frequency of pulse, great debility or exhaustion, &c., supervene. It is still greater, the result being nearly always fatal, if the vomited matters have a fæcal smell; if flatulent distension be great and be attended by borborygmi, and if hiccup, or flatulent eructations be frequent or distressing. If the obstruction be suddenly removed, and evacuations more or less abundant be passed, pain or debility, or irritability of stomach still continuing, the prognosis is very unfavourable. If the pain and intestinal obstruction be suddenly removed, the vomitings, or hiccup, or abdominal distension still continuing, a fatal result will soon follow, and the sooner, the

weaker and more rapid and irregular the pulse, and the colder the extremities.

141. If constipation be attended by frequent abortive efforts to evacuate, or by tenesmus or straining, obstruction is generally present in the rectum, and often is produced by internal hæmorrhoids, or by stricture of the rectum, or by an enlarged ovarium or uterus, or by displacement of the uterus, or by enlarged prostate. Costiveness, in tubercular consumption, is more favourable than diarrhœa. An alternation of constipation and diarrhœa indicates serious chronic or structural disease of the digestive organs; and, in children, that the mesenteric glands are affected, chiefly enlarged. If constipation follow the sudden cessation of diarrhœa, and become obstinate, the prognosis is unfavourable; more especially if pain, tenderness, tension or distension of the abdomen be also present, and the tongue become dry or parched.

142. *B. Frequency of the intestinal evacuations* depends much on the age and habits of individuals. Infants evacuate the bowels twice or thrice daily, adults generally once only, sometimes twice, old persons even less frequently, and sedentary persons, who eat little, only once in two, three, or even in several days. Great frequency of evacuation, or purging, is always occasioned by disease of the digestive canal,—most frequently by irritation and hyperæmia of the digestive villous surface. The purging, when continuing for some time, constitutes diarrhœa, but when it ceases spontaneously after the bowels are unloaded, or after a short time, from the operation of medicine, it hardly amounts to the latter. Purging or diarrhœa is frequently owing to teething in children, and is a common complication in exanthematous fevers, and in gastro-enteric catarrh. In these cases it is also pathologically characterised by irritation with hyperæmia of the digestive villous surface. When it follows ingurgitation of food or intoxicating liquors to excess, or fæcal accumulations, or the irruption of accumulated bile into the bowels, it is thus similarly characterised, and generally subsides spontaneously, especially if due abstinence be adopted; but when it occurs as a complication of exanthematous or gastro-enteric fevers, or in child-bed fevers, the spontaneous cessation of it should not be trusted to, means to moderate or to arrest the inordinate action being then required.

143. When diarrhœa occurs in the course of adynamic or putro-adynamic fevers, asthenic inflammation of the intestinal villous surface and of Peyer's glands should be dreaded, and indeed it may have far advanced, especially if the stools present an ochry appearance. In such cases the danger is very great—very considerable if the diarrhœa have been of some duration, and extremely great if the stools have this appearance, or are intimately mixed with blood. Diarrhœa is also a most dangerous symptom when it supervenes upon chronic disease of the lungs, or of the liver, or spleen; and when it is connected with diseased mesenteric glands. Whenever the state of the evacuations shows either a protracted absence of bile, or an intermixture of blood, the prognosis should be unfavourable, and at a far advanced period of chronic or of hectic diseases, the danger should be considered as very great or extreme. When stools are passed immediately after substances have been received into he stomach, and more particularly if they ve passed but little changed from the state in w ch they were taken, a fatal result may be expe ed in the great majority of instances, and disea of the mesenteric glands, and often also of er collatitious viscera, may be inferred.

144. Diarrhœa following vomiting often b- sides spontaneously, especially when the c se consists of irritating ingesta, or overloading o he stomach. The same prognosis may be e r- tained if the diarrhœa follow constipation If diarrhœa and vomiting, with or without spa s; be of considerable duration; if they occasion k- ing, &c., or if they be produced by poisons an irritant and depressing nature, danger shoul be inferred, especially if spasms be present and n- tinue. (See Art. Cholera and Choleric F er of Infants.) In most instances of diarrhœa he previous history of the case, the diseases of v ch it is a consequence, or a complication; the st- ence and character of nervous symptoms he amount of nervous or vital depression accomp y- ing it; the nature and character of the prev ng diseases and of the dominant epidemic constit on, especially in connection with the exanthem us and continued fevers of which diarrhœa is s e- quent a complication, should severally re ve due consideration before we form concl ons either as to the result, or as to the indicati of cure.

145. If diarrhœa be attended by pains fo w- ing the course of the colon, or by tormina, the he colon may be considered as the chief seat the affection. (See Art. Colon and Dysent y.) If the pains extend down the sacrum, or be en the sacrum and pubis to the anus, or if th be accompanied by dysuria or ischuria and by es- mus, the rectum is also affected. If diarrh or dysentery be attended by spasm of the sph ter ani, inflammation often with abrasion of the u- cous surface in the vicinity may be inferred If, in these diseases, the sphincter ani becom re- laxed or paralysed, an unfavourable opini of the result may be entertained, and more espe lly, if this occur in the course of diarrhœa co pli- cating exanthematous, or typhoid or ady nic fevers.

146. If purging or diarrhœa, occurring the course of visceral congestions, especially th of the liver or spleen, or in dropsical effusions, in hypochondriacal affections, or as a seque of agues, appear to give relief; or be follow by greater animation or increased strength a ac- tivity; and if either occur in the course of ers and other acute diseases, as a critical evacu on, being moderate in frequency and contin ce, and the evacuation of a more natural and h hy character, a very favourable issue may be exp ed. (See Art. Crisis.)

147. *C.* The Alvine Evacuations f ish important information as to the nature, com a- tions and issue of both acute and chronic ma es. The fæces are altered by disease, in form, i n- sistence, in colour, in odour, in quantity, the nature of their constituent elements or mat ls, and in the substances they contain, or th are passed with them.—(*a.*) The *form* and *cons nce* of the evacuations vary with the age of th ub- ject. The fæces in infants are pulpy and e- ially without form. In adults, they are u lly

l and more consistent, and in aged persons
ither continue so, or become much harder
ss bulky. At all ages, however, after in-
they present every grade of consistence,
fluid to solid, according to the states or
ons of the digestive organs. In cases of
odic or permanent stricture of the rectum
s, or of internal hæmorrhoids, the evacua-
of small calibre, and often presents the ap-
ce as if the fæcal accumulation were
l through a diminished aperture, in con-
s or broken, but considerable lengths, and
same diameter. If there be enlargement of
ostate, or displacement of the womb, the
tion is generally more or less flattened.
ischarge may be lumpy, may resemble
s' eggs in form, be hard or very consis-
r scybalous. It is generally of these
in dysentery, colic, hysteria, sometimes
ochondriasis and in several other diseases.
sentery, these lumps or balls are accom-
either with a serous fluid, or with mucus
with blood, or with both, proceeding from
ammatory irritation of the mucous mem-
accompanying the spasm of the muscular
nd the flatus, which chiefly occasion this
f the fæces in these complaints. Indeed
ver the stools present this lumpy or scyba-
rm, a spasmodic and flatulent state of the
, especially of the colon, may be inferred;
stiveness is generally present.

1 In some cases, especially in chronic dys-
with impaired action of the liver, the
are tenacious, figured and consistent, re-
ng putty in tenacity and sometimes also in
For these, stomachic or chologogue pur-
are generally required. In aged and
ry persons, especially females, and often
en the liver is torpid or obstructed, fæcal
accumulate in the sigmoid flexure of the
and in the rectum, distend the bowel,
es beyond the power of reaction or pro-
, and become hard and dry, owing to the
ion of their more fluid constituents. In
te, the lower bowel, especially the rec-
ay be closely plugged up, the natural
to overcome the obstruction being accom-
with tormina, and continuing abortive un-
concrete fæces are removed from the over-
d and obstructed rectum by mechanical

14 (b.) *The colour* of the stools is very ma-
affected by the ingesta. In children the
health are generally yellowish, in adults
in old persons dark brown. They are ren-
uch darker by port-wine or claret; by ex-
liquorice, and by most of the dark fruits;
darker or nearly black by all the prepara-
iron, and by all articles of diet containing
as black puddings. They present a
hue, more or less dark or deep, after
egetables, especially spinach. After rhu-
ey are often yellow, and after magnesia or
, or both, they are often paler than na-
The preparations of mercury often cause
es to assume a greenish hue, probably in
ence of the state of the biliary and in-
secretions, and of acidity of the prima via.
npound decoction of aloes often imparts a
ue to the stools.

15 (c.) *The odour* of the evacuations seldom continues the same as in health, in either acute or chronic diseases, and, when they return to their natural odour and colour, the circumstance is favourable. The more offensive the odour of the stools, the disorder of the intestinal secretions and excretions, the accumulations of them in the prima via, and the depression of vital power, may, either severally or conjoined, be inferred to have been also the more remarkable, unless indeed some preparation of sulphur have been taken and given the discharges the odour of sulphuretted hydrogen. If the stools have an earthy smell, and more especially if they have the odour of raw flesh or of putrid meat, a most unfavourable prognosis should be given, especially in gastric or intestinal fevers, in dysentery or in other diseases implicating the bowels. When the stools have a sour smell, then diarrhœa, or obstructed biliary discharge, or both, are generally present, and acidity of the intestinal contents clearly exists. This symptom is frequent in the diarrhœa of infants and children, and previously to, or during an attack of gout or rheumatism. The stools in pestilential and infectious maladies have a most offensive odour, which is peculiar to each malady, as in choleric pestilence, small-pox, &c.

151. (*d.*) *The colour* of the stools is variously changed in disease. It is pale, greyish, clay-like or nearly white, in all cases of biliary obstruction, whether accompanied with jaundice or not. In the more chronic biliary obstructions, and in the darker shades of jaundice, the colouring and other ingredients of the bile are altogether wanting, the stools are nearly white, unless when partially coloured by the ingesta; and the slightest indications of the presence of bile in the stools are to be viewed as a favourable occurrence. A greenish hue of the stools occurs in several disorders of the digestive organs, and in scrofulous or other organic diseases of the brain. A deep brown, or greenish-brown colour of the stools is generally owing to the passage of bile, which had been accumulated for some time in the gall-bladder and hepatic ducts, into the bowels; and a yellowish, or bright yellow tint may be imputed to the passage of recently formed bile into the intestines. Black stools are generally produced by the presence of blood, which may have passed into the stomach either from the nose, gums or mouth, or from the pharynx, or may have exuded from the internal surface of the stomach or small intestines. When blood is partially digested and intimately mixed with the contents of the bowels, the uniformly black hue presented by the fæces has been ascribed to black bile, which had been long retained in the biliary apparatus; others admitting that this colour is produced by blood have believed that the blood has escaped from the secreting structure of the liver along the ducts. In favour of this latter opinion we have no satisfactory evidence. The source of the colour in these doubtful cases may be determined by diluting the stools, when they will assume a more determinate red or green, according as the colour is owing to blood or to bile. An ochry colour of the stools is generally produced by numerous ulcers, seated in the glands of the villous surface, the blood exuded in small quantities from these being intimately mixed with the contents of the intestines, which are usually in these cases more or less fluid.

152. When blood is exuded in small quantity in any portion of the digestive canal above the valve of the cæcum, it is generally mixed intimately with the fæces. But, even when poured out in the small intestines, it may be passed by stool almost pure, although often grumous and uncoagulable, when the quantity is considerable or large, or the bowels irritable. Blood, imperfectly mixed with fæcal matters, dark-coloured and uncoagulated, may have come from either the small or large intestines. When it proceeds from the latter, it is often pure, red, and coagulable, and generally precedes or accompanies the evacuation. When it follows the passage of fæces, it commonly proceeds from the rectum, and is a consequence of internal piles. The blood thus discharged per anum, either alone or mixed with fæces, may be an exudation from an irritated portion of the villous surface, or a discharge from an ulcer or ulcers, or from a diseased vein, or an exudation occasioned by the association of irritation with a semi-dissolved condition of the blood itself. Bloody stools, either ochry, black, red, reddish-brown, &c., occur in adynamic or typhoid fevers, in scurvy, in purpura, in organic diseases of the liver or spleen, in dysentery, in cancer implicating the digestive canal, in vicarious menstruation, hæmorrhoids, and contingently on several other maladies. Although the quantity of blood extravasated in these diseases may be barely sufficiently to colour the stool, yet it may be so great in other cases, as to excite fears of speedy dissolution, especially in fevers, and in organic lesions of the liver or spleen. These excessive hæmorrhages are always dangerous, especially in the more advanced stages of adynamic fevers. Nevertheless, recovery sometimes takes place, even in persons considerably advanced in life. I lately saw, within a short period of each other, two cases of this kind, with my friends Messrs. HOULTON senr. and junr.; and, in these, although the loss of blood was remarkably great, recovery took place in both. The quantity of blood may be very small, or may merely streak the mucus, or discolour the serum, in which it is passed, and yet the danger may be extreme, as in ileus, volvulus, or intus-susceptions, in enteritis, in dysentery, the attendant symptoms more prominently evincing the danger. A raw, earthy, or putrid odour of the stools, in these cases, is the most unfavourable sign which can accompany the presence of blood in the stools, whatever may be its quantity.

153. The discharge of blood by stool in moderate quantity may produce relief in several diseases, especially in those of the liver or spleen, and in hæmorrhoids. But the relief may be only temporary, inasmuch as the disease or lesion, which occasioned it, may not be removed by it, and may proceed after a period of relief, this discharge recurring, or some other results being produced. In all cases of this kind the prognosis should depend upon the effects produced by the loss; by the existence or non-existence of anæmia, or of vital sinking; but, when such discharge occurs, in adynamic fevers, whatever may be the quantity — even no more than may be sufficient to impart an ochry appearance to the stools, then great danger is present.

154. (*e.*) *Bile* may be present in the evacuations in every conceivable quantity. The *stools* may even consist almost entirely of bile, or they m not contain a particle of it, as in choleric pest nce and in obstructive diseases of the biliary o ns. A brown, or gingerbread-colour of the ools indicates a due proportion of both cysti and hepatic bile; a bright, but deep orang hue evinces a preponderance of hepatic bile nd, when the stools consist chiefly of a fluid this tint, becoming darker after it is passed, the hey may be viewed as bilious, or consisting in reat measure of bile mixed with more or less ecal matters. Superabundance of bile in the ools is generally caused by chologogue purgativ prescribed at a time when the biliary ducts an all-bladder have been loaded with this secret , or by excitement of the liver, in connection w the influence of high ranges of temperature, c with passion or intemperance, or by any caus productive of irritation of the duodenum or the common bile-duct.

155. The stools may present various rms and grades of consistence, both whe well coloured and abounding with bile, and hen deficient in colour and in bile. When t deficient, they may be watery or serous, s in diarrhœa and pestilential cholera, or pul eous or thin, as in jaundice, or in torpor and rious states of obstruction, of the liver, or co e or hard in rarer cases of biliary obstruction ithe with or without jaundice. Deficiency bile the stools presenting either of the charact jus mentioned, but most frequently a thin or aceous consistence, is a symptom of torpor f th liver, as in many persons who have resid long in an intertropical climate, of obstructio f th ducts from constriction or contraction co uen upon inflammation, or from the impacti of biliary calculus, and of the several organic nge described in the articles JAUNDICE, GAL LADDER and DUCTS, LIVER, &c.

156. (*f.*) The stools may contain more les *serum*, as in the serous diarrhœa, whi proceeds chiefly from inflammatory irritatio f th mucous surface of the intestines, and wh presents a brownish, or dark brown hue, in t mo chronic cases, and when the liver or sple s implicated; or they may consist almost en ly o serum, containing small albuminous flocc , an present a pale and turbid appearance, or mbl rice-water, as in the diarrhœa of choler pes lence, in which they are frequent and mo bundant, and constitute the most dangerous sy ptom of the malady. The continuance of pal urbi or serous evacuations, without any ap ranc of bile, is always a dangerous circumst e, pecially after rational means have been ed arrest them, and to procure a secretion bil or when they are very forcibly disch ed squirted from the anus. In pale, w ry serous stools, insufficiently coloured w bil especially when passed frequently, an he fection having been of some considera dur tion, substances which had been recently t n in the stomach are often passed either but lit or at all changed from the state in which y been swallowed. This *Lienteric form* dia rhœa is always most unfavourable, espe lly infants and children, after weaning, o luri dentition, or that have been deprived the nurses' milk. (See Art. DIARRHŒA, § 1 Th occurrence of serous diarrhœa with vo ng

ts and children in warm summers and au-
s, indicates serious and often very dangerous
se, especially when attended by fever. (See
Choleric Fever of Infants.)

7. Various substances, foreign to a natural
of the evacuations, are sometimes found in
, besides serum and blood. These are
y mucus, pus, fibro-albuminous exuda-
fatty substances, cholestrine, biliary cal-
various kinds of intestinal concretion, worms
dead or living, portions of the mucous
detached from the subjacent tissues, and
portions of intestine thrown off, in conse-
e of intus-susception and the consequent
es. These severally require but little re-
—*a. Mucus* occurs in *Dysentery* and *Diar-*
and is often mixed with serum and pellets,
nps of fæces. In the mucous state of the
, the follicular apparatus, with the villous
e, is chiefly inflamed; but this appearance
pass into a watery or serous condition, or
nto a mixed state, in which the evacuations
ore or less streaked with blood as in dysen-
If ulceration supervene, the evacuations
n sanious matters, or blood in larger quan-
—*b. Puriform* stools, or an admixture of
with fæcal matters, may follow mucous
ations, as in chronic diarrhœa, or chronic
tery, especially when the puriform matter is
diluted or mixed with mucus; but, when it
ent alone, or in large quantity and unmixed,
little mixed with fæces, then the rupture of
scess, seated either in the liver, or in the
, or in the vicinity of the spinal column,
me part of the intestines, may be inferred.
nge of mucous to serous, or to muco-puri-
or to sero-sanguineous, or to sanious, or to
rm, stools, or to intestinal hæmorrhage, in-
s a progressive advance of disease — gene-
f structural change; inflammatory irritation
ing to suppuration or ulceration, with the
l changes described when treating of Diar-
Dysentery, and Fever. — *c.* The pas-
fatty substances in the stools occurs in rare
es, and has been observed chiefly in malig-
nd chronic visceral diseases, as in those of
er, pancreas, duodenum and lungs. The
substances sometimes passed from the
, of which no notice need be taken at
ace, are described in the article Concre-
intestinal, and in the other articles on
s of the Intestines, &c., — on Worms, &c.
. (*g.*) In all cases in which it is necessary to
e the state of the intestinal evacuations, and,
, in almost every case which comes before
ysician, the several regions, not only of the
but also of the abdomen, should be care-
xamined by percussion, and by pressure,
d according to the peculiarities of indi-
cases; and the sensations of the patient, as
the sounds emitted, should be carefully
ered. When pain is experienced either
usly to, or during, or after evacuations, its
ter and connection with defæcation ought
scertained. In addition to these points, the
h, nutrition, and vital manifestations of
ient, as well as the performance of the se-
xcreting functions, should receive attention.
rt. Abdomen).

IV. Symptoms and Signs connected
he Circulating Systems.—When treating of Auscultation, of the Aorta, of the Arteries, of the Blood, of the Heart, of the Lymphatic and Lacteal System and Glands, of the Pulse, and of the Veins, the Semeiology *of the Circulating Systems* was fully considered, especially as respects diseases of these systems. It therefore only remains for me, at this place, to notice only those topics which have either been omitted or insufficiently discussed under these heads.—

160. i. In the articles on Auscultaton and Heart and Pericardium, I have described the physical signs of the heart and its capsule. The healthy and morbid sounds of the heart were topics of discussion when these were written, and they still are by no means satisfactorily determined. The interruptions, obstructions, or difficulties, to the passage of the blood through the several cavities and orifices of the heart, besides being accompanied by certain physical signs, described under these heads, give rise to several physiological or functional symptoms which ought also to receive due attention. The chief of these are — 1st. Short or difficult breathing, varying from a scarcely appreciable disturbance to dyspnœa or to orthopnœa; and often at first overlooked, or hardly complained of unless when ascending stairs, or a height. — 2d. Attacks of faintness, or of syncope, followed or not by palpitations, &c.; — 3d. Paroxysms of difficulty of breathing, or startings from sleep, especially about one of the earliest hours in the morning. — 4th. A sensation of sinking, or of suffocation, or of dissolution, upon walking quickly, or against the wind, or upon any physical exertion. — 5th. Congestion of the brain, owing to obstructed return of blood, occasioning vertigo, head-ache, or apoplexy, palsy, &c., if not prevented by epistaxis. — 6th. Congestions of the lungs, often causing hæmoptysis, pulmonary apoplexy, œdema of the lungs, or serous effusions into the thoracic cavities. — 7th. Œdema of the lower and upper extremities, and often also of the face, in the morning; or asphyxia by accumulations of mucus in the bronchi.— 8th. Lividity of the lips, tongue, gums, fingers and nails. These cannot, individually, be assigned to certain or determinate organic lesions, but may severally accompany or supervene upon one or more of these lesions. Certain of them may even be present without any structural change of the organ, as shortness or difficulty of breathing may be a symptom of anæmia, or of chlorosis. Faintness or syncope, with or without a feeling of dissolution, is most frequent in passive dilatations of the cavities, or in cases of fatty softening of the parietes, of the heart, with or without ossification of the coronary arteries.

161. *Palpitations*, as well as irregularities, and intermissions of the heart's contractions, &c., attend several organic lesions of the organ, and they may occur independently of any of these, and merely as a consequence of weakness or other disorder of the digestive organs, or of irritation of some viscus with which the heart sympathises. When palpitations follow mental emotions or sudden shocks they soon subside, or are followed by depression or faintness; or when they are consequent upon hysteria, or irritation or excitement of the sexual organs, the heart's action returns to its normal state. But, in cases of chronic debility, of exhaustion from prolonged

discharges, or from over-exertion or from inanition, or from prolonged anxiety, even independently of any manifest organic lesion, palpitations may frequently return, be alternated with faintness, or with irregularity of action, or even be characterised by such irregularity. In these latter circumstances, organic nervous power is more or less impaired, as respects the heart, especially in cases of faintness with or without any of these states of irregularity; or this power is irregularly distributed or determined, as in cases of nervous palpitation, in most cases of which it is also considerably weakened; the impaired tone of the muscular coats of the digestive canal, also generally present in these cases, admitting of flatulent distensions and fæcal accumulations, and thereby increasing the cardiac disorder. Indeed the parietes of the heart very often participate in the impaired vigour or tone of the coats of the stomach and bowels, flatulent distension of these impeding or interrupting the return of blood to the auricles, and thus preventing either the filling, or the dilatation of the cavities of the heart. When palpitations, attacks of faintness, or irregularity or intermission of the heart's action take place without being attended by any auscultatory sign, impaired influence or energy of the organic nervous system — constitutional or organic nervous debility is then generally present, although some change of structure, not indicated by the impulse or sounds of the heart, may also be present, as in cases of fatty softening, or of impaired nutrition of the parietes of the organ, or of disease of the coronary arteries. When treating of diseases of the HEART, in 1836, I directed attention to fatty degeneration of the substance of the organ (see that Art. §§ 224. *et seq.*); but, although this change may be admitted to be a consequence of impaired or morbid nutrition of the organ, often in consequence of ossific or other deposits in the coats of the coronary arteries, yet both softening and impaired nutrition of the muscular structure of the heart may take place without fatty degeneration in any very manifest degree being present. In all such cases, however, faintness, remarkable shortness of breathing, a sense of dissolution on walking fast, or on exertion, are generally observed.

162. ii. CONGESTION OF THE CAVITIES OF THE HEART may occur, either from general vascular plethora, or from a greater or more rapid return of blood to the right side of the heart than can be sent onwards by the ventricle, or from weakness, or dilatation of the parietes of the organ, or from obstruction to the circulation by material or mechanical causes. Either of these pathological conditions may produce this effect, or any two, or all of them may exist in the same case, and may even, without any further appreciable change, either terminate life or place it in imminent jeopardy, the distension of the cavities having been too great to be removed by the impaired or exhausted power of their parietes, or the material obstruction being too great or prolonged to be overcome by the weakened action of these parietes. In cases of this kind the patient experiences, whichever of these pathological states obtain, extreme oppression and a feeling of distension in the cardiac region, with great alarum, choking, dyspnœa, or orthopnœa, and often also with a sense of impending dissolution. The congestion is not limited to the cavities of the l
but extends to the large vessels, especially t
veins, and the action of the organ is either
or irregular, or tumultuous and inefficient.
congestion is evidently connected with ove
tension of the cavities, as shown by the incr
sphere of dulness on percussion, by pain i
left shoulder, or under the shoulder-blade,
extending to the arm. Death may ensue
congestion be not removed, partially or altog
either by stimulating or reinforcing the pow
action of the heart, or by diminishing the di
ing mass of blood by depletion, or by the c
nation of both. When this event takes
it may be imputed to some other pathol
state than this, as to spasm of the heart, espe
when the orifices, valves and parietes of the
present no very manifest lesion, the post-m
changes, or even the last struggles of exi
removing the congestion, either wholly
part, by which life had been extinguished.
slighter states of congestion of the heart a
quently present in *Hysteria*. (See Arts.
GESTION and HEART, *Pleuries*.)

163. iii. THE SYMPTOMS AND SIGNS FUR
BY THE ARTERIAL AND VENOUS SYSTEMS.–
remains to be added to what has already be
vanced on this subject in the articles A
ARTERIES, PULSE, and VEINS, to whic
reader may be referred. When treating
Pulse I have pointed out the SEMEIOLOGY
prising both the *diagnosis* and *prognosis*, of
action. There is generally heard, by me
the stethoscope, a dull weak sound in the
the larger arteries, and this sound is va
modified, according to the state of the blo
the thickness and tone of the arterial p
If the blood be thin, or watery, or poor in h
globuline, or if the arteries be thin, and th
deficient as respects the capacity of the
the sound of the arteries at every systole
ventricles is clearer and approaches near
bellows or blowing sound. This sound is
and ceases with the systole of the ven
Pressure on the artery developes this
which is imputed to the friction of the
current or wave against the coats of the a
each contraction of the ventricle.

164. *A. Morbid arterial sounds* are eithe
or single or *double*.—*a*. The *simple* or inter
bellows-sound is observed when tumours
arteries, in aneurisms, in cartilaginous an
deposits in the coats of arteries, and w
circulation is accelerated, especially in c
or anæmied persons, and after large l
blood. It is generally sibillous in tone
racter, varies in strength and loudness,
isochronous with the termination of the sy
the ventricles.—*b*. The *double* or continu
lows-sounds are heard chiefly in the caro
subclavian arteries, but seldom with
strength in both. Of these two or
sounds, the first is the stronger; and wh
are loud or high, they become whizzing,
rumbling or piping, or sibillous; but pre
the artery, the position of the head, &c.,
various modifications of these sounds,
however, are generally loudest with the
of the ventricles.

165. *B. The Capillary vessels* of various
the surface, especially in febrile, exanth

an cachectic diseases, furnish indications of som importance as respects vascular action and vit power. Pressure in cases characterised by red ss or discolouration of parts of the external sur e often, indeed generally, shows the cause, wh ier this be capillary injection or congestion, or travasation. If the last, pressure does not ma ially affect the discolouration. In the first and econd of these causes, pressure momentarily rem ves the discolouration; and the rapidity of the turn of blood into the emptied capillaries is an dication of the rapidity of the circulation. Wh the colour is florid, the circulation is active, and ital power is not very manifestly impaired, but hen it is dark-red, purplish or livid, the cap ary congestion is the consequence of impai vital power, and the circulation through the pillaries is sluggish or impeded. The capill es become impaired more and more in vital on with the advance of age, and are subject to the ne structural changes as are described when trea g of these changes in the coats of the Ar ries (§§ 38. *et seq.*). When treating of the changes (in 1831), I described the *atheromat s* matter deposited in the walls of the arteies s "a suety substance which is greasy to the ou ;" and, although much more recently stated o c sist of fat, or to be fatty, yet I believe that he scription I have there given (see Arteries, § 59 to be the more correct, as with fat other he cal constituents and animal products are on ned.

1 . *C. The veins* furnish indications of pathoogi states by their size and distension, by their ari se conditions, by the rapidity of their disens when pressure is applied in their course to he art, and by their pulsations. The veins in he nples, face and neck are distended in cases f c gestion of, and vascular determination to, he ain; and when this state is viewed in conect with other symptoms, the distension not ein caused by attendant convulsions, then vasula depletion is generally required. A distended r ricose state of the veins in any of the exrem es evinces obstruction of the venous trunk, r l ge branches, owing either to obliteration, res re or other changes described in the article Vei The rapidity with which the veins refill, fte aving been emptied by friction, followed by res re in their courses, as well as their size and uln , serves to show the degree of fulness, or f de iency, of blood in the system. The veins re all in youth, and in corpulent persons; hey re large in the aged, and in the emaciated, his ate admitting and showing fulness or enarg ent of the veins, especially of the extremiies. In the aged the veins lose their tonicity, nd e more prone to congestion, and to retarded r c structed circulation, especially when the ircu tion has to overcome the gravity of the olu n of blood in the veins.

16 A venous pulse is sometimes seen. It cca nally results from the continuation of the ear action through the capillaries to the veins, whe this action is inordinately excited, and is win in some respects to the reaction of the api ries upon the distension caused by the conact n of the ventricle, impelling the blood-wave nw ls. The pulsation in other cases may be aus by an artery lying under or near a vein; nd some instances the pulsation is retrograde, as in the jugular veins, and in these it is a most important sign of cardiac disease, and is produced by contraction of the right ventricle, and regurgitation of blood, owing to dilatation of the right ventriculo-auricular orifice, or to imperfection of its valve.

168. *D. The Blood itself* furnishes most important signs of the nature and probable issue of disease. Of the signs which this fluid — vital in its relation with the several viscera, but more especially with the ganglia and ganglial nerves which supply the vascular systems — presents in disease particular notice has been taken when treating of the several forms and complications of disease, in the articles specially devoted to them, as well as in the comprehensive article on *the changes observed in the blood in disease.* (See Art. Blood.) To these, but more especially to this last, I must refer the reader, as nothing of any interest or of the least importance has been added to our knowledge beyond what may be found under those heads, and more particularly the last. *Spontaneous discharges* of blood and the sources and appearances of the blood thus discharged, furnish very important pathological and prognostic indications, but these are fully considered in the article on Hæmorrhage.

169. iv. The Lymphatic System—*vessels and glands.*—This system furnishes but few signs of disease beyond those which appertain to the maladies occasionally seated in them; and these signs are described in the articles on the Lymphatics and Glands, Scrofula and Pestilence, Glandular. Enlargements, inflammations, &c., of the lymphatic glands, and inflammation of the lymphatics themselves, are generally produced by some irritation, sore, or puncture, or by the inoculation of some poison in a situation near to, or beyond the seats of these affections. Enlargement of the glands near the base of the cranium, or in the upper region of the neck, is often observed in cases of scrofulous or tubercular meningitis and softening of the brain, in young subjects, either with or without effusion of serum in the ventricles, or between the membranes; and similar affections of the glands, either near the sternum, the clavicles, or arm-pits not infrequently precede or accompany the development of tubercles in the lungs. Enlargement, inflammation, suppuration, &c., of the glands, and even inflammation of the lymphatics, followed by disease of the glands, are very frequently occasioned by the application or inoculation of some virus, or poison, or by sores or irritation, as often shown by the introduction of the syphilitic poison into the frame, and by poisoned wounds or punctures. But independently of these causes and sources of contamination, the lymphatic glands are sometimes enlarged or congested in weak and delicate subjects, and they are occasionally asthenically inflamed and disorganised in the course of pestilential and malignant fevers; but most frequently and especially in the plague, in which pestilence the affection of these glands constitutes a distinguishing feature.

170. V. Symptoms and Signs of the Respiratory Function.—These symptoms are of the greatest importance in respect not only of the diseases seated in the organs of respiration, but also of all other maladies to which the frame is liable. More or less disturbance of the respiratory func-

tion very often attends diseases of the heart and large vessels, and the advanced stages especially of diseases of the abdominal viscera, of febrile and constitutional maladies, and of affections of the brain. When treating of Auscultation, of the Chest, of the Bronchi, Larynx and Lungs, the signs and symptoms of the function of respiration, were described with reference chiefly to diseases implicating that function. Besides the signs furnished by auscultation, percussion, and inspection and admeasurement of the chest, several other means have been recently suggested of furnishing signs of pulmonary disease, and these have reference chiefly to the determination of the quantity of air received and discharged from the lungs at each inspiration and expiration, and of the power with which these respiratory acts are performed. For this purpose Dr. Hutchinson has invented an apparatus which he has termed a *spirometer;* and in order to show the movements of the chest in health and disease, Dr. Sibson has furnished an instrument, which is called a *chest measurer.* My limits prevent me from describing these and their application to the diagnosis of pulmonary maladies, and oblige me to refer the reader for all that should be known respecting them to the *Transactions of the Medical and Chirurgical Society,* (vols. xxix. p. 137., and xxxi. p. 353.) These means of diagnosis are of more or less service, especially in doubtful or difficult cases; but they should not be confided in further than that they are useful aids to the means previously employed, and to the rational symptoms furnished by the maladies of the respiratory organs. In all diseases, whether of these, or of other organs, the *voice* and *breathing* of the patient demand the strictest attention. The Voice is especially considered in a separate article; the *respiration* or breathing will be briefly noticed at this place.

171. i. Respiration is influenced or modified by age, by sex, by temperament, by the habit of body, by mental emotions, by the states of the atmosphere, by the positions of the body, and by the sleeping and waking states, and most remarkably by disease. Of certain of these little need be said. Temperament influences the respiration chiefly in connection with the conditions of the atmosphere, and with mental emotions, the nervous, susceptible, and irritable temperaments experiencing a greater frequency of respiration during warm and humid states of the air, and when the mental emotions are more or less excited. Persons of a full habit of body, and the subjects of obesity, respire more frequently, and receive less air into the lungs at each inspiration, than the thin or the more slenderly formed; and the short in stature have a somewhat less capacity of the lungs than the tall. Much, however, depends upon the breadth or width of the chest. A person when standing or sitting breathes more fully and freely than when lying down or reclining upon either side. Hence in bronchitis, in pneumonia of both lungs, and in cases of effusion into both pleural cavities, the patient cannot lie upon either side, for this position in some measure extinguishes the motions of the side of the chest upon which he lies, and increases the difficulty of respiration. Respiration during sleep depends very much upon the position and upon the habit of body, and upon the state of the stomach.

172. *Respiration during disease* should be examined — 1st. By observing the motions of e chest, and the phenomena attending inspira n and expiration; — 2d. By auscultation, or y listening to the sounds produced by respiratio n the several regions of the thorax. The *secon* of these modes is considered under the head s. cultation; it furnishes chiefly signs of disea of the respiratory organs, or rather those chang of respiration which diseases of these organs proc e. The first not merely evinces diseases of the bi- ratory organs, but also gives more or less info a- tion as to the states of the vascular system, the abdominal viscera, and of the brain. To this *st mode* of examination a brief notice is to be dire d. Attention should be paid — 1st. To the freq cy and quickness of the respirations; — 2d. T he motions and degrees of expansion in the se al regions; — 3d. To the states of the nostril nd mouth during respiration; — 4th. To the ni- formity, the ease, or the exertion of respira n; and the relations, in frequency and exertic of the individual respirations to each other; - 5th The states of expiration in relation to inspira ry — 6th. The sensations experienced by the p ent during the acts of inspiration and expiratio — 7th. The states of the expired air, chie in respect of temperature and odour.

173. *a.* The *frequency* and *quickness* of b th ing may each exist independently of the er Respiration is more *frequent* than in health, en a portion of the lungs can no longer perfo its functions, as in pneumonia, tubercular consum on &c., or when the lungs are more generally af ted as in bronchitis, or prevented from expandi by pleural effusions, by incurvations of the sp or by the invasion of the thorax by abdomi or other tumours, or effusions &c. It is also or frequent when the circulation is more rapid han in health, and passes more rapidly, or in ger quantity, through the lungs, as in febrile ma ies and when the lungs are congested by im der circulation through the heart. The progn s of increased frequency of breathing depends pon these causes — upon the nature of the or ro- ducing it. In febrile diseases, the less fr ent the respiration relatively to the amount of ver the more favourable is the prognosis. The l th ing even in the most unfavourable circums nces very rarely amounts to sixty in a minute. spi ration may be more *rare* or *less frequent,* n in health, as when the heart's action is impe d or rendered slow, or when the brain is conges , or the basilar parts of the brain, or medulla obl ata or cervical portion of the spinal chord, is co sted or pressed upon, or in syncope, catalepsy, ruc tural changes of the substance of the he ; in sopor, coma, or apoplexy, or in certain st s of paralysis; and during the extreme exh tion preceding dissolution.

174. *Quickness* of respiration, especially in spiration, arises from a more rapid action the muscles of respiration occasioned by either ak- ness or fatigue of those muscles consequ on paroxysms of cough, as in pneumonia, bro itis, pertussis, or on great muscular exertions on pleural effusions; and in many of these ca , as in pleuritis, in pleuro-pneumonia, in peric litis, &c., the breathing may be quick and yet l fre- quent than natural, especially when respi on is attended by pain. Quickness increases ti lan- ger of frequency of respiration, especially i neu

mo a, pleurisy, tubercular, and other organic ma lies. *Slowness* of breathing is very often an att lant of diminished frequency, especially in the maladies, with which this latter is mentioned in nnection. When it occurs in cases of extreme ex ustion, or at a far advanced stage of acute or ch nic disease, with a small, weak, or irregular pu , sinking of the features, cold or clammy extre ties, &c., it indicates approaching dissolution. Bu it may also occur, although not as a consequ ce of serious disease, as in these circumsta es, in cases of nervous debility, during attacks of ntness, or it may usher in hysterical syncope, or talepsy, and be unattended by danger.

5. *b.* The *motions* and degree of *expansion* of the hest vary much in different individuals in the sar disease. The *motions* of the chest, in the sev al thoracic regions, should be observed, when the lothes are removed ; and any difference in the egree or extent, or quickness of motion in eit side, ought to be noted. Uniformity of the mo ns of both sides of the chest is an indication of ore or less uniformity of the parts co ined in each. But if this uniformity is only pa l, if it be absent in any region, pleuro-pneumo a, tubercular formations, pleuritic effusions or hesions, or other structural lesions, may be inf ed to exist in the region where the motion is im red or deficient, and the prognosis is unfav rable, or should be given with much caution.

6. According to the degree of expansion of the hest, respiration is *large*, or *full*, or *small*, or ve small or shallow. If the breathing be full or rge, the chest expanding freely and naturally, the ythm being equal or normal, a favourable op on may so far be entertained ; but if this state of spiration be also rare or slow, or if the rhythm be nequal, oppression or congestion of the brain, as nervous fevers, or sopor or coma, or apopl y should be apprehended, if not actually pr nt; or the accession of convulsions may be ex cted, especially in children. Respiration may be ry great or large, and yet the quantity of air rec ved into the lungs may be very small, the lu s being obstructed by disease of the bronchi, or their substance, or by emphysema or pleural eff ons. A *small* or shallow respiration accompa s pleuritis, pleuro-pneumonia, pericarditis, he titis, and diaphragmitis, also peritonitis, gastri and enteritis, owing to the increased pain or un siness occasioned by a fuller or larger expa on of the chest ; and is an unfavourable sign es cially when it is attended by much debility or a se of sinking, or by some degree of quickness, or a sudden stop.

7. If the rhythm, or intervals between the res rations be irregular, or of unequal duration, an nfavourable opinion may be entertained, in the diseases affecting the thoracic organs and br , and in the far advanced period of other se e diseases, more especially if, with irregularity of ythm, there also be inequality of the fulness, gr ness, and quickness of the respiration, a great re ration following, or alternating with a small or When the respirations are affected by spasms, or y sighing, they are exceptions to this rule. A uick respiration, or a small one suddenly cut sh t, or interrupted by pain, or by the increase of it characteristic of pleuritis, pleuro-pneumonia, di hragmitis, peritonitis, gastritis, &c.

78. *c. The States of the Nostrils and Mouth* during respiration often indicate the issue at far advanced stages of the disease. The expansion of the nostrils or alæ nasi at each inspiration indicates a great want of pure air in the lungs, and evinces great danger in all diseases of the pulmonary apparatus. The patient often breathes entirely by the mouth in diseases of debility or exhaustion, or at an advanced stage of acute maladies, especially in dangerous diseases of the brain, and the low or typhoid forms of fever, the tongue and mouth becoming more parched by the passage of air. During respiration various morbid sounds are produced, chiefly by the posterior nares, and by the larynx and pharynx which possess some prognostic significance. *Snoring* occurs during the sleep of plethoric, or other persons even in health, when the mouth is partially open, and occasionally in disease, especially in apoplexy. A *stertorous* breathing is always morbid, and is of much more importance than snoring, which is generally produced by inspiration, stertor chiefly by expiration through the nose and is a dangerous symptom in apoplexy. Expiration entirely by the mouth, with a puffing or blowing sound, is still more dangerous in this malady.

179. *d. The Ease, Uniformity, and degree of Exertion required in respiration.*—Respiration, as respects the exertion made in its performance, may be easy, weak, strong, difficult, or strangulating. (*a.*) An *easy*, *quiet* and regular or uniform respiration, without sighing or cough, is always a favourable sign, especially in febrile affections, and always renders other symptoms, which might otherwise be considered severe, less unfavourable, especially quickness of pulse and heat of skin. —(*b.*) A *weak* respiration is characterised by the slightness of the motion of the respiratory apparatus, and by the diminished action of the respiratory muscles. It is a fatal symptom in pulmonary maladies, and in low or nervous fevers. It is chieflyi n syncope or faintness, and in catalepsy, in which it is commonly the most remarkable, that it is of the least prognostic importance. — (*c.*) A *full* respiration is generally present in healthy persons during exercise, or in excited states of nervous power and of the circulation. It is present, in varying grades, in all febrile and inflammatory affections, or in disorders of excitement unattended by diseases of the respiratory organs, and it does not indicate danger, when it is uniform, easy, and without pain or difficulty. — (*d.*) A *strong* respiration is a higher grade of the last, and always is attended by some degree of exertion. It occurs in affections of the trachea and bronchi ; in congestive pneumonia, in several diseases of the heart, and in the more sthenic states of fever.

180. *e. Difficult respiration,—Dyspnœa*—is attended by much more muscular exertion than the former, and is present in asthma, in bronchitis and pneumonia of both lungs, in effusion into the pleural cavities, in obstructive and congestive diseases of the heart and large vessels, in emphysema of the lungs, &c. In this state of breathing, certain modifications may be remarked depending upon the seat and severity of the malady. — 1st. The respiration may be *abdominal*, owing to increased action of the diaphragm, and to the consequent motions of the abdomen. This is observed in apoplexy, in certain states and forms of fever, attended by cerebral congestion and exhaustion, in pleuritis, fracture of the ribs. — 2nd. The breath-

ing may be *thoracic*, the abdomen presenting but little motion; as in inflammation of the liver, or stomach, or bowels, or of the peritoneum — of the last especially; or in ascites, or enlargement of the spleen or liver; or other changes impeding or preventing the free action of the diaphragm may be present. If the breathing be both thoracic and abdominal, great difficulty of, or obstruction to, respiration manifestly exists in the organs contained in the thorax, or in the respiratory passages. — 3d. According as certain muscles are called into action during breathing, the degree of difficulty may be determined and the severity and danger of the malady inferred.

181. The more that the action of the upper ribs co-operates in enlarging the thorax — the more high the thoracic movements are observed — the *respiratio sublimis* — the more difficult is the breathing and the more dangerous is the malady, as in hydro-thorax, the advanced states of diseases of the heart and pericardium, in bronchitis of both lungs with mucous accumulations, in congestive pneumonia, in tracheitis, &c. In the more extreme cases of this kind, but chiefly in croup, laryngitis, œdema of the glottis, &c., the muscles of the neck are also brought into action, and the muscles also of the face are often also sympathetically affected. In the maladies just now mentioned the motions of the thyroid cartilage upwards and downwards with each forced expiration and inspiration are extensive and remarkable. When the motions extend to the mouth and nostrils, in difficult respiration, the danger is extreme. The act of inspiration is most difficult, from its commencement, in the several states of croup, laryngitis, inflammation of the epiglottis, in laryngismus stridulus, and in all affections of the glottis: it is most difficult towards the termination when the disease is seated within the thoracic cavity. In some cases of difficult respiration, the patient can take a deep and full inspiration, and yet he breathes with difficulty and frequently. In these the heart or brain, or some other organ, but not the lungs, is affected. In bronchitis, in tubercular consumption, in asthma, and in emphysema of the lungs, expiration is often more difficult than inspiration.

182. In the acute diseases of the thoracic organs, the degree of dyspnœa is not always proportionate to the severity of the attack, or to the amount of organic change. But in all acute cases, a laboured respiration is always unfavourable, especially when it is continued. And, in chronic affections of these organs, a gradually increasing dyspnœa, without remission, is even still more unfavourable. Dyspnœa is always greatest when both lungs are affected; and when it is consequent upon the retrocession or disappearance of acute eruptions, especially in the exanthemata, it is always a dangerous sign. If the dyspnœa be attended by profound debility, or lividity of the lips, or gums, fingers, &c., death is near.

183. *f. The Sensations experienced during respiration* are most important. These are chiefly pain, anxiety, a sense of strangulation or suffocation, and a feeling of impending dissolution. — *Pain* is felt, chiefly during inspiration and towards the close of the act, in pneumonia, in pleuro-pneumonia, in pleuritis, &c., and at the commencement of the act in pleurodynia, acute pleurisy, peritonitis, &c. If it be experienced only when taking a full respiration, adhesio of the lungs to the costal pleura are probably pre t; but inflammatory action may, in those cases, ist in the lungs, or even in other organs, acco ng to the seat of pain, when thus excited. In bro hitis, bronchial catarrhs, and influenza, the pa is often felt most, at the advanced stage, or tov ds the termination, of the act of expiration. *in* in one or other of the regions of the chest ma be constant, but more or less aggravated durin espiration, or it may be experienced only d ng this act, or not be felt unless the inspiration o xpiration be full and deep. Pains about or b w the collar bones, shoulders, shoulder-blades, i he back, or between the shoulders, are frequent i ubercular consumption, and may exist independ ly of inspiration, although often increased b it. When thus increased and experienced tov ds either side of the sternum or towards the a es of the ribs, or even in the back, chronic dhesions exist, or are being formed, betwe a portion of lung and the ribs. Pain in he sternum, not aggravated by full respiratic is often syphilitic; if aggravated or caused b espiration, especially expiration, it is produce by bronchitis, or inflammation of the mediasti n. Pain, in the cardiac region, if it be continued ut aggravated by breathing fully, or if it exter to the left shoulder and arm, may depend upor arditis, pericarditis, or endocarditis, more espec ly if rheumatism of some joint or part have prec ed it, or accompany it. If the pain continue i he same part, it indicates acute or chronic infla ation of the subjacent structures. If the pain ift about it may be owing to hepatic congestic or to some other biliary disorder, or to rheum sm or pleurodynia. Pain in the right shoulder under the right shoulder-blade, is generally ca ed by disease of the liver. When pain is incr ed by pressure it may be attributed to pleurodyn or pleuritis, or to pericarditis. The motions o he arm and chest increase the pain of pleurod ia. A dull pain, a feeling of weight or oppressic or tension, attends pneumonia, congestion of he lungs or heart, dropsy of the thoracic cavities nd enlargements of the liver or spleen, espec ly when great, and in certain positions of the l y. Intensity of pain is seldom proportionate t he severity of the disease of the thoracic viscera It is generally greatest or most acute when th attack is sudden, extensive, and seated chiefly i he serous tissues. In most cases when the pa is increased, or is induced, by full respiration, re is more or less anxiety.

184. *g. Anxious* respiration is most frec nt during congestive states of the lungs, heart, ge blood-vessels, and brain; but more especially i aphragmitis, pleuritis, in disease of the valves c rifices of the heart, in fatty softening of the subst ce of this organ; and towards the fatal terminati of inflammations of the lungs, bronchi or pleura nd of thoracic dropsy. It is always an unfavou le symptom. — A *strangulating* or suffocativ espiration occurs chiefly in croup, laryngitis d other affections of the larynx or trachea. — e spiration may be attended by a feeling of *imper ng dissolution*, especially when it is frequent, rt and difficult, especially in angina pectoris, i e organic lesions of the heart, &c., in some cas of spinal paralysis, in all which it is a very unfav rable symptom. If the feeling be caused b he

accession of syncope, the prognosis is very different, unless the syncope proceed from disease of the heart.

185. *h. Other phenomena* are presented by the breathing that deserve notice.—When the respiration is healthy it is not attended by any sound, which can be heard by the ear, when removed from the chest; but in cases of difficulty, especially in the states now described, various modifications of *sound* may be heard. The sounds of inspirations and expirations become audible and even somewhat loud, during or after physical exertion, especially ascending eminences, and at the same time frequent, strong and deep. Respiration is *suspirious* or sighing, during states of mental anxiety and depression, of pulmonary, and of cardiac congestion, in cases of nervous depression or exhaustion, in hysteria and in hypochondriasis, and in hepatic or biliary congestion. Recovery from faintings, syncope, hysterical paroxysms, and from catalepsy, is attended by suspirious breathing.—A *panting* or *gasping* respiration is observed chiefly in the most extreme or dangerous cases of thoracic disease, and in the same circumstances as have been noticed in connection with the most difficult states of respiration, of which this is the most fatal. It often terminates life in cases of pneumonia or of bronchitis, or of congestion of both lungs, in the advanced states of organic disease of the heart, of hydro-thorax and hydro-pericarditis, and in diseases of the larynx and trachea. In these last, in asthma, in œdema of the glottis, and in hysterical affections of the throat and neck, the breathing is then also suffocative or strangulating, and attended by a *sibillous*, or *hissing* sound. In the spasmodic states of the larynx, as in laryngismus stridulus and hooping-cough, the sound is *crowing*, *loud*, and *stridulous* at each inspiration, ultimately ceasing in a short time, or becoming strangulating and suffocative, and terminating life with the usual phenomena of asphyxia.—As to the sounds of respiration in the several regions of the chest, on AUSCULTATION, I must refer the reader to that head.

186. *i. States of the expired air in respect of temperature and odour.*—*A.* The *temperature* of the expired air is always more or less above natural in sthenic inflammations of the lungs, bronchi and pleura, during inflammatory fevers, and in the state of vascular excitement in continued and periodic fevers. It is slightly lower than in health in states of vital depression, especially in congestive affections of the thoracic organs and in disorders of debility; and it is much lower in the last or the advanced periods of fevers, particularly the adynamic, the typhoid and the malignant, and in the asthenic forms of the exanthemata. It is lower still, being almost cold and raw in the choleric pestilence, and in the extreme or fatal states of congestion, when the changes produced by the air on the blood cease, or nearly cease to take place.

187. *B.* The *odour* of the breath varies much. In perfect health it is sweet or pleasant; but during disorders of the digestive organs, it is foul, loaded or unpleasant. It is more or less unpleasant, in cases of dyspepsia, during flatulence and costiveness, and during the catamenia, when the odour is peculiar. It may be rendered very unpleasant by several articles even during health, as by eating onions, leeks, assafœtida, garlick, &c. The odour of the breath of those attacked by continued, exanthematous, malignant, and pestilential fevers, is most unpleasant and infectious, especially to the predisposed. In those the odour is particularly disagreeable; and the humidity of the expired air is often unusually great, and loaded with animal matter, especially at an advanced period of these maladies, as shown by breathing on a mirror or on any cold polished surface.

188. A disagreeable odour of the breath is present also in scurvy; in cancerous diseases of the stomach, mouth, uterus, &c.; in malignant sore throat; in gangrene of the lungs; in constipation of the bowels, and frequently in diarrhœa, especially in the diarrhœa precursory of pestilential cholera, and in asthenic dysentery. In this last and in chronic diarrhœa, an earthy or cadaverous odour of the breath is a most dangerous sign. In verminous complaints and in chlorosis the odour is sweetish or resembles that of new milk.—There are several other topics connected with respiration, but certain of them have received a special notice under their respective heads, as COUGH, HICCUP, VOICE and SPEECH, and to those the reader is referred. It therefore only remains to consider at the place the *Expectoration* and the *Signs connected with Expectorating.*—

189. ii. THE EXPECTORATION furnishes much information as to the nature, seat and issue of disease; especially of pulmonary diseases.—It may consist —1st. of morbid mucus;—2d. of purulent mucus; —3d. of purulent mucus containing portions of tubercular matter:—4th. of pus or ichorous matter; —5th. of blood, or blood conjoined with either of the preceding; — 6th. of fibrinous substances moulded in the bronchi; and 7th. of calcareous matter, or hard concretions formed in, or the remains of tubercular deposits.— In order to form a correct idea of the various matters thrown off the respiratory passages, the appearance and composition of healthy mucus from these passages should be noticed. There is, however, much difficulty in obtaining healthy mucus from these sources, as it is more or less altered from the normal state when excreted in such quantity as admits of its examination, and it is so mixed with the secretion of the bronchial glands, and so changed by the air, and the states of the air in certain localities, as to modify its condition very remarkably. The mucus of the bronchi is propelled along these canals by the ciliary motion on the surface of the mucous membrane, and by the respiratory functions. The mucus excreted is a viscid, tough and tenacious or stringy matter, which is often clear or colourless, but more frequently it is turbid, of a grayish, or faint yellowish white tint, and of semi-fluid consistence. According to SIMON it consists, chemically, of a varying proportion of water and of the following constituents, namely, mucus-corpuscles, epithelium cells, mucin, small quantities of extractive matters and fat, chlorides of potassium and sodium, alkaline lactates, a little carbonate of soda and phosphate of lime, and sometimes a minute quantity of albumen.

190. *A. Morbid Mucus* is produced chiefly by catarrh, bronchorrhœa, and by bronchitis; and in these especially, as well as in several other diseases, it is often produced in great quantity, and in various states.—The quantity, as well as the appearances, of the pulmonary sputa depends much

upon the quantity of water or serum, and of albumen, with the other ingredients just mentioned. The sputa are most watery or serous in bronchorrhœa, and in congestive and œdematous affections of the lungs: they are most viscid and albuminous in the inflammatory states of the bronchi. In these states the sputa are whitish, or of a pale yellow colour, and float in water. They possess a certain degree of consistency, and feel slimy in consequence of the mucin connecting the mucus-corpuscles.

191. *B. Purulent Mucus* from the lungs contains much less mucin than normal and morbid mucus; and consequently the sputa have not the toughness, lubricity and consistence of mucus unmixed with pus; and have a decided tendency to dissolve. In bronchitis and other affections of the lungs, the transition from morbid mucus to purulent mucus is so slight, that it is hardly possible to detect the first traces of pus mingled with the mucus — or to determine the presence of a little pus in mucus, or of a little mucus in pus. Purulent mucus sinks more quickly in water, than the healthy secretion, owing partly to its containing less air, and partly owing to the greater quantity of albumen and of chlorides and higher specific gravity. Equal proportions of mucus and pus readily sink in water. A small amount of pus separates from the mucus when placed in water. Phthisical sputa, which commonly consist of purulent mucus, deposit a whitish granular sediment at the bottom of the vessel, while masses of mucus are still floating on the surface of the water.

192. *C. Purulent Mucus with softened tubercular matter* is observed in the second and third stages of phthisis. Most of the expectoration in the malady proceeds from the chronic bronchitis which accompanies it. When the sputa is placed in a glass vessel containing water, then minute portions of softened tubercle, or much larger fragments may be detected either adhering to the mucus, or sunk to the bottom of the vessel with the granular sediment consisting chiefly of the purulent portion of the excretion. These fragments of softened tubercle consist either of whitish streaks, or yellowish white masses, resembling portions of boiled rice, or of greenish white matters, of irregular shapes. (See Art. Tubercular Consumption.)

193. *D. Pus and Ichorous matter.*— *a.* Pus may proceed from three sources: — 1st. from violent inflammatory irritation of the bronchi. — 2d. from inflammation of the parenchyma of the lungs, — or 3d. from a vomica or abscess opening into the bronchi. This last is comparatively rare; and pure pus is very seldom produced by the first and second sources. Violent irritation of the respiratory passages may cause the formation of pus in place of the mucous secretion. Hence the production of pus is owing to a greater intensity of the same morbid action which, in progressive grades, produced morbid mucus and purulent mucus: — but it may be assumed that even in this highest grade a small proportion of mucus may still be present. Genuine pus is a somewhat thick fluid, viscid, but capable of separating in drops, like cream, of a whitish-yellow, yellow, or greenish-yellow colour; and of a faint animal odour. It may be slightly acid, or slightly alkaline, or even neutral. When mixed with water if soon sinks to the bottom, and on stirring it forms an emulsive fluid from which a sedime of pus-corpuscles is soon deposited. When exan ed under the microscope, pus appears, like m us, to consist of a clear fluid in which small, r d, and occasionally oval corpuscles are swim g, the quantity of which is in a ratio with the t kness of the pus. Pus and mucus-corpu les closely resemble each other in form and che cal relations. Their sizes are nearly the same ut the nuclei of the former become more distinct an those of the latter when the corpuscles are tr ed with acetic acid.

194. The *liquor puris*, or fluid in which the orpuscles are contained, is transparent, and us lly of a pale yellow colour. It contains so lar an amount of albumen, that on the applicati of heat it becomes white, and very flocculent. he large amount of albumen, and of the chlo es, especially the chloride of sodium, associated a small quantity of fat, distinguishes the fluid p on of pus from the consistent and adhesive flu of mucus, and indicates the affinity betwee he liquor puris and lymph. The fat is chiefly ntained in the pus-corpuscles, the nuclei pro bly containing a large proportion of it. In the i or puris the fat is combined with alkalies.

195. It appears from the researches of G ay, Simon, and others that pus consists of two di nct portions :— 1st, A fluid, or liquor puris :— d, And of corpuscles swimming in this fluid, a insoluble in it. The corpuscles are surround by a capsule which becomes tumid in wat is soluble in free potash and is reduced by am nia to a thick viscid jelly, dissolves on prol ged gentle digestion, and is doubtless compos of mucin. Of the nature of the contents the corpuscles lying between the nucleus an the capsule nothing is known. The nucleus pr bly consists of albuminous matter and fat. The liquor puris contains much albumen, som fat, pyin or dissolved mucin, extractive matte and salts. In pneumonia, as the chlorides, pecially the chloride of sodium, are increa in the sputa, they are diminished, or disappear the urine.

196. An *ichorous matter* is sometimes ectorated when gangrene of a portion of the ng takes place, and in malignant growths i the lungs. It may either proceed from a de or other change of pus, or be secreted from th angrenous or malignant part. This matter i in, discoloured, of a brownish or reddish tin and emits a fetid odour. It often either conta no pus globules, or very few; and those are b ken down. Although ichor is of a reddish col , it may not contain blood corpuscles; these orpuscles having been dissolved in the morbic id, and having thereby imparted this colour it. Mucus, or muco-puriform matter, may b expectorated with it in greater or less prop on, owing to the irritation of the bronchial mem ne over which it passes during the process of excretion. The presence of this matter is ays indicative of great danger. Recovery may wever, take place when it proceeds from ga ene of a small or isolated portion of the lung.

197. *E.* Blood may be present in any of the tes of the sputa already described. It may fo , in a pure and unmixed state, the whole or th ief amount of the expectorated matter, or acco ny more or less of either of the preceding kin It

merely streak or dot the sputum, or be so in-
tely mixed with it as to give it a pinkish, red-
rusty or brownish hue. When the blood is at
nsiderable, it proceeds from one or other of the
es described when treating of HÆMORRHAGE
the respiratory organs: it may be caused
terrupted circulation through the heart, or by
estion of this organ, or by congestion of the
and bronchi, with or without congestion of
eart, or by the irritation or congestion pro-
d by tubercles, or by inflammatory action, or
e ulceration or erosion of vessels in tubercular
ies, or by disease of the coats of the capilla-
r arterial ramifications. It was the fashion,
erly, to ascribe all hæmorrhages from mucous
llous surfaces to an exudation from the capil-
of these surfaces; but this, although a
non source, especially when congestion or
mmatory irritation exists, does not always or
generally obtain, for ulceration or erosion of
ls, and disease of their coats, especially suetty
heromatous deposits in them, favouring their
ure when congested, are not infrequent
es of hæmorrhage, especially when the dis-
ge of blood is large or very considerable.
n the bloody expectoration is small in quan-
it commonly proceeds from exudation, owing
r to congestion and relaxation of the capilla-
and then it is rusty or dark-coloured, as in
estive or asthenic pneumonia, or to inflamma-
irritation of the bronchi adjoining the inflamed
on of lung, and then the blood is of a more
l red, in very small quantities, and mixed with
co-purulent matter, as in sthenic pneumonia
in tubercular consumption.

98. When blood has been expectorated in
r large or small quantities, it often continues
lour the sputa for several days afterwards, the
ur generally passing from a dark red to a
n, or rusty, to an ochry and greenish hue, as the
tity of colouring globules diminishes or be-
s altered in the containing fluid. Extravasated
d always occasions more or less irritation in
mucous surfaces over which it passes, and
e a more copious expectoration of morbid
us or of muco-purulent matter follows the
orrhage, and continues for a longer or shorter
d, according to the nature of the primary
consecutive changes. When blood is present
e expectoration in a quantity merely sufficient
olour the expectoration, and is intimately
d with it, pneumonia is certainly present, the
tion of the tint from red to brown, or from a
ish brown to that of prune juice, indicating
failure of vital power. If the blood merely
ars in minute streaks or spots, severe catarrh
ronchitis may only exist; but if it occur in
r spots or patches, pneumonia or phthisis is
monly present. When the spots of blood are
d in a copious turbid or muco-purulent ex-
oration, then phthisis or very severe bronchitis
s. When they are seen in thick yellowish or
nish-yellow and rounded sputa, then pneu-
ia may be inferred: in these cases the prog-
s is very unfavourable. A frothy, fluid and
ht red blood is usually an exudation from the
chial membrane in phthisis. Dark-coloured
d, without froth, and without muco-purulent
ctoration, and in large or considerable quan-
proceeds generally from congestion, or from
ion of vessels in a tubercular cavity, or from
pulmonary apoplexy. Clear fluid blood, without froth, and in large quantity, comes either from aneurisms, or from eroded or diseased vessels.

199. The bleeding may proceed from the pharynx, or even from the posterior nares, and, owing to the irritation produced by it in the glottis or epiglottis, occasion a hawking cough; but in these cases, redness is generally observed in the throat. The bleeding may be vicarious of menstruation, or of hæmorrhoids, or be consequent upon the suppression of either; and if in these cases there have been no antecedent symptoms of phthisis, the blood may proceed chiefly from the bronchial surface; but, even in these, it is often followed by, or connected with, either bronchitis or tubercular deposits. When the bloody sputa occur in fevers, and in the course of cardiac disease, the prognosis should be very unfavourable: it may be less so when bloody sputa are observed in scurvy and purpura. In all these cases numerous concomitant and antecedent circumstances should be taken into consideration.

200. *F.* FIBRINOUS EXUDATIONS take place, in rare cases, in chronic and in sub-acute states of bronchitis, and are moulded in the ramifications of the bronchi. They are generally expectorated in the form of the bronchial tubes, and present various extents of ramification and degrees of firmness and tenacity. These ramifications are very rarely hollow: they are commonly either filled with a softer matter, or are firmer in the more external layer. They resemble the false membranes or fibrinous exudations formed in the larynx and trachea in croup: and which are frequently thrown off in that disease accompanied with more or less gelatinous or glutinous mucus. (See Art. BRONCHI, § 49. and CROUP, § 33.)

201. *G.* EARTHY OR CALCAREOUS CONCRETIONS are sometimes expectorated by persons who have had phthisical symptoms and recovered, or who are still suffering them in a chronic form, or have suffered in various grades for several years. I have seen many of these cases. These concretions vary in size from that of a head of a pin, to that of a small bean. Their surfaces are generally unequal, irregular and ragged. The expectoration of them may or may not be attended by much sputa, which may or may not be coloured with blood: most frequently the sputa are scanty, and are only minutely streaked or dotted with blood. A medical man called upon me, complaining that on each inspiration and expiration, but during the latter especially, there was a loud whistle, which could be heard at any distance in the room from him. He had neither cough nor expectoration; and he stated that he had not experienced either for several years. He was a fluent and eloquent speaker and lecturer, and never experienced any inconvenience from speaking for a long time; but many years ago, he had had some pulmonary symptoms. I told him that one of these concretions, of considerable size, was making its way through the parietes of one of the large bronchi, and that he would expectorate it in the course of a few days. He did so; the concretion being the size of a large pea. He is quite well at this time. A relative of my own has expectorated many of them, at different periods, the largest being the size of a small bean. She has been the subject of chronic phthisis for many years; but is now able to be about, and go out of doors.

202. *H.* The Expectoration in the several forms of disease of the Respiratory Organs has been fully described under the separate heads of Catarrh, Cough, Bronchi, the diseases of, Hæmorrhage *from the respiratory organs*, Lungs, the diseases of, Pleura, Tubercular Consumption, &c.; but it will, nevertheless, be useful to give at this place a brief *resumé* of the appearances of the sputum, in those maladies, in which it is present in increased quantity or altered quality. — (*a.*) In *dry catarrh* the sputa are scanty, and consist of small pellets of tough, greyish or greyish-yellow mucus, which are expectorated after severe fits of cough. — (*b.*) In *pituitous catarrh*, the sputa are much more abundant, and thin or watery, consisting of a serous mucus, containing albumen and mucin. This expectoration varies much in quantity and appearances, with the severity of attack, the congested state of the lungs, and with its complication with rheumatic or cardiac affections. — (*c.*) In *broncorrhœa* the expectoration is watery or serous, most abundant, and sometimes extremely so when complicated with pulmonary congestion or cardiac disease. — (*d.*) In *acute bronchitis*, little or no expectoration occurs at first: but a liquid, slightly saltish sputum is soon formed, which gradually increases with the progress of inflammation. It is at first transparent, nearly colourless, moderately viscid, retains many small air bubbles, and is frothy on the surface, especially when expectorated after much coughing. When expectorated in the same vessel, the sputa coalesce, and may be drawn into a ropy stream. The viscidity of the sputa is in proportion to the severity of the inflammation, of the fever, and of the dyspnœa. As the disease declines, the sputa become pearly, opaque, or of a yellowish or greenish white, and more consistent and glutinous. If a relapse or exacerbation takes place, the expectoration becomes thinner, more transparent, glairy, and frothy. As amendment advances, the sputa are more readily coughed up, and in more distinct pellets, which do not so readily unite into one mass as before. They gradually diminish in quantity. — (*e.*) In *chronic bronchitis* the sputa vary much in different cases, and in the same case at different periods. They are frequently similar to the sputa at an advanced period of the acute form. They are often opaque, yellowish or greenish-white, owing to an admixture of a muco-purulent matter of this hue, with mucus, and a watery or serous fluid. Sometimes the thick, opaque matter floats in the pituitous or serous fluid expectorated with it. In other cases, the mucus is inspissated, fibrinous, and moulded into the shape of the bronchial ramifications (§ 200.).

203. (*f.*) In *pneumonia*, the sputa, after the first two days, consist of a viscid, transparent fluid, tinged with an orange or rusty hue. At first they resemble the sputa of acute bronchitis, and they may be poured from one vessel into another in the form of viscid strings. At a more advanced stage, the sputa become so glutinous and viscid as not to leave the vessel even when inverted. They are, also, more streaked with blood, or red, or rusty. As the disease declines, the sputa assume the first or bronchitic appearance. In unfavourable cases, the expectoration becomes more viscous, more rusty, brown, opaque, or purulent. In some still more unfavourable cases it is altogether suppressed,
owing to its viscous nature, and the want of p er
to throw it off; suffocation taking place, th
lividity of the prolalabia and extremities. In er
unfavourable cases, the expectoration assume he
form of a deep, reddish-brown and slightly v id
liquid, like the juice of preserved prune or
liquorice water. This appearance indicates he
existence of suppuration, or of a cachectic te
of inflammation which has gone on to softeni or
purulent infiltration. The characteristic spu of
pneumonia, or pleuro-pneumonia, are or e,
greenish-yellow, reddish, bright-red, or streak or
dotted with red, or rust-coloured, according t he
amount of red globules contained in them. — .)
In *pleurisy*, the expectoration is scanty, mu s,
or muco-serous, or resembles that in the diff nt
forms of catarrh.

204. (*h.*) In *phthisis*, the expectoration is v ed
according to the stages of the disease, and is ch ly
from the bronchi during the whole course o he
malady, and altogether from them during the st
and second stages. In some states of ph sis
little or no expectoration takes place throug t,
or not until shortly before death. In the st
stage there is either no expectoration, the c gh
being dry, or it is of a simple catarrhal or n-
chitic character, or sero-mucous, and more o ss
abundant, especially when the lungs are th ly
studded with tubercles, a mucous rhonchus ng
generally heard on auscultation. In the se nd
stage, the expectoration continues as in the st,
or assumes a more bronchitic character, or p es
into the muco-purulent form of chronic bronc is,
until the softening and evacuation of the tuber ar
deposits. When the softened tubercles make eir
way into the bronchi, the irritation of these c ls
is increased, the mucous or muco-purulen x-
pectoration is augmented, and contains wl sh
streaks, or whitish-yellow fragments, consisti of
the softened tubercles. As the softening nd
formation of a cavity proceeds, the sputa as ne
further changes, which have been already no ed
above (§ 192.), or fully described in the a le
on Tubercular Consumption.

205. (*i.*) The sputa are *evacuated* or *exp* o-
rated with various degrees of ease or of diffic y,
according to the nature and stage of the dis e,
the state of the sputa, the age and the streng of
the patient. They may be hawked up, with r h
ease, in some cases, or coughed up, with mo or
less difficulty, in others. They may be ex c-
torated and swallowed, as in children, and s e-
times in adults, when they are not very abun t.
The rapid, violent, and loud expiration, by w h
expectoration is generally effected, and cough o-
duced, is caused by irritation existing in, or n-
pathetically propagated to, the larynx. C gh
may thus be occasioned either by the irritati of
sputa, when they reach the larynx, or sy a-
thetically by disease in any part of the respir ry
apparatus, or by disorders of the stomach, o-
phagus, or pharynx and fauces. In the fo er
case, expectoration follows the cough; in e
latter, there is no sputum, or very little. (See t.
Cough.) The more viscous the sputum, the re
difficult is the cough, especially in bronchitis e
cough often becoming suffocating or even stra -
lating as the sputum passes the larynx, as in cr p,
and the bronchitis of old persons, especially a
far advanced stage. As the strength of the pa nt
sinks, the morbid secretion accumulates, is ex -

d with greater difficulty, sometimes becomes viscous, and hence still more difficult of irge, the functions of the lungs are impeded, ltimately arrested.

5. iii. Yawning and Sighing are nearly re- phenomena, both consisting of prolonged in- ions, and both indicating nervous weariness haustion; or the depression depending upon il longings, fatigue, or approaching sleep. are often present during the more slight of congestion of the lungs, or heart, or large s; and they are generally of service in re- g these states, by accelerating the circulation, y more fully dilating and supplying the air- with fresh air. They are frequently observed g the premonitory and invading stages of or febrile diseases, and in states of nervous istion, and general debility. Whilst yawn- most frequently a sign of *ennui*, or of mental ty and fatigue, sighing is most commonly a f mental depression, melancholia, or hysteria.

7. iv. Sneezing is a reflex, spasmodic action of spiratory muscles, consequent upon irritation llation of the Schneiderian membrane. It ts of a deep inspiration followed by a sudden violent expiration, by which the air is driven rough the nose and mouth with much force n audible noise. It is most commonly occa- l by an incipient catarrh; but it may occur various causes of irritation implicating the and respiratory passages, and as a sympa- phenomenon in hysteria and in verminous lers. It sometimes, when frequently re- d, precedes or ushers in an attack of apo- or palsy.

8. Of *Laughing* and *Weeping*, it is unne- ry to remark further, at this place, than they are chiefly manifestations of certain ite states of mental emotion; that they oc- hiefly in susceptible, and often weak minds; hat they are characteristic phenomena of the rical paroxysm. They are sometimes of use, tter especially, in moderating the emotions; ing, by its mechanical stimulus, or its succes- , transmitted to the biliary apparatus; weep- by proving a serviceable derivation from a sted brain, or an overloaded or congested and large vessels.

9. VI. Symptoms and Signs connected the Urinary and Sexual Organs. — signs furnished by the urinary and sexual ions and organs are of the greatest import- as respects not only the diseases of these and lated organs, but also numerous maladies of it parts and of the whole frame. Those signs 1 more immediately belong to diseases of organs, are described in the articles upon diseases, especially in those treating of the iey, of Leucorrhœa, of the Ovaria, of the e, Urinary Bladder and Passages, of the ius and Vagina, and of the Vulva.

0. i. The Signs furnished by the Urinary retion. — The signs connected with the ry functions divide themselves into — 1st, which are connected with the chemical and cal states of the *Urine* itself, — and 2d, those h depend upon the modes of *excreting* the . The *first* of these are discussed in the e Urine, and several of both the first and *d* are directly dependent on diseases of the ary Organs. Both orders of signs may rtain either to diseases of these organs, or to diseases of the brain or spinal chord, or to maladies implicating the whole frame, as pestilential, malignant, or exanthematous fevers; or to disorders of the digestive, assimilative, the excreting, and the sexual organs. The great interest which thus necessarily attaches itself to states of the urine, and of the excretion of it, will become at once apparent, from the connections just enumerated. Reserving, however, the chief topics connected with these subjects for the articles just mentioned, I shall merely glance, at this place, to a few of those which are of less importance, and which are signs merely of disorders of distant organs, or of constitutional maladies. Of the states, changes, and chemical conditions of the urine, I have treated at another place (see Art. Urine): I now notice merely changes in the function of excreting it.

211. *A. The excretion of the Urine* may become difficult, painful, changed, or arrested; and the *secretion* of it may be scanty, or altogether suppressed, the excretion being similarly affected. Difficult excretion of urine may amount to what has been termed *dysuria*, in a lesser grade, and to *stranguria* in its higher grade: the former requiring much effort to empty the bladder, the latter strong efforts to discharge the urine, and chiefly by drops or small quantities. *Ischuria* has been used to express the suppression or the retention of urine — *ischuria renalis*, when none is secreted, and *ischuria ureterica*, or *vesicalis*, or *urethralis*, according to the seat of obstruction. — *a*. Dysury and stranguary may proceed — 1st, from diseases of the urinary organs and passages: — 2d, from the conditions of the urine itself, or from the presence of a calculus or calculi in the bladder or urinary passages: — and 3d, from disease of either adjoining or distant viscera, as in cases of dysentery, of hepatic or splenic disease, or of uterine or ovarian lesions. Neither dysury nor strangury should be viewed as devoid of risk, whenever observed. If either occur in aged persons, or in those who have previously experienced disease of the urinary organs or passages, a most minute examination should be instituted to ascertain the nature and seat of lesion, from which alone the amount of risk or danger should be inferred.

212. *b. Ischuria* may more correctly be divided into that of *suppression*, and that of *retention*. The *suppression* or non-secretion of urine is caused 1st, by inflammation or structural changes of the kidneys themselves: — 2d, by congestions, inflammations, or other alterations occurring in the course of exanthematous or other fevers, or pestilences: — 3d, by organic or other maladies of the brain, spinal marrow, or their membranes. In all these circumstances, the ischuria is a most dangerous sign, inasmuch as it consists of the suppression of a function by which the principal part of the injurious, effete, and irritating materials accumulating in the blood is eliminated and discharged; the arrest of the function being necessarily followed by very manifest alterations of the blood, by an uncommon excrementitious plethora, and by effusions in shut cavities and cellular parts, by coma and death, unless restoration of the excretion take place before these results have reached an irremediable extent. The *ischuria suppressionis*, in the three classes of disease in which it occurs, is nearly equally dangerous; as respects the general results, it is least so in inflammation or congestion of the kidneys; it is most dangerous, or commonly

fatal, in diseases of the brain and spinal chord, and it is not much less dangerous when it occurs as a complication of exanthematous or other fevers or pestilences. In scarlet fever, the kidneys are often asthenically inflamed or congested to an extent incompatible with the performance of their functions, the excrementitious matters and fluid which should be excreted by them thereby accumulating in the blood. In pestilential cholera, the ischuria is a consequence of the excremential fluid of the blood being all discharged by the digestive canal and skin, none being left that can be removed by the kidneys; other excremential matters, however, accumulating in the blood, owing to the suppression of the renal function, and consecutively inducing secondary fever and fatal complications.

213. *c. Ischuria retentionis* — the ischuria of retention, or of obstruction, — may take place either in consequence of an obstruction at the outlet of the pelvis of one or both kidneys, or in the course of the ureter, by a calculus, tumour, or any other lesion, or by inflammation, suppuration, &c., implicating either or both these. In all these cases the urine may be secreted, may accumulate in the pelvis of the kidneys or ureters above the seat of obstruction, and none may reach the bladder. But the *ischuria of retention* most frequently occurs in consequence, 1st, of *paralysis* of the coats of the bladder, consequent upon disease or injury of the brain, spinal chord, or their membranes; or of congestion of the nervous centres and paralysis of the bladder, in the course of typhus or low fevers; — and 2d, of *obstruction* to the discharge of urine from the bladder, sometimes caused by spasm, but more frequently by disease near to, or in the neck of, the bladder or urethra, as diseased prostate, impermeable stricture, the impaction of a calculus, &c. In all these circumstances ischuria is attended by more or less danger, but the amount of danger altogether depends upon the exact nature and seat of lesion, in respect of the urinary passages, upon the age and sex of the patient, and the progress and duration of the pathological lesion by which the ischuria is caused.

214. *d.* Ischuria may occur, however, in hysterical females — *Ischuria Hysterica* — and may depend upon either congestion of the spinal chord, and paralysis of the bladder, or upon spasm of the cervix vesicæ; most probably upon the former. Several cases of this form of ischuria have come under my notice, in which the urine required to be drawn off, twice or thrice daily, yet complete recovery has ultimately taken place. It is generally caused by masturbation, and is sometimes feigned.

215. *B. Inability to retain the Urine* — *Incontinentia Urinæ* — *Enuresis*, occurs in various forms. It may follow ischuria, or may take place even in connection with over-distension of the bladder; the coats of this viscus having been so over-distended as to have lost the power of contraction and of evacuation. In this case, there is a constant dribbling of the urine. In such cases the prognosis is unfavourable, and especially in aged persons. The incontinence may proceed from the state of the urine itself, especially when, owing to disease of the kidneys, it contains either blood or albumen: but this form consists rather of frequent calls to pass urine, the quantity being small, than of absolute incontinence. Very frequent calls to micturate occur in most inflammatory diseases of the urinary organs, and more especi those affecting the bladder. In such cases calls take place as soon as a spoonful accum in this receptacle. This incontinence ma proceed from ulceration of the inner surface bladder, or from disease of the neck of the or from calculi, or clots of blood, or from f bodies, in the bladder, or from paralysis neck of the bladder. The paralytic state i frequent in aged persons, in those who hav viously suffered diseases of the urinary orga a consequence of strangury or ischuria, or ease of the spinal chord or its membranes, a complication of typhus or of low fevers; which circumstances it is a very dan symptom.

216. *C. Frequent calls* to pass urine, more being passed on each occasion, sometimes in nervous persons, especially during sta mental anxiety or expectation; and in hys females. In many instances, the quantity urine passed on one, or on several occasi connection with hysteria, is often surprisin these, this symptom need not create much a but in all cases of frequent calls to mic especially during night, the urine ought tested, in order to ascertain the presence of men, or other substances, in it. Whenev complaint occurs, the state of the urinary and the habits require attention, and sho ascertained in connection with the physical the quantity, and the chemical condition urine itself, and with the functions of the di and circulating organs.

217. *D. An external examination of the al* should always follow the recognition symptoms and signs connected with the u organs and urine. Percussion will aid in taining the existence of enlargement of the k or of distension of the bladder. Increased the kidney, or the accumulation of fluid pelvis of the organ, may be inferred, when marked dulness on percussion, there is fulness or tumour felt, whilst the region be the lower ribs and margin of the ilium is p forwards, the thumb being gently moved or p anteriorly. But the bowels ought to have freely evacuated before this examination c confided in. The *sensibility* of the region kidney, during this, or any other exami affords information of great importance termining the existence of disease of the k especially inflammation and the existen calculi in the ducts or pelvis of the organ. ureter may be so distended in ischuria ureter when a calculus is impacted in its lowe tremity, as to be felt like a rope in, or above the inguinal region.

218. A dull sound on percussion, imme over the pubis, indicates fulness of the bl Pain in this situation is a sign of over-diste and pain behind or below the pubis is a syn of inflammation or ulceration of the bladder its cervix, and of stone in the bladder. Dis the prostate is best ascertained by examinati anum. The existence of stricture, or stone bladder, &c. should be ascertained by the by the catheter, bougies, &c. (*See also the A* Diabetes, Kidneys — *diseases of*, Pro Urine, and Urinary Bladder.)

219. ii. Signs and Symptoms of the S

ns.—*A. These symptoms in the Male* have not,
ally, received that amount of attention which
equire, as respects the states of the constitu-
he diseases of particular organs, and espe-
those of the brain and spinal chord. The
s to which male organs are primarily and
y liable, have been ably discussed by modern
al and medical writers: it is chiefly as to
anner in which these organs are affected,
thetically, in the course of other maladies,
brief notice will be taken of them at this
In health, the testes and penis are well
oped, and the scrotum is more or less con-
d; the cremaster muscles evincing sufficient
o draw the testes close to the penis. In rare
ces, one or even both testes may not have
nded into the scrotum, and may have been
ed in some part of their course from the
en to the scrotum.

). In *diseases* of vital depression or exhaus-
especially in fevers, in diseases of the diges-
rgans, and particularly of the stomach and
nes, the dartos and scrotum are no longer
gated, the cremasters are incapable of con-
on, and the testes hang down unusually low.
phritis, and in calculus or other diseases of
dney, the cremaster of the same side as that
ich the kidney is affected is contracted, the
drawn up close to the penis, or even to the
al abdominal ring; and a darting or aching
often is felt in the testis of that side, or ex-
along the chord. In those diseases in which
remaster and scrotum are so remarkably
ed, as just stated, the venereal desire is for
ime extinguished; but with convalescence
them, especially from fevers, a restoration of
ontraction of these parts, and of the sexual
, is one of the most certain signs of recovery,
ncing a return of nervous power in both the
ic and spinal nervous systems.

1. Inordinate relaxation of the cremasters
rotum, often with more or less wasting of the
, and sometimes with both softness and wast-
akes place in those who have prematurely or
nately exercised their genital organs or been
of self-pollution. By these persons the
eal congress can no longer be either satisfac-
or fruitfully exercised. The seminal fluid is
r sufficiently nor healthily secreted, the or-
being rendered incapable of discharging their
ons. Hence Impotence, and one of the
s of Sterility. (*See those Articles.*) Persons
ave thus destroyed their sexual functions, or
ave greatly weakened them, and those who
been accustomed to sexual intercourse and
ave relinquished such intercourse, are often
ct to involuntary discharges during sleep, and
ereby more or less exhausted. When these
untary pollutions are complained of, it may
ally be inferred, that the individual had pre-
rely or inordinately addicted himself to sexual
ses, or to self-pollutions, and that having be-
aware of the injury they had produced, and
ined from them, the debility and morbid
bility thereby occasioned still persisting, the
athetic excitement of a venereal dream
ed sufficient to produce a seminal discharge.
Art. Pollution.)

2. The sexual organs having been so ex-
ted by premature, or excessive, or unnatu-
e, as to give rise to impotency, and the feeling of incompetence having taken possession of an individual's mind, so as to prevent him from entering upon the married state, or from exercising these organs, the disuse actually increases the wasting, softening, or decay of these organs, and, with such decay, constitutional vigour, or vital energy, becomes impaired. A very large proportion of bachelors are actually impotent after 30 or 35 years of age, and, being conscious of their prematurely exhausted powers, prudently abstain from sacrificing the happiness of the opposite sex. All are not, however, so prudent, for some marry from various motives, although capable only of exciting a desire which they cannot gratify. Owing to the cause now noticed, the duration of life amongst bachelors is considerably less than amongst married men.

223. Loss or increase of sexual desire depending thus, 1st, upon the states of the organs concerned in the performance of the sexual functions, 2d, upon the activity or excitement of those sources of nervous energy actuating these organs, and, 3d, upon the general condition of the body, it follows, that either loss or increase of this desire becomes a symptom of disease in one or other of these quarters. It has just now been shown, that the organs destined to the performance of the sexual function may be exhausted, or altogether worn out, or disorganised, by premature or excessive use, or subsequent disease. Nevertheless the desire may exist, although performance is most imperfect, or even impossible. When this is the case, excitement is present in the sources of nervous power actuating these organs, either in the nervous centres at the origins of the nerves supplying these organs, or in the mind acting upon these centres, although these organs themselves may be incapable of discharging their offices. The excitement may be mental only — a mere passing or temporary feeling — but it may be more permanent, or even remarkable and uncontrollable; and, in this case, there is always reason to infer the existence of irritation or inflammatory action in those parts of the nervous centres — ganglial, cerebral, or spinal — most intimately related to the nerves supplying these organs. Diseases implicating the whole frame, as fevers, &c., are rarely attended by increased sexual desire, unless during convalescence from them. On the contrary, this desire is altogether abolished during their duration, whilst at the same time the sexual organs are collapsed, the testes dependant, and the scrotum flaccid and disposed to erythematous inflammation and excoriations. In acute, inflammatory, and febrile diseases, the sexual functions and desires are either impaired or abolished at their commencement, and during their continuance. In diabetes, in severe influenza, general debility, in some diseases of the brain, and in all acute maladies of the digestive canal, the sexual desire is lost.

224. The sexual desires and powers are seldom very remarkably impaired in chronic diseases of the lungs and heart, especially in tubercular consumption, and particularly in the more chronic and non-febrile states of this malady, in which they even may continue almost to the last. The same may be said of diseases of the ovaria and uterus, and, in a less degree, of chronic affections of the liver, spleen, and kidneys. Too frequent erec-

tions without sufficient cause, and seminal discharges at the commencement of, or too early in, an erection is a sign of general debility, or of susceptibility and morbid irritability of the sexual organs consequent upon masturbation or sexual abuses or upon irritation of the urethra, at the caput gallinaginis, or of stone in the bladder, or of ascarides in the rectum. But discharges from the prostate gland should be distinguished from seminal emissions, the former being much more frequent than the latter. Continued erections—*priapism* — is sometimes occasioned by calculi in the kidneys or bladder, by gonorrhœa, by epilepsy, &c.

225. *B. Signs connected with sexual organs of the Female.* — Retardation of the development of the female organs is occasioned chiefly by deficiency or atrophy of the ovaria. Want of sexual desire may proceed from the same cause, or from extreme debility, or from the same diseases as have produced his state in the male (§ 220.) Excessive sexual desire is a symptom of irritation or inflammatory action of the ovaria, or of active congestion or vascular determination to the uterus; or of masturbation, which had commenced early and been long continued. (*See further, in illustration of this subject, the Articles on* Impotence and Sterility, *on* Leucorrhœa, Menstruation, *on* Self-Pollution, *on the diseases of the* Ovaria, *of the* Uterus, Vagina, &c.)

☞ The following *Synopsis* or *Contents* of the preceding article, with the number of the paragraph commencing each topic, may be useful by facilitating reference.

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SYNCOPE—See FAINTING AND SWOONING.

SYPHILIS—See VENEREAL DISEASE.

TABES. — SYNON.: — *Marasmus*; — *Atrophia*; *Phthisis*; — *Macies*, Auct. — These terms, as well as *tabes*, are usually employed, *generically*, to express *emaciation of the whole body with languor, and generally with some degree of hectic fever*; but to these terms are usually added certain specific appellations, according to the cause and nature of the emaciation, atrophy or tabidity, in particular cases, — as the *Tabes* or *Atrophia Infantum* or *infantilis*: — *T. Mesenterica, glandularis, scrofulosa*, &c.: — *T. Diabetica*: — *T. Lactantium (of Nurses)*: — *T.* or *P. pulmonalis*, — *Marasmus senilis*: — *T.* or *M. dorsalis* or *dorsualis*. — *T. coxaria*; — *Tabidity, Atrophy, Emaciation, Decline.*

CLASSIF.—IV. CLASS. III. ORDER (*Author in Preface*).

1. DEFIN.—*Chronic emaciation of the body, with weakness and aching of the back and loins, languor, debility, and impotency.*

2. *Tabes, Marasmus*, or *Atrophy*, is considered at sufficient length in the articles treating of the diseases, chiefly organic, on which this state, however named, actually depends. According as it proceeds from obstruction of the mesenteric glands, so it is described in the article on diseases of the MESENTERY; and as arising from tubercles in the lungs or other viscera, it is treated of under the heads, TUBERCULAR CONSUMPTION, and SCROFULA and TUBERCLES. The other pathological conditions, of which extreme emaciation is a contingent or an occasional result merely, are so very numerous, that even an enumeration of them at this place is unnecessary, especially as they have been noticed in connection with this effect under their respective heads. But there is one form of tabes to which attention may be further directed than it has been, when treating of one of its most common causes, as well as of its usual consequences, namely, *self-pollution* and *impotence and sterility.*

3. TABES DORSALIS, in its various forms, and with its several concomitants, is of much greater

importance to the individual himself, as well as to those connected with him, than has usually been considered; and, although imputed solely to the male sex, the same affection, produced chiefly by similar causes, and characterised by nearly similar symptoms, is not infrequently also observed in the female. In the former sex it is generally *caused* by premature or excessive sexual excitement, or by consequent involuntary pollutions; in the latter it is also occasioned by the same causes, and by prolonged leucorrhœa commonly consequent upon self-pollution.

4. i. *The symptoms* in both sexes are chiefly extreme emaciation, a weak and bent state of the spinal column; the lumbar region of the spine having lost its posterior concavity, and having become either straight or convex, owing to the softened yielding or atrophied state of the intervertebral substance. The gait is unsteady and vacillating; the knees bend under the weight of the body; and all the muscular movements and mental manifestations evince debility, exhaustion, impaired powers of exertion, application and attention. The genitals are often flaccid, wasted, or soft and small, in the male; and are subject to leucorrhœa in the female; the eyes are sunk, and the whole body is emaciated. If the causes are continued, various functional and organic lesions supervene, especially nervous affections, varying in character with the peculiarities and circumstances of individual cases, hysteria, hypochondriasis, mental depression or delusion, tremors, extreme susceptibility, anæmia, and ultimately epilepsy, incomplete or complete, partial or general paralysis, insanity, and the several other consecutive maladies mentioned when treating of voluntary and involuntary Pollutions.

5. ii. *The Prognosis* in Tabes dorsalis entirely depends upon the changes which the spinal chord has undergone, and upon the secondary affections which have appeared. The nature of the changes, however, which may have taken place in the chord, can be inferred with but a slight degree of certainty; for the chord may be partially softened, or it may be atrophied, or indurated, or both wasted and indurated; and the fluid existing between the spinal membranes may be increased, or the venous sinuses of the spine may be remarkably congested. The prognosis will greatly depend, not only upon the progress of the disease, but also upon the continuance of its principal cause; for, too frequently, the vice in which it has originated is persisted in, notwithstanding the conviction of the miseries which result. Although the disease may not be cured, or even much relieved, life may be prolonged for a considerable period.

6. iii. *Treatment.*—The means which have been recommended for Debility, Impotency, and for Pollutions, voluntary and involuntary, are altogether appropriate to this complaint, which commonly, as just stated, proceeds from the same causes as these. But unless the cause be relinquished, the means of cure may be most judiciously resorted to without avail. Of these means, chalybeate mineral waters, and preparations, change of air, and residence in a dry and temperate air, frictions and stimulating embrocations along the spine; the iodide of iron taken in the syrup of sarza; the preparations of cinchona, of gentian, of valerian, of sumbul, &c., are the most beneficial, aided by suitable diet, exercise and regimen.

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TETANUS and TRISMUS. — Synon.
τανος (from τείνω, I stretch), Auct. Gr
Tetanus, Pliny, Vogel, Swediaur, Sa
Cullen, &c.; — *Tonos Trismus*, Parr;
tonia rigida, Young; — *Entesia T*
Good; — *Catochus*, Auct.; — *Tetano*
— *Todtenkrampf*, *Starrkrampf*, Germ.;
tano, Ital.;—*Tetanus Erectus*, *vel T. Pr*
— *Tetanus*, *Tetany.*—*Tonic or Entonic*

Tetanus Emprosthotonos, — ἐμπροσθό
from ἔμπροσθεν, forwards, and τείνω, I st
when the body is bent forwards.—*Tetanu*
cus, Good; — Tetanic Procurvation.

Tetanus Opisthotonos, — ὀπισθότονος,
ὄπισθεν, backwards, &c., when the body
backwards. — *Tetanus Dorsalis*, Good;
Recurvation.

Pleurosthotonos—from πλευροσθεν, sid
πλευρὸν, the side, &c., when the body is b
rally. — *Tetanus lateralis*, Sauvages.

Trismus, — τρισμὸς, — from τρίζω, I g
when the muscles of the jaws are chiefly
affected. — *Entasia Trismus*, Good; —
jaw.

Classif. — 4th. *Class:* Nervous
— 3d. *Order:* Spasmodic Affectio
len). — iv. *Class:* Dis. of the
Function. — iii. *Order:* Affecti
Muscles, (*Good*). — II. Class. III
(*Author in Preface*).

1. Definit.—*A tonic state of Spasm — o*
Spasm, extending to many or to most of the
of animal life, or voluntary motion — with
bations, and usually without any period of
relaxation, until the subsidence of the mal
progress being generally acute or sub-ac
often most rapid, and then terminating
asphyxia.

2. The *Pathology* and *Treatment* of Tet
Trismus have been subjects of discussion
medical and surgical writers during man
and even the most experienced and th
writers have confessed their inability t
satisfactory information respecting them.
tanus is most frequently a consequence o
operations, and of external injuries, in t
climates, physicians are not often c
its treatment. Nevertheless it behoves
much as surgeons, to be acquainted wit

wn of both the nature and the treatment of
alady. Although it, as well as trismus, is
requently symptomatic, yet it occasionally
s primarily or idiopathically — rarely in this
e, but not infrequently in hot climates, es-
y in the dark races.

ccording to its *severity* and *duration*, te-
has been divided into *acute* and *chronic;*
neither point of view can it be considered
in any case, a chronic disease. If any such
n be adopted, the *acute* and *sub-acute* states
e assigned to it; but this division is al-
er arbitrary; as no line of demarcation can
wn between them. *Primary* or *idiopathic*
is either acute or sub-acute, is often less
than the symptomatic, and is less danger-
pecially in temperate climates. The *symp-*
or *traumatic tetanus* is commonly acute
a most dangerous malady. Besides the
is now noticed, certain forms have been
ed, which are characterised by peculiar
ms, which are merely manifestations of the
in greater severity, or to a more limited
in some muscles than in others. The
state of the disease, *trismus,* is that in
the more general forms commence; the
usually recognised being *trismus, pleuros-*
, *emprosthotonos, opisthotonos,* and *tetanus*
; but two or more of those forms may ap-
the progress of the same case, according
norbid action of the muscles extends or pre-
ies in one set of muscles over the others.

Description.—The *symptoms* of tetanus,
eir forms, are very readily recognised; but
il those characteristic of the malady ap-
Those which are *premonitory* of the attack,
h occur in the period which elapses be-
he cause and the declared disease, have not
tisfactorily observed. It cannot be sup-
hat this period is without any premonition
npending malady. I have remarked un-
or pain at the epigastrium, and about the
much lassitude, with restlessness and de-
of spirits; chilliness or cold chills, espe-
the idiopathic; uneasiness and anxiety at
ecordia; twitchings of the muscles of the
limb, in some cases of the traumatic form;
stinate constipation in every form of the
These symptoms may be of short dura-
they may be experienced for a consider-
e: they are followed by pain under or be-
sternum, often extending backwards to the
y more or less difficulty of swallowing; by
l stiffness of the neck, &c. To these are
y soon added all the other symptoms
characterise the more partial or limited
the disease, namely rigidity, pain or con-
of the muscles of the lower jaw.

Trismus may be viewed as the commence-
all the forms of tetanus. With, or follow-
pain under the sternum and difficulty of
ing, the patient complains of uneasiness or
of the muscles of the jaws, neck and
nd pain in the course of the cervical
f the spine. To these succeed a difficulty
ng the jaws, in masticating or swallowing
d in rotating or even in moving the head.
scles which raise the lower jaw assume a
contraction or tonic spasm, so that the
kept in constant contact (*locked-jaw*).
ptom is first indicated when the patient
is desired to show his tongue, and soon is followed by more or less spasm of all the muscles of the face. The angles of the mouth are retracted, the alæ nasi are elevated and the nostrils expanded; the eyes are fixed and prominent, the brows and forehead drawn and wrinkled, the countenance presenting an anxious or distressed expression. In children, or rather in young infants, the disease may not proceed further, as respects the tetanic affection of the muscles, and yet it may terminate fatally, more or less rapidly, either in convulsions or in asphyxia. This limitation, and this course of the malady, are very rare in adults, the state of trismus generally advancing quickly to those about to be mentioned.

6. *b. Pleurosthotonos,* or *tetanus lateralis,* is a predominant spasm of the muscles of one side, drawing the body to that side. This form very seldom occurs. It commences with trismus, or with the affection of the muscles of the face and neck, and often passes into one or other of the forms about to be noticed. The lateral curvature is not always considerable, for it is produced rather by a greater severity of the spasms in one side, than by any limitation of them to that side. I have observed the form in a child, in an idiopathic form, death occurring during a violent convulsion from asphyxia.

7. *c. Emprosthotonos* is the predominant contraction of the muscles of the anterior aspect of the trunk, by which the body is bent forwards, and the head is drawn to the sternum. This state is rarely observed during the whole course of the malady. It may occur for a short time, and be followed by either opisthotonos or tetanus erectus. It, as well as the other forms of the disease, commences with trismus, which in it, as in the others, continues throughout.

8. *d. Opisthotonos* is the bending backwards of the trunk by the excessive action of the muscles of the posterior parts of the neck, back and loins. This is the most frequent form of the disease. The numerous strong extensor muscles of the spine overcome the action of the flexor muscles of the abdomen, and produce a rigid curvature, or posterior concavity, the body resting, during the exacerbations, upon the occiput and heels only; the jaws being also forcibly closed, and the abdominal muscles contracted. This form may be followed by, or may alternate with, the next, the *tetanus proprius.*

9. *e. Tetanus,* although designating any of the forms of the disease attended by general spasm, and being the generic appellation, is often intended to convey the idea of a state of the disease, in which the body is stretched out by the spasms, without being very manifestly bent in any direction — *tetanus erectus,* not *tetanus proprius.* It may follow, in the progress of the malady, either of the states already noticed, presenting at intervals the form of opisthotonos, the posture assumed by the trunk depending upon a momentary or temporary predominance of action of certain muscles or series of muscles; or it may appear in this form consecutively upon the premonitory symptoms, and the partial affection of the face and neck, and preserve it throughout.

10. *A.* Acute Tetanus. — This common form of the disease may be either symptomatic or idiopathic. It may result from propagated irritation, and present no satisfactory evidence of inflamma-

tion of the membranes or substance of the spinal medulla; or irritation may superinduce inflammatory action, with the usual symptoms, or even be attended by such symptoms from the commencement, especially in the idiopathic form (See PATHOLOGICAL INFERENCES, &c., §§ 61, *et seq.*) — *a.* After a more or less evident manifestation of premonitory symptoms (§§ 4, 5.), contractions, generally persistent, commence in the muscles of the face and neck — the stage of *trismus.* These contractions extend downwards to the muscles of the back and trunk, and often also to those of the limbs; and the disease assumes either of the forms now stated, but most frequently the two last specified. The jaws generally continue firmly closed; and, although the contraction of the muscles of voluntary motion — of both the trunk and limbs — or the rigidity of these muscles, remains uninterrupted, violent paroxysms or exacerbations of the contraction recur after short intervals, or after from five, to fifteen minutes, and are attended by extreme pain and distress. As the disease advances, the exacerbations become more violent or prolonged; the body is bathed in a warm perspiration; the pain at the præcordium is increased; respiration is laboured, embarrassed, or hurried; and the pulse becomes very rapid and often irregular. The exacerbations are induced by the slightest causes — by a current of air, by attempts to move or to swallow, or by unpleasant sounds, or by a strong glare of light.

11. As the disease continues, the voice becomes altered, harsh, and disagreeable; the larynx is raised upwards, and the tongue is often forced against the teeth during the exacerbations, and lacerated. The shoulders are drawn forward, and the body is either extended or forced into the other positions already noticed, according as the action of one set of muscles predominates over their antagonists. The sense of tightness and the pain under the sternum and ensiform cartilage continue to extend to the spine, and are attended by a laboured, quick, and difficult respiration, and by an agonising feeling of suffocation. The muscles of the face are strongly contracted, whilst the countenance is pale or livid, and bathed in perspiration. The patient expresses the most distressing sufferings, both from pain, and from the difficult respiration, particularly during the exacerbations, which are more frequent, prolonged, and violent as the malady advances, the respiratory muscles, and even the diaphragm, ultimately becoming more or less affected. Owing to this extension of the spasm the patient is carried off by asphyxia, especially in the more acute or rapid traumatic cases; but in the more sub-acute and idiopathic cases, when the disease has been of much longer duration, the severity of the symptoms often abates previously to death, and the patient sinks apparently from exhaustion, but even in these a recurrence, or an extension of spasm, to the respiratory muscles sometimes terminates life.

12. *b.* Such is the usual course of this malady, but each case presents certain modifications of the symptoms during its progress. The earliest or the most constant precursory symptom is obstinate constipation, and this generally continues throughout the disease. The pain at the epigastrium, and anxiety under the sternum, and at the præcordium are the next, and these are very prominent, equally persistent, and general tend to the spine. Inability to swallow is to spasmodic action of the muscles of the and pharynx, and probably also of the œsop often implicating also the glottis, attem swallow liquids being often followed by forcible rejection through the nose and This state of spasm is such as prevents the duction of a flexible tube down the œso from one of the nostrils. The difficulty of cation, owing to the spasm of the sphinct increases the constipation; and a similar di attends micturition, the urine being someti tained, or forcibly ejected by the spasm abdominal muscles. The spasms of the r of the face occasion remarkable distortion features, young persons often presenting t pearance of age. Respiration is chiefly during the exacerbations. It is then ca difficult, and painful; the pain extendin the ensiform cartilage and præcordium spine, or darting in the direction of th phragm, and being most probably occasio spasm of this muscle. The pain in this si at an advanced period of the disease, is from that experienced under the sternum commencement. The spasmodic contra the muscles is attended by more or less su but this is said not always to be the case exceptions are certainly rare; for I hav seen an instance to the contrary, althou distress has been much less in some than in others, and experienced only du paroxysms.

13. The greatest diversity is presented extent and severity of the spasms, and state of the pulse, in different cases. W some the muscles of the face and neck, a ticularly the muscles closing the jaws, are or solely attacked (*Trismus*), those of th and limbs being but slightly or not at tracted; in others, the muscles of the much less affected, whilst those of the tr limbs are severely attacked. Mr. CURI his excellent work, remarks, that the mu the eye are sometimes, but not generally When this occurs, the eye-ball is fixed an slightly inwards, the patient being unable it towards particular objects. Most fre however, these muscles are free, the eyeli half-closed, the contractions of the orb palpebrarum, in this case, being unopp spasm of the levator palpebræ. The pup eye has been said to be contracted in teta some writers, and to be dilated by ot believe it to be generally contracted; bu may become dilated with the supervention cerebral congestion connected with incip phyxia. The muscles of the extremities frequently, or less severely, affected than the face, neck, and trunk; the forear hands being generally the least affect much depends upon the seat and natur injury, of which the disease is the effect; spasms sometimes commence, or are most in the injured limb. When the disease lowed amputation, the spasms of the mu the stump and limb are often most dis The spasms being thus more or less gen severe, as respects the voluntary musc ultimately extending to the sphincters, a

tory muscles in the more acute cases, the and continued spasms of these latter mus- nerally terminating life in these cases, it e inquired — 1st, whether or no the spasms also to involuntary muscles; and, 2d, r sleep has any influence in relaxing

1st. It has been supposed by Currie, , Howship, Travers and others, that in tetanus, is caused by the extension of o the heart. But, with Mr. Curling, I he existence of spasm of this organ, even mination of the disease. There can be no hat the inordinate actions of the voluntary occasion a quick return of blood to the de of the heart at the accession of the ms, and rapidity as well as irregularity of on of this organ; but any degree of spasm uld be incompatible with the continuance But, although spasm of the heart is not in the course of the malady, it may occur minate life; and Mr. Howship has ad- case, in which he believed, from the state heart observed after death, that spasm of an was the cause of death. The examina- this instance, was made eleven hours after t which time the body is generally still nd the heart firmly contracted. In two ute traumatic cases, which I examined ath, the heart did not present any ap- es different from those observed in cases en or rapid death from other causes. ese cases terminated in asphyxia. Mr. g refers to a case for which amputation formed by Mr. Liston, and in which the contracted so much that there was no hage, and ligatures on the mouths of the vessels became unnecessary. I am not ed with any similar case. The contrac- ainly could not have existed to any con- extent previously to death, otherwise the on could not have gone on; the phe- n being produced by the increased irri- of the coats of the arteries and by their ion on exposure to the air. It was sup- Dr. Cullen and others, that the con- always observed previously to the n, and during the course, of the disease to spasm of the muscular coats of the canal; but there is no pain or other referrible to this quarter suggestive of bstinate constipation generally attending re maladies of the nervous centres of ife, as shown when treating of diseases of in and Spinal Chord.

nd. Sleep rarely occurs in acute traumatic and only during a few minutes, or in the between the exacerbations, or when the d contractions in these intervals are not by much pain. In the sub acute cases, , sleep is more frequent, and a more com- axation of the muscular contractions takes out upon being awakened the full tension uscles returns. This circumstance shows ence of loss of consciousness upon the rritability of these cases, and throws some n the pathology of the disease (see §§ 61. During recovery, and in the less severe nd when the intervals between the pa- are considerable, sleep may ensue, and sms be relaxed, especially as then the effects of the narcotics, so frequently prescribed for the disease, begin to be manifested.

16. *c.* The *pulse* in tetanus has been variously described by different authors. This has been owing chiefly to the different states of the heart's action in the several stages or states of the disease, and the varying grades of frequency in the acute and sub-acute cases, as well as in the idiopathic and symptomatic forms of the malady. Dr. Morrison, Hennen, Macgregor, and others have remarked, that the pulse is seldom much affected; but the greater number of writers have stated the pulse to be very much accelerated, and most remarkably so in acute cases. This is the result of my own observation in the numerous cases which I have had an opportunity of observing in France and Germany, in 1815 and 1816, and subsequently in warm climates. In an acute case, which I attended in 1820, the pulse was 120 in the minute in the first day of the developed attack. The patient died on the third day. The pulse is generally much less frequent during the intervals than in the paroxysms; but the degree of frequency varies in different cases, as well as in the course of the disease. The treatment adopted has often a considerable influence in quickening the pulse, and towards a fatal issue this is especially the case. The changes taking place in the spinal chord, medulla, &c., and their membranes, according to their nature and amount, also influence the pulse. As the powers of life sink, or are depressed by sedative agents, as by tobacco injections, &c., the pulse becomes remarkably quick, and often feeble. Both the pulse and the respiration are greatly accelerated by the spasms, and hence are varied in character and in quickness with their severity and frequency of accession. During their continuance, especially towards the close of the malady, the pulse is often so frequent, weak, and irregular as not to admit of being accurately counted, whilst the respiration is laboured or gasping.

17. *d.* The *surface* of the body is much warmer than natural, is bathed in perspiration, and is often morbidly sensitive to external agents. The amount of animal heat necessarily varies in different cases — probably from 100° to 106° of Faht. M. Prévost, of Geneva, has stated it to have been much higher (110°), in a case under his care. Dr. Bright says that it was 105° on the third day of the disease. I observed it $105\frac{1}{2}$° in the axilla, on the second day of a case which terminated fatally on the fourth day; and 106° in another which died on the third day. The perspiration is most copious during the exacerbations, and generally has a pungent and peculiar smell. Larrey supposed it to be critical; but Mr. Curling justly considers this not to be the case. I have seen it the most abundant in the most rapidly fatal cases. A miliary eruption sometimes accompanies excessive perspiration and heat of the skin. The cutaneous sensibility is unusually great, especially to the slighter causes of sensation, as to a light touch, to cold air, &c., and in this the disease resembles the sensitiveness of the surface in Rabies, and in inflammation of the spinal membranes (see Spinal Chord, § 135.).

18. *e.* The *urine* is generally in small quantity in tetanus, as may be supposed from the excessive perspiration, and it is usually high-coloured. It is more abundant in the sub-acute form of the

malady. The bowels are always constipated, and are moved with great difficulty; the stools, however, present no very remarkable disorder, beyond what is usual from retention. The tongue is commonly white and moist at the commencement; but it is often dry, with the papillæ erect as the disease advances, and thirst becomes urgent. When tetanus or trismus is fully developed, the tongue can seldom be satisfactorily shown.

19. *f.* The *senses* are acute during the course of the disease, especially sight, hearing, and touch, and are remarkably susceptible of their respective stimuli. The functions of the *mind* are unimpaired, even during the most distressing exacerbations, and any degree of delirium is rarely observed until shortly before dissolution, and then it may sometimes have been occasioned by the narcotics which had been prescribed.

20. *g.* The state of the *blood* has not been satisfactorily observed, either in the idiopathic or symptomatic form of the disease. I have seen it without any particular change in one case, and both cupped and buffed in another; and slightly cupped only, in two; but one of these cases was only once accidentally seen by me. The question is, whether or no this state of the blood is connected with, or a manifestation of, inflammatory action in the animal nervous centres, or merely the consequence of the inordinate muscular action; but this involves the consideration of the pathology of the disease. Admitting that there is inflammatory action of these centres, or at least of their envelopes, in some cases, as there undoubtedly is in the idiopathic states of the malady, there must necessarily be some degree of fever; and this state of the frame is said not to exist in traumatic tetanus. Mr. Curling observes that this form of the malady "is generally unattended by fever; and Dr. Cullen, Dr. Clephane, and Dr. Chalmers, and many other authors have remarked that the blood very rarely possesses an inflammatory character." Mr. O'Beirne states that he witnessed about two hundred cases of tetanus; but he never saw one accompanied with fever. It may certainly be admitted, that, in the traumatic form of the disease, fever is not often observed at its commencement, and that the febrile symptoms enumerated above, especially the quick pulse and respiration, the hot skin, the copious perspiration, thirst, and excited papillæ of the tongue, are chiefly the consequences of the violence of the muscular contractions; yet, in many cases, these symptoms (if not febrile, what are they?) are partly to be imputed to increased vascular action — an action excited by the irritation propagated to the spinal chord and medulla oblongata, and thence reflected upon the voluntary muscles, the inordinate action of these muslces developing increased vascular determination to the origins of the spinal nerves, and to the spinal chord; this determination, advancing to morbid action, perpetuating the muscular contractions, extending their spheres, and ultimately terminating in very many instances, by implicating the respiratory muscles, even the muscles of the glottis as well as those of the pharynx.

21. *B.* Sub-acute and other States of Tetanus. — When an attack of either idiopathic or symptomatic tetanus is less severe than that described above, especially during the second and third days, or when its severity is pa ll subdued, it may continue in a sub-acute or de form for several days, or even for three, f , o five weeks. This state of the disease ha ee usually termed *chronic;* but it hardly c b called so, as respects either the charac o duration of the disease. In this less ac o milder form the symptoms are nearly the m as in the acute, especially at an early peri bu they either are, or become, less severe. in tervals between the paroxysms are longer, th paroxysms are shorter, or the spasms are de The pulse also is either less frequent or bu itt accelerated during the intervals, and the c rac tions are less general or continued than th acute form. The symptoms thus graduall sub side, and the natural functions assum thei healthy states. But the muscles contin fo some time stiff or sore; and they are li e t a return of stiffness or contraction after ex ure to either cold, wet, or miasmatous exhalati .

22. *The sub-acute or mild form* of tetan ma present an intermittent character, especiall he it is idiopathic, owing to the concurring in enc of malaria with wet and cold in causing e at tack; but this modification of the disease on met with in warm climates and in miasma s lo calities. In females, trismus, or sub-acute anu may assume an *hysterical character*, or hy rica symptoms may be associated with the teta , th disease being really tetanus, and occasio l b an injury. Of this association I had a y re markable instance, many years ago, in a k my own family. This state of the diseas ou be distinguished from hysteria, when th latte assumes a tetanic form, owing to the vio ce o the spasms during the hysteric paroxys (Se Diagnosis, § 35.).

23. But tetanic symptoms may be proc ed i females by the usual causes of tetanus, es iall during the catamenia, or after an abo n, o after parturition, especially if any portio f th ovum, or membranes, or placenta be ained In these there is sometimes much of hys terical character, but the tetanic may so p dom nate as to place the patient's life in jeopa . O this I saw a case to which I was called in nsu tation some years ago. I was convince f th retention of a portion of the ovum. A d ctio of secale cornutum with the biborate of s a wa prescribed, terebinthinate enemata were ini tered, and terebinthinate embrocations plie along the spine. The cause of irritat wa discharged from the uterus, and the pa t r covered.

24. *C.* Terminations.—A *fatal issue* mo commonly occasioned as now stated. In t cas the paroxysms become more severe and p nge and the pulse most frequent, feeble, and i gula Respiration is difficult, hurried, labori , an unequal. The motions of the chest an f th diaphragm are impeded; and the lips, t , su surface become first pallid and then liv Th lungs are congested, and air ceases to eith inhaled or expelled. It has been suppo tha during the paroxysm, asphyxia may be oc sione by spasmodic closure of the glottis, th pasm extending to this quarter chiefly or only; l the death is thus suddenly produced durin e e acerbation; and it has also been infe l th spasmodic closure of the glottis is supe ded

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spa of the muscles of the chest and diaphragm. W her either mode takes place solely, or both co- erate, in occasioning the fatal result, is a ma r not easily determined; but it is of some im tance that it should be ascertained, as indicat an extreme measure of treatment in immi- nen ircumstances. Whilst death is thus generally occ ioned in the acute cases, it is imputed chiefly to haustion, in the sub-acute, or chronic as com only termed; the prolonged disease, the in- abi y to receive nutriment, the return of spasms, and he consequent exhaustion and inanition ter- mi ing life. But, even in these, spasm may affe the muscles of respiration, or even the glo , and produce death. When exhaustion or na ion occasions this termination, the paroxysms bec e weaker and less frequent; the pulse small, wea irregular or intermittent; the muscles relax; the atures sink; the eyes are dim, or are covered by slight film; and respiration is gasping, slow or l oured, or it gradually and almost insensibly cea .

2 Recovery from tetanus is commonly gra al. In a table where Mr. Curling has arr ged 128 cases of traumatic tetanus, fifty- eig terminated successfully: eight being cured in t course of a week; three in ten days; four in a ortnight; four at the end of three weeks; fift at the end of a month; four after five wee ; eight after six weeks; three at the end of eig weeks; three after two months; and in two afte hree months. The muscles often continue stiff or some weeks after the spasms have sub- side owing to the injury received by them dur the attack. Even months may elapse bef they regain their healthy tone and action. In ase recorded by Dr. Currie, the patient's feat es retained "the indelible impression of the dise e." And, in a case by Mr. Curling, the pat t complained of stiffness about the jaws whe exposed to cold, although nine months had ela d from the attack; and, in another case, rigi y of the muscles of the lower jaws continued for months after recovery. A few days before this as written I was consulted by a gentleman, wh jaws had continued so firmly locked, after an ack of idopathic trismus, that some of the fro teeth had been extracted to enable him to rece e food into his mouth. This contraction of the uscles of the jaws had continued nine years, wit ut any change. He had become accustomed to i and he now consulted me for a different ail- men The treatment of these effects of tetanus is a atter of importance, as will appear in the seq .

2 *The duration of tetanus* varies very remark- abl both in the idiopathic and symptomatic for . This is well shown, as respects the latter for by the table compiled by Mr. Curling. Pro ssor Robison has stated that a negro having cr hed his thumb with a broken piece of china, wa eized with tetanus, and died in a quarter of an ur. In one case, the patient died in twelve hou ; in another, recorded by Mr. Dickinson, dea took place in twenty-two hours; and, in a cas ontained in Mr. Curling's table, in twenty hou . In another, fully detailed by this excel- len writer death occurred sixteen hours after the firs ppearance of tetanic symptoms, and six days afte the injury. This termination is frequent at var us periods from twenty-four to forty-eight hours. In the table just mentioned, fifty-three cases were fatal within eight days after the appearance of symptoms: eleven on the following day; fifteen on the second day; eight on the third; seven on the fourth; three on the fifth; four on the sixth; three on the seventh; and two on the eighth day after the commencement of the disease, but very few after a longer period. Morgagni mentions a case which was fatal after twenty days. Dr. Lionel Chalmers, in his account of acute idiopathic tetanus in South Carolina, assigns the duration of this form of the disease nearly to that of the traumatic form now quoted from Mr. Curling. Dr. L. Chalmers states that patients generally die in twenty-four, thirty-six, or forty-eight hours, and very rarely survive the third day; but, when the disease is less acute, that few are lost after the ninth or eleventh day.

27. *D.* Appearances in Fatal Cases.—Different changes have been observed in different cases, and those which have been found in some have been absent in others. Certain changes are, however, more constant, and are rarely altogether absent.—*a.* The *body* generally is unusually rigid after death; and the *muscles* are not only firm or contracted, but they also present, in many places, rupture of their fibres and ecchymoses.* The *blood* is always uncoagulated, and hence it gravitates to the more depending parts, and gives those parts externally a livid or dark mottled hue. The combination of rigidity of the muscles with fluidity of the blood shows that the *rigor mortis* is not the result of the coagulation of the blood in the structures; this state of the muscles being evidently owing to the morbidly increased irritability before dissolution, the remains of which still continue in their fibres for some time after death.

28. *b.* The *nerves* immediately connected with the seat of injury, are stated by some writers to have been injured, inflamed, or otherwise changed; and by others to have been in no ways affected. Even when presenting manifest appearances of inflammation, they have been viewed as merely participating in a similar state of the surrounding parts. In some cases, however, the inflammatory changes have not been confined to the portions of the nerves in the seat of injury; but have been traced in different parts of their course as far as their origins. Many recent observers have traced these changes along the nerves to the pia mater, the arachnoid, and the substance of the spinal chord, which have usually also presented evidence of inflammatory action. Some instances have occurred to these and other observers (see Bibliog. and Refer.), in which injury of the nerve has existed, or causes of irritation have been in contact with the nerve, without signs of inflammatory action. As respects the nerves, therefore, the

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* Mr. Bowman (*Philos. Transact.*, 1841, p. 69.) has found some muscles in tetanus apparently healthy, whilst others presented a pale appearance in many parts, like the muscles of fish, arising probably to the blood having been squeezed out of the vessels. In other parts they had almost lost their fine filamentous structure, and presented a soft spotted mass which was easily torn. Extensive ecchymoses were frequent, and contrasted with the pallor of other parts. Under the microscope, the primitive fasciculi exhibited, here and there, the characteristic signs of extreme contraction, fusiform swelling, and a closer approximation of the transverse striæ than usual. In other parts, these fasciculi were reduced in size, and the striæ were either far apart, or had disappeared entirely. In many parts they had burst with the sheath.

proofs of change, although evident in many instances, are wanting in others; but it is by no means certain that, although changes perceptible to the unaided senses have been wanting, no change has existed, or that irritation of a most violent kind may not have been propagated along the nerves without developing inflammation, or changes usually termed inflammatory, sufficiently great or manifest to remain many hours after death.

29. *c. The ganglia and sympathetic nerves* were suggested by me, in a paper published in the *London Medical Repository* for May, 1822, to be the seat or pathological cause of tetanus, and especially of the idiopathic form of the malady. I then contended, that the ganglial, or the organic nervous system, is the source of irritability in contractile tissues; and when this property is inordinately excited, without the control of the will, that changes should be looked for in this system. Some years subsequently, Mr. Swan directed attention to the sympathetic system in tetanus, and stated that the ganglia were preternaturally injected in this disease; and appearances said to support this statement were observed by Andral, Aronssohn, and Dupuy; whilst Meyer, Vetter, and others, have adduced instances of tetanus consequent upon ossific deposits irritating branches of ganglial nerves. It should not, however, be overlooked, that the ganglia are often very vascular, even in health; that they are not always, or even generally, unusually or excessively vascular, and much less manifestly inflamed, in tetanus; and, even granting them to be excessively injected or inflamed, it cannot be shown that their inflammation could be more productive of tetanus, than a state of irritation or of vascular erythism, this latter condition being manifestly more compatible with excessive discharge of function, than a state of inflammation.

30. *d. The Spinal Chord, Medulla Oblongata, Brain, and their Membranes,* have frequently presented changes more or less decidedly morbid, in tetanus and trismus. I believe that these changes are rarely altogether absent, especially as respects the spinal chord, medulla oblongata, the pons Varolii, and their membranes, when the inspection is made within twenty-four hours after death, and when these parts are carefully examined. Something, however, should be imputed, as respects both the presence and the absence of change, to the fluidity of the blood after death, and to the position of the body. In no inspection which I have witnessed, have inflammatory appearances in one or other of these parts been altogether wanting. These appearances have been viewed as the pathological cause of tetanus by the Franks, Larrey, Magendie, Brera, Recamier, Reid, Kennedy, Ollivier, Castley, and many others, whose writings are referred to in the Bibliography; and when tetanus or trismus has been present, and these changes have been slight or absent, the circumstance may be explained without inferring that these parts were either unaffected or unchanged, even in their vascular conditions during life (see §§ 63, *et seq.*). The changes more commonly observed are, vascular injection of the pia mater, sometimes with exudations of lymph on its free surface; hardening or softening of one or more of the columns of the chord or of the medulla oblongata, softening being more frequently observed when the inspection has been long dela d; opacity of the arachnoid, or deposits of all plates of bone or of cartilage in the free a hnoid, the surface of these plates being roug on the sides next to the pia mater; generall ncreased vascularity, sometimes with recen dhesions, and congestion of the veins and ve us sinuses of the spine. These changes may e nd more or less generally along the chord and edulla oblongata, often also to the pons Varoli nd even to parts in the vicinity of the latter nd surrounding the fourth ventricle. They re thus observed, with several ossific plates i he arachnoid, in an acute case of tetanus whicl as under my care in 1820, and of these appear es I made a coloured drawing, which is still i ny possession.

31. In addition to these, the substance (he chord and medulla is somewhat reddened (injected, and exhibits numerous red points en divided. In some cases, the membrane re more decidedly inflamed and thickened. (erally, the spinal fluid is abundant and som at altered or turbid. In rarer instances, a pu m exudation is found between the membranes nd the softening of a portion of the chord pres s a puriform infiltration with capillary injection In still rarer cases, the serous exudation is of se colour, or even more deeply tinged, or even od is extravasated and extended along a consid ble part of the chord. These are the chief ch ges which are observed in the spinal medulla in tal cases of tetanus; but nearly all the appea ces described when treating of *inflammation the membranes and substance of the* SPINAL RD and MEDULLA OBLONGATA, are sometimes nd in cases of tetanus and trismus, especia in the idiopathic form; whilst in some cases, ore particularly of the traumatic form, no ch ges in the spinal chord, medulla oblongata, o eir membranes, or in the ganglial nerves, or in any other part, have been detected; ut, whether the examination in these instance has been sufficiently minute or not, may be vi ed, in the present state of our knowledge, as newhat doubtful.

32. The morbid appearances which ve been constant in the cases which I hav inspected, chiefly, however, many years ago, re, injection of the membranes and substance the more central parts of the base of the brain the medulla oblongata, the pons Varolii, and p tes of the fourth ventricle. Numerous cases ill rative of the pathology of tetanus have been de ed by Mr. Curling; and to his work, as well to others, and to many interesting papers refer to in the Bibliography, I refer the reader.

33. The changes which have been fou in these parts of the animal nervous system it of more than one interpretation, and man tly supervene in two ways:—1st. They may induced primarily, especially in idiopathic te s, the seat and extent of the inflammatory action ng the medulla oblongata and chord, occasi ng the extended and the continued contraction nd the spasmodic exacerbations.—2nd. They ay be merely consequences of the irritation con ed to the spinal medulla and membranes, or he medulla oblongata, or parts in its vicinit by nerves proceeding from the periphery of the e, or by communicating nerves from internal g lia

cera: the irritation, thus extended and re- d by motory nerves on the voluntary muscles, s increased vascular action; and this in- ed action in many instances advances to mation, or to the production of changes, resembling, or identical with those said to flammatory. (See *Pathological Inferences*, § 61, *et seq.*).

. *e.* In addition to the above, changes have found in other parts of the body. The *lungs* sually congested, and the blood in the vessels k and fluid, owing to the immediate cause of — the state of asphyxia. Increased vascu- or inflammatory injection of the digestive *us surface* has also been seen by M'Arthur, , Andral, and others; but this change may ave resulted from the asphyxia, or from the ines prescribed. Injection of the *ganglia* en remarked by Swan, myself, and others; is, if it at all exceed the natural state, may ly the result of propagated or transmitted ion. The existence of *worms* in the intes- and stomach in a very large proportion of of both the idiopathic and symptomatic y, especially the former, is interesting, at as a predisposing cause; and instances s fact have been recorded by Mursinna, erne, Larrey, Laurent, Dazille, Thomp- Morgagni, Stoll, and many others; and importance has been attached to them as a of tetanus by these writers. "The papillæ næ at the root of the tongue are sometimes hypertrophied, and the mucous lining of *arynx* highly injected, and containing a ty of frothy mucus." (Curling.) — The *nx* and upper portion of the œsophagus are contracted, and their internal surface is red nflamed, and often covered with a viscid h mucus. Similar appearances are also in cases of Rabies (see § 22.). In both lies the spasms of the pharynx explain the es of these parts.

II. Diagnosis. — Tetanus can hardly be ken for any other malady.—*a.* The continued action of the muscles of the jaws and face; the iar pain under the sternum; and the exacer- s of the continued muscular contractions, d in connection with the cause, when this wn, sufficiently indicate the malady. — *b.* It however, when superficially viewed, be ken for *rabies* (or hydrophobia, as that ly has improperly been termed), owing to fficulty of swallowing fluids, to the accession asms of the muscles of the face and neck attempts to swallow, and to the increased ility. But the entire absence of muscular action during the intervals between the pa- ms, and the morbid impulse and ferocity cterising the rabid paroxysms, distinctly that disease, and distinguish it most satis- ily from tetanus.

c. Tetanus can hardly be distinguished from *mation of the membranes of the spinal chord medulla oblongata*, especially idiopathic teta- Indeed this latter, and even the sympto- , may be viewed as often being very acute of inflammation attacking almost simultane- the arachnoid and pia mater of the chord nedulla oblongata, and occurring either pri- y or consecutively of irritation propagated to parts (§ 33.); the extent of the morbid action occasioning a co-ordinate extent of muscular contraction. When treating of meningitis of the chord, and of myelitis (see Spinal Chord, §§ 127—157.), I described the symptoms, as respects the voluntary muscles, as being identical with tetanus or trismus, according to the seat and extent of disease of the spinal membranes. Inflammation attacking either these membranes, or the chord, or the medulla oblongata, or extending to them all, will necessarily be followed by effects, as respects the muscles especially, varying with the changes produced in these structures by the inflammatory irritation or action, of which they are either successively or co-etaneously the seats. For, if the morbid vascular action in these tissues be not followed by either effusion of lymph, or softening of the chord so as to occasion abolition of function (paralysis), it must necessarily follow, that the increased muscular action, produced by the vascular action in the membranes of the chord, will be continued either until the vascular action subsides or is subdued by treatment, or until it extends to the membranes or substance of the medulla oblongata and central parts of the base of the brain, and occasions spasm of the respiratory muscles and asphyxia. In many cases the inflammatory action in the membranes or substance of the spinal chord is limited to a portion only of either, or of both, and the consequent changes are such as occasion paralysis, the tetanic contractions described, in the article referred to, being partial and co-ordinate with the extent of disease in the chord, and either preceding the paralysis, or co-existing with paralysis, but in a different series of muscles. Instead, therefore, of viewing tetanus and trismus, especially in their idiopathic forms, as totally different diseases from inflammation of the membranes of the spinal chord and medulla oblongata, I consider them very closely allied, although not identical maladies, the chief differences arising from the extent to which these membranes are affected, from the development of muscular irritability being greater in the one disease than in the other, and from the changes consequent upon the irritation or inflammatory action of which they are the seats.

37. *d.* It ought not to be overlooked that *Hysteria*, especially in its more paroxysmal and spasmodic form, may very closely simulate one or other of the forms of tetanus. Of this I have observed several very remarkable cases; the closeness of resemblance being such as would have induced a physician, who had seen the case for the first time, to believe that the patient was actually the subject of tetanus. Generally, however, these hysterical tetanic seizures are preceded and attended by so many hysterical phenomena that the difficulty of diagnosis is slight. But this is not always the case; for the trismus, or the more general tetanic contractions, may be so protracted, and the symptoms of either opisthotonos, or emprosthotonos, be so complete, as to lead to the conclusion, which the observation of some cases has confirmed, that the irritation of the sexual nerves has so excited the spinal chord or membranes, or the origins of the spinal nerves, as to develope a tetanic state, owing to the reflection of this irritation, from the chord and origins of the voluntary nerves, upon the muscles of voluntary motion. The nature of these hystero-tetanic seizures, even when prolonged, may be inferred from the sex and age of

the patient, from the history of the case, from co-existing hysterical symptoms, and from the rapid effect produced by influences acting strongly on the mind, or powerfully exciting volition, as preparations to apply the actual cautery, or the cold affusion. It may further be mentioned, that cases may occur (I have seen three undoubted instances) of simulated trismus or tetanus in hysterical females, especially in those who addicted themselves to self-pollution. The test just mentioned will often aid in the detection of these cases, and often present the recurrence of the hysterical form of trismus or tetanus. The trismus, or more fully developed tetanus, occurring in rare instances after parturition or abortion, is often attended by hysterical symptoms, and hence requires close attention to distinguish it from some states of hysteria; the alliance in such cases being close. Although *epilepsy* is attended both by trismus and tetanic spasms, yet the characteristic unconsciousness of the former sufficiently distinguish it from the latter.

38. III. TETANUS INFANTUM.—SYNON. *Tetanus vel Trismus Nascentium; Tet. vel Tris. Neonatorum; Tet. or Tris. of new-born Infants.* — *The Tetanus* or *Trismus* of recently born infants is essentially the same disease as that already described. It generally commences in the first seven or nine days after birth, and rarely later than the fourteenth day. The muscles of the lower jaw are first affected, hence it has been frequently named trismus; but the spasms are rarely limited to these, but commonly extend to the other muscles of the face, and to those of the neck, trunk, and also of the limbs. Even when the spasms are apparently confined to the muscles of the jaws, a paroxysm of more general spasm suddenly occurs and terminates life by asphyxia. The tetanus of infants usually presents two forms, as in the tetanus of adults, but is even more rapid in its progress than the latter — the *acute*, which commonly terminates life in ten or thirty hours, or within forty-eight hours; the *sub-acute*, which may be prolonged to eight or nine days, but more frequently terminates from the third to the fourth or fifth. Recovery from either of its forms is very rare.

39. This malady is now very rarely observed in temperate climates, and formerly not frequently, unless in Lying-in-Hospitals, in which it has appeared as a most fatal endemic. According to Dr. JOSEPH CLARKE, it proved fatal to many of the infants born in the Dublin Lying-in-Hospital. At the conclusion of 1782, of 17,650 born alive in that institution, 2944, or about 17 per cent., had died of it within the first fortnight from birth. But it is chiefly among the dark races, and the negro slaves especially, that it is most frequently met with. Mr. MAXWELL, Dr. HANCOCK, Dr. MORRISON, and others state that it is a chief cause of depopulation in the negro races in the West India Isles, and in the colonies of Demerara and Essequibo, the deaths of new-born infants from this malady being about cent. per cent. of all that are born. According also to RUSH, FOURCROY, VALENTIN, DAZILLE, CAMPET, and others, it is also a frequent, and always a fatal disease in the southern or slave states of the United States, but that it is rarely seen in white infants. According to Dr. HOLLAND and Sir GEO. MACKENZIE, it is destructive to all the infants born in the island of Haimacy, on e south coast of Iceland, and it exists in St. K t, the most remote of the western islands of S land; this prevalence being imputed chiefly t e food given to infants.

40. *The causes* of this disease of infants e been very differently assigned by writers. y some it has been imputed to the division o e umbilical chord, and by the subsequent treatm t, and hence it has been viewed as traumatic tet s in the infant; by others it has been considere s idiopathic, and caused chiefly by a vitiated a osphere, from crowding and deficient ventilat ; and by many it is said to be owing to the reta d meconium, and to morbid secretions in the p a via; whilst not a few impute its frequent oc rence in the West Indies to the excessive us of irritating purgatives soon after birth. All t e causes have been disputed, and exposure to d, or currents of air, has been assigned as its ef agent. That more causes than one are conce d in producing it seems most probable, and, in nection with the division of the umbilical ch d, an impure air, currents of cold air, unwholes e and inappropriate nutriment, and irritation o e digestive canal either by morbid secretions d excretions, or by unsuitable purgatives, may ocur in developing the malady, in those con utionally predisposed to it, as negro infants ap ar to be, especially in some localities. That a ntaminated atmosphere is concerned in causin e malady in white infants is shown by the fact, at the very remarkable fatality occasioned by in the Dublin Lying-in Hospital, and noticed a e (§ 39.), was reduced, after the date there st d, from seventeen per cent. to five per cent. a better ventilation of the institution.

41. *The appearances in fatal cases* have en very differently described. But, although n ly every case has been fatal, and numerous op rtunities of inspection have been furnished, ill the changes produced by the malady have en very imperfectly observed. Until early i he present century the spinal chord and par in the vicinity of the fourth ventricle were rare or never examined, even in this and other for of tetanus; and as various concomitant or conti nt changes were remarked by writers in diff nt tissues and organs, so these changes seve ly received the credit of directly or patholog ly producing the disease. Various changes c an inflammatory kind have been observed in pa in the vicinity of the umbilicus; whilst seve of these changes have been considered such a ecessarily follow the division of the chord. Dr. GOELIS of Vienna was among the first to exa ne with attention, although preceded by the FR s, the spinal chord and medulla oblongata, i he cases which occurred in the foundling hospi of that city; and he, as well as others subsequentl always observed increased vascularity of the nbranes and substance of those parts of the a al nervous centres. Indeed, according to my n observations in a few instances, and to th of other writers who have always inspected se parts, not only in cases of trismus and te s, but also in fatal cases of epilepsy and convul s, morbid appearances, either congestive or infla atory, and often also their usual consequences ve been observed in these situations, and in the re central parts of the base of the brain, and ce

have no reason to infer that the pathology of
tetanus of new-born infants is in any material
ect different from that of the tetanus of adults,
only difference being in the greater severity,
teness, and fatality of the former; and as far
ny own observation has extended, in the more
ked inflammatory appearances, or the ex-
nely increased capillary injection of the ner-
s centres of both organic and animal life.

2. IV. RELATIONS AND ALLIANCES OF TETA-
AND TRISMUS TO OTHER DISEASES.—i. Certain
hese *Relations* have been already noticed when
cing the *Diagnosis* of Tetanus and Trismus,
there are others which should not be over-
ked, especially as they serve to throw light on
nature and treatment of this malady. When
ting of inflammation of the membranes of the
AIN and of the SPINAL CHORD, I stated that
sm, more or less constant or persistent, is
sent in the muscles supplied with nerves, the
gins of which are more immediately connected
h the inflamed part, and that the spasm conti-
s until pressure or disorganization, at the
gins of these nerves, destroys their functions.
hen irritation is propagated from remote or dis-
parts to the membranes of the cerebro-spinal
em, the effect produced may be longer per-
ent, than when inflammation is primarily de-
oped in these membranes; for, in the former
e, the irritation may continue long before in-
nmation is developed, whilst, in the latter, the
nary existence of inflammation may be more
idly followed by exudation, thickening, and
er inflammatory changes calculated to impair
destroy the functions of their seats and of adjoin-
parts. Hence in most cases of spasm, con-
sive disease, and tetanus, the nature and ra-
ity of the fatal result depend either upon the
ension of the irritation to parts intimately con-
ted with the origins of nerves supplying vital
ts, or to the inflammation and consequent
nges at or near the origins of these nerves.

43. *A.* In *cerebral* or *spinal Meningitis* there is
erally spasm of muscles supplied by nerves,
origins of which are allied to the irritated or
amed portion of membrane; and, when the
nbranes of the basilar parts of the brain are
cted, the spasms are the more general and se-
e or fatal. In the convulsive or spasmodic
ctions of infants or children, the great diffi-
ty often is to determine whether the attack
ceeds from disease existing primarily in the
in or its membranes, or from irritation and
secutive morbid action propagated thither
n distant or remote parts; and even when the
er is most evidently the case, it is not the
difficult to decide how far the propagated
tation may have affected the membranes or
stance of those parts of the cerebro-spinal
tre to which it had extended. The spasmodic
cks of infants and children, whether tetanic
convulsive—whether persistent or momentary
generally depend upon certain pathological
ditions, which are usually simple, or unasso-
ted at their commencement, but which are not
requently complicated in their advanced pro-
ss. These conditions may be — 1st. Irritation
vascular erythism in, or implicating, the more
tral parts of the base of the brain, or of the
mbranes.—2d. A similar state affecting some
tion of the spinal medulla.—3d. Inflammatory action, at an early period of its progress, or before the consequent organic changes have abolished the functions of the nerves proceeding from the seat of morbid action in either the brain, or spinal chord, or their membranes. — 4th. Irritation primarily affecting some portion of the digestive canal, and propagated thence to either the chord, or brain, or their membranes.—5th. Irritation existing in the gums, or in other parts more or less remote and similarly propagated. — 6th. Morbid states of the blood, arising either from the absorption of morbid matters, or of poisonous articles, or from self-contamination, consequent upon the failure or arrest of some depurating function, and affecting the substance or membranes of the cerebro-spinal centre.

44. It will follow, from a due consideration of the usual procession of morbid action, that the disorder, whether denominated irritation, erythism, morbidly exalted nervous function, &c., commencing originally in either the *fourth* or *fifth seats* — in either the digestive canal or other parts—will frequently, and after various periods, superinduce either the *first*, *second*, or *third* of these pathological conditions, or all of them in succession; and whilst they, severally or singly, are attended by spasm, more or less persistent or momentary — tetanic or convulsive, continued or paroxysmal — the great difficulty which the physician will have to contend with, is to decide respecting the origin and seat of disorder and the progress it has made, conformably with the procession of morbid actions now demonstrated. To ascertain these points with due precison, also, the remote causes, the more immediate effects of these causes, and the whole history and progress of each case require accurate examination; and the functions of parts deriving nerves from the several sources already indicated should be duly investigated. The accession, the progress, and termination of each attack — paroxysmal or more or less persistent—ought to be carefully and closely observed, in respect—1st. Of the functions of ingestion, digestion, and defæcation.—2nd. Of respiration, circulation, and vascular action. — 3rd. Of the functions of sense, and of altered sensibility. — 4th. Of cerebral manifestations and consciousness.

45. When there is, in connection with spasmodic or tetanic action, increased sensibility of the surface of the body, the membranes of the spinal medulla are obviously implicated. If with these symptoms there be also a morbid exaltation of the senses of hearing, seeing, &c., the extension of irritation or of inflammatory action to the basilar parts of the brain may be suspected. If the spasm be accompanied with anæsthesia of the surface, either consecutively upon increased sensibility, or primarily, or with impairment or loss of the functions of sense, the presence or supervention of congestion, or of effusion, or of softening, in those parts of the nervous centres, upon states of irritation, erythism, or inflammatory action, may be inferred; the extent and seat of spasm, and of impaired or lost sensation, indicating the seat and extent of the pathological condition. If in connection with, or consecutively upon, spasmodic contractions, there be loss of all consciousness — of all the functions of sense, and all the manifestations of mind — as in epilepsy, and in puerperal and some other forms of convul-

sion, &c., it may be inferred, that the irritation, whether cerebral, spinal, or in parts remote from these centres, so affects the medulla oblongata or the central parts of the base of the brain as to occasion spasm of the respiratory muscles, especially of the glottis and diaphragm, or to paralyse or arrest their functions, either for a time or fatally; if for a time only, the cerebral congestion attending the paroxysm and the imperfectly oxydised blood serve to dissolve the spasm by paralysing for a brief period the previously irritated nerves, a return of the normal state of the functions ultimately resulting; if fatally, the protracted spasm and the consequent congestion and asphyxia terminate existence.

46. The views now stated explain the alliance of tetanus or trismus with the spasms or convulsions of infants and children, as well as of adults; for, as long as the parts of the base of the brain, which are more intimately connected with conscious sensibility, are not implicated in such a manner as to abolish their functions either for a time or for ever, the attack is simply spasmodic or convulsive, consciousness and mental manifestation being unimpaired. When, however, the powers of mind and consciousness are affected, the extension of disease to the brain, or the primary affection of some part of this organ, is made manifest, and the attack is either epileptic or apoplectic, according to its mode of accession or to the phenomena attending and following it.

47. *B.* In *Epilepsy* and in the *epileptic convulsions of the puerperal states*, there are present not only the spasms of the muscles of the neck and face, but also most of the other phenomena of tetanus, in either of the forms already defined, often modified, but sometimes almost identical with them, although generally of a short or paroxysmal duration. The chief distinction, however, is in the sudden accession of unconsciousness which is generally contemporaneous with, or somewhat antecedent to, the spasm. In all cases of spasm or convulsion, accompanied with unconsciousness, the muscles of respiration are early affected, and cerebral congestion and imperfect oxygenation of the blood result, these conditions tending to dissolve the spasms, and thereby to admit of the return of a normal state of respiration, if they are not so excessive or persistent as to destroy life.

48. *C.* In *Apoplexy*, and more especially in that form which was first described by me under the name of *convulsive apoplexy*, tetanic rigidity of muscles, more particularly of those of the neck or limbs, with various convulsive movements, is more or less manifest. Although in these cases the vessels of the brain are very frequently diseased, and the substance of the brain consecutively altered, with hæmorrhagic clots, yet the spasms, tetanic contractions, and convulsive movements are not to be imputed so much to these and other allied alterations in the substance of the brain, as to changes in the membranes, especially in those parts which cover the central and basilar parts of the cerebrum.

49. *D.* The tetanic spasms and convulsions observed in the more violent *paroxysms of Hysteria* are seldom accompanied with unconsciousness; or, if they be so attended, the loss of sensation is incomplete, and supervenes gradually, whereas it is instantaneous and complete in the fully developed fit of epilepsy; and it comes on gradually or suddenly, or is incomplete or co
plete in convulsive apoplexy, the contractions
the muscles being either very extended or limi
in either malady. The chief differences in
spasmodic or muscular contractions, characteris
these diseases and the several forms of trism
and tetanus, are that they are either subordin
phenomena, or of comparatively short durat
in the former, whilst they constitute the char
teristic feature, the most dangerous symptom,
the cause of death, in the latter.

50. *E.* In the tetanic contractions characteris
the *convulsions of infants and children*, especia
the form termed *eclampsia*, there is gener
more or less affection, primary or propagated
the cerebro-spinal centres, or of their membra
If the brain be unaffected, the functions of se
and consciousness are not materially distur
during the attack; but if these functions be ma
festly impaired or lost, the mischief is in
brain or its membranes, or is propagated thit
either along the spinal chord or its membranes
directly from the seat of irritation, by means
the ganglial or sympathetic nerves. In yo
children and infants, when the irritation is in
stomach, or in the bowels, or in the gums,
often difficult to determine whether the musc
contractions are attended by loss of conscious
or insensibility. In many cases they are not
associated, as evinced by the senses of sight
hearing, by the sensibility of the surface, and
the free and unembarrassed cry; this last m
especially indicating, that the function of resp
tion is unaffected. In other cases, even when
irritation is seated in one or other of these pa
the cerebro-spinal centres may not be implic
at first, but they may become affected soone
later, and be the chief seat of disease, as c
monly observed in other convulsive maladies
tacking either children or adults. (See arts. C
VULSIONS, §§ 22, *et seq.*, and SPASM.)

51. ii. THE EFFECTS OF MUSCULAR CONT
TIONS ON THE CIRCULATION have not recei
sufficient attention from pathologists. It is m
fest that the changes produced on the circula
by muscular contraction, inordinate either in
gree or in continuance, will vary with these
ditions, and with the muscles affected.
provisions so wisely made as to the retur
blood from the brain and spinal chord: the sin
within the cranium, and the venous sinuses of
spinal column are so arranged, as very great
diminish or to counteract the ill effects of arre
the return of blood from these organs; neverth
more or less obstruction to the return of blood
them is produced by violent or protracted sp
chiefly by pressing upon venous trunks, or by
terrupting the passage of air into the lungs, o
preventing the relaxation, or by continuing
contractions, of those muscles, upon the alter
relaxation and contractions of which respir
depends. In these cases, the right auricle of
heart becomes over distended, the return of b
from the brain impeded, the liver becomes
gested, and the circulation through the lung
sufficient for the oxygenation of the blood;
phyxia and cerebral congestion being the ulti
results.

52. iii. THE INFLUENCE OF THE BLOO
MUSCULAR CONTRACTION is even greater
that of muscular action on the circulation.

ing to the states of the blood circulating
ugh muscular parts, the contractions of these
tures may be exalted, spasmodically excited,
weakened, or even altogether abolished.
h of these states is doubtless owing to the in-
nce of the blood upon the nervous centres,
which the affected muscles derive their
es ; but it is not unreasonable to infer, that a
ly oxygenated state of the blood will impart
directly to the muscular fibre, that an oppo-
state of the blood will impair the tone of this
, and that the accumulation of acid, acrid or
ting elements or materials in the blood, oc-
oned by interrupted excretion or otherwise,
sometimes cause not only exalted or morbid
ractions of muscular parts, but also irritation
vascular excitement of the substance and
branes of the nervous centres. If the vas-
r excitement go on to the usual condition
consequences of inflammatory action, these
ges will rarely be limited, although more
ifest in one part than in another, for the ex-
g pathological cause is general, being pre-
in the blood, and implicates both the nervous
tures and their membranes ; whereas the
e common exciting causes of inflammation
fly act locally, and affect a portion only of
e structures, although often extending more
ss to adjoining parts.

. V. Causes. — *A. Predisposing causes.* —
several forms of tetanus are more frequent and
e fatal in the male, than in the female sex.
is partly owing to greater exposure of the
er to the exciting causes, especially to in-
s, accidents, and wounds. Of the influence
mperament in favouring the occurrence of the
se, we have no certain knowledge ; but pro-
y the nervous and irritable temperaments are
prone to it. There is no doubt of the much
er liability of the negro race to every form of
us or trismus, than of the white race. Cli-
and locality have a marked influence in
isposing the frame to a tetanic seizure. This
inced by the much greater frequency of the
dy in hot, than in temperate climates, and in
d and malarious localities, than in dry situa-
. Disorders of the digestive organs, es-
lly the retention of morbid secretions and
etions in the digestive canal, the existence of
tinal worms, the failure or arrest of the de-
ting functions. and the consequent contami-
n of the circulating fluids, are amongst the
frequent causes of predisposition. Bodily
ue, harassing duties and occupations, ex-
ve muscular exertions, and irregularities of
or unwholesome food, are also causes of pre-
sition. The catamenial period, parturition,
abortions also favour the occurrence of the
se in females.

. *B. The exciting causes*, in temperate cli-
s, are chiefly injuries and surgical operations.
ctures and lacerations of fascia, tendons, and
es ; lacerations and ligatures of nerves ; and
ies of the extremities, especially of the hands
feet, are the most frequent causes; but
ds in any situation or part of the body,
of every kind and grade, from the sting of
e or wasp, or the abrasion of the cuticle, to
mputation of a limb, may produce tetanus.
eanly incised wound is much less likely to
sion this disease than a puncture or laceration. But, although these injuries are chief causes of the attack, the influences of the predisposing causes, and of those which are mainly concerned in producing the idiopathic form of the disease, in concurring to develope the malady, should not be overlooked. The causes which thus give rise to the idiopathic state of the malady, and which so often concur with injuries in developing the symptomatic form are, vicissitudes of temperature, exposure to the heat of the sun, more particularly to the sun's rays, and soon afterwards to the chills, dews, and cold of night; sleeping on the ground, especially when exposed to the night dews or moon's rays ; exposure to currents of air, or to cold and wet in any way ; drinking cold water, or other cold beverages, when the body is perspiring ; imprudent cold bathing ; sleeping in confined and ill-ventilated apartments ; breathing a contaminated or a miasmatous atmosphere ; and such laborious occupations as making trenches, digging clayey soils, &c. Whilst these concur with, or aid injuries or wounds, in giving rise to tetanus, they frequently of themselves occasion the disease, especially in hot climates, and in the dark races, more particularly the negro race, by arresting the eliminating processes, and by favouring the accumulation of morbid materials in the blood, which enter into new combinations, and irritate the nervous centres and membranes, and the muscular structures themselves, both directly and indirectly, by means of the nerves. Owing to a stricter attention in preventing these predisposing and concurring causes, and to the adoption of a more wholesome diet and regimen, the several forms of tetanus are now much less frequent than they were many years ago, more especially the traumatic or symptomatic form. Tetanus may be produced by some poisons, particularly by nux vomica, and its preparations (See Art. Poisons §§ 364—381, *et pluries*).

55. As I shall have to show hereafter, certain of the exciting causes seem to act more directly on the spinal medulla than others, whilst many of these causes occasion a state of the most distressing irritation, transmitted through the medium of the ganglial system, or of the sentient nerves, or even through the media of both, to the cerebro-spinal centres, and thence reflected on the muscles of voluntary motion. Thus worms in the digestive canal, not only predispose to attacks of traumatic tetanus, but also directly occasion the idiopathic form of the malady. That these parasites are no infrequent cause of tetanus has been insisted upon by Avicenna, Schenck, Hillary, Bisset, Rush, Chalmers, Michaëlis, Rahn, Zulatti, and De Haen ; and not by worms only may the disease be thus occasioned, but also by whatever inordinately irritates the intestinal canal, as the retention of the meconium, or the use of drastic purgatives, in infants. I have seen it caused by internal strangulation of the bowels, the primary lesion being accurately ascertained only after death. A temporary state of tetanus has even been produced by the passage of gall-stones, as was shown by a case which lately came under my care, emprosthotonos, of many hours' duration, having been thereby occasioned, with the slowness of the pulse which usually attends this form of biliary obstruction, the attack having been not only severe, but also protracted. Tulpius has recorded an instance of the disease having been

occasioned by calculi in the kidneys; and I have observed the sufferings produced by the passage of calculi along the ureters, accompanied by spasms so general, so continued, and so severe, as closely to approach the tetanic state.

56. Several of the causes are very rarely productive of the malady, as caries of the vertebræ; whilst others which had more frequently occasioned it, are fortunately not so often observed now as in former days. Tetanus not seldom followed a recourse to torture, as torture was practiced either by civil authorities or by pseudo-religious inquisitions, or by military and naval commanders; but whether the wretched result proceeded from the excessive pain thereby produced, or by the irritation excited in the tissues — the integuments, the nerves, the muscular or the tendinous fibres — of the parts which sustained the injury, cannot be readily determined. **Harder** says, that he has seen it follow pain only; but it may justly be admitted, that excessive pain may have predisposed the system to be affected by the irritation more permanently developed in the seat of torture. That the disease may follow either burns or scalds has been admitted by many writers, and has been shown by **Smith**, **Fizeau** and others; and that it may be caused by fright or terror has been proved by **Riedlin**, **Pideret**, **Hansa**, **Bierling** and **Latour**. **De Haen** says that he has seen it produced by retrocedent gout; and probably the *materies morbi* of gout in the blood had so excited the spinal medulla and membranes as to develope a state of morbid or continued contraction of the muscles, amounting to idiopathic tetanus. **Wright** and other writers have insisted much upon the influence of insolation in warm climates, or in warm seasons in temperate climates, in occasioning tetanus, and with much justice, as inter-tropical physicians will admit; and no less just and important is the fact shown by **Avicenna**, and adverted to by many since the days of the celebrated Arab, that sleeping on the ground, especially after exposure to the sun's says, or whilst exposed to the night dews, or to the moon's beams, is a most influential cause of idiopathic tetanus, and of the development of the malady after injuries, wounds, &c.

57. *C.* The *Formative period* of tetanus, or the time which elapses from exposure to the causes until the commencement of the attack, is a matter of some importance, as respects the elucidation of the manner in which the causes act, and the employment of measures calculated to prevent the development of their effects. The duration of this interval is most various — from an hour or two to fourteen days, — most frequently, in cases of injury, from the fourth to the fourteenth day. In the returns furnished by Sir J. **Macgrigor**, the interval never exceeded three weeks. Sir G. **Blane** mentions four weeks as the longest period. Sir B. **Brodie** observed the disease to commence generally in the second week. **Mr. Curling** refers to an instance recorded by Mr. **Ward**, of the occurrence of the malady ten weeks after a burn in the axilla. May not some other cause or causes have occurred in this interval?

58. It has been noticed by Mr. **Curling** and others, that the longer the interval between the receipt of the injury and the appearance of the symptoms, the less acute and dangerous is the disease. In thirteen cases the symytoms did not commence until three weeks after the wounds, only four of these were fatal; and of seven c in which the symptoms did not appear until a l period, or about four weeks, only two termin fatally. The more rapidly the disease follow exciting cause, the more acute and fatal do prove, in both the idiopathic and the symptom form.

59. *D. The state of the injury* or wound at commencement of the disease, is a subjec interest. Dr. **Rush** remarked, that there is absence of inflammation or free suppuration f the wounds causing tetanus. This generally pears to be the case. The injury either seem be healing, or is quite healed, and even forgot when the disease commences. In some insta a feeling of irritation is referred to the injury cicatrix; and in others a cause of irritation, material or palpable nature, is detected in on the other, or is found to affect a branch or ment of nerve. In others no such feeling or c apparently exists. If a healthy suppuration h existed in the wound, it is usually suspended, is followed by an ichorous, or scanty sanious charge, just before the accession of the spasm the muscles of the jaws and neck and the culty of deglutition, or contemporaneously the accession of the premonitory symptoms n tioned above (§ 4.).

60. VI. **The Prognosis.**—The *issue* of teta varies with the causes, and with the form which disease assumes. A fatal result is most freq in the traumatic form. It is less frequent in idiopathic form, and much less frequent in sub-acute, whether idiopathic or symptomatic when the malady is prolonged beyond the n or tenth day. Much, however, depends not upon the exciting or efficient cause, but also u the influence of concurring causes, as exposur cold and wet, to malaria, or to an impure or o respired air, and the presence of intestinal wor either, or all, of these tending remarkably to crease the mortality of the traumatic form. concurrence of malaria or other impurities of air, with exposure to cold, also greatly incre the fatality of the idiopathic states of the mala Recovery very rarely takes place if the p rise above 110, in the intervals between the acerbations on the third day, especially in traumatic form; still more rarely, if it reach on that day; and no hopes may be entertaine the pulse in that form reaches this latter freque on the second day, or at an earlier period. **Parry** thought that, if the pulse of an adult under 110 on the fourth day, the prognosi favourable; and if 120 or upwards, unfavourab but cases frequently terminate fatally on the th fourth, or fifth day, and yet the pulse, in the tervals between the paroxysms, has not risen ab 100, or 110, or even, according to some writ above 80 or 90, although this latter state of pulse, in acutely fatal cases, does not quite ag with my observation. Dr. **Druitt** has very tr and ably stated that, "as a general rule, the p gnosis is *favourable*, if the complaint is partial, — it does not affect the muscles of the glottis, — i has lasted some days, without materially increas in severity, — if it is sensibly mitigated by remedies employed, — if the pulse is not mu accelerated, — if the patient sleeps, — and if has been subject to it before, in an intermitt

On the other hand, the prospect will be
ourable, if the spasms continue to increase in
ity, and especially if they affect the muscles
e glottis;" and I would add, or if they ex-
to the diaphragm and other muscles of re-
ion; and if the disease be very acute and
ulse very frequent on the second day.

. VII. PATHOLOGICAL INFERENCES and RE-
s.—*a.* That a predisposition, original or ac-
d, exists in some constitutions to be affected
tanus, when the exciting causes, by their
e or their concurrence, are brought into ope-
; that this predisposition is most evident in its
al state, in the negro race, and in the darker
; and that males appear to be more suscepti-
f this malady than females.

. *b.* That depressed states of organic nervous
r, connected with nervous susceptibility and
increased irritability, seem to favour the oc-
ace of an attack of tetanus; and that, still
especially, the presence of worms in the
tive canal, disorders of the digestive and
inal functions, intertropical or warm and
natous localities, or otherwise contaminated
of air, and the arrest of the excreting pro-
s, further tend to favour the appearance of
alady, by accumulating excrementitious ma-
s in the blood, and aid the operation of the
ng causes enumerated above (§§ 54, *et seq.*).

. *c.* That the lesions of the nervous centres
imal life, on which tetanus has generally been
osed to depend may be: — 1st, that of ery-
, or of irritation, in which vascular injection
organic lesion are either not seen, or not
fested to any considerable amount, or so as
admitted as inflammatory;—2dly. Or, that
creased vascularity and the changes generally
ed as constituting inflammation, or conse-
t upon it;—3dly. Or, any change inter-
ate between the extremes of these states —
inima of the former, and the maxima of the
— may be inferred to exist in cases of the
al forms of this disease.

. *d.* That similar lesions, in their nature and
int, to those just stated may exist in the
ent or centripetal nerves, or in the ganglial
es, which are the media by which the irrita-
is transmitted from its primary seat to the
l medulla and central parts of the base of the
, although lesions in these communicating
es are not easily ascertained, traced or ren-
l apparent after death; or they may be such
e compatible only with the living state, and
pear soon after dissolution.

. *e.* That any irritation at the periphery of
ervous sphere may be propagated by sentient
es to that part of the nervous centres with
h the part irritated is most intimately con-
d or related, and be reflected thence upon
ular parts, through the motor nerves which
ost intimately connected with those portions
e nervous centres to which the irritation is
mitted.*

. *f.* That the irritation of the muscular
tures themselves, directly produced by the
mulation of morbid and irritating materials— acid or saline — in the blood, may induce a more or less continued state of spasm of the muscles, and the existence of these materials in the blood, may perpetuate this state and superinduce further changes in the nervous centres and in their membranes, this state of the blood being produced as above noticed (§ 52.).

67. *g.* That the irritation thus excited may be perpetuated or continued to the extinction of life by asphyxia or by vital exhaustion, without the changes actually constituting inflammation having been developed — at least to an amount admitting of their permanent manifestation or undoubted existence after death.

68. *h.* That, although this (§ 67.) may be the case, especially in the traumatic form of tetanus, and more especially when the ganglial system, which is so intimately connected with the existence of irritability in all animals, is brought within the sphere of morbid action, yet inflammation and its usual consequences actually does sometimes take place, but not so frequently and evidently in the traumatic, as in the idiopathic malady.

69. *i.* That the inflammatory changes observed particularly in the idiopathic form, as when occasioned by insolation and by subsequent exposure to cold or the night dews, or by sleeping on the ground, &c., may be early produced, the tetanic phenomena being merely the manifestation of the early inflammatory state and changes in the membranes or substance, or in both, of the spinal medulla, extending often to, if not originating in, the medulla oblongata and the central parts of the base of the brain; and that the changes, whether inflammatory or merely irritative and incapable of demonstration, which first take place in the nervous centres of animal life, should be looked for in the parts most intimately connected with the origins of the nerves supplying the muscles of the pharynx, lower jaw, throat, and neck; these changes, as they extend along the membranes of the medulla oblongata and chord, extending the sphere and the severity of the malady.

70. *k.* That, in these cases (§ 69.), according to my observation, the pain which is commonly felt in the occiput, and in the cervical and dorsal regions of the spine, with the throwing backwards of the head, &c., in addition to the symptoms pathognomonic of tetanus, early declare the seat and nature of the disease — irritation or inflammation of the parts now mentioned (§ 69.).

71. *l.* That, in cases which arise from irritation in some distant part, transmitted to nervous centres and reflected thence upon contractile structures, and in which inflammatory action is either absent, or its existence is problematical at an early period of the malady at least, we can no infer, agreeably with what we know to take place in the animal œconomy, that inordinate or continued contraction of muscles can exist, without an increased demand being made upon the circulation supplying the nervous centres which actuate these muscles; and hence we may conclude that increased vascularity, or even the earlier states of inflammation, of these centres and of these membranes may be the necessary consequences of the continued and inordinate muscular action constituting the disease; the augmented determination of blood thus directed to these nervous centres

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his view is identical with that stated with reference
e pathology of CHOLERA, CHOREA, and CONVULSIONS,
ies which were written more than three years, and
shed in 1832, or about two years, before Dr. M.
's earliest writings on the reflex *function.*

tending to the perpetuation and the extension of hte muscular contractions, and thereby to the more or less rapid extinction of life.

72. *m*. That, notwithstanding this condition of the nervous centres of animal life, whether primary or superinduced, it is most probable, that the contractions would not become so persistent, or the spasms so severe and frequent, if the ganglial system preserved a normal state of function, or was free from irritation or vascular excitement.

73. *n*. Inferring, as stated above (§§ 63, *et seq.*). that tetanus may depend upon, or be connected with, one or other of three pathological states of the nervous centres of animal life, namely, — 1st. Upon inflammatory action of these centres or of their membranes, especially in the idiopathic form of tetanus,—2nd. Upon inflammatory action superinduced upon irritation transmitted from the periphery of the sentient nerves to these centres, or from ganglial nerves to these centres, and thence reflected on contractile structures, — and, 3rd. Upon irritation thus transmitted and thus reflected, without sufficient proof of inflammation, — it should become an object to ascertain with all possible accuracy, to which of these pathological states the case belongs to which we are called to administer relief; for, upon the inferred pathological condition, the indications and the plans of cure should be based.

74. *o*. Many of the changes which are presented by the lungs, the heart, the blood, and even by the liver and digestive mucous surface, are manifestly results of the mode of death. Those seen in the pharynx and glottis are evidently caused by spasms of those parts, consequent on the irritation or inflammation, or both, existing in the medulla oblongata and its vicinity, and upper portions of the spinal medulla, or their membranes. Yet other morbid appearances may exist in different portions of the digestive canal, or in one or other of the urinary or genital organs, which cannot be viewed as the results either of the malady or of the mode of death; but which may be considered as being either sources of irritation, or as concurring aids to irritation, or merely as accidental and unimportant changes: if they be viewed in the former light, it becomes important to ascertain how far they can be connected with the early or premonitory symptoms, and to determine the manner in which the functions of the organs in which they were seated, had been discharged.

75. *p*. That, when tetanus follows irritation or injury in some peripheral part of the nervous system, the division of nerves or parts between the seat or cause of irritation and the nervous centres most frequently fails of arresting the disease; such failures evincing the superinduction and extension of the irritation, or other morbid condition constituting the malady, to the nervous centres of animal life, and probably also to the organic or ganglial system, to which I imputed irritability in its normal manifestations very many years ago, and more recently in this work. (See Arts. Irritability and Irritation).

76. VIII. Treatment.—A slight experience of the different modifications of tetanus, more especially of the idiopathic, symptomatic, and infantile forms, is sufficient to show the justice of the distinctions which I have endeavoured to establish, between what may be considered as the inflammatory
and the irritative states of the malady. But as e
state does not exist simply or unassociated
one condition is accompanied with more or le
the other — as the irritative often sooner or
becomes inflammatory, or the former state
quently induces the latter, the difficulty of d
mining in practice how far the one state ma
ist independently of the other is remark
great. Unfortunately a simply inflammatory
of either the membranes, or the substance o
central parts of the base of the brain and med
or of both the membranes and substance of
parts, is seldom so manifested as to admit
distinct recognition, the very phenomena whi
sympathetically produces either masking its
sence, or throwing doubts on its existence.
sides, irritation is so nearly allied to inflan
tion, even when it exists simply, and so
excites the inflammatory state, by eliciting vas
determination and injection — "ubi irritati
fluxus" — that we can hope only to reac
amount of accuracy which may not altogeth
deserving of being considered erroneous. I
difficulty of ascertaining pathological condit
upon which all rational indications of cure sh
be based, be so great in this malady as not to
hitherto been overcome, can it be a matt
surprise that the means which have bee
sorted to, both by physicians and by surgeo
its treatment, have been most opposite in
effects, the most different in their natures, a
every respect most empirical and uncertain?
this state of our knowledge it would be bett
leave Nature to her unaided efforts, to ob
closely and accurately what is the true proc
of changes and of their manifestations, ar
ascertain the seats and the extent of lesi
soon after death as may be attempted with
priety.

77. I have contended above, more st
ously perhaps than any previous writer, fo
inflammatory character of this malady, espec
in the idiopathic form. But admitting the
ence of this character, as manifested by
changes observed after death, the following
tions remain to be determined, namely, 1
inflammatory state necessarily or always ev
to the close observer during the life of the
tient when it actually exists? and, if it be evi
Is it most successfully treated by the
means resorted to, when combating the st
form of inflammatory action? — 1st. A
spects the former question, it may be said,
inflammation of either the substance o
membranes of the spinal medulla, or o
medulla oblongata, or parts in the vic
is often ascertained with great difficulty.
is apparent from what I have said when
ing of spinal inflammations (see art. Sp
Chord, &c., §§ 137, *et pluries*); and there I
viewed them as they are usually present
both physicians and surgeons in the cour
practice — as commonly limited to a portion
of either the membranes or substance o
chord, or as advancing along them grad
and attacking successively adjoining por
But, when the inflammatory action of these
extends rapidly, or takes place almost co-ë
ously, the effects upon contractile stru
are quickly and extensively manifested. Wh
therefore, it be irritation or inflammation

luced in the spinal medulla and its mem-
;, or irritation quickly inducing a certain
it of vascular injection or inflammation, or
y an exalted polarity of the spinal chord,
ntended for by K. SPRENGEL, there is
to infer, that the morbid condition is at
mited in extent, although advancing ra-
and that it commences in the more imme-
icinity of the origins of the nerves supplying
iscles of the pharynx, lower jaw, and neck.
pain is felt in the cervical region of the
extending either upwards to the occiput
vnwards to the dorsal and lumbar regions,
the sensibility of the surfaces, whose nerves
nnected with those parts of the nervous
s, is unusually increased, or when any sti-
acts upon the muscles connected with these
so as to occasion spasm or distress, as
ttempting to swallow, it may then be in-
that a morbid action, usually termed in-
itory, is really present in the membranes or
re of these parts, although pain and other
ms may not be exasperated by pressure on
rtion of the spine where inflammation of
rd or its membranes is indicated ; pressure
her influencing the pain than it would if it
nade upon some part of the cranium when
in is similarly affected.

2nd. Admitting the presence of inflamma-
the spinal medulla, or central parts of the
the brain, or their membranes, in many,
in the great majority of, cases of tetanus,
at an early or in an advanced stage, or
utively upon transmitted irritation, the suc-
f such means as are usually employed
inflammation still remains questionable.
ow that the term inflammation has been
l to very different states of vascular in-
, as I have shown when treating of inflam-
, and that these states differ as to the cur-
rough the capillaries, as to the power or
hich these vessels manifest, as to the pro-
or fluids which are exuded from them
these states, and as to the extension of the
action or condition to continuous or con-
tissues. Hence, even when the first
n is admitted in the affirmative, we must
ecourse to the results of an enlightened
nce for our answers to the second: and
answers only can be given, so as to be
tory, by referring to the effects of such
as are most successful in removing changes
nly considered as, and denominated in-
itory. But it should not be overlooked,
has been most satisfactorily shown, that
hanges are so different in their local cha-
, in their constitutional relations, and in
endencies and results, as to require for
uccessful issues very different and often
te means of cure ; the differences being
ned chiefly by the varying grades of or-
nervous power, and by the presence of irri-
or injurious excrementitious materials in
od (§ 52.). These facts have been fully
ted when treating of the several forms,
es, and modifications of *Inflammation* in
fferent organs and tissues; and what has
roved and admitted of inflammation gene-
, and of the special manifestations of it in
rgans and tissues, may be extended to in-
ation in those parts of the substance and
. III.

membranes of the nervous centres to which the disease has been now chiefly referred.

79. But, it should not be overlooked, that whilst the fully developed malady may be attributed to an inflammatory state of these parts, induced by transmitted irritation, the primary morbid condition, especially in the traumatic or symptomatic form of the malady, — the irritation existing, whether manifested or not, in the seat of injury, propagating itself to the nervous centres, there developing morbid action, and perpetuating reflex muscular contraction,— should be attempted to be removed or counteracted by the most efficient and appropriate means. Whilst the local or primary irritation exists, or its transmission along centripetal nerves is not interrupted or prevented, the procession of irritation to inflammatory action, and the extension of this action along the membranes, with the reflected muscular contractions, are thereby promoted, and the morbid consequences — the tetanic contractions and spasms — necessarily aggravated. Therefore, at all periods of the malady, but as early in the treatment as possible, means should be employed, in *the traumatic form* of the malady, *to arrest the transmission of irritation from the seat of injury to the nervous centres, or to allay irritation in this seat.*

80. *A.* THE LOCAL TREATMENT of traumatic tetanus should therefore be as early as possible determined upon; the means being such as are most suitable to the nature of the injury. To obtain the end now stated — 1st. Amputation or excision of the wounded part;—2nd. Division of the nerves proceeding from the seat of injury;—3rd. The application of agents calculated to procure a healthy action or a free suppuration in the injured parts, — and 4th. A recourse to soothing or anodyne applications to these parts, and in the course of the nerves proceeding from them, have been severally recommended, and have been found of service in some cases, and inefficacious in others. It is obvious that, when the symptoms of tetanus, and even when those of its first stage, trismus, have appeared, the pathological changes in the nervous centres and their membranes have already commenced, although they may not be fully developed; and that the removal of the remote irritation which produced these changes may not then be influential in subduing them. Nevertheless, the removal of the cause may render the effects either more mild or more controllable by treatment, — may prevent the effects from reaching that amount which the continuance of the cause might develope.

81. *a.* Instances of recovery from acute traumatic tetanus, after *amputation* had been employed in order to arrest the attack, have been recorded by LARREY, VALENTIN, WHITE, HOWSHIP, and others; but recourse to it has also failed with many. Mr. CURLING states, that it was performed in eleven of the cases in the table which he has given, and of these seven were cured. In most of these, however, the operation was resorted to before the symptoms were fully developed, at which time only should hopes of success from it be entertained. It is inadmissible in sub-acute tetanus, unless the condition of the injury be such as demands the operation independently of the spasms; for most of the cases of this form recover, often notwithstanding the treatment which has been

adopted. Mr. CURLING very justly remarks that amputation is justifiable only after a severe injury of the extremities, immediately that there is the slightest indication of spasm; for, if delayed until the disease is more advanced, instead of proving beneficial, it will rather aggravate the symptoms and render the constitution less able to sustain the exhausting effects of the spasms.

82. *b. Division of the nerves*, in order to arrest the transmission of the irritation from the injured part, and even of the *tendons* and *aponeuroses*, when these are lacerated or injured, has been advised and practised in some cases with marked success by SCHMUCKER, HICKS, DELAROCHE, MURRAY, FOURNIER, STÜTZ, LARREY, and some others. When this operation can be performed so completely as to comprise all or the chief nerves proceeding from an injured part, it should not be neglected, nor delayed until the disease is fully evolved. It is in every respect to be preferred to amputation. Dr. PENNOCK has advised the application of ligatures or cupping-glasses, in order to paralyse the nerves, when a complete division of them cannot be effected, as previously recommended for poisoned wounds. In cases of cutaneous or superficial injuries, &c., these means may be resorted to.

83. *c. Incisions* made into the seat of injury, and *applications* which may excite a free suppuration in it, have been recommended by RUSH, VALENTIN, MERCIER, CAMPET, LARREY, PARANT, and many others. The actual or the potential *cautery* has been advised by some, with this intention; and a free opening into the seat of injury, or reopening of the cicatrix, or incisions into it, and the application of various substances, with the view of exciting healthy action, have been recommended by others. In one case, I directed the injured part to be freely incised, soon after the occurrence of spasms of the muscles of the wounded limb, and the incision to be filled with lint soaked in equal parts of tincture of opium and spirits of turpentine, the same substances being also applied as an embrocation, on flannel, in the course of the nerves proceeding from the part; but, as the treatment about to be noticed was employed at the same time, the share which these means had in the recovery of the patient is not very manifest; the local symptoms, however, appeared to be much alleviated by them.

84. *d. Soothing*, *emollient*, and *anodyne* applications were advised by HIPPOCRATES, CELSUS, CÆLIUS AURELIANUS, and by many of the moderns, to the injured part; they may be employed either immediately or after the division of nerves or the incisions already noticed. These means have not been restricted to the part, but have likewise been applied in the course of the nerves proceeding from it. The agents which have been thus employed by the more recent writers consist chiefly of moist heat, anodyne poultices, fomentations, or embrocations; applications containing either opiates, or conium, or belladonna, &c. It has also been recommended by CERIOLI, LEMBERT, and others, to remove the cuticle from the parts in the vicinity of, or above the seat of injury, and to apply either of the preparations of *morphia* to the denuded surface. It is obvious that these, or similar means, can be of use only early in the disease, and as aids to other rational measures.

85. *e.* Whilst *these local means* are more or
less appropriate to traumatic or symptomati e-
tanus, and chiefly to the acute form at a ry
early stage of the attack, and are useful ds
to the treatment which the pathology of the s-
ease will suggest, the measures about to be p ed
under review *are equally suitable to all the* ns
of the malady, duly adapting them, howev in
respect of amount, combination, and succe n,
to the severity and peculiar features of indiv al
cases. It should not be supposed that all es
which recover, especially those which I hav e-
nominated as sub-acute, and more particu ly
such as are symptomatic of, or associated h,
other diseases, as with hysteria, or with epilep or
even with the effects of malaria, as insisted on
above (§ 22.), are really cured by the n ns
which have been employed. Nature in ma of
these cases asserts her own prerogative, and c es
it above the many and incongruous agent so
often irrationally, empirically, and injuri ly
resorted to. If we consider the diverse and en
opposite nature of the measures which have en
prescribed for this malady, their apparent su ss
in some instances and their failure in others nd
their employment in different states of the di se,
with little regard to the modes of their oper on
in relation to pathological conditions, we n s-
sarily must infer that recovery has some es
taken place, notwithstanding their use, and ot
by their aid.

86. *B.* THE EXTERNAL MEANS recomme ed
by writers are almost as numerous as those e-
scribed internally, and whilst they have been ed
as adjuvants by some, they have been re
entirely confided in by others. — *a.* Not the st
important of these are the *affusion of cold* er
and the *cold bath.* The former was presc ed
by HIPPOCRATES, but he directed the patie to
be afterwards wrapped in warm coverings. he
cold affusion was also adopted by AVIC A,
SCHENCK, KITE, RUSH, WRIGHT, TALLM N,
and CURRIE, for this disease; and the cold th
by COCHRANE, HARRIS, MOSELY, and the w rs
now mentioned. CELSUS considered the ld
bath to be injurious. FISCHER advised it, o m
having been given internally. In the cas in
which opium has been taken in large or fre nt
doses, the cold bath, and more especiall he
cold affusion on the head and cervical spin re
much less hazardous, if not beneficial, in is
disease than when they are resorted to er
other circumstances. Both the cold affusio nd
the cold bath are not without some degree of k,
if the shock produced by either be too sudd or
too severe for the amount of vital power. ut
when judiciously employed, and the effects e-
fully watched, and aided by appropriate int al
remedies, they may, especially the cold affu s,
prove most influential means of cure, more i-
cularly in the idiopathic form of the ma y.
Many instances have been recorded of rec y
from acute tetanus, by means of cold appli n
either of these modes, or in some other way. e
changes found on dissection after fatal pois g
by *nux vomica* and *strychnine* are the same, e-
spects the spinal medulla, the central parts e
base of the brain, the cerebellum, and their n-
branes, as those observed in fatal cases of teta ;
and the treatment found most successful in p o-
ing by these substances is generally appro te
in acute tetanus. (See *art.* POISONS, §§ 3 —

M. Guérin de Mamers states, that old affusion arrests the tetanic paroxysms iced in animals by nux vomica. The appli- of cold lotions, or of pounded ice, to the ut and nape of the neck, whenever or as as the temperature of these parts is above atural standard, has not hitherto received tention it deserves as appropriate means in sease.

b. Warm baths and *Vapour baths.* The r were recommended by Marcard and . Sir J. Macgrigor found them to produce ntary relief only. Hillary and De Haen tated that instantaneous death has sometimes ed their use. This result may have arisen their temperature having been too high, ally when the patient was first immersed. baths are the safest, if not the most bene- when their temperature is at first from 85° °, and gradually raised to 96° or 98°. have little influence on the acute form of lady; but they are often of service in the ute, and during convalescence. Behrends, nna, Stütz, and Marcus prescribed warm containing alkalies and aromatics; and rson recommended tobacco to be infused in ath, and after the operation of purga- vine to be freely exhibited. Warm baths been employed chiefly in connection with ernal use of stimulants, tonics, and anti- odics. Dr. Marsh has recorded three in which *vapour baths,* at a low tempera- were employed for many hours in suc- . Two of the three cases recovered; but ere of the sub-acute form. These baths een also prescribed by several Continental ans; but with no advantage in the acute f tetanus.

c. Emollient applications over the spine disease were noticed by Hippocrates, , Cælius Aurelianus, and others; and pplications either consisted of vegetable were aided by *oleaginous frictions* over eral surface of the body. That they may peared of some service in sub-acute cases admitted; but that they were in any way ice in the acute admits of doubt. *Fric-* long the spine were advised by Celsus ny others.

d. Rubefacient and oleaginous Liniments brocations, applied over the spine, were em- in tetanus by Aretæus, Avicenna, Ru- De Haen, and Stürz; but the benefit to be from them in the acute form was doubt- hough they may have proved of service in -acute. I have prescribed certain of the *nts* contained in the Appendix (*See Form.* 97. 307. 311.) with apparent advantage, or arts of the turpentine and of the compound r liniments of the London Pharmacopœia, little Cajuput oil, when applied constantly e spine, in the form of an embrocation, by of flannel or spongio-piline. — *Sinapisms sters* over the spine were recommended by Hunter, and Latour; but Chalmers ls that they produce an injurious effect. plication of the *actual cautery* to the neck ioned by Celsus; but it has not received ction of modern writers.

90 C. Constitutional and Internal . — *a. Antiphlogistic measures* have been advised by many writers, and more or less censured by others, in this disease. But the selection of these measures, the extent to which they may be carried, and their adaptation to the peculiarities of individual cases, are of the utmost importance, rendering them either beneficial or the reverse. — (*a.*) Of these means the most dangerous, and yet often the most beneficial, is *bloodletting.* For, if prescribed in cases where debility and irritability are very manifest, where the disease is far advanced, where the pulse is very rapid between the paroxysms, and where the disease follows an injury, bleeding, especially from a vein or to any considerable amount, is more frequently injurious than beneficial. The evidence in its favour is extremely contradictory. It has been recommended by Aretæus, Celsus, Paulus Ægineta, Forestus, Hillary, Pujol, Bisset, and many others; and its repetition, even oftener than once, has been resorted to by Coxe, Gardane, Guthrie, Earle, &c.; but the results have not always been satisfactory. Flajanini states that he has seen death immediately follow bloodletting; whilst Lisfranc says, that it has been carried to an enormous extent and been followed by recovery. Mr. Curling is not in favour of its adoption, unless early in the disease, and when the attack is decidedly inflammatory. In this, as well as in other maladies, the physician will be guided by a variety of circumstances. The appearances on dissection seem to favour the adoption of bloodletting, yet these appearances, if not produced, may be heightened, by the disease; and, even admitting them to have existed from the commencement, experience has shown, that inflammations of the spinal medulla, or of its membranes, are not so successsfully attacked by bloodletting, as many other inflammations. When the disease is idiopathic; the patient young, robust, and plethoric; the pulse full, strong, and not very frequent or much above 100 between the paroxysms; and the disease is not far advanced, and especially if pain is complained of in the occiput and cervical region; then bleeding by a number of *leeches* applied in these situations, or *cupping* as advised by Celsus and Paulus Ægineta, appears to be indicated. In the circumstances, also, just mentioned, not only leeches or cupping along the spine, but also venæsection, may be practised, and even repeated, according to the effects produced. In more doubtful states, *dry cupping* along the spine may be tried. *Arteriotomy* has been recommended by Vogel; and several writers have considered, with much justice, that, when bloodletting is indicated, it should be carried to a full extent at once, and not repeated to a small amount at intervals. There can be no doubt that, in all spasmodic and convulsive maladies, however inflammatory the appearances may appear after death, or however accelerated or excited the circulation may seem during life, bloodletting, especially venæsection, is a hazardous remedy; and, although sometimes required in a decided manner, particularly in the circumstances and in the way just stated, it requires the utmost caution and discrimination. When it is clearly indicated, the action of other suitable remedies is promoted by it.

91. (*b.*) *Purgatives* are essentially requisite in tetanus and trismus; but, in order to obtain

satisfactory results from them, they should be given early and decidedly, and selected judiciously. Calomel with the compound extract of colocynth, or with jalap, or scammony, or camboge, may be prescribed in such doses as will produce, as advised by **FORESTUS** and **HAMILTON**, copious evacuations. **MOSELEY** directed the cathartics to be conjoined with cinchona or other tonics. These, especially the more bitter tonics, generally render the operation of purgatives more certain. In the few cases I have seen, I have prescribed, at first, full doses of calomel with camphor; and, some hours afterwards, the spirits of turpentine with castor oil, the action of these having been promoted by enemata containing these oils and some common salt. The frequency of worms in the digestive canal of patients attacked with either idiopathic or traumatic tetanus, has induced me to prefer these means, and to give them in large or repeated doses early and according to the circumstances of the case. The oil of turpentine, when judiciously prescribed in this disease, is not only an energetic anthelmintic and purgative, but also the most certain antiphlogistic and antispasmodic remedy we possess. After the bowels have been freely evacuated by its aid, or by a combination of it with other cathartics, it may be given internally at various intervals, either on the surface of an aromatic water, or in the form of an electuary made with honey and powdered liquorice-root; and may be administered in enemata, or applied along the spine in the form of embrocation (§ 89.).

92. Where there is reason to infer that the disease is favoured, or in any degree occasioned by the presence of uneliminated acid, acrid or excrementitious materials in the blood, the action of the excreting viscera should be excited by means of these and other purgatives, by diuretics conjoined with or alternated with these, or by combining cathartics and diuretics with large doses of the alkaline carbonates, or of the chlorate of potash, or with magnesia and sulphur in full and repeated doses, so as not only to excite the several emunctories, but to change the state of the blood, and to counteract the injurious action of the morbid materials by combining with them and neutralizing their influence and effects.

93 (*c.*) *Mercurials*, internally and externally, have been very frequently prescribed in all the forms of tetanus, as purgatives, as alteratives, and as antiphlogistics, and have received the sanction of **MANGET**, **DONALD MONRO**, **MEASE**, **KITE**, **CLARK**, **ECKER**, and others; and calomel, the bichloride of mercury, and the oxides, have been severally employed, in order to produce these effects. Calomel, given in full doses, alone or with other medicines, early in the disease, and as a cologogue purgative, is generally of use. But no confidence can be placed in it, or in any other mercurial, as a remedy for tetanus, especially the traumatic form. Mercurials were formerly much employed in the West Indies as purgatives and alteratives for the cure of idiopathic tetanus, but even when ptyalism has been produced by them, no alleviation of the disease has resulted, as shown by **MACGRIGOR**, **WELLS**, **THOMSON**, **CARLISLE**, and **CURLING**, tetanus even having occurred in persons during mercureal salivation; and the malady appearing to have been aggravated in other cases by the production of this effect. Of twelve cases related by Mr. **HOWSHIP**, of te consequent upon injuries, in which mercury freely exhibited two only recovered, and in it was conjoined with opium.

94. (*d.*) *Antimonials* are uncertain in operation in trismus and tetanus, and are ble to the same objections as have been against bloodletting, but they also posses advantages sometimes to be procured fro latter. The preparations which are most de ing a trial in this disease, are tartar emeti James's powder. In a case of sub-acute te treated by Mr. **LISTON**, the former was giv doses of one grain every hour, and the p was put into a warm bath thrice in the da bath containing in solution half an ounce o tarised antimony (*Lancet*, 1834 and 183 581). The pulse after the baths was gen accelerated, but became much softer as s the copious sweating by which it was fol appeared. Mr. **WOODWARD** (*Dublin Jour Med. Science*, July, 1835) exhibited tart antimony in a case of idiopathic tetanus, wi effect of depressing the pulse and diminishi muscular rigidity. The patient was soon a swallow, and, by persisting in this remedy dually recovered. Dr. **ELLIS** administere substance in enemata; but no sufficient expe of the results of this practice has hitherto furnished.

95. *b. Sedutives* of various kinds have often prescribed for all the forms of te Certain of the means already mentioned are strictly sedative than antiplogistic, although rally prescribed with the latter intention, cially the cold affusion and antimonials.- *Colchicum* has been recommended for teta M. **DUFRESNOY**. Dr. **W. G. SMITH** ha ployed it largely in the West Indies, and, opinion, with great benefit. But as he em several other means at the same time, the a of benefit which was really due to this po medicine remains doubtful (*see* § 114.).

96. (*b.*) *Tobacco* has been much emplo cases of tetanus. Mr. **CURLING** remark "the earlier writers applied the *oleum taba* ternally to the back and neck." In a w Dr. **GARDNER**, at the beginning of the century, entitled the *Triall of Tobacco*, stated that "the suffumigation of tobacco, taken, is a good remedy for the starke stiffness of the neck called tetanus." C who practised in the French West India in the last century, prescribed tobacco inj and wine by the mouth, and detailed cases proving the success of the practice. use of tobacco injections in this disease h sequently been recommended by O'B **ANDERSON**, **EARLE**, **TRAVERS**, and **CU** In most of the cases the infusion, or dec or smoke of tobacco was administered as en twice or thrice daily; and wine or other were given by the mouth, to counteract t tressing poisonous action of the tobacco (**POISONS**, §§ 523, *et seq.*). This substance of the most powerful agents which can ployed against tetanus. Its effects are, ho seldom lasting, and it tends very rema when given late in the disease, or when t is strong, to depress the powers of life bey powers of reaction. I have perused n

has been written in its praise, and I can state, that it has often proved injurious, to its having been resorted to at a too ad- d period of the malady, and in a too power- m or dose ; and, even in the cases where it ppeared to have been of service, its effects red very equivocal. In two acute cases I attended many years ago, the infusion of o was administered as an enema, contrary advice, by the other medical men who also in attendance, and both cases termi- fatally, with all the symptoms of poisoning acco, a few minutes after the administra- f the second injection. The bodies were ned after death, and displayed the appear- described above (§§ 27, *et seq.*). The de- n or infusion has been also employed in gnating a warm bath, into which the pa- have been immersed twice or thrice in the

9 The use of *tobacco* in tetanus requires the t caution. The sensations produced by it, the dose is too powerful, are most distress- d, when prescribed late in the disease, are s often fatally prostrate the powers of life. when less injurious, patients have expressed nsations occasioned by it to have been so sing, that they would rather have endured nvulsions, painful as they were ; and that ould hardly be induced to submit to a re- n of the medicine. Mr. **Curling**, who is more in favour of its use than I am, states f nineteen cases in the table, in which to- was employed, nine recovered. There can doubt that this medicine was injudiciously ibed as to form, dose, and period of the dis- nd as to other means resorted to, in some fatal cases ; but there is as little doubt, some of the cases which recovered, the was not due to this substance. When the it is determined upon, in an acute or tic case, a scruple of the leaf should largest quantity for an adult, infused lve ounces or a pint of water, and ad- red as an injection. The dose ought not larger at first, although it may afterwards eased according to its effects. If employed it should be early in the disease ; and it en be so conjoined with other agents as to te the operation of purgatives given by the . During a recourse to it, the powers of ould be supported by tonics, stimulants, trients, especially by wine, ammonia, and neans about to be noticed.

9 (*c.*) *Hydrocyanic acid* was recommended . H. **Ward**, of Gloucester, and given in detailed by him, at first every half hour namon-water ; and, after three hours, the having then been considerably relieved, continued every four hours, and was taken e. The patient ultimately recovered. Mr. g states, that this medicine was employed, ll doses, in three cases, all of which were It is obvious that, in small doses, but little age can be expected from it, and, in large it requires great caution and a close obser- of its effects.

9 (*d.*) *Æthers* have been prescribed in various nations, in the several forms of tetanus. mpound spirit of sulphuric æther, and the chloric æther, were recommended, in conjunction with other sedatives and antispasmodics ; but little benefit appeared to have resulted from them in the acute cases, and in the sub-acute their effects were doubtful. Recently, frictions with the sulphuric or the hydrochloric æthers, or with chloroform, have been prescribed ; and probably much of the benefit supposed to have been derived from this mode of using these substances, has been produced by the inhalation of a portion of the vapour diffused in the air, during the use of them in large quantities in this manner.* M. **Morisseau**, in a case of traumatic tetanus, ordered the surface of the body to be assiduously rubbed with chloroform three times in the day. This treatment was continued during five days, and was attended by a copious perspiration. On the sixth day the patient complained only of general languor and debility (*Union Médicale*, 21st June. Paris, 1851).

100. The æthers and chloroform have been employed, especially by inhalation, with apparent success, both in this country and abroad, in tetanus and trismus. Nevertheless, they severally require a much more extensive and satisfactory trial in this disease, than has as yet been given them; and this trial should be made with greater precision, and ought not to be limited to one or two modes of using them, but extended to the exhibition of them by the mouth, to the inhalation of them with the atmosphere, to frictions of the general surface with them, and to the administration of them in enemata. Even although they may not be the means which should be mainly confided in, they will generally prove excellent adjuvants, and will palliate the most urgent symptoms.

101. *c. Narcotics* have been very generally employed in the treatment of tetanus, especially of the traumatic form.—(*a.*) Of this class of medicines, the preparations of *opium* and of its ingredient *morphia*, have been most frequently prescribed. Opinions respecting the use of opium in this disease, are not only different, but even opposite. This drug is recommended in various forms of combination, by many writers : by **Larrey**, conjoined with camphor and nitre; by **Stütz**, with the fixed alkalies in large doses; by **Latham**, combined with ipecacuanha in the form of the pulvis ipecacuanhæ compositus; and by **Marcus** in frequent and increased doses. It has been prescribed by the mouth, in enemata, and in embrocations and liniments applied externally. It has also been used conjointed with other substances, as with alkalies in warm baths ; and certain of its preparations, as the aqueous solution, have been injected into the veins of persons af-

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* The following case of inflammatory idiopathic tetanus, by Dr. **Tibaldi**, will show the treatment employed for this form of the disease in the north of Italy :—A labourer, aged 28 years, was attacked with tetanus two days after lying on the damp ground while in a state of perspiration. In pursuance of the plan generally adopted in that country for this disease, he was bled eight times during five days, sometimes to as much as twenty ounces; and above a hundred leeches were applied to the painful parts. On the sixth day, the state of the patient being still severe, Dr. **Tibaldi** had the loins rubbed twice with sulphuric æther ; the patient was bled a ninth time, and took half a grain of acetate of morphia. The frictions with æther allayed the spasms. The next day (the seventh) he was again bled, and an ounce of æther was rubbed over the back and neck. On the following day the patient could sit up, and was soon afterwards convalescent.

flicted with this malady. *Morphia* and its salts have likewise been prescribed, both internally and externally, in the several forms of tetanus, and not infrequently to a blistered surface, after the removal of its cuticle.

102. It is difficult, if not impossible, to form a correct or a precise opinion as to the effects of these preparations, or of the best modes of combining and administering them in this malady. Whilst several authors are favourable to the use of them, others of great experience, as Sir J. Macgrigor and Mr. Travers, consider them, if not objectionable, at least inefficient; and some writers have given opium, either in solution or in a solid state, in so enormous doses in this disease, without any very marked effect, as to induce a belief, either that the drug has not been swallowed, or that the system is insusceptible of its action during the malady. The truth, however, is that the opium, by the excess of the dose, paralyses the vital actions of the stomach, and it is retained in this organ without change. Moreover, there is no doubt that it has often been given both improperly and injuriously, as respects the quantity, the modes of administration, and the previous treatment. None of its preparations should be prescribed until the secretions, excretions, or fæcal accumulations have been freely evacuated. Either of them which are most congruous with the other medicines prescribed may then be tried, in decided and frequent doses, by the mouth or in enemata, in conjunction with antispasmodics, aromatics, stimulants, or tonics, or with camphor or ammonia, or the fixed alkalies, oxide of zinc, oxide of bismuth, or with castor, musk, &c., or even with wine or brandy, according to circumstances, or when the evidence of morbid irritation predominates above that of inflammatory action in the nervous centres and their membranes. In this state or form of the malady, the endermic application of morphia may be prescribed, whilst other medicines, as stimulants, antispasmodics, or tonics, are liberally taken; or the fluid preparations of opium may be administered in enemata with camphor, assafœtida, spirits of turpentine, &c.

103. MM. Percy and Laurent (*Journ. des Progrès des Sc. Méd.*, tom. iii. p. 257., 2*d. sér.*) injected a watery solution of opium into the veins, in three successive cases of tetanus, with success. This practice was adopted in eight instances, and recovery took place in five. MM. Delpech and Dubreuil had recourse to the injection of a scruple of the watery extract of opium dissolved in two ounces of water into the veins of a lady, aged 50, attacked with tetanus consequent upon the application of a caustic to an ulcerated os uteri. This solution was injected after three intervals of about twenty minutes each. The patient fell asleep; the pulse became full, and 70 in a minute from being 120, and the muscles were relaxed. Upon wakening from her sleep, the tetanic contractions returned, about eight hours after the injection. The operation was repeated, and was followed by the same results. The patient, however, sunk on the third day. MM. Percy and Laurent further state, that they have injected twenty grains of the extract of stramonium, dissolved in half an ounce of water, into the veins of several persons attacked with tetanus, and with success. They have also injected a strong decoction of this plant with ni. lar results; but the details of these cases a not furnished in the work in which this statem is made, nor is any notice taken of instanc of failure. The injection of a solution of acet of morphia into the veins of two horses affecte ith tetanus was tried at the Veterinary Sch at Alfort, but the result was unfavourable. Ir. Sewell, of the Veterinary College, also trie his practice in a horse and in an ass, affecte ith idiopathic tetanus. The tetanic symptoms ere removed, but the animals subsequently die om other causes, but not from a return of te us. (Curling, *Opus cit.* p. 202.)

104. Other narcotics have received, com ratively, but slight attention in the treatm of tetanus. *Stramonium* was considered of s ice by Dr. Begbie (*Trans. of Med. and Ch rg. Soc. of Edin.*, v. i. p. 285.); and *Belladon* vas recommended chiefly as a prophylactic b M. Sauter. The *Canabis Indica* was sugg ed, but I am not acquainted with any instan in which recovery from tetanus has resulted fr its use: at least further experience of its eff in this disease is required.

105. *d. Alteratives* of various kinds have een tried for this malady, and several medicin already noticed, have been prescribed in alte ive doses, especially the bichloride and other pr rations of *mercury*. When the disease is at led by morbid states of the blood, more especia by acid and other excrementitious materials ac ulated in the circulation (§ 52.), large ses of the *fixed alkalies*, as advised by Stü or of *magnesia*, or of *ammonia*, as recommen by Blankard, after the bowels have been free vacuated, will prove of service: but these uld not be trusted to alone; they should be em yed as will hereafter be recommended (§ 112.). The preference in such cases is due to magnesia asmuch as it both corrects this state of the blo and opens the bowels. Fowler's solution of *arse* was prescribed by Hull, Jenkinson, Holcombe aylor, and Miller in large and frequently re ted doses, in conjunction with opium and stim nts. The last-named physician gave ten drops this solution every hour with as much tincture of um in a spoonful of brandy, in four cases of tra atic tetanus, which terminated favourably (*New gl. Journ. of Med.*, &c., Boston, 1818.). T administration of alkalies internally in large ses with opium, and the employment, at the me time, of alkaline warm baths, although prai by Stütz, Behrends, Wild, Else, and others ere denounced as inefficacious by Marcu nd Ficker.

106. *e. Antispasmodics* and *stimulants* ave been very generally prescribed in the s ral forms of tetanus. Of these, the most freq tly resorted to are *musk, camphor, assafœtida,* er, *castor, spirits of turpentine, the æthers,* and nonia, variously conjoined with each other, o ith opium, alteratives, and other stimulants. Nslie, Huck, Zanetti, and others were favo ble to the use of musk. Cheselden gave it w the tincture of opium, in moderate doses, a at short intervals. Chapp and Vogt prescrib the same medicines, but in larger doses; and Hnier recommended the musk to be give ith camphor. The following is nearly the sam reparation as that prescribed by him: —

1 347. ℞. Moschi, Camphoræ, sacchari albi, āā ʒj.; Te cum Mucilag. Acaciæ ʒvj.; dein adde Spirit. Ammo Arom. ʒij.; Infusi Arnicæ ℥v. Misce. Capiat Co .j. amplum singulis horis.

As œtida and *castor* were favourably noticed by Elsus, Aratæus, and Schultz, and many ot s; but, in modern times, they have been giv in tetanus chiefly in conjunction with the oth medicines just mentioned, or with opium, eit by the mouth or in enemata. Fournier and Escay consider *ammoniacum* one of the most cer n remedies for tetanus, but that it should be ven in frequent doses, carried as far as half an nce in the twenty-four hours. A successful rec rse to spirits of *turpentine* has been had by Ph lips, Hutchinson, Peacock, and Gibbon, wh prescribed this medicine by the mouth or in ene ata. In either mode, as well as externally app d, it is generally of service (§§ 89, *et seq.*). Th *balsam of Peru* has also been administered bot internally and externally in tetanus. Dr. Ko ock states, in Harless' Annals, that he gav as much as ʒij. of this balsam in the twenty-fou ours, in a case which terminated favourably.

7. *f. Tonics* of various kinds, and conjoined wit stimulants, or with alteratives, or with nar-cot , have been frequently prescribed in tetanus, ofte however, too indiscriminately, and without due eference to the form, state, or stage of the ma ly. Rush considered this disease as essen- ial one of debility, and therefore prescribed for t chona, ammonia, wine, brandy, cordials, &c. but, in addition, he directed the wound to be ear opened or enlarged, and to be filled with int aked in spirits of turpentine, in the trauma- ic rm of the disease. *Tonics, stimulants,* and *aro tics* of various kinds, and in different com- bin ons, had been recommended by Celsus, Ar æus, and others amongst the ancients; the mo energetic in their operation was advised for eta s by Harkness, Parkinson, and Bisset. Dr. Bright prescribed the sulphate of *Quina,* wit other stimulants; Dr. Elliotson, the *carbo- at of iron,* in large doses; Dr. Smith, the *sul- pha of zinc;* Rush, Moseley, Plenk, and Fis er, the *cinchona* in powder, or in decoction. Th free use of *wine* was advised by Hippo- cra s, Hillary, Rush, Currie, and Hosack . c only add that these, as well as antispasmo- dics or stimulants, or alteratives, or narcotics re neficial chiefly when prescribed with strict efe nce to existing pathological conditions. If he orbid irritability be characterised by de- bili or by morbid states of the blood; if these tat predominate over inferred inflammatory cti in the membranes or substance of the spi- nal ord; if this action be not clearly indicated, r i t have been actively attacked by antiphlo- gist measures; if the disease be traumatic or sym omatic; and if the secretions and excretions hav been freely promoted and evacuated, then eith of these classes of medicines, or various com inations of certain individual substances be- lon g to two or more of these, will be more ike to be efficacious than when otherwise em- plo d. In these circumstances of the disease, on may be conjoined with antispasmodics, wit alteratives, and with narcotics or sedatives, and e given every hour, or every two or three hou , according to their doses or to their effects. The llowing may illustrate such combinations:—

No. 348. ℞. Potassæ Hydriodatis ℈j.; Potassæ Bicarbon. ℈iv.; Tinct. Camphoræ Comp. ʒj.; Tinct. Cinchonæ Comp. ʒss.; Tinct. Capsici ʒss.; Decocti Cinchonæ ℥vjss. Misce. Capiat Cochl. ij. larga, 2dis. vel 3tiis. horis, cum aquæ pauxillo.

No. 349. ℞. Moschi et Camphoræ, āā ʒj.; Extr. Belladonnæ gr. vj. (vel Extr. Canabis Indicæ purif. gr. xii., vel Extr. Conii gr. xviij.). Tere cum Mucilag. Acaciæ ʒjss., et adde Ammoniæ Hydrochloratis ℈ij.; Hydrarg. Bichloridi gr. j.; Tinct. Serpentariæ ʒss.; Tinct. Cinchonæ Comp. ʒj.; Decocti Cinchonæ (vel Infusi Valerianæ) ℥v. Misce. Capiatur Cochleare unum largum omni horâ, vel omni bihorio, in aquæ destillatæ pauxillo.

108. *g. Diuretics,* especially the *tincture of cantharides,* the spirits of *turpentine,* the spirits or oil of *juniper,* are said to have proved successful in cases of this disease by Gardiner, Brown, and Mease. The good effects of these are, however, most manifest when they have been given in such frequent or large doses as to irritate the urinary passages, or to occasion bloody urine. It has been said that the South Sea islanders, amongst whom traumatic tetanus is a frequent disease, endeavour to cure it by producing mechanical irritation of the urethra.

109. *D.* Successive and Combined Measures. —The *Treatment* of tetanus should not consist of an empirical employment of one or more medicines, the efficacy of which has been vaunted by some writers, doubted by others, and altogether denied by not a few. It is chiefly by a *succession* and *combination of means,* carefully considered and selected, and appropriately applied to the pathological conditions of each case, as far as these may be rationally inferred from the antecedents, and from existing phenomena. Much will necessarily depend upon the stage at which the case comes under treatment, upon the cause or causes which have produced the attack, upon the circumstances connected with the patient, and the means which have been already employed. The success of treatment will mainly also depend upon a right interpretation of the state of the pulse, especially between the exacerbations— upon the existing vascular action generally, and locally, as far as this may be inferred, from a close investigation of symptons, especially from the state of deglutition, from the seat and extent of the spasms, and from whatever appears to excite or to allay them.

110. In the treatment of tetanus and of several other diseases, certain misconceptions often mislead the inexperienced physician, not the least injurious of which are the following: — 1st, That bleeding will generally cure, and that it is necessary to the cure of inflammatory action:—2nd, That there are no other means than this, upon which any dependence can be placed capable of effecting this purpose:—3rd, That all tonics, antispasmodics, stimulants, narcotics, &c., are contra-indicated, or are necessarily injurious, or at least inefficacious, where inflammation is present or blood-letting is required. It should therefore be recollected that, even when inflammation most unequivocally exists, blood-letting, when alone confided in, may be carried so far as to endanger life, without removing this state, especially when, owing to its seat, it occasions spasms or convulsions, or when its seat is the centre, or intimately connected with the centre, to which all impressions are conveyed and rendered objects of conscious sensation or perception, as is the case with the seat of tetanus and trismus. We ac-

cordingly find that blood-letting, when confided in alone, may be carried to the utmost, by repetition or otherwise, in the treatment of this disease, whether idiopathic or traumatic, and yet the desired result is not attained. Nevertheless, blood-letting, largely or repeatedly, may be required and prove most beneficial, when judiciously timed and directed, especially in the idiopathic form. But it generally requires several aids to the development of its efficacy, and, in tetanus more particularly, it is serviceable chiefly by favouring the operation of other means, although these means may seem calculated to produce effects very different from, or even opposite to, those expected from blood-letting. None of these means is more beneficial in this malady than purgatives such as have been mentioned above, aided, as occasion will suggest, by croton oil or other active cathartics, and by such other of the remedies noticed above as the circumstances of the case may warrant or require, especially by terebinthinates, internally and externally, by mercurials and by antimonials.

111. *a.* The *Symptomatic* or traumatic form of tetanus is not so manifestly benefited by vascular depletions as the idiopathic, unless the patient be young, robust, or plethoric; and unless pain be experienced in the occiput, cervical or dorsal regions of the spine; or other signs of the supervention of inflammatory action, upon irritation propagated to these regions of the nervous centres, be present; and in these circumstances blood-letting, general or local, or both, should be prescribed, according to the peculiarities of individual cases, and to the effects produced. Brisk cathartics, more particularly those already recommended, followed by antispasmodics, conjoined with sedatives or narcotics; or by tonics and stimulants, selected with judgment and prescribed with decision, are generally requisite, the period of exhibiting them, and the mode of combining them depending upon the acumen and experience of the physician. In this form of the malady, the *local* and *external means* mentioned above (§§ 80—89.) ought to be resorted to without the least delay; and be followed by active cathartics, and the other means which the progress and state of the disease will suggest. In this, as well as in the idiopathic, form of tetanus, *worms* often are present in the digestive canal, and either predispose to, or aggravate, the disease, more especially in warm climates, and in certain localities. Therefore the purgatives should have an anthelmintic operation, or *anthelmintic* medicines should precede the exhibition of cathartics, those already noticed being preferred, and administered by the mouth and in enemata.

112. In the symptomatic form of tetanus, where the indications of inflammatory action in the nervous centres or their membranes are hardly manifest, or are equivocal, — where violent spasmodic action and continued contraction are the chief and dominant symptoms, — the free evacuation of the bowels by chologogue, anthelmintic, and drastic purgatives, as already advised, ought to be the first *intention*, in connection with the local and external measures directed above. The next should be to support vital power and resistance, and to correct morbid states of the circulation, by administering the more powerful tonics, antispasmodics, and stimulants, in such combinations with each other, or with sedatives or r-
cotics, or with alkalies, as the circumstanc of
each case may suggest. If it be inferred, th he
irritation has been excited, extended, or p e-
tuated by morbid or excrementitious materi in
the blood, the free action of the excreting o ns
—of the bowels, kidneys, skin, &c.—shoul be
promoted by the exhibition, either alone, or th
tonics, stimulants, or aromatics, of diuretics a-
phoretics, and alteratives,—of alkalies, the n te
or chlorate of potash, the citrate of magnesi or
precipitated sulphur with magnesia, cam r,
turpentine, the balsams, &c.

113. *b.* The *sub-acute* states of tetanus re re
similar means to those already mentioned, e-
scribed appropriately to the features chara is-
ing individual cases. In these, as well as he
acute, the symptoms or signs of inflamm ry
action in the nervous centres or their memb es
should be assiduously looked for; and if th be
observed, the treatment ought to be directe c-
cordingly. In this form of the malady, as w as
in others, the most powerful agents are not a ys
or even generally the most efficacious in arr ng
or controlling its course. Mild remedies, en
appropriate in their operation to existing pa lo-
gical conditions, especially when they are abs bed
into the circulation and correct morbid st of
the blood, or when conjoined with either he
several sedatives or narcotics noticed abo (§§
95, *et seq.*), are often more beneficial th the
most heroic, more particularly in the milder ms
of tetanus, in which it is often doubtful wl her
these latter are more injurious than services .

114. It should always be recollected, a
judicious succession, as well as combinat of
means is required for the cure of a disease ich
is so violent, so distressing, and so rapid its
course, as the acute forms of tetanus are; a we
accordingly find in the histories of cases fur ed
by writers that such a succession and combi ion
have proved the most successful. Gilmo and
recourse to blood-letting, and administered c nel
with camphor, soda, and brisk cathartics, fo ved
by tonics and narcotics. Woodford pres bed
blood-letting, calomel, Dover's powder, b ers,
terebinthinate enemata, and the solution ar-
tarised antimony in frequent doses until pro-
duced nausea, fœtid and black evacuations ing
been procured by means of the antimon nd
the turpentine injections, relief was th ob-
tained. Several writers have observed the ne-
ficial effects of large doses of the alkalie ith
opiates or other narcotics, after bleeding, ga-
tives, and other suitable means have been ed.
Dr. Smith, after the operation of purgativ ap-
plied from fifty to sixty leeches along the ine
and behind the ears; and as soon as the l hes
fell off, he kept constantly applied, over the ole
length of the spine, cloths wet with a stron lu-
tion of the muriate of ammonia. At the san me
he administered the wine of the seeds of colc um,
commencing with half a drachm, and inc ng
the dose every half hour or hour, until it pr ced
vomiting, when it was no longer given. her
authors have shown that, after a due reco to
blood-letting and purgatives, in this malad ery
different means of cure may be of service, dif-
ferent cases, as blisters along the spine, fo ved
by poultices moistened by an infusion of to co,
wine and opium being taken at intervals; the

co affusion on the occiput and spine, followed
by arm coverings, hot wine, spices, and opiates,
th affusion being continued until approaching
sy ope, and these measures being repeated upon
a urn of the spasms; or the extract of opium
co bined with camphor and nitre, or with tar-
ta ed antimony; or the injection of a solution of
a tery extract of opium into the blood, in ad-
di n to medicines otherwise administered; or
th njection of a solution of tartarised antimony
in the veins; or the administration, *per anum*,
ei r of this solution, or of the infusion of to-
ba o, or of tobacco-smoke. A recourse to seve-
ra f these more energetic means, more particu-
la the injection of powerful agents into the
bl d, and the administration of tobacco or tar-
ta ed antimony, always require the utmost cau-
tio The effects of these should be carefully
ob rved during a considerable time after they
ha been employed, in order to ascertain the
pr riety of repeating them, and that no time may
be st in having recourse to measures to coun-
te t any injurious effects which may appear
fr them.

5. *E.* The Prevention of Tetanus or Tris-
m can rarely be entertained by the physician,
as he circumstances indicating the contingent
oc rrence of the malady in its idiopathic form
ar eldom sufficiently marked, and still seldomer
co e under his cognisance. But it is a very im-
po nt consideration to the surgeon. Much of
wh I have advanced when discussing the treat-
m t of Shock (*see that art.* §§ 19—28.) applies
to e prevention of this malady after severe in-
ju s. But the chief means of prevention con-
sis n promoting the excreting functions of the
sk bowels, and urinary organs, and in support-
in he constitutional powers when these appear
to nguish, or are inordinately depressed by the
sh k, or by other causes. A dry and temperate
st of the air, due ventilation, and the removal
of e patient from unhealthy or miasmatous lo-
ca ies, or from crowded dwellings and narrow
ar insufficiently drained streets, are of the great-
es mportance in preventing the occurrence of
th raumatic forms of tetanus.

6. *F.* Convalescence from tetanus or tris-
m requires much care as respects the regimen
ar medical management of the patient. The se-
cr ng and excreting functions ought to be duly
re lated and promoted whenever they become
to d. The functions of the skin should be fa-
ci ited by occasional warm baths, by frictions,
ar by regulated exercise in an open and healthy
at sphere. The digestive organs always remain
lo weak and irritable, and require the use of
m tonics with soothing or sedative medicines,
as e bitter infusions with hydrocyanic acid, &c.,
ar a light diet. As the digestive functions be-
co e restored, the more energetic tonics, or cha-
ly ate preparations, and mineral waters, may be
gi n, and a more generous diet be allowed.

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THERAPEUTICS, GENERAL PRI PLES OF—Physic, practical Princi of—Therapeia Generalis.

1. In the article Disease I have disc
— 1st. *The causation of disease, or Ætiology*
2nd. *The general doctrine of disease, or P*
geny,—the several states of Morbid Action;—
Diseases of the fluids, and more solid struct
generally originating in altered conditions of
especially in those previously discussed; —
The connection of Morbid Actions and of or
lesions with Morbid states of the Blood; —
The Procession of Morbid Phenomena; —
The Terminations of Disease; — 7th. *The*
tions, Alliances, Successions, and Complicati
Disease; — 8th. *The Mutations and Meta*
of Disease;—and 9th, and lastly, I have no
very briefly, *the Circumstances modifyin*
Form, Complications, Durations, and Termin
of Disease. This article, in connection with
on the Blood, on Absorption (all writter
published in 1831, 32, and 33), on Endemi
Epidemic Influences, on Infection, o
flammation, and on Sympathy, constitu
system of General Pathology, to whic
though many years before the Profession, th
even now (1853) little of any importance t
and in which I can find as little either to c
or suppress. During this period, howev
have seen many of my ideas reproduce
others; and although I have been fla
even by this mode of adopting them,
have not had the honour of their patern
signed to me. Of this I have reasonable ca
complain.

2. Having, under the above and other
considered the *Causes* and *Doctrines* of dis
actions, and the *Successions of Changes* foll
the predisposing, exciting, and accessary
of disease, until either recovery or stru
changes, and even death, ensue; and havi
the articles Auscultation and Sympto
logy, and in others on the symptoms and
of disease, discussed the phenomena and
festations of general and special morbid act
legitimately follows, that the *Principles*
should guide us in attempting the remo
alleviation of disease should be as fully dev
and illustrated as the scope and limits of my
will permit.

3. In the articles on Endemic and
demic Influence, on Infection, on Prote
from Pestilential and other Maladies
in several other places, the most importan
practical parts of Public and Private Hy
have been fully treated of. Although th
vention of disease does not strictly fall with
scope of *therapeutical doctrine*, yet it is so c
allied to it as to warrant a reference to
places, where it is most appropriately consi

nnection both with the causes which require ention and counteraction, and with the ef- which result when such precautions are aken.

I. Circumstances retarding our arrival st Principles in Therapeutics.—*A. Er- us, limited, or one-sided views of the causes, , nature, and procession of disease — of me- doctrine* — are amongst the most influential s of retarding, and even of arresting, our ress in therapeutical knowledge, and in at- g to principles which may enable us to me- se that knowledge, and to advance its pro- . The empirics and dogmatists of antiquity, umoralists of much later times, the solidists nervous pathologists of the last century, the ines of Brown, the less philosophical and limited views of Broussais, and other par- hypotheses, which never reached the dignity ing accounted theories, have set principles fiance, and left reason out of consideration. rines have been based on postulata; and , in other hypotheses, may have been true species or variety, has been unjustly im- to the genus or order. Inferences have drawn from a few incorrectly observed ; whilst assertions have been received as , and credulity has reposed upon them; less authority thus usurping the place of observation and calm deduction.

B. The neglect into which the vital endow- of the frame has fallen, amongst modern pa- gists, and the disposition to impute more to ical and material changes than truly belongs m, are also no mean causes of the retardation progress of sound therapeutical principles. *vis vitæ*, the operations of Nature, constitu- power, vital resistance, &c., are terms have been used synonymously with vital wment; but whatever may be the name by *vitality* should be recognised as a principle r being,—as the chief essence or principle istence, — it should always receive the first chief consideration. Although partially or ther neglected by many, and although re- are imputed to other agents and causes more especially belong to it, yet it on occasions asserts its own rights, evinces le throughout its domain, and, whatever s we may employ, and often even in op- on to injurious agents, it accomplishes salutary purposes for which it is destined, emoves diseases which can be removed only influences. Whatever may be the object ention with which medicines are adminis- , whatever the mode of prescribing them, ital manifestations of the organ to which are applied, or of the body generally, are or less affected by them.

C. Specious or novel plans or views, to much greater importance is attached than deserve — Novelties, specious appliances, pts at precision which cannot be reached, various methods recommended by cunning ns to serve their peculiar purposes, and ly caught up in order to serve the same or to show extended information, severally to retard, and even to mislead, the march of peutical knowledge. The recent vaunting c importance of medical statistics, and of rical methods of proving the seat or nature of particular maladies, or the efficacy of particular remedies or plans of cure,— undue values put upon therapeutical agents, plans, or systems, —the vain parade of imported articles of medical belief, even although they may rank no higher than specious absurdities, are all impediments in the way of truth. A physician who has obtained by accident, by connection, or by talent of some kind, a position in his profession, asserts that a disease, or class of diseases, exists in certain numerical proportion, or presents numerically certain pathological changes or phenomena; and that the success of particular remedies or plans of cure may also be valued numerically as respects that or other diseases. The assertion, although so fallacious as to be almost absurd, yet being made by a physician of reputation or position, is believed, paraded as an astonishing novelty, and as an undisputed truth. Yet no hypothesis connected with medicine is more erroneous, inasmuch as there is not one disease which is always the same in all its features, in all places, or seasons, or times, or which is identical as to its precise seat, nature, or vital and material relations and associations. As there is not a single disease in the various and ever varying states of climate, of causes, of duration, of endemic or epidemic influences, of constitutional peculiarity, &c., that is identically the same, attempts at a numerical precision must necessarily be fraught with error, and be productive of most injurious results; the specious appearance of a precision which the nature of the subjects to which it relates cannot reach, or even approach, misleading those who prefer authority to deep thought, and a striking novelty to close observation.* This is only one of the several specious plans or novelties which the love of notoriety, or the desire of distinction, has thrown out to the credulity of the multitude, each one having its own crowd of believers, until another supersedes its supremacy for a time,—until it, in its turn, sinks under the influence of a successor, the revolving wheel of time at last turning up anew the theories, the plans, and the beliefs of past ages.

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* There cannot be a more absurd belief than that confided in by some recent writers, who have adopted the numerical method, not only of describing the causes and symptoms of any particular disease, but also of treating such disease. Thus our Continental brethren, and our domestic imitators, having assumed that the disease is pneumonia, or pleuritis, or peritonitis, or any other specific form, without noting the influences of climate, season, age, constitution, endemic or epidemic conditions, duration, complications, &c., are not content with informing us that so many in the hundred presented a certain symptom, or proceeded from a particular cause, and that another number in this hundred furnished different results, but they go even further, and, endeavouring to enlighten us still more, tell us that a certain number per cent. of a certain disease was cured by one medicine, another certain number was cured by another medicine, the one which cured the most being *the* remedy for that disease; as thus most irrefragably proved by this most admirable statistical or numerical therapeutical method! Let me take a recent illustration of this most admirable method, as furnished by a most distinguished medical *savant*, somewhere between this and the Black Sea. He takes a large number of cases of a disease which he has assumed to be, or is pleased to call, *pneumonia*, but of the truth of which we have no evidence, and none whatever of the causes, of the characters, of the duration, of the morbid associations or complications, &c.—no proof whatever whether or not they were cases of sthenic, or of asthenic or congestive pneumonia, or of broncho-pneumonia, or of peripneumonia. He re presents these numerous cases as pneumonia, although it is well known that pneumonia presents very different and even opposite features, and conformably with such features requires very different and even opposite means of cure, —means varied and appropriate to each case and to each state and stage of the malady. But the enlightened and illustrious therapeutist makes short work of his numerous cases. True to his faith in numbers—to his infallible "numerical method," he divides his devoted, although numerous cases into three equal parts. These three equal numbers — these three forlorn hopes, which thus are led to storm the stronghold of scientific and rational medical practice—are each very differently treated: one devoted third is treated by blood-letting alone; an-

7. *D. Wrong estimates of the efficacy of particular medicines and agents* are as influential in retarding the progress of therapeutical principles, as the adoption of erroneous doctrines of the causes, seats, or nature of disease. Therapeutics is based equally on sound pathological principles, and on a knowledge of the operation and efficacy of medicine — of the instruments which we employ for the removal of morbid conditions. It requires not the lapse of many years to show the experienced physician the perishable reputation of many of the agents which have been employed against disease. Worthless agents have often been adopted; means which possess little influence have been over-estimated; and others which are efficacious when judiciously used have sunk below their true value, or even fallen into disuse. Fashion, undue estimates, improper and irrational employment, have contributed their respective shares in retarding our knowledge of therapeutical agents, and in preventing us from accomplishing therapeutical intentions. The same revolutions which have taken place in respect of medical doctrines during many centuries have likewise taken place as to therapeutical agents; the vanity of some, the cupidity of others, and the sanguine or enthusiastic views of a few, leading those into error who trust to authority, and who are deprived of the means or the powers of original research and profound observation.

8. *E. The licence allowed by the laws to charlatans, impostors, and systems of imposture,* and the credit which these obtain with the public, owing to the confidence of their assertions and the false testimonies they produce in support of their delusions, are injurious to the progress and reputation of scientific medical practice. The cure of disease being essentially a most important and high profession, all who pretend to it receive from the public an amount of notice great in proportion to the parade, rather than to the justice, of their pretensions. Hence the high standard of medical profession is lowered; and every pretender, whilst he detracts from this standard, derives to himself a reputation with the credulous public which is altogether opposite to his deserts. These impostors, by assuming characters v ch do not belong to them, and which the negli ce of the legislature, and the worse than negli ce of the expositors of a most imperfect legisl n, not only permit, but even encourage, by th by lowering the prestige of medical science, ar by diminishing the amount of encouragement ld out to learning and science, actually retar he progress of scientific research, of profes al learning and observation, and consequent of practical medicine.

9. *F. But the most remarkable cause o he slow progress of therapeutical science is to be f d, in the highest and most legitimate ranks o he medical profession — in physicians themselv* — Public institutions for the cure of disease, in ry few instances in this country, and, even se only in recent times, have furnished the amo of knowledge to the profession which they are c ulated to furnish; and many of those, who have en engaged for the greater part of their lives in at-ing the diseases received into the wards of se hospitals, have gone to their graves either w out having thrown any light upon the obscuri of pathology and of therapeutics, or, if any ch light had broken in upon the darkness of eir mental vision, it had never been reflect to others, or enlivened the gloom in which the ad shrouded their ignorance. Other physician ve enjoyed the patronage not only of the publ but also of their profession, and must have had eir minds stored,—if, indeed, capable of obt ing and retaining such stores,—with pathologic nd therapeutical knowledge, and have sunk in the tomb without furnishing a single fact, prec or opinion, by which their names could be re ted a single day from their deserved oblivion. hus the springs of therapeutical science have her been dried at their very sources, or have een absorbed by the barren and sandy soils th gh which they had most unfortunately p ed. Others, with a more determined selfishne reserve to themselves, and to their own use and for their prospective gains, the results o the experience they may have reached, and he researches they may have made; and, w out reflecting that the attainment of knowledg imposes the duty of imparting that knowle to others, as a grateful return for the kind rovidence of attaining it, do all in their po to turn it to their own advantage, and to pre t it from coming before the profession or the p lic. This last cause, however, of the retardat of therapeutical knowledge is much less rema ble than formerly, and is rarely to be obser in the present day.

10. *G. The want of correct ideas as* the *physiological action of remedies* is one the most powerful causes of the retardation of rapeutical knowledge. It is obvious that en when the causes and nature of a disea are clearly indicated and recognised, if the ph logical action,—the *modus operandi*, of the nts prescribed be not accurately known, the dications of cure cannot be successfully fu ed, unless, indeed, the vital resistance of the me be such as overcomes the injurious or ng directed means. Hence the propriety, as be shown in the sequel, of ascertaining wit recision the true action of the means employ ol using aright the instruments of cure.

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other devoted third, by tartar emetic only; and a somewhat more fortunate third is left entirely to the unaided efforts of Nature. Can there be any doubt of the result, when we know well that many cases of pneumonia, instead of blood-letting, or tartar emetic, in which cases these means are certain destruction, require camphor, ammonia, and other remedies very different from those he has experimented on? What this empyrical admirer of the "numerical method" inferred, when he found that Nature was the best doctor, may not be manifest. But she is undoubtedly very greatly to be preferred to the *soi-disant* physician, who treats disease according to the name he chooses, often irrationally, to give it; and without adapting or combining his agents in such modes as an enlightened physician would employ and direct them to the removal, the counteraction, or to the relief, of such existing morbid actions as pathological science would enable him to detect and estimate with due accuracy.

1 *H. The prejudices, also, of those who are sub- to medical treatment, and the neglect of* although chiefly preventing the success of ent, likewise retard the advance of this de- nt of medical science. Many persons sub- treatment to satisfy their friends, without n its efficacy, or at least with a conviction edical care cannot avert their fates, or the decrees of Providence, not knowing, believing, that the means are required to be y us before the blessing of the Almighty accorded to them ; and that those are ertainly aided by Divine power who use endeavour to aid themselves, whilst those istrust their own, and other human efforts, requently reap the fruits of distrust and ef. The neglect of patients themselves, al- confiding more or less in medicine, to out with care the injunctions of the phy- as to its use, and as to diet, air, exercise, gimen, often mislead him as to the opera- d the success of the means which he has bed, and induces him to attribute either too r too much to their influence.

12 *Medical jealousies and contentions; opposing s, plans, or means of cure; jarring views e efficacy or operation of certain medicines; e opinions in courts of justice, or otherwise ing in public; the publicity given to me- iscussions,* especially when different views rmly espoused, have severally and col- ly an unfavourable influence on the public, lly at the present day, and prevent many rusting to medical treatment, at least for period as is requisite for their cure. These stances induce many to have recourse to tans, whose confidence and assurances im- a similar sentiment in them. The im- ce, also, of those who ought to be patient; quent changes of their medical advisers, e consequent discordance of their views their means of cure ; the recourse to new r agents before those previously employed ceived due trial, or their effects observed, r with various other circumstances depend- on both physician and patient, and with o frequent incongruity of the means pre- l, not merely retard or prevent the reco- f the patient, but also exert a similar influ- n the progress of therapeutical science.

1 II. THE PRINCIPLES OF THERAPEUTICS. limits prevent me from noting the ear- tempts to develope the principles of thera- s, or the more recent efforts at a satisfactory ement of these principles. The reader desirous of satisfying himself as to these s, may do so by referring to the works enu- d in the BIBLIOGRAPHY. Without adopt- r in any way following, the methods of , I shall draw upon my own resources, and hat extensive observation and prolonged ence have induced me to believe. Al- on this, as on many other occasions, I h the references for those who choose to ecourse to them, yet the opinions or doc- which may be there found, and those will be here enunciated, if they agree at in as far as they agree, may be viewed as ac- s or coincidences, and as evidences of their rather than that I have been indebted for to any of the sources there indicated.

14. i. FUNDAMENTAL PRINCIPLES OF THERAPEUTICS — THE ESSENTIAL BASIS OF THERAPEUTICS.—*A. To endeavour to interpret aright the operations of Nature, and not to interfere with them when their procession is conducive to the removal of morbid states, or to a return to health, but to aid and to develope them when aid is required.* — This precept is evident to all observing and experienced minds; but it is not always adopted by the inexperienced. When a person is seized with epistaxis, or with vomiting, or with diarrhœa, or with a hæmorrhoidal discharge, inexperience may attempt to arrest it, and thus to change a salutary evacuation to a dangerous malady. If these were duly watched, the effects carefully observed, and allowed to proceed, either until they subsided spontaneously, or until it became obviously requisite to arrest them, cerebral congestions and determinations, hepatic obstructions or congestions, or other serious affections, which often follow upon their premature arrest, might be averted. It not infrequently occurs, that either of these discharges, especially when scanty, or insufficient to produce a salutary effect, points the path which should be taken. Where Nature directs, we should follow; and, although her steps may not be exactly those in which we should always tread, the principles she inculcates ought to be adopted, and carried as far as an enlightened experience, or a reasoning observation, will warrant.

15. *B. We should next endeavour to ascertain the causes, the mode of accession, the duration, and the extrinsic and intrinsic circumstances influencing the progress, of the disease.* — *a.* It is obvious that the nature of the *cause* will always most materially influence the state, course, and termination of the malady. The cause often becomes identified with, and forms, as it were, a portion of the constitution of the disease. A poisonous seminium, emanated from an infected person, impregnates the frame of another, imparts a specific character to the resulting malady, in all its successive and spreading disseminations. Malaria invades the frame, and produces effects commensurate with the concentration or dose of the poison and the susceptibility of the individual. The inflammations resulting from the more usual causes of suppressed perspiration, or of interrupted eliminating processes, manifest different features from those which result from special animal emanations, or other poisons: whilst the former are more or less sthenic or limited, the latter are spreading, erysipelatous, contaminating, or infectious. (See *Arts.* ENDEMIC and EPIDEMIC INFLUENCES, ERYSIPELAS, INFECTION, POISONS, &c.)

16. *b. The mode of accession* is often an index to the future character and course of the malady. If the accession is clearly connected with the cause, and such as the cause usually produces, both the nature and the treatment of the disease are often clearly indicated. Thus, if a person experiences chills or rigors, but complains of no remarkable pain or other affection of an organ lodged in any of the cavities, although there be pains in the head, back, and limbs, and if he can trace his disease to exposure to any of the usual sources of malaria, either intermittent or remittent fever may be considered as having commenced; and if, after such rigors and such exposure, heat

of skin, vascular reaction, and the other usual symptoms of febrile excitement be present, the nature of the malady becomes still more manifest, although a further time, probably only a very few hours, may be required to demonstrate the type of the malady. In such cases, an emetic, followed by a chologogue purgative, and by free evacuations, and these, at the due period, by a powerful dose or doses of quina or of cinchona, &c., will make a salutary impression on the frame, will break the chain of morbid actions, and prevent the succession of febrile paroxysms. This connection of the cause with the accession of the disease it produces, is still more remarkable in respect of specific and infectious maladies, and often not less so as regards endemic and epidemic diseases, and often furnishes a sufficient basis for therapeutical intentions.

17. *c. The duration of the disease*, when the physician is first called, and the previous history of the case, obtained with all possible precision, are essential to a proper treatment of it. The stage at which it has arrived; the existing pathological conditions, as far as they may be traced; the probable degree of vital power or resistance; the evidence as to the state of the blood and of the depurating organs and functions; and the means which have been already employed, and the effects produced by them, should be severally estimated with all the accuracy in our power. It is obvious that, as disease is generally a succession of morbid actions, leading either to the restoration of health, or to exhaustion of vital power and deterioration of the fluids and structures, so should the progress in either direction be carefully considered, and the indications and means of cure directed accordingly.

18. *d. There are numerous intrinsic and extrinsic circumstances influencing the character and tendency of a disease* which ought to be duly considered by the physician, inasmuch as a recognition of these, and a careful estimate of them very often, should direct or modify both the indications and means to be adopted. I can merely enumerate these circumstances at this place, as a more full consideration has been given them under different heads. The several *epochs of life*, from infancy to extreme old age, not merely have diseases which are especially incidental to them, but also very remarkably modify the features and tendencies of those which are common to all ages. (See *Art.* AGE.) — The *temperament* and *habit of body*, particularly as respects vascular fulness and inanition, or anæmia, are of great importance, as I have shown in the article BLOOD (§§ 13—77.). *Varieties of the human species* and *differences of race* very remarkably influence not only the predisposition to, but also the treatment of, many diseases, especially those of a febrile, inflammatory, and epidemic nature; and when individuals of any variety or race have migrated from a climate in which they were indigenous, to one more or less different in the several physical elements and circumstances which constitute *climate*. The pathology and treatment of diseases, with reference to difference of race or variety, was for the first time duly considered in this work. The *occupation* of the individual not only induces many diseases, but also modifies others. (See ARTS and EMPLOYMENTS, &c.).—The *habits* and *mode of living* usually adopted by the patient both modify the character of many of the di ses to which he is liable, and require modified i ca- tions, means of cure, and regimen. They are en productive of several others, as fully shown i he article on DISEASE (§§ 18, *et seq.*). In additi to these, certain DIATHESES and hereditary di es should not be overlooked, and, of the forme he SCROFULOUS, the GOUTY, and the RHEUM c, are the most important.

19. *Mental impressions, emotions*, &c. h a powerful influence in modifying, as well in predisposing to, disease; and this influen is very generally exerted during the whole cou of the malady, favouring, and sometimes even ca- sioning, an unfavourable or a favourable ue, according to the nature of such impressio or emotions. These affections of mind ought a ys to be duly considered by the physician bef he forms his indications or selects his means of re. In severe, dangerous, and infectious mal es, the patient often entertains anticipations he result, which occasion their own fulfil nt. When these anticipations are unfavourabl nd especially when they amount to convictio in the patient's mind, then they should be com ed not only morally but physically. They s ld even direct the indications and the means of re, the most powerful remedies being then re ed to rouse the vital powers and resistance, to est exhausting discharges when these are pr nt, and to restore the depressed energy of the o nic and cerebro-spinal nervous systems. S ral slighter and more chronic maladies eithe are rendered more severe, or are prolonged, by en- tal disquietude or anxiety, — by some cau de- pressing or irritating the sentiments, em ns, and passions. The mental condition and ci m- stances of a patient should, therefore, be er- tained, when the state of disorder indicate ny disturbance in this direction, and ought be directed accordingly.

20. *Several extrinsic influences* modify th ha- racter, nature, type, and terminations dis- ease, not merely in as far as they are the oc ion of it, but chiefly by the impression they ma on the frame during the course of the malady. *Cli- mate* remarkably affects the prevalence and ure of many diseases; and requires that the indic ons and the means of cure should be directed and di- fied accordingly—and with reference not me y to those persons who are indigenous and accli ed, but also to those who have recently under e a change of CLIMATE. (*See that Article.*) EN- DEMIC and EPIDEMIC INFLUENCES (*see these* ls), confinement in an infected atmosphere, in crowded or ill ventilated apartments and al- tics, emanations from burying-grounds, s ers, drains, cess-pools, or water-closets, and t nu- merous sources of atmospheric contam ion described when treating of the causes of sti- LENCE and of the means of preventing it, se lly not only produce disease, but aggravate i ha- racter when the patient continues to be sub ed during its progress, to any of these sea

21. *States of weather* and *season* have also g in- fluence upon the course of diseases, certain ges of temperature favouring the occurrence o me diseases, or even being necessary to the d sion or to the infection of others; especially in- fectious, pestilential, and epidemic maladi The influence of season, weather, winds, and, m

y, of ranges of temperature, not merely on fusion of disease, but also upon its general ter, is so well known that it is unnecessary nish any illustrations of the fact at this as they are fully adduced, under their re- e heads, when treating of the maladies influenced by these causes, and in the s DISEASE, INFECTION, &c., and in those ferred to.

2 Amongst other influencing extrinsic causes, evailing *epidemic constitutions*, as well as ust mentioned, and generally in connection hem, require strict attention when forming lications, or selecting means of cure. These ic constitutions often continue many years, e prevailing diseases present either a high of sthenic diathesis, or a general asthenia, ression of vital resistance to the progress of changes. In the former, the character of d actions is sthenic, inflammatory, and re- tive; in the latter, it is adynamic or deficient power. The sources of these prevailing utions have not been satisfactorily shown. ave been imputed to a prevailing charac- the seasons, to the annual amount of rain during a series of years, and to the states strial and atmospheric electricity—to either of which they may be referred, although ofs respecting them are not quite conclu- and are not sufficient to exclude the influ- f other, or even of unknown agencies.

2 C. *To determine the pathogeny of disease— rtain existing pathological conditions, and rbid tendencies characterising them*, is the asis on which indications of cure should be d. This is the great *axiom* in rational eutics, and, unless due regard be paid to ical treatment is worse than empyrical:—it destructive of life,—it entirely subverts intentions. This being the case, the ut- re should be taken to arrive at accuracy ing these conditions, and as to their several ies and consequences if they be not ar- or controlled. Due consideration ought to be given to those topics which have ready discussed. The existing pathological aving been rationally inferred from every d circumstance connected with the disease, n its causes and modifying or accessary in- s, the indications and means of cure should opriately directed to remove, or to control, teract them, according to their natures and ies, as shown in the more *special prin- f therapeutics* (§§ 36, *et seq.*), and fully ted in the consideration of the specific f disease, under their several heads.

24 D. *To remove all predisposing, exciting, ncurring or accessary causes, as far as in our power*, is obviously necessary to the l of the effects resulting from these causes. uses of disease, especially those which are or most influential, are often so obvious, eir connections with their effects are so trative, that the existence of the former s to infer the latter; and a due manifesta- the latter is indicative of the former. This ially the case in respect of specific, in- , contagious, febrile, endemic, and epi- maladies. But there are other diseases re the effects not of one or even of two merely, but of several. There are numerous circumstances which influence, by predisposing or by counteracting, the susceptibility of the individual to the invasion of the exciting or efficient causes of disease; whilst there are many more which concur or reinforce these causes, either at the time of, or subsequently to, their morbid impression and action. Some of these may escape detection or due estimation, whilst others may have an undue importance assigned to them. Still it should be our strenuous endeavours to ascertain their existence and influence with due precision, in order that they may be removed orcounteracted.

25. ii. GENERAL THERAPEUTICAL PRINCIPLES AND PRECEPTS.—*A. Of indications and contra-indications in the treatment of disease.*— Indications or intentions of treatment or cure are those objects or ends which we propose to attain, in order to remove altogether, or to alleviate disease when removal is no longer attainable, owing to its nature or progress. Cont a-indications are such intentions or means which would, reasoning from existing phenomena and pathological states, either not remove or benefit these states, or would aggravate them, and thereby risk the life of the patient. Indications of cure are to be accomplished or fulfilled appropriately and successively, by a careful and accurate deduction from existing morbid conditions and tendencies, and with a strict reference to the fundamental principles noticed above, to facts, and to the considerations and reasonings which accurately observed facts suggest. Having observed with care and acumen, and drawn rational indications from a close and comprehensive view of both the intrinsic and extrinsic circumstances of the case, the next object is—

26. *B. To employ agents or means,—remedies or medicines,—for the fulfilment of those indications or intentions that are the best calculated to this end.*—But to attain an object, to accomplish an intention, it is most requisite to entertain accurate views as to the mode of action, the proper methods of employing, and the efficiency of, the agents, instruments, or means which we may recommend. The physiological action of medicines, in different doses or quantities, ought to be known, and the operation of the same medicines and doses be ascertained, in different diseases, by a careful experience and close observation. Having previously known the modes in which agents or means become remedial or instrumental against disease, those agents or medicines should be employed with strict reference to the removal of existing morbid states, as far as they may be ascertained, and with the intention of preventing progressive disorder, a strict regard being always had to the physiological and pathological operations of these medicines or agents.

27. *C. To closely observe the states of vital power and resistance, and the grades and character of vascular action, in connection with the condition of the circulating fluids and of the several secreting and excreting functions.*—Our means should always have regard to the vital manifestations, recollecting that agents become remedies only when acting on vital states, and appropriately to a correct interpretation of these states,—when they calm or lower vital excitement, or morbidly increased vascular action, if either of, or both these pathological conditions are present, and when they

restore vital power or impaired vascular action, if either of, or both these states require restoration. But it is not only necessary to attend to the grades and character of vital power and of vascular action and reaction; the conditions of the circulating fluids, and of the secreting and excreting organs, should be ascertained with all possible accuracy. The condition of the circulating fluids, especially of the blood, can often be inferred only from the activity, from the torpor, or from the suppression of one or more, of the eliminating or depurating functions, and from the appearances of the skin, extremities, and the outlets of mucous canals; it may be further inferred, on many occasions, from the states of the heart's action, and of the pulse, in connection sometimes with the appearances and the changes of the blood itself, when taken from a vein. Whatever may be the changes, the signs, or the phenomena which may guide our inferences as to vital power, or to vascular action, or as to normal or anormal conditions of the fluids or solids, these inferences having been rationally drawn, the indications of cure conclusively follow, and are to be fulfilled by medicines selected conformably with their known operations.

28. *D. To take into consideration not merely the states of vital power, of vascular action, and of the excreting and depurating functions, but also the diathesis, the general aspect, the complexion, the posture, the nutrition, and the physical power of the patient.*—In addition to these, the circumstances in which the patient is placed, and by which he is influenced, whether mental or physical, — whether intrinsic or extrinsic, — should be duly estimated conformably with the influence they may severally or collectively exert in favouring, or in counteracting, the indications and the means of cure; and these means should be selected with due reference both to these indications, and to these moral and physical circumstances which are never present without influencing, more or less, the present condition, and the course and the terminations of the disease; and, moreover, without modifying the effects of remedies.

29. *E. To select the means of cure with strict reference to what is known of their modes of action, and, conformably with this knowledge, to employ them appropriately to inferred pathological conditions.*—Medical agents are remedial only as they are rationally or appropriately prescribed. In order that they may be so employed, it is requisite to bear in mind the following propositions:—1st. That medicines should be given in forms which may best produce their desired effects; — 2nd. That the vehicles in which they are given, should also possess this property;—3rd. That the substances with which they are associated, ought to be such as either will develope their effects, or will concur in producing the same effects;—4th. That substances which act upon more than one function, surface, or viscus, ought to be cautiously prescribed, and with especial reference to the function or viscus on which their operations are desired; — 5th. That when medicines are likely to occasion nausea, pain, or distress, these effects should be avoided by combining them with substances which may prevent or correct such discomforts; — 6th. That, when it is desired to influence more than one organ or system, agents whose actions have been shown to be thus plex, may then be selected with these inten or several may be conjoined with these provided that they are chemically compa suitable to the ends proposed, and altogethe gruous with each other; — 7th. That the bination of medicine producing different effec ten occasions additional effects, different from produced by either, and frequently without rially disturbing the action proper to each. propositions, although almost self-evident, re a few remarks for their elucidation. My however, require that these remarks shou very brief.

30. *a.* The form best suited for the pr tion of the effects of a remedy, is that conveys either all, or the greatest amou the properties characterising the remedy which presents these properties in the mos able state for their immediate, or for their protracted operation, as either may be req Thus the more immediate and full operati medicines is most frequently obtained by in or decoction, by dilution, or in the state of ture or essence, according to the nature substance; or by trituration or minute di if the substance be more or less solid. states of solid, and extract, or in the form o many substances either may long remain i stomach without being acted upon, or ma the pylorus, and either occasion a very de or a very imperfect effect; and when pil gilded or silvered, their operation may b longer delayed, or they may pass off without dissolved. When the operation of mec upon the lower bowels or uterus is desired the form of substance, extract or pill, m preferred.

31. *b.* The vehicles best suited for the nistration of active medicines, should be gruous with the operation of these medicine such as may prevent the stomach from disturbed by them, and at the same tim mote their operation. Thus the action disulphate of quina is promoted by takin the compound infusion of roses; the tinct cinchona, in the infusion or decoction, or aromatic water; the several tonic tinctur bitter and aromatic infusions; and the pu tinctures or salts, in laxative or purgativ sions; neutral salts, in states of much dil powders, in aromatic infusions or waters; a active ingredients for enemata, in vehicles will admit of their administration in due o admixture.

32. *c.* That several substances whose are congruous, or calculated to develop mutual actions, are often most beneficial scribed together, cannot be controverted, ally in cases requiring a decided operation secreting and excreting organs, and a due de ment of the several vital manifestations. various purgative or cathartic substanc combined with advantage; several stim with antispasmodics; tonics, with stin and aromatics, &c. Quina, or the dis of quina, is advantageously given with phor, in many cases requiring the f or cinchona with ammonia, or with taria, or with both; or myrrh with assa galbanum, or ammoniacum; or infusion

, with tincture of sumbul, or with ammonia, he æthers; the preparations of iron, with those quina, or with those of calumba or quassia; preparations of scoparium, with those of taacum, juniper, &c., or these with the salts potash, &c., or with diuretic spirits or tinces, &c.

3. *d.* It is often desirable to have recourse substances which affect more than one func-, or to combine medicines which affect difnt organs, due regard being had to the funcrequiring to be chiefly acted on. Certain licines, particularly those which are alterative, more or less specific in their operations, proe, according to their doses, the frequency of r repetition, and the nature of the disease, nges in more than one organ or function. rcurials, antimonials, iodine, and the iodides, hur, magnesia, and the alkalies, &c. may be uced in illustration of this position. Whilst hur acts on the bowels, it is partially absorbed the blood, and acts also upon the skin, inasing both the cutaneous exhalation and the icular secretions. Magnesia opens the bowels, artially absorbed, and neutralizes and councts excrementitial materials in the circulation. alies and the iodides combined with alkalies, ct the blood, and through it the several unctories and solids. Camphor passes into the ulation, affects the nervous system, and proes exhalation from the lungs and expectoon; the terebinthinates also are absorbed, and upon the capillary circulation and on the neys, &c. Many of the neutral salts act upon bowels; and being absorbed, especially when n in doses which are not purgative, excite the neys to increased action, and sometimes also skin, &c.

4. *e.* The action of medicines may cause disfort or painful symptoms, which should be vented or counteracted by adding substances ich will correct these unpleasant effects. Purives, especially those which are cold, saline, or seous, and substances which in large doses asion vomiting, frequently are rendered both re pleasant and more active, by conjoining m with aromatics, or with spices, or with ers, or with both, and sometimes also with dynes or narcotics; or by giving them in r divisions, or in more diluted states, either ilarly combined, or in smaller and more died doses.

5. *f.* Medicines possessed of different properties y be conjoined, when it is desirable to affect re than one function, organ, or system; proed that the action of the one substance does counteract that of the other, and that they are mically and vitally compatible with each er. Thus the alkalies, the combination of m with boracic acid, or common borax, the rate of potash, magnesia, and the citrate of gnesia, severally change the states of the od, especially when uric acid or the urates and in are in excess in the blood, or when this fluid loaded with excrementitial materials. They tralise these materials, and promote their reval by means of the emunctories; and, when y are conjoined with tonics, or with febrifuges, with bitter infusions, they promote the salutary cts of those, especially in periodic and low ers, more particularly when they are given in the decoction of cinchona with serpentaria, or with camphor, arnica, &c. Those deobstruent and alterative substances, or the iodide of potassium, with the solution or the carbonate of potash, and with the tonics now mentioned, are also most beneficial in several states of rheumatism and gout, in some diseases caused by malaria, and in several other maladies, chiefly owing to the combination of means and to their conjoint actions.

36. *g.* The combination of medicines possessed of different properties, often gives rise to different or to additional effects, those characterising each either still appearing, or being masked by the effects resulting from the combination. Sometimes the effects are a combination of those produced by each ingredient, as when tonics are combined with aperients or purgatives. The true Dover's powder, or the association of ipecacuanha and opium with the nitrate of potash, produces an effect beyond those which characterize these constituents; yet their individual properties are more or less manifested. Disulphate of quina, conjoined with one-tenth of the quantity of aloes which is usually required to open the bowels gently, produces a cathartic operation. Small doses of opium tend to determine the action of medicines, which are apt to disorder the stomach or bowels, to the skin or to the kidneys, as when they are conjoined with antimonials, or with ipecacuanha, or with colchicum, or with the common diuretics.

37. III. Special Therapeutical Principles —The special consideration of therapeutical principles has been partly discussed under other heads; but it may not be without advantage to bring the whole subject, in a full and connected manner, before the reader, referring him to those places in which certain topics are as fully considered and illustrated as the scope and limits of this work will permit, in order that repetitions may be prevented both in this and in other places.

38. i. The Restoration of Nervous and Vital Power, when primarily depressed, is very often necessary; and the physician is called upon to accomplish this intention in a great variety of circumstances,—in cases of mental and physical Shock (see that Article); after the impression or action of numerous sedative, poisonous, or noxious causes; upon the invasion of any of the several infectious and pestilential maladies; in the cold stage of periodic fevers; and in the several forms of local or general Debility (§ 5, *et pluries*). In these, and even in other circumstances of disease, either the organic nervous energy, or the vital power generally is more or less depressed; but this may not be the only morbid condition. It may be associated with others in various grades, equally requiring attention and removal; but when it constitutes the prominent or chief affection, the others may arise from and depend on it, and the vital depression then imperatively requires removal. When the depression is a primary effect of known, specific, or poisonous causes, the continuance of it may then be followed by one or other of three results:—1st. It may become more and more urgent, or may increase until the vital manifestations entirely cease; —2nd. It may be followed by imperfect or abortive efforts at reaction, life at last sinking in the struggle;—3rd. When the vital energies are not subdued in either of these modes, reaction of a

tumultuous or excessive kind may supervene, and endanger the integrity of the structures or organs most predisposed to organic alteration. These results are the more likely to occur, when specific, infectious, or poisonous causes occasion the primary vital depression; inasmuch as the functions of the secreting and excreting organs are then early impaired or interrupted, or entirely suppressed, and the blood and other circulating fluids are more or less altered, contaminated, or poisoned. In this, as well as in other states of disease, the Indications are:—1st. *To ascertain and to prevent the further action of the causes occasioning vital depression;*—2nd. *To remove the effects already produced;*—and 3rd. *To prevent or counteract contingent or consecutive results.*

39. *A.* The *first* of these, although not always possible, may often be accomplished. A contaminating air may be corrected by ventilation, or by removing either the sources of contamination or the patient from their influence. But a specific infection or contagion, having once made its morbid impression, cannot be prevented from producing the succession of changes which characterise its effects, although these changes may be aggravated and vital power depressed by a humid, impure, or contaminated atmosphere; the second and third intentions are, therefore, to be attempted. Malaria, in any of its states, may have made its impression on the frame; and, although removed, the effects will take place in the form of vital depression, chills, rigors, &c., followed by vascular reaction, perspiration, &c. But if the patient were to remain during the progress of the disease, subjected to the continued influence of this cause, the disease would be more severe, more difficult to remove, and more prone to occasion structural changes in predisposed organs, and might even assume a more continued and dangerous type. There are numerous external or physical agents which depress the organic nervous energy, and through this system lower the vital manifestations; and there are many mental, and intrinsic, and even structural conditions which produce similar effects, without being clearly evinced or ascertained. In these circumstances, although the causes, and the changes which they have induced, may be loosely inferred; yet their removal or prevention may not be within our power, and the next indication is to be at once attempted.

40. *B. Secondly,* To remove the depression already produced, is an intention which should be fulfilled by means, as respects their powers and natures, appropriate to the grade of depression and the phenomena characterising it. But these means should have more or less reference, not only to the state of depression, but also to its causes — whether mental, physical, specific, infectious, &c. They ought to be sufficient for the end proposed; but not excessive in their operation, or such as are likely to occasion inordinate excitement or reaction, or irritation, or inflammation of the organs to which they are directed. In the more extreme cases, or when vital power is remarkably depressed by the invasion of infectious maladies, the more powerful stimulants are then required, aided by external measures, in order to determine the flow of blood to the external surface, and to relieve the internal organs from the congestion and vascular distension which oppress them, and which, without uch means, the vital powers might not be suffic t to overcome. The invasion of several ma lies produced either by malaria, or by infectious na-nations, or by moral or physical shocks, is ten attended by vital depression, characterised y a sense of sinking and of coldness; by tre ors, rigors, or shiverings; by failure of the pu , as respects either strength or frequency, or bot by a shrunk, cold, and bloodless state of the ex nal surface; and by a feeling of oppression or of xiety at the epigastrium and præcordium. ese phenomena, when they are caused by malar are in most cases soon followed by vascular an ital reaction, unless in those circumstances and ses which are fully described in their proper ces (See Fever, Intermittent, &c. §§ 33— 5.). — In the more severe and congestive o uch cases, retching or vomiting is generally ded to the above characteristics of vital depre on; and when the invasion of infectious and stilential maladies — of exanthematous and her fevers, produced by their specific poisons, attended by signs of vital depression, such , or similar to, those now stated, there are ger ally also superadded retchings or vomitings, or th, evincing the more serious nature of the vi depression, and showing the efforts of Natu not only to throw off the morbid cause, but a to resist the impression it has made, and to ove me the congestion produced by it in the large sels and vital organs. In such dangerous ci mstances, nature points the way to the fulfilm t of the indication under consideration, and the fore it should be followed by promoting it by propriate means, such as by warm, stimular and demulcent draughts; by external warmt and warm baths, containing salt, mustard, &c and by stimulating and aperient enemata, in der to remove fæcal accumulations and depr sing morbid excretions. The great question is, I nese circumstances how far should the vomiti be promoted or allowed to proceed? This c be decided only by the effects produced and, the quantity and appearances of the matters ej ed; but generally, if the retchings or von ngs continue beyond the time apparently su ient for producing a salutary effect, if the r ters thrown off be scanty, serous, or sero-mucou and if the vomiting be attended by an interna nse of heat at the epigastrium, and tenderness c eat over the region of the stomach, and by her gastritic or gastro-enteric symptoms, then, i ead of promoting the vomiting, or of exhibiting s uli, &c., the gastric irritability should be a yed by refrigerant or cooling demulcents, con ned with sedatives; by external derivatives, an her suitable means. (See Art. Gastro-enteri Disease, and Stomach, Diseases of.) Nerv depression and sinking require for their remo the more diffusive stimuli, often conjoined wi antispasmodics or with tonics, according to c mstances, and as shown in the article De ity (§§ 43, *et seq.*). The same symptoms wh indicate the propriety of restraining retchin and vomitings, should also forbid the exhibiti by the mouth, of stimulants or tonics, which i her circumstances of vital depression, would required, often liberally and frequently, bu with due circumspection and regard to the effec produced, and to the peculiarities of the case; hese

med ines also being selected judiciously, and
acc ling to an enlightened experience.
4 C. *Thirdly*, During our efforts to remove
pri ry vital depression by suitable agents, due
reg ought to be paid to the prevention of con-
ting t or consecutive results of an unpleasant
or ious nature ; and when these cannot be
pre ited, they should be counteracted as far as
pos le. The internal congestions, which fre-
que y occur during the vital depression directly
pro ced by sedative infections and poisonous
cau , frequently continue after efforts at reaction
hav been made ; or, although partially removed,
give se to more or less disorder, especially when
secr ng or excreting organs have been thus af-
fect Not infrequently the viscera which expe-
rien d congestion during the primary depression,
bec e, during the consequent reaction, the seats
of a ngestive inflammation or irritation. Hence
the opriety of preventing or anticipating these
resu in the treatment employed to remove the
prin y morbid condition — of prescribing those
mea which are least likely to convert congestion
into flammation, and which, while they remove
the pression, restore the vital manifestations in
the veral secreting and excreting organs, and
pro te the functions of these organs, especially
of th skin, kidneys, and bowels. The contingent
evil upon vital depression depend very much
upo the depressing causes; and where these
caus are specific, the effects are generally such
as y be expected, yet they cannot be en-
tirel prevented, or even always allayed or con-
troll . If the causes are concentrated, the
susc tibility great, and the consequent depres-
sion treme, the contingent congestion and con-
equ t effects, although expected, may soon
est life, however judicious the means which
may used. Numerous proofs of this are fur-
ish us by the histories of the more malignant
ase f remittent, continued, exanthematous, and
est itial fevers. In these the causes charac-
eris the effects, and all the manifestations of
hes ffects throughout the frame ; but, although
hes effects necessarily result, well directed
mea may often allay or control them when
hey re excessive or dangerous. These means
will cessarily depend upon the effects in the se-
vera orms of these maladies ; and are such, as
well the particular effects they are employed to
ont , as can be discussed only under their spe-
ific ads, to which I must refer the reader.
45 ii. The Promotion of the several se-
RET G AND EXCRETING FUNCTIONS — OF THE DE-
UR NG PROCESSES, WHENEVER THEY ARE TORPID
R I AIRED, has been just stated, as generally
equ e to the prevention of many contingent
vils uring states of vital depression by what-
ver use produced ; but it has a still more gene-
al a lication, for in all circumstances, and in all
yna ic or other states of vital manifestation —
n st s of excitement and increased vascular ac-
on, s well as in those of depression — these
nc ns are very often either torpid or impaired,
r e interrupted, and require restoration ; other-
ise dditional, or more severe and dangerous
har s result, and the blood, loaded with excre-
ien al materials, occasions the most deleterious
ffec in vital organs. But the functions of de-
ura g or excreting surfaces or organs are not
onf d to the mere elimination of injurious elements or materials. In connection with this depuration, the organic nervous fibriles, by means of the capillary vessels, affect more or less the state of the blood circulating in the capillaries, and impart to it a more complete organization as well as vital properties. The blood, in different parts of the capillary circulation — in the skin, in the respiratory mucous surface, in the digestive villous surface, in the structures of the several glands — by the influence exerted on it by the organic or ganglial nerves, through the media of the capillaries, thus varies, in vital properties and in sensible qualities, with the modified vital manifestations of the ganglia and their nerves; the functions of organs or parts owing not only their differences and specific characters to these modifications, but also the amount of their performance.

43. Next to the sedative or depressing effects produced by the causes of disease, the impairment or arrest of depurating functions closely follows, the latter being very frequently the consequence of the former. These functions are often, in these circumstances, restored by the same means as are employed to remove the primary morbid impression, especially by a judicious selection of emetics, and of diffusive stimuli, and by warm, hot, or medicated baths. In all cases — 1st. *The Causes which impaired or interrupted these functions should be ascertained and removed ;* — 2dly. *The Means which the states of the several secreting and excreting functions require for their due promotion, should be prescribed, and generally with marked reference to the causes on the one hand, and to associated and contingent pathological conditions on the other.*

44. *A.* Suppression of the depurating function of the *skin* illustrates the importance of these intentions, whilst it shows the several pathological effects which may result from it. The great diversity of these effects, upon different persons, depend upon,—1st. The existing susceptibility of the individual ;—2nd. The amount and duration of the cause ; — 3rd. The predisposition of certain organs or tissues to be affected ; — 4th. The vicarious increase of other excreting functions, diminishing or modifying the effects produced by the cutaneous suppression ;—5th. The concurrence of other causes with those which suppressed the action of the skin. The suppression of excreting function being referred to its cause with all possible precision, the exact nature and amount of the pathological effects should be ascertained. If the function of the skin be further considered in connection with this subject, we find that its suppression may be followed, especially if the kidneys do not perform a vicariously increased function, by catarrh, or by rheumatism, or by inflammation of the lungs or pleura, or by diarrhœa, or by dysentery, or by enteritis, or by other maladies, according as the predisposition of parts may determine the morbid action. The cause or causes, whether exposure to cold or to influences depressing vital power, occasion, first, interruption of the depurating function of the skin, and, next more or less fulness or congestion of, or vascular determination to internal viscera or parts ; and, in addition to this latter effect, and as a consequence of the suppression of the cutaneous function, the blood is loaded with these excrementitious elements which the healthy action of the skin elimi-

nates. The conditions of the blood and of the circulation resulting from the changes and circumstances just enumerated, are such in many cases as kindle disease, either those now mentioned, or others of a slighter or severer nature. The practical importance of tracing the causes and the succession of effects is further illustrated by the beneficial results which follow, when these causes are duly recognised, and the means of cure judiciously directed to the removal of the causes and the effects produced by them, and especially to the restoration of the impaired or suppressed function.

45. Still further, the treatment of any of the diseases mentioned above (§ 43.), when occasioned entirely or chiefly by suppressed cutaneous function, is legitimately based on the principle of restoring this function, and by its aid of removing injurious excrementitious elements from the blood, of soliciting the circulation to the external surface, and of diminishing the vascular determination to the seats of disease. The importance of attending to the depurating function of the skin is too frequently overlooked in the treatment of diseases, and in health, by all classes of the community. In the cases to which allusion has been here made, the means commonly resorted to, viz. warm and medicated baths and diaphoretics, suited to the nature of the disease and to the existing states of vital power and vascular action, are those usually indicated. But the appropriate use of these is to be acquired only by close observation and by an enlightened experience.

46. Not merely the restoration, but also the due preservation, of all the functions are most essential both to the removal of disease and to the continuance of health — more especially of the excreting functions; and those performed by the skin are not the lowest in the scale of importance. There are several practices connected with this function, in health and in disease, that have been too much neglected in modern times, although adopted among the ancients, and even by uncivilized communities at the present day; these are, anointing the surface of the body with oil; oleaginous frictions of the skin, especially after bathing; and the use of woollen or cotton coverings for several diseases, and whilst having recourse to diaphoretics. Frictions of the external surface with oil,—with olive, palm, or other vegetable oils, promote the excreting functions of the skin, protect the surface from the injurious impression of physical, infectious, and morbid causes, and tend to preserve a due supply and distribution of blood to the extremities and external parts; and these effects are the more manifest the more constantly they are resorted to, in connection with due ablution and bathing. The advantages also which result from lying in blankets or other woollen coverings, during the exhibition of diaphoretics, or when the depurating functions of the skin are being promoted, have been too generally overlooked in modern times, and deserve adoption in many diseases requiring an increase of these functions.

47. *B.* What has been said respecting the promotion of the *functions of the skin* applies likewise to the *other secreting and excreting functions.* Impairment or interruption of these, caused either by depressed vital manifestation, by lost or paralysed power, or by mechanical obstruction, requires the same indications of cure as have been ited above (§§ 39, *et seq.*), due regard being had the selection of our means, to the remote a the more immediate causes, and to existing an contingent pathological states. Of all the ex ting or depurating functions, those performed the *kidneys* are the most important, and most idly fatal when impaired, interrupted, or supp sed. But it is not merely impairment of this f tion as to the quantity of the excretion, but disc er of it as to the natural quality that also requ s attention. Both conditions demand close o rvation, and furnish important indications the treatment of disease, these indications be always derived from pathological states most serious import, whether existing at the in sion, or in the progress, or towards the term ation of disease. Mere deficiency of this ex etion may require the use of means — of *diur* *cs* — suited to the vital conditions and to the s es o vascular action; but the quality or chemic con stitution of the urine, either independe ly o quantity, or in connection with the abund ce o the excretion, excites the most serious co dera tions, both as to the vital powers, and as the states of the blood and circulation, and enth requires powerful alterative or consti iona remedies, appropriate to existing path gica changes. Illustrations of the importanc f re cognising alterations not only in the quan , bu also in the constitution of the urinary ex etion and of founding rational intentions of e on these alterations, are furnished in the Art es o the Blood, on Disease, on Diabetes, o Drop sy, on the exanthematous and continued vers on diseases of the Kidneys, on the Uri , &c. to which I must refer the reader for the i ntion and means of cure, when the function f th kidneys are impaired, disordered, or inte pted as to either the quantity or the quality o e ex cretion, and for the pathological causes d th consequences of such disorders of this ex tion.

48. *C.* Impaired and interrupted excret func tions of the *intestines* and *liver*, are next in port ance to those of the kidneys. Many dise s ori ginate in, or are characterised by, at earl stage of their progress, defective excreti actio of the liver and bowels—in neglecting to omot these depurating functions. It is beli d b many that the regular and daily evacuati of th bowels is quite sufficient; but this ma ot a ways be the case, as to either the fæcal di arg or the biliary secretion, or even as to bot and although the former may appear frequ t an abundant, the latter may be deficient, alto gether wanting. Hence the importanc f ob serving accurately the appearances of t intes tinal excretions, both in health and in dis e, an of having recourse to such means as se ap pearances, the frequency of evacuation, d th associated states of disease will sugge Th several substances arranged as *purgat* s an *cathartics* should be suited to the peculi ties each case, and be conjoined with othe f th same class, or with such as may either ect o promote their operation. The general ect o purgatives is to leave the bowels more r les torpid after their operation has ceased. is wi often be prevented by conjoining a bit toni with the purgative, as a preparation of ge an, o of cinchona, with that of senna, or the su ate o

with aloes, the digestive canal being there- engthened as well as excited to increased These and similar combinations are often n operating, but they generally procure d feculent evacuations, whether given in imple states of combination, or with various e or saline and stomachic additions. The topics connected with torpor or inaction bowels, and with similar conditions of the – with impaired excreting functions of the nd intestines, — are fully discussed under ads, CÆCUM, COLIC and ILEUS, COLON, PATION, INTESTINES, JAUNDICE, LIVER, M, &c., to which my limits oblige me to

iii. TO EQUALIZE THE VITAL AND VAS- ACTIONS THROUGHOUT THE FRAME is a al object, desired in all diseases in which anifestation or vascular action is inordi- expressed in, or determined to, any parti- tructure or organ; or in which vital organs ngested or oppressed. The entire accom- ent of the two preceding objects generally ains this. Yet states of disease sometimes themselves, or circumstances occur, which the physician to prefer such means as more act in this way — which equalize the vital ascular actions. Indeed, most of those act also upon the secretions and excretions, especially on those of the skin, as when baths, warm diaphoretics, pediluvia, &c., scribed; and the very agents which are given ore vital power (§§ 37, *et seq.*) have often ect of equalizing the circulation and pro- the secretions. The means just now men- generally produce these complex effects, and are often equally efficacious when employed ble forms and appropriately to pathological ons. The acetate and other preparations nonia, the spirits of nitric æther, sulphur, or imperfectly conducting bedclothes, iluents containing diffusive stimuli, &c., milar effects. In cases where local deter- on, or increased flow of blood, occasions oppression, or augmented function, or defect of function in parts from which the vascular action is derived, not only those but others of a more strictly *revulsive* or *ive* kind, are often required, especially local ons, dry-cupping, blisters, rubefacients, and gents, whose operation is more permanent inued, as setons, issues, and similar modes lucing *counter-irritation*, or even suppu- and vascular discharges. (See Arts. CON- N, and BLOOD, *local plethora and determina-* , §§ 23, *et seq.*)

iv. TO MODERATE EXCESSIVE SECRETION EXCRETION, OR TO RESTRAIN EXCESSIVE ARGES, is an intention requiring much acu- the physician, to carry into safe execution. e secretion or discharge may not be safely ned or stopped. It may be a safety-valve l by nature; and, when this is the case, it not be closed without another having been uted. When an attentive and a discrimina- amination of the case shows that the dis- is productive of injurious effects, and re- either to be moderated or arrested; and when sociated with other disorder, equally requir- be removed, then such means as will have fect, consistently with the nature of the secretion or discharge and with the existing state of vascular action, should be employed. Whenever an excessive or unnatural discharge is attended by increased vascular action, attempts to moderate, and far less to arrest it, should not be prematurely or hastily made, or, if made, they ought to be directed chiefly to the states of vital and vascular action. A nasal or hæmorrhoidal discharge of blood may prevent an attack of apoplexy or palsy, or of congestion of the liver or lungs. Any chronic or prolonged discharge, if abruptly arrested, may be followed by congestion or inflammation of the affected organ, or of an adjoining part, or by effusion into a shut cavity. Thus I have seen the sudden arrest of a copious leucorrhœa followed in different cases by congestion of the uterus, by inflammation of this organ, or by peritonitis, followed by copious effusion of serum. The same effects may also follow sudden arrest of a too abundant catamenial discharge. Whatever merely suppresses the morbid effect whilst the pathological cause or condition is allowed to exist, may be productive of bad or even fatal results. A chronic diarrhœa, if suddenly suppressed, without due attention having been paid to the appearances of the evacuations, to existing pathological states, and to the excretions from the skin and kidneys, or without either establishing a free derivation from the bowels, or determining the circulation to the surface, &c., may be followed by enteritis or peritonitis, with or without serous effusion into the peritoneal cavity. Epistaxis, if prematurely arrested, especially in persons of middle or advanced ages, or full habit of body, may be followed by an apoplectic, paralytic, or epileptic seizure.

51. In all cases of excessive or prolonged discharge, the nature of the discharge, and the changes from which it proceeds, require attentive examination; and these particulars having been ascertained, the treatment should be directed chiefly to the changes producing it. Many inordinate discharges, especially when acute or severe, or of sudden occurrence, cure themselves. As soon as the irritating secretion or accumulated excretions are fully evacuated, the disorder ceases, as in many cases of autumnal cholera or diarrhœa, and there remains only a slight irritation, occasioned by the morbid secretions, which either subsides, or is soon removed by promoting the functions of the skin, or by correcting morbid tendencies in the blood and digestive functions, or by other suitable means. Recourse to the more powerful *astringents* or *tonics*, without due regard to the circumstances just mentioned, or is often had, in cases of excessive discharge, to others of equal importance connected with the source of mischief; and in consequence of the use of these, the disease is arrested, and the patient thinks himself cured. But, after a short time, a different disease is manifested, one often more serious than its antecedent, and proceeds without the cause of its occurrence being sometimes suspected. Hæmorrhoidal discharges, or fistula in ano, especially when chronic, have been followed at some period, more or less remote from their cure by these or other means, by congestion of the liver or lungs, by hepatitis or pneumonia, or by ascites, or by increase of pre-existing pulmonary disease, as is most frequently the case.

52. v. TO MODERATE OR ALLAY EXISTING NER-

VOUS EXCITEMENT, OR UNNATURAL FUNCTION, OR IRREGULAR ACTION, is an intention which the physician is often called upon to accomplish, in the present state of society. The successful attainment of this end depends greatly upon a due recognition of the remote causes, both mental and physical, — both moral and corporeal, — and of pre-existing and existing changes. The removal of the causes should always be preliminary to attempts to allay the excitement, whether nervous or vascular. When the former is associated with the latter, it should always be ascertained whether the nervous disorder is occasioned by increased vascular determination and action, or whether this latter results from the former. The nature of the exciting causes will often render the procession of morbid phenomena more or less manifest, and at the same time suggest the indications and means of cure. When the causes are of a mental or moral nature, when they have acted chiefly on the susceptibility and sensibility of the individual, and when they have produced suffering, pain, spasm, or irregular muscular actions, then those means which are classed as *sedatives*, or *anodynes*, or as *anæsthetics*, are usually required; but in many of such cases, *stimulants*, or *antispasmodics*, or even *tonics*, may also be necessary in conjunction with these, particularly when debility or exhaustion is present. If, however, the nervous excitement be attended by increased vascular action, or local determination, and more especially if this excitement be a consequence of the vascular disorder, those means which will allay this latter disorder should precede a recourse to those which act chiefly on the nervous system. In such cases, the *antiphlogistic* and other measures usually required, are often aided by a judicious recourse to sedatives or anodynes, or even to anæsthetics or narcotics, especially when want of sleep, or excessive pain, or restlessness, or disordered muscular actions, characterise the affection. If the nervous excitement or disordered actions be traced to vascular determination to, or inflammatory action in, any portion of the cerebro-spinal centres or their membranes, or to a similar affection of the sexual organs, or to other inflammatory or febrile conditions, then the same indications and means of cure as are noticed in the following section (§§ 52, 53.) are necessary; and when they have been judiciously employed, they may then be followed by such of the medicines belonging to the above classes, as are most appropriate to the existing states of nervous disorder.

53. vi. TO ALLAY OR MODERATE INCREASED VASCULAR ACTION, OR TO REMOVE VASCULAR DISORDER, is obviously required, especially when excessive; for we cannot with propriety leave this disorder to the unaided efforts of nature, unless it be slight, and the constitution and age of the patient be such as warrant confidence in the result. In order to allay increased vascular or febrile action, the physician should investigate its causes, its manifestations, the states of the secretions and excretions, the indications of vital power, and the conditions of the circulating fluids, as far as they are indicated by the pulse and by the hue of the surface, of the lips and tongue, and of the extremities. The diathesis of the malady — sthenic or asthenic, dynamic or adynamic — and other changes having been inferred from these sources, the *indications* and means cure
must be based upon them. If the cula
or febrile excitement be *sthenic* — if it be arac
terised by a salutary reaction indicating ithe
impairment of organic nervous or vital pov , no
contamination of the fluids — it should be ayed
by the means classed as *antiphlogistic* an *febri*
fuge, comprising blood-letting when the n re o
the case requires it, in any form. In ad on t
these, substances which promote the secret s and
excretions, which equalize the circulatio when
it is inordinately determined to particular gans
and which derive it from the affected c an to
the external surface, are generally benef .

54. When the vascular or febrile ex men
is *asthenic*, — when vital power is exhau d o
depressed, and the circulating fluids are c ami
nated or poisoned by infectious or injuri ele
ments, or materials which irritate or ex the
vascular system, — then the *indications* cur
are: — 1st. To support the vital energies; — 2nd
To promote the secreting and depuratin func
tions; — 3rd. To correct or counter the
morbid states of the blood, by such m cine
as may be absorbed into the circulation pro
duce these effects. The importance of s las
indication is so great as to require for itse dis
tinct consideration (§§ 54—56.). Suffi nt il
lustrations of this therapeutical principle to b
found in the Articles ERYSIPELAS, FEVE , IN
FLAMMATIONS, and PESTILENCES, as well inde
other heads, where a more special conside ion i
devoted to the several topics embraced by

55. vii. MORBID STATES OF THE BL AR
TO BE CORRECTED OR COUNTERACTED BY EAN
WHICH OBSERVATION, SCIENCE, AND EXP ENCE
HAVE SHOWN TO BE SUITABLE TO THIS D. —
Morbid conditions of the blood are so va us a
respects their causes, associations, and onse
quences, and are so little known, especial s re
gards their intimate natures and the slig and
subtiler alterations, as frequently to rende e *in*
tentions of cure imperfect, their accompl men
unsatisfactory, and the choice and oper on o
means doubtful. We know that the bl and
the secretions and excretions are more les
contaminated in many maladies, and o g t
many causes, — 1st. That the contaminat may
take place slowly and insidiously, until, u n the
action of some exciting or concurring ca , ac
tive disease is developed in the form of ut o
rheumatism, or of scurvy, or of cutaneo affec
tions; — 2nd. That it may result more pidly
and much more dangerously, owing the
absorption of morbid secretions or i rious
materials into the blood, as in cases uru-
lent or sanious infection; — and 3rd. That may
take place in a more rapid and specific ner,
from a poisonous infection, producing its uliar
seminium, and propagating itself amongst who
are susceptible of its operation, even alth gh in
may cases the changes of the blood are ither
considerable nor manifest. Morbid state f the
blood are often the most evident and produ ve of
the most dangerous results in the advance ages
of continued, remittent, exanthematous, an esti-
lential fevers; and these states, whether eed-
ing from foul, contaminating emanations, other
causes, or from a seminium of a specific ure,
generating its like, affect both the secrete uids
and the solids, as shown when treating the

m dies produced by these causes. In the earlie tages and slighter cases of these diseases the ch ges of the blood are either very slight or not ve manifest; yet they nevertheless may be infe d to exist, inasmuch as the odour of the bl l has been found different, and the same sp es of disease has been propagated by it.

6. Alterations of the blood are owing, as shown ab e and more fully in the Articles Blood and D ase, and in those on the maladies in which th alterations are the greatest, to pre-existing m id states, as in *scurvy*, *purpura*, *gout*, *rheumatis* &c., or to the poisonous operation of infectious mi ms emanating from a person similarly affected, as the *pestilences*, the *exanthemata* and *malignant fe s*. We know, that diseases which are most m gnant and dangerous, proceed from causes wh h remarkably depress the powers of life, and eit r suppress or disorder the depurating functio . Hence it may be inferred that, although the sp fic cause produces effects which are constant an specific, the resulting changes on the blood, esp ially when heightened by vital depression an mpaired excretion, increase the malignancy of he malady, and often either occasion or ha n death. Now, to counteract these changes it comes necessary —1st. To support, promote, or store vital power, as far as may be possible; 2n To promote or restore the several excreting or purating functions;—and 3rd. To endeavour to rrect or neutralize the morbid materials or el ents formed or accumulated in the blood in th rogress of, or antecedent to the full developm of the malady.—The *first* and the *second* of th intentions should be energetically carried ou y the same or similiar means to those adve d to above (§§ 37—47.)—by powerful *restora es, tonics, stimulants*, &c.; and by stomachic, wa , and stimulating *emetics, diaphoretics, diuretic* nd *purgatives*, as may be most appropriate to th ature and state of the malady.

. The *third indication* is that which more es ially concerns the present subject. In ce in diseases, in which the blood is very manifes altered, the crasis or coagulating power of thi luid is increased, as in rheumatism and gout; wh t in others it is more or less impaired, as in sc y, and in the malignant maladies alluded to ab e. In the former, *alteratives*, as the alkalies an he alkaline earths, especially magnesia, are re red to neutralize the acids formed in the digestiv anal, and even also in the blood; in the latter, th most powerful *stimulants, tonics*, and *antisep s*, are necessary to the restoration of vital po r, of the irritability of the contractile fibre, an of the crasis of the blood, and to the counterac n of the tendency to dissolution manifested by oth fluids and solids — to the putridity conte d for by the older writers. Of the several to s and stimulants often required to fulfil the pr nt indication, it is unnecessary to make mentio at this place, as their use is fully shown un r the diseases in which they are most appropr e. Of those which manifestly prevent or co teract a septic tendency, it may be remarked th whatever supports or restores vital tone, has in ectly this tendency, but that there are substa es which possess this property in a more di t manner—that are more strictly *anti-septic*, as ydrochloric acid, the chlorides and hydroch ides, chlorinated waters or fluids, the chlorate of potash, the nitrate of potash and several other alkaline salts, the terebinthinates, balsams and camphor, creasote and tar, the cinchona and cascarilla barks, and the barks of several trees, as the oak-bark, willow-bark, cedar-bark, &c. In the more urgent or malignant cases, two or several of these may be conjoined or given with stimulants or tonics, as the decoctions or infusions of cinchona, or of serpentaria, or of arnica, with nitrate of potash, the carbonates of the alkalies, or the chlorate of potash, &c.

58. viii. To allay morbid Irritation by means suited to the several Manifestations of this Condition is often of urgent importance, and always is attended by great difficulty, inasmuch as the successful accomplishment of this object requires an accurate interpretation of the cause and essence of the morbid conditions or changes on which the irritation depends. The source of irritation may exist *locally* in any structure or tissue, or in a nervous ramification; or generally, in the blood and in the secreted and excreted fluids; or both *locally* and *generally*. When it is *local*, it may, according as it may affect the nerves or the blood-vessels at its source, either occasion spasm, convulsion, or severe or neuralgic pain, or produce alterations of structure, acute or chronic inflammation, and their several consequences. When it is *general*, febrile action, more or less violent or acute — more or less rapid in its course, and dangerous in its issue — is always present; the morbid, contaminating, or poisonous materials present in the blood, and other fluids inordinately exciting vascular action, and at the same time depressing nervous or vital power. When the irritation commences locally and becomes general, then the secretions and nutrition of the part have been changed, and the morbid products have been absorbed into the circulation; and whilst the local irritation continues, the general irritation is superadded, occasioning an amount of febrile or general disturbance, varying with the nature and the amount of the materials absorbed, with the state of predisposition or diathesis, with the accumulation of these morbid matters in the blood, or with the rapidity of their elimination by the emunctories. Thus we have presented to our observation sources of local irritation and change, followed more or less rapidly by every grade of hectic or irritative fever; and not merely by these, but also by destructive changes consecutively produced in various organs, and more especially in those concerned in the elimination of the morbid matters from the blood. It is unnecessary to prosecute this subject any further, as it is fully considered in the Articles Abscess, Absorption, Hectic Fever, and more fully and in its several relations, both pathologically and therapeutically in the article Irritation.

59. ix. To alter, or more completely to change morbid States of individual Tissues, or of the Structures generally, may be considered an intention, the fulfilment of which is beyond our powers. I have shown, when treating of typhoid, adynamic, putro-adynamic, and malignant *fevers*, and *exanthematous* and *pestilential maladies*, and of *scurvy*, *syphilis*, &c., that we have every proof of alterations having taken place, in the advanced course of these dis-

eases, not only in the fluids, but also in the vital cohesion and intimate organisation of the more solid structures, and yet the vital powers may arrest these alterations, and gradually restore the healthy conditions. This great end can be attained only by the restorative efforts of nature — by the development of vital resistance to further changes. The constitutional powers often, by resisting further alterations, accomplish this object without assistance, or merely by the aid of freer ventilation, of a purer air, or by the removal of injurious influences. But these powers are often assisted or developed by art — by means which restore or promote nervous or vital energy (§§ 37, *et seq.*), and which moderate, correct, or remove morbid states of vascular action and alterations of the blood (52—56.). The indications, as well as the means, are fully discussed in the treatment of the maladies just referred to, and of several chronic and cachectic diseases, especially *scrofula*, *rickets*, *scurvy*, *venereal diseases*, &c., to which I must refer the reader.

60. x. TO PREVENT OR REMOVE EXHAUSTION IN ITS VARIOUS FORMS is often required of the physician; but the nature of the previous excitement of which exhaustion is the consequence, should be ascertained, as the issue in many cases depends upon such excitement and its causes — whether mental or physical, moral or corporeal. The *indications* and the *agents* required to fulfil them, are usually the same as have been already mentioned when treating of primary depression of nervous or vital power (§ 37.). In this latter state of vital depression, although its cause may be more energetic and dangerous, yet the frame is more generally free from structural change of its tissues or organs, and reaction is more readily produced, than in the secondary vital depression, or exhaustion consequent upon mental, nervous, or vascular excitement. Whereas in the exhaustion thus produced, and more especially when following vascular disorder, alterations of the fluids, and even of the structures, are more likely to be present, and to complicate the vital depression, the structural change and the vital condition mutually increasing each other, often opposing the influence of the most judicious means of cure, and generally requiring the most energetic and the best-directed agents for their removal. The observations which I have offered on this subject when treating of *consecutive and complicated* DEBILITY (see Art. DEBILITY (§§ 43, *et seq.*) will further elucidate this subject.

61. xi. TO REMOVE CONGESTIONS OF BLOOD, ACCORDING TO THEIR SEATS, is one of the most important ends for which medical aid is required: to accomplish this end the most energetic agents are often necessary, especially when congestion is complicated with marked depression of organic nervous or vital power, or with oppression or suppression of the functions of the congested organ. In these circumstances the indications are:— 1st. To *derive* the circulation from the seat of congestion to other external parts, by suitable *revulsants*, *rubefacients*, &c.; — 2nd. To equalize the distribution of blood throughout the frame, as advised above (§ 48.); — 3rd. To support nervous or vital power, especially when inordinately depressed, by appropriate restoratives and stimulants; — and 4th. To restore the function of the congested organ. This subject is fully elucidated in the Articles CONGESTION and BLOOD §§ 23—33.).

62. xii. TO ENABLE ORGANIC NERVOU OR VITAL POWER TO RESIST THE SLOW EXTE ON OF DISEASE, OR TO OVERCOME ITS MORE I ID ADVANCES, AND TO THROW OFF PARASI AL AND OTHER FORMATIONS, are ends which sl ld be much more frequently proposed for succ ful attainment in practice, than they usually ar In many diseases, the efforts of nature are in ficient for these purposes, unless they be aid by suitable means. In malignant and pestil ial maladies, these efforts are inadequate in the ost severe cases, and should be reinforced b he most energetic means, especially by tonics, s ulants, antiseptics, and others already no ed. In diseases of a slower course, as scr la, scurvy, and morbid formations of various ds, tonics, conjoined with alteratives, are gen lly indicated; but very much depends upo he choice which is made of these means, ich should be appropriate to the nature of indiv ual cases. In most of the diseases which requi the development of vital resistance, restorative a nts ought to be directed both to the organic ne ous system, and to the blood — the energy o the former must be excited, and the crasis and ity of the latter must be preserved, or restored en deficient. In acute malignant maladie the means which we possess are not always eq to the attainment of these ends. The vital e gy may be too far depressed to be excited by m cal agents, however well selected or directed; , if it be excited, the reaction evinces features e lly morbid and dangerous with those of the pr ous depression; for the states of the fluids, esp lly of the blood, conduce to structural chan as rapidly and certainly during vascular react as during vital depression. Hence it is gen lly insufficient merely to rouse the organic, ne us, or vital power, unless we also procure a free mination of morbid materials or elements fro the blood by the emunctories, and, at the same ne, prevent or correct alterations of this flu by means appropriate to the inferred alterati , as advised above (§§ 54—56.).

63. In chronic, malignant, or structural ladies, the constitutional or vital power is imp ed, and the blood is altered more or less, alt gh not always visibly or demonstratively altere As these maladies advance, especially cancer, ercle, rickets, &c., the alteration of the bloo becomes more and more evident, this fluid bein inner, poorer, or deficient in red globules. ce the necessity of supporting the powers of l by means which will neither excite nor irritate em, and of preserving the healthy state of the od by conjoining with those means such a vill correct or prevent alterations of this flui and will, at the same time, promote the conv ion of the colourless or chylous globules c the blood into red globules — will promote the rocesses of sanguification and nutrition — as lybeates and cod-liver oil.

64. The same indications and means ich are most successful in resisting the slow ext ion of organic or malignant maladies, are als ost advantageously employed in throwing off *rasitical animals* and *productions*, and in pr nting their generation or formation. Althou the expulsion of parasitical animals from the es-

ti canal requires a recourse to a class of reme- di which act chiefly either on the canal itself, or n the *entozoa*, or on both, and are usually cl ed as *anthelmintics* ; yet the reproduction of th e animals is to be prevented only by means w h develope organic nervous power, which in ove the states of the blood, and of the secre- ti and excretions, which promote the digestive fu tions, and which insure a healthy nutrition. O hese means nutritious food, and pure air and pu water, are amongst the most important.

6. xiii. To RESTORE, AS FAR AS MAY BE RE- ST ED, IMPAIRED OR LOST FUNCTION is to remove a ve large proportion of the ailments to which our fr es are liable. This being a great end of me- di l treatment, the course which may be pur- su in attaining it should be duly considered, and w a strict reference in practice to the nature of in vidual cases. The means used for attaining th object should be directed either — 1st. to the sc ces of function. — 2nd. or to the organ itself, w se function is impaired or lost, — 3rd. or to th promotion of the general health and constitu- ti al powers, — and 4th. or even to these conjointly, c aneously, or consecutively. — The great im- p ance of attaining this object has been insisted u n, when noticing the consequences of impair- m t of the excreting, or depurating functions (1, *et seq.*) ; but there are other functions than th e of elimination which may be impaired, and th issue may be more or less serious. Most of th disorders comprised under the *first class* in the a ngement which I have followed in this work, c sist of impaired function or defective action. A in all these the indications now stated may be se rally adopted.

6. The means of cure, when not acting directly o he the surface or organ to which they are ap- p d, and frequently even when directly effecting s n surface or organ, act also — 1st. on the ner- v systems, especially the organic, — 2nd. on the v ular system and on the blood ; and through e er or both these channels, indirectly or conse- c vely on the organs or surfaces whose functions a defective. The deficient function may thus b estored by stimulating the nervous endowment o ts appropriate organ at or near the origins of t nerves ; or by exhibiting medicines which are i bed or absorbed into the circulation, and either a r the constitution of the blood or excite the o n or surface whose functions are impaired by t r presence in this fluid. The actions of the k neys, for instance, may be increased by sti- m ating applications over the loins, or by various s stances (*diuretics*), which having passed into t circulation, and being carried by the blood to t se organs, excite them to increased action, e er whilst these substances are being eliminated l them, or whilst circulating through them be- f they are eliminated by some other emunc- t y. The secreting and excreting functions of t liver, of the digestive mucous surface, of the b nchial mucous surface, of the skin, &c., are aug- m nted in similar ways, by the several classes of m dicines, which, owing to these respective pre- d minant modes of action, according to their d es and combinations, have been called *chologo- g s*, *aperients* or *purgatives*, *expectorants*, *dia- retics*, &c.

67. xiv. To PALLIATE URGENT OR DISTRESSING S IPTOMS, EITHER WHEN THEY CANNOT BE REMOVED, OR IN ORDER TO OBTAIN TIME TO ASCERTAIN THEIR SOURCES and FOR THE REMOVAL OF THESE SOURCES, OR PATHOLOGICAL CAUSES, is an intention which the physician may propose to himself either at the outset or invasion of disease, or at its ultimate or fatal close — even in cases of little or no danger, and in those of the greatest danger. It is obvious that the means, in these very different circumstances, should have strict reference to the nature and tendency of the phenomenon or symptom by which the patient is distressed. If it be alarming sinking, stimulants and restoratives are required; if violent or painful spasm, antispasmodics, anodynes, sedatives, &c. according to the seat, antecedents and concomitants of the *spasm ;* if it be extreme pain, sedatives, narcotics and other means advised under the head of *neuralgic affections ;* if to remove alarm or mental perturbation, the combination of restoratives or stimulants with sedatives or narcotics ; making always such selection of means as experience, derived from enlightened and close observation, will suggest and will point out as appropriate to the features and complications of particular cases. A judicious application and combination of means, in the most extreme cases, and when no hopes of prolonging life can be entertained, will, in conjunction with the solace of religion, render dissolution as calm and peaceful as the accession of the natural sleep.

68. xv. To EXCITE AND DIRECT THE MENTAL EMOTIONS, SO AS TO PREVENT THE EXTENSION OR AGGRAVATION OF DISEASE AND TO INSURE OR HASTEN RECOVERY, is one of the highest aims of medical science ; and is often conducive both to the prevention and to the removal of disease. *Fear*, *anxiety*, and all the *depressing emotions* not only predispose the frame to the invasion of disease, but alas impart to disease an asthenic or low character, and conduce to unfavourable results ; whereas, *confidence*, *hope*, and all the elevating emotions support the powers of life, reinforce the vital resistance, and impart a great share of the efficacy exerted by the means of cure. Not only ought all mental and moral circumstances which either have caused, or have influenced, the progress of disease, to be removed as far as possible, but the mind of the patient should be inspired with hopeful sentiments, and by the confident bearing and expression of the physician. There are numerous circumstances also directly affecting the mind, and indirectly influencing it through the media of the senses, which aid the treatment of disease, especially of diseases which are chronic, or which impair the mental energies. The chief of these are: agreable mental occupations; the solaces resulting from the performance of duties and from conferring benefits on the deserving ; the contemplation of the numerous wonders and beauties of nature ; the enjoyment of musical and harmonious sounds, of the appeals of reason and eloquence, and of instructive and interesting society ; the affectionate regards of relations and friends, and rational amusements and relaxation. In addition to these, changes of scene, of air and locality, or more complete change of climate, and travelling, with all the circumstances which render travelling mentally and bodily healthful, should not be overlooked.

69. Having thus endeavoured to point out, for the *instruction* of the inexperienced, and as *suggestions* to others who wish to review the stores of information

with which observation may have enriched their minds, what I consider to be — 1st, *The fundamental principles of medical practice or Therapeutics*, — 2nd. *The more general principles*, — and 3rd. *The special principles of Therapeutics*, I shall conclude with an ARRANGEMENT *of the modes of employing*, and *of the operation of medicines*. When treating of POISONS, I gave a full exposition of the modes of exhibiting, the channels of operation, and the physiological and pathological effects of poisons. It is obvious that, as many poisons are employed, although in very different states and doses, as very important means of cure, the *classification* of these will necessarily approach to that of *Therapeutical Agents*; and hence several resemblances will be observed between the arrangement gives in that article and the classification which I am now about to submit to my readers.

THERAPEUTICAL AGENTS, CLASSIFICATION OF, ACCORDING TO THEIR MODES OF ACTION AND EFFECTS.

The classification of medical agents is a matter of great difficulty, and hence numerous excellent attempts have been made to overcome the difficulty by many of the more recent writers on Therapeutics. My limits will not admit of my noticing these in the manner which they deserve; but the reader who is desirous of becoming acquainted with them, will find them in the works of their respective authors enumerated in the BIBLIOGRAPHY. The arrangement I am now about to adopt, may not be superior to several of those which have been already published; but, as it is in accordance with the views exhibited in this work, more especially in this article, and in that on POISONS, I have adduced it at this place.

I. PSYCHICAL OR MENTAL REMEDIAL INFLUENCES.

i. THOSE FURNISHED THROUGH THE MEDIA OF THE SENSES. — *The sensual affections of mind* — *External affections of mind.*

A. Affections of mind induced by *pleasant odours* and *tastes.*

B. States of mind induced by *vision* — by the sight of the beautiful in nature and art, of endeared objects, especially after absence or dangers, &c.

C. *Sounds* and *Noises*, of various kinds, especialy such as are monotonous, often favour the occurrence of sleep. — Appeals of reason and eloquence. — Musical and harmonious sounds, vocal and instrumental, in due variety or combination. — The society of relations and friends. — Rational amusements, &c.

D. The Sense of *Touch:* — Frictions — Rubbing — Shampooing — Flagellation, &c.

ii. THE INTELLECTUAL AFFECTIONS OF MIND.

A. A due and moderate exercise of the powers of *perception* — *conception* — *memory* — or *powers of consciousness.*

B. A well directed exertion of *imagination* — — of *reason* and *judgment* — and of *other active intellectual states.*

C. A due exercise of the *powers* of *reflection* — of *right* and *wrong* — of *causation and truth* — of *duty* — *immortality*, &c. — of *rational incentives to duty.*

iii. THE MORAL AFFECTIONS OF MIND.

A. Instinctive or simple moral affections. — Hope — Confidence — Anticipation of pleasures and happiness — Love — Desire of p-probation, of knowledge, of power, &

B. Rational emotions of mind. — The d es which the individual owes himself nd those connected with him. — Reli us obligations — Agreeable mental pur its — Useful occupations — Rational am ements &c.

II. HYGEIENIC AGENTS AND INFLUENCES.

i. FOOD AND DRINK.

A. Food. *a.* Vegetable and farinaceous liments. *b.* Animal food. *c.* Mixed d. *d.* Regulated diet or dietetic regimen du ng and after disease.

B. Drinks. *a.* Distilled and spring w rs. *b.* Mineral waters. *c.* Beverages, wines d liquors. *d.* Prescribed forms or combina ns of these.

C. Condiments — Spices, Sauces, &c.

ii. AIR AND LOCALITY.

A. Purity of air, in connection with loc ty with the soil and with its productions.

B. Light and sunshine.

a. Influence of light.

b. Effect of the sun's rays — the chemic — the electrical or magnetic — the co r-ing, &c.

c. Of the absence of either or all these.

C. The Temperature, dryness, or humidi of the air. — Dependence of these on l u-tide, on altitude, on the soil, on the o-ductions of the soil, on position or loc y.

iii. OF EXERCISE.

A. In-door exercise. *a.* Occupations anc n-ployments.

B. Exercise in the open air. *a.* Wal g. *b.* Riding. *c.* Active and athletic exer es.

iv. CLIMATE AND CHANGE OF CLIMATE. — ee Art. CLIMATE.)

A. Climate of Great Britain and Ireland.

B. Foreign climate. *a.* European. *b.* As c. *c.* African. *d.* American. *e.* Austral n and Polynesian.

C. Changes of climates.

a. Effects of change on different race or colours.

b. Effects of change on disease.

D. Travelling and Voyaging.

a. Travelling by Railroads, or otherwi

b. In sailing or in steam-vessels.

c. The several effects of these modes.

III. MEDICINAL AGENTS — MEDICINES APP D TO THE FRAME.

i. MODES IN WHICH MEDICINES ARE EMPL D OR EXHIBITED.

A. To the respiratory organs. — Inhale or inspired.

B. Taken into the stomach. — In various f ns and combinations, without or with the d.

C. Injected or introduced into the bowels. — e-mata and suppositories.

D. Introduced or injected into the sexual d urinary organs.

a. Into the vagina.

b. Into the urethra and urinary bladder, c.

E. Applied externally.

a. To the general surface, or part of e surface.

b. To a part of the surface after the rem l of the cuticle. — Endermic medication

F. Injected into the blood vessels.

The Action of Medicines.

A. Locally and Primarily — On the tissues to which they are applied.

B. Remotely and Consecutively. — Sympathetically, and by the blood.

C. Both Locally and Remotely.

D. Chemically—By altering the chemical constitution of fluids and solids.

E. Mechanically and Surgically.

F. Vitally — By altering the states of function or vital manifestation.

G. Organically. — By affecting the structure or the intimate organization of parts.

The Modes in which, and the Channels through which Medicines act.

A. Primarily and Locally.

- *a.* On the nerves of the part.
- *b.* On the capillaries of the part, and on the contained fluids.
- *c.* On the irritability of the tissues.
- *d.* On the organization and structures of the part.

B. Sympathetically or through the media of the of the organic and the animal systems of nerves.

C. By imbibition, or endesmose and absorption. Through the medium of the circulating fluids, especially the blood.

The General Effects of Medicines.

A. Depressing nervous influence and vascular action.—Lowering vital power—Sedatives or depressants.

B. Stimulating nervous influence, either organic or animal.—Stimulants.

C. Exciting vascular action.—Phlogistics.

D. Exciting both nervous influence and vascular action—Excitants.

E. Exhausting nervous influence, or vital energy — Exhaurients.

F. Altering, otherwise than dynamically, nervous influence and vital power.—Alterants.

G. Changing the sensible appearances and the constitution of the blood.—Hæmapharmaca. Blood-Remedies,

H. Producing a succession of two or more of these effects,

ASSIFICATION OF MEDICINES ACCORDING TO HEIR SPECIAL OPERATION.—THE PHYSIOLOICAL ACTION OF MEDICINES.—*Remedial agents ccording to their special effects.*

ASS I. ABSTRACTING THE ANIMAL HEAT, OR EPRESSING THE CALORIFIC PROCESS IN A ART OR THROUGHOUT THR BODY. — REFRIERANTS.

i *External Refrigerants:* — Thin clothing—Cool r cold air—Cold Baths—Cold affusions or ouche—Cold sponging—Shower-baths—Cold r evaporating lotions—Ice applied externally —Cold solutions,

i *Internal Refrigerants.*

- *a. Dietetic Refrigerants.*—Lemons, Oranges, Mulberries, Strawberries, Pomegranates, Confected Ices, Tamarinds, Common Sorrel, Lettuce, Whey, Butter-milk, &c.
- *b. Medicinal Refrigerants.*—Cold fluids,—Ice and Iced waters—Solutions of hydrochlorate of ammonia—of Nitrate of potash —of Nitrate of soda—of most of the alkaline neutral salts—Citric Acid and the citrates—Tartaric acid and the tartrates—Acetic acid—Acetate of ammonia, &c.

Class II. Depressing, suppressing, or benumbing Sensibility, or paralysing, Involuntary and Voluntary Motions. — Sedatives.

i. *Mental Sedatives,* — Grief, Anxiety, Fear, Terror, Regret, Sadness, Disappointment, Loss of fortune, reputation, friends &c., Home-sickness, &c.

ii. *Physical or Medicinal Sedatives.* — Humid states of the atmosphere, and whatever favours the transfer or eduction of electricity from the frame. The preceding agents (Class I.) when long or largely employed, relatively to the state of vital power or resistance, The preparations of Lead and Saturnine Solutions, Hodrocyanic acid, Laurel water, Volatile oil of bitter almonds, Cyanide of potassium; Tobacco and its several preparations, especially the oil; the infusion, decoction, and smoke of Tobacco, Nicotina, Sulphuretted Hydrogen gas, Carburetted hydrogen gas, Carbonic acid gas, Chloroform and Æthers, especially when inhaled; excessive blood-letting, or vascular depletion causing syncope.

Class III. Softening, liquifying, or dissolving one or more of the Tissues or Textures.—Dissolvants.

The Alkalies and alkaline subcarbonates—Antimonial salts—The Oxalates and Oxalic acid—Boracic acid—Biborate of soda—Putrid animal matters, &c.

Class IV. Astringing the tissues, and increasing the Tone or Vital Cohesion of Structures — Astringents and Tonics. — Antiseptics.

i. *Vegetable Astringents.* — Oak-bark, Nutgalls, Catechu, Kino, Uva-Ursi, Rhatany, — Tormentilla, Pomegranate bark or rind, Logwood, Bistort, Matico.

ii. *Bitter Tonics.* — Quassia, Simarouba, Gentian, Calumba, Cheirayta, Common Centaury, Buckbean, &c.

iii. *Astringent and Bitter Tonics.*—The Cinchona Barks, Spigelia,, Elm-bark, Willow-bark.

iv. *Aromatic Tonics.* — Cascarilla bark, Wormwood, Elecampane, Canella bark, Angustura bark, Hops, Cedar bark.

v. *Acid Tonics.* *a. Mineral Acids:*—Sulphuric, Nitric, and Hydrochloric acids; Alum. *b. Vegetable Acids.* — Formic acid, Gallic acid, Catechuic acid.

vi. *Alkaloid Tonics.* — Quina, Cinchonia, Salicine, Quassine.

vii. *Metallic Tonics.*—The salts, oxides, and carbonates of iron, of silver, of zinc. The bichloride of mercury in minute doses.

Class V. Irritating Tissues, Structures, and Organs. — Irritants. — Corrodants.

i. *The mineral salts,* in large doses or in quantities above those producing a tonic or astringent action. The chlorides and chlorates of the alkalies. The metallic salts as the sulphates and chlorides of zinc, copper, &c. The Nitrate of Silver, salts of antimony, &c. Lime unslacked.

ii. Euphorbia, Croton Tiglium, Savine, Rhus Toxicodendron, Mezereon, Pyrethrum, and numerous acrid or irritant *vegetable productions* and vegetable oils. (See Art. *Poisons*, §§ 234. —248.)

iii. *Animal Irritants,* as Phosphorus, Cantharides, and the scales of many insects. Morbid Animal secretions and poisons.

iv. *Physical and Mechanical Irritants:* — Urtication, Heated air, Hot water, Heated metal. The Actual Cautery, Setons, Issues, &c.

Class VI. Relaxing the Tissues, or lowering the Irritability of Structures. — Emollients, — Demulcents.

i. *Aqueous Emollients:*—Water at ranges of temperature betweeen 65° and 170°. — Aqueous Vapour, Medicated Aqueous Vapours.

ii. *Mucilaginous Emollients—Demulcents:* —Prepared from gum Arabic, Tragacanth, Mallows, Marsh-mallows, Coltsfoot, Linseed, Sweet Almonds, &c.

iii. *Amylaceous Emollients:* — Farinaceous and starchy substances. Flour, Oatmeal, Barley, Sago, Arrow-root, Starch, Tapioca, &c.

iv. *Sacharine Emollients:* — Honey, Liquorice, Sugar of Milk, Beet-root.

v. *Albuminous Emollients:* — White and yolk of eggs, Milk, Saliva.

vi. *Gelatinous Emollients:* — Gelatine in its pure or other forms, or as obtained from Isinglass, Hartshorn shavings, Tendons, Bones.

vii. *Oleaginous Emollients:*—Animal fats, Butter, Spermaceti, Vegetable oils, especially Palm, Olive, Almond, Linseed, and other oils.

Class VII. Stimulating, or exciting the Vital Manifestation of a Tissue or Organ. —Stimulants—Excitants.

Stimulants are related, on the one hand, with *Tonics* and *Irritants*, especially when the latter are given in small doses; and with *Sudorifics*, *Evacuants*, and *Diureties*, on the other. They act primarily on the organic nervous, and on the Cerebro-spinal nervous Systems, according to the manner of using them.

i. *Condimental and Aromatic Stimulants.*—Garlic, Leeks, Onions, Mustard, Horse-radish, Scurvy-grass, Water-cresses, and other anti-scorbutic plants. The hot or warm Spices— Ginger, Pepper, Capsicum, Cloves, Cinnamon, Canella, Ginseng, &c.

ii. *Resinous and Balsamic Stimulants:* — Guaiacum, Mastic, Elemi, the Turpentines, Copaiva, Opobalsum, Benzoin, Styrax, Tolu, Peruvian Balsam.

iii. *Gum-Resins;* — Assafœtida, Ammoniacum, Galbanum, Sagapenum, Opoponax, Myrrh, Olibanum.

iv. *Camphoraceous Stimulants:* — Camphor, Arnica, Serpentary, Contrajerva, Valerian, Cajuputi oil.

v. *Ammoniacal and other Stimulants:* — The preparations and Salts of Ammonia. The empyreumatic oils, Phosphorus, Musk, Sumbul, Castor.

vi. *Alcoholic Stimulants:* — The several alcoholic liquors. Wine, Alcohol, the Æthers. Malt and fermented liquors.

vii. *Calorific and Electrical Stimulants.* — A temperature exceeding 60°. The sun's rays, especially as imparting light, heat, and electrical influence. Dry heat above 60° and not exceeding 120°. The electro-motive or the electro-magnetic current.

Class VIII. Augmenting the Secretions and Excretions—Evacuents—Depurants.

Substances which produce this effect, generally first excite the organic nerves, supplying the parts on which they act, and consec tively attain the end which chiefly chara terizes them. In larger doses, they not or stimulate the functions to which they are rected, but often also *irritate* more or less markably the tissues to which they are appli They are thus closely related to *stimulants*, a to *Irritants* and *Alterants*.

i. *Increasing the Secretions from the Schneider membrane.* — *Errhines.*

  a. *Aromatic Errhines:* Lavender, Marjora Sage, Spices, &c. reduced to powder.

  b. *Acro-Sedative Errhine:* — Tobacco, phorbium, Veratrum, Asarum, &c.

ii. *Augmenting the salivary Secretion—Sialagog*

  a. *Local sialogogues — Masticatories:* — zereon, Pellitory of Spain, Horse-radi Ginger, Betel nuts, Betel leaf, Musta Tobacco, &c.

  b. *Remote or contingent Sialogogues:*—Act through the medium of the circulation preparations of Mercury, of Iodine, Gold. Foxglove, Hydrocyanic acid, Ni acid, &c., in rare instances.

iii. *Provoking the discharge of the contents of Stomach, and increasing the secretions from villous surface.* — *Emetics.* — *Vomits.* — biliary and pancreatic secretions are frequently increased by the operation emetics.

  a. *Vegetable Emetics:* — Ipecacuanha, bacco, Mustard, and other vegetable tants, taken in large doses.

  b. *Mineral Emetics:* — Emetic Tartar, phate of Zinc, Sulphate of Copper.

Of these Tobacco and Emetic Tartar are most despressing: often so depressing as be injurious or even poisonous. They ou never to be given in states of vital exhaus or Narcotism.

iv. *Producing Alvine evacuations.*—*Purgative Cathartics:*—

  a. *Laxatives or Lenitives, Mild Aperients* Manna, Cassia pulp, Tamarinds, Pru Almond and Olive Oils, Magnesia, Bi trate of Potash.

  b. *Cooling Antiphlogistic or Saline Pu tives:*—The Sulphate of Soda, Potash Magnesia, Citrate of Magnesia, Tartrat Potash.

  c. *The Milder Purgatives:* — Sulphur, na, Rhubarb, Aloes, Castor Oil.

  d. *Chologogue Purgatives. Alterative or curial Purgatives:* — Calomel and o preparations of Mercury. Bitartrat Potash in large doses.

  e. *Drastic or Acrid Purgatives. Hydrag Cathartics:* — Jalap, Scammony, G boge, Black Hellebore, Colocynth, phate of Potash, Elaterium, Croton oi

v. *Promoting the Excretion of Urine — Diure* — Acting chiefly through the medium of Blood.

  a. *Acid and Saline Diuretics:* — The d Mineral and Vegetable Acids, the bonates of the Alkalies, the Veget Salts of the Alkalies, especially the B trate and the Acetate of Potash, the trates of Soda, Potash, and Magnesia Nitrates of Potash and Soda.

  b. *Irritant Diuretics:* — Squills, Com

Broom, Cantharides, Juniper, Turpentines, and Balsams.

c. Sedative or Depressing Diuretics: — Digitalis, Colchium, Tobacco.

d. Alcoholic and Ætherial or Stimulant Diuretics: — Dilute Spirit, Gin, Ale, the Nitric and other Æthers.

Promoting Cutaneous Transpiration. — *Diaphoretics.*

a. Diluent or aqueous Diaphoretics: — Warm Fluids, Whey, Tea, Gruel, Broths, &c.

b. Saline, Antimonial or Cooling Diaphoretics: — Acetate, Citrate, and Carbonate of Ammonia; Alkaline Citrates, andTartrates, Nitrate of Potash, Sulphur, Sal Ammoniac, the preparations of Antimony, weak solutions of Camphor.

c. Opiate Diaphoretics: — Opium, Morphia, and their preparations, conjoined chiefly with Ipecacuanha, or with one or more of the foregoing, or with the Æthers.

d. Warm or stimulating Diaphoretics: —The preparations of Ammonia, Sassafras, Mezereon, Guiacum, Camphor in full doses, Spirits or Alcoholic fluids, the Ætherial preparations, Coffee.

. *Promoting the discharge from the Bronchi and Trachea.—Expectorants.*

a. Vapours inhaled into the Lungs;—The dilute vapour of Turpentine, or of Tar, or of Creasote, or of Camphor, or of Iodine, or of Benzoic or Acetic Acid; the smoke of Stramonium, or of Tobacco.

b. Stimulating Expectorants; acting chiefly by the Organic nervous system and the Blood: — Camphor. The Gums and Gum-resins, the Balsams, Ammoniacum, Squills, Senega, Garlic, Onions, Sulphur.

c. Nauseating or emetic Expectorants—Depressing Expectorants: — Preparations of Antimony, of Ipecacuanha, Lobelia inflata, Tobacco.

i. *Exciting the Catamenial Discharge—Emmenagogues.*

a. Purgative Emmenagogues:— Acting chiefly on the lower Bowels. Aloes, Camboge, Colocynth, Calomel, Black Hellebore.

b. Diuretic and stimulating Emmenagogues: — Savine, Juniper, Rue, Cantharides, the fœtid Gums, Castor, the preparations of Iron, Myrrh, &c.

d. Acting more directly on the Uterus: — More frequently restraining hæmorrhage from the uterus by exciting contractions of its parietes, than favouring a discharge from it. Ergot of Rye, Biborate of Soda, Oil of Turpentine.

LASS IX. EXCITING THE CEREBRO SPINAL NERVOUS SYSTEM — NERVOUS AND MUSCULAR EXCITANTS.

Nux Vomica and Strychnia, and plants containing Strychnia, Brucia Antidysenterica, Coculus Indicus, Coriaria Myrtifolia, &c. &c.

LASS X. IRRITATING AND DEPRESSING MEDICINES—IRRITATING AND PARALYSING.—ACRO-SEDATIVES. Substances which irritate the Tissues and depress organic nervous or vital power.

Mineral Acro-Sedatives:—Arsenic and its compounds. Tartar Emetic and Antimonial preparations. Cupreous substances: Baryta and its Salts; Sulphate of Potash in large doses, Oxalate of Potash, Chromate of Potash, the Sulphurets, Tartaric Acid.

ii. *Vegetable Acro-Sedatives:* — Aconite and its preparations. Colchium autumnale, Helibore and its species, Digitalis, Indian and Virginian Tobacco, Castor Seeds, Jatropha Manihot, Veratria, &c.

CLASSS XI. IRRITATING AND ALTERATIVE—ACRO-ALTERANT MEDICINES.

i. *Mineral Acro-Alterants:* — Chlorine and the the Chlorides. Chlorate of Potash, the Hypochlorides: Iodine and its compounds, Iodide of Iron, of Mercury, of Arsenic, Bromine, Mercury and its preparations, Arsenic, &c. The Alkalies.

ii. *Vegetable Acro-Alterants:*—Iodine, Bromine, the Thorn-apple, Conium, Belladonna, Benzoin, Camphor, Turpentine and the Terebinthinates and Balsams, Tar, and Tar Water.

CLASS XII. ALTERING VITAL ACTIONS.—ALTERANTS—DEOBSTRUENTS:—Changing the state of the secretions, and of the nutrition of certain textures and organs, according to the substance employed, and the mode of employment.

i. *Mineral and Metallic Alterants.*—Sulphur, Magnesia, the Carbonates of the alkalies, the Preparations of Iron, of Mercury, of Iodine, of Arsenic, &c.

ii. *Vegetable Alterants:*—Taraxacum, Carbon, Sarzaparilla, Sassafras, Citric acid and Citrates; the preparations of Iodine, especially the Iodides,

iii. *Animal Alterants:*—Cod and Torsk liver oil, Ox-gall.

CLASS.—XIII. STUPEFYING OR NARCOTISING THE NERVOUS SYSTEMS.—NARCOTICS.—HYPNOTICS.—ANÆSTHETICS.

i. *Gases and Vapours, especially when inhaled:*—Carbonic acid gas, Carburetted hydrogen gas, Sulphuretted hydrogen. The vapour of Chloroform, or of the Æthers, or of Alcohol.

ii. *Vegetable Narcotics:*—Opium, Morphia, and their preparations. The smoke of Opium, Henbane, Cicuta virosa, Poppy, Hops, Hemlock-dropwort, Lollium temulentum, Canabis Indica (an uncertain narcotic).

CLASS XIV. AFFECTING THE STATES OF THE BLOOD AND CAPILLARY BLOOD-VESSELS HÆMATO-CATHARTICA.—HÆMAPHARMACA.

i. *Altering the Appearance and Condition of the Blood. Blood-medicines:*—The Alkaline Carbonates, Magnesia and its citrate, the Nitrate, Citrate, and Chloride of Potash; the Chlorate of Potash; the Nitrate, Citrate, and Chloride of Soda; Chloride of Sodium; Alkaline Solutions, Sulphur, weak or dilute Acids, Chlorine and Chlorinated solutions and waters, Nitro-hydrochloric acids, Citric acid. The preparations of Iron; Chalybeate and Mineral springs and artificial mineral waters.

ii. *Constringing the Capillary blood-vessels and altering the state of the blood circulating in them:*—The Mineral acids, the diacetate of lead, the spirits of Turpentine, the Ergot of Rye, the Gallic and Tannic Acids, Matico, Creasote.

CLASS XV.—INDUCING CONTRACTIONS OF THE UTERUS.—PARTURIFACIENTS.—PARTURIENTS. Ergot of Rye, Biborate of Soda, Spirits of Turpentine, in full doses or in enemata.

CLASS XVI. EXPELLING WORMS AND PRE-

VENTING THE FORMATION OF WORMS.—ANTHELMINTICS.

i. *Mechanical Anthelmintics*:—Filings of Iron, Granular Tin, Cowage, *&c.*, followed by drastic purgatives.

ii. *True Anthelmintics*:—Substances poisonous to parasitic animals:—Oil of Turpentine, Tar and Tar water, Creasote, Animal oil or Dippel's oil; Chenopodium or worm-seed, or its oil; Spigelia or Pink-root, Male fern, bark of Pomegranate root, bark of the root of Azedarac, Fucus helminthocorton, Corsican Wormweed, Tanacetum vulgare, common Salt, Kousso.

iii. *Purgative Anthelmintics*: — Calomel, Jalap, Scammony, Castor oil, Aloes, Hellebore. — Most efficacious when following the exhibition of the preceding.

iv. *Medicines preventing the formation of Worms*:— Assafœtida, Myrrh, the preparation of Iron, Tar-water, Charcoal; Quassia, and bitter tonics.

CLASS XVII. PREVENTING OR CORRECTING A TENDENCY TO A DISSOLUTION OF THE TISSUES, OR TO A SOLUTION OF THE VITAL COHESION OF TEXTURES—ANTISEPTICS.

The Substances classed as *Astringents* and *Tonics* (Class IV.) are also more or less *Antiseptic*.

i. *Mineral Antiseptics*:—The Chlorides of the alkalies, the Hypo-chlorides, Chlorine and Chlorinated fluids, the Chlorides of the metals and of the metalloids, the Tincture of the hydrochloride of iron, the Chloride of Zinc, the Mineral Acids.

ii. *Vegetable Antiseptics*:—Tar, Turpentine, Tar water, Creasote, Charcoal, Camphor, the astringent and tonic Barks, Quina, Beebirine, Tannin, Gallic, and Gallic Acids.

CLASS XVIII. NEUTRALIZING ACIDITY, REMOVING OR PREVENTING ANTACIDS. —SORBEFACIENTS.

i. *Direct Antacids*:—The Alkalies and Alkaline Carbonates, the Carbonates of Iron, of Zinc, of Bismuth, Magnesia, Lime and their Carbonates, Lime-water.

ii. *Indirect Antacids*:— The Mineral acids, Tonic and Bitter Infusions, Tonic Mineral Salts, Sulphate of Quina, &c.

CLASS XIX. DESTROYING OR REMOVING, OR COUNTERACTING AN INFECTIOUS SEMINIUM OR MIASMS. — DISINFECTANTS.

i. *Destructives*:—Heated air from 180° to 254°. —This is the only real disinfectant. All other substances, which have been extolled as disinfectants, act merely by *removing* offensive odours, or by *fortifying* persons exposed to infection against its invasion. The medicines enumerated in CLASSES iv. vii. and xvii., by increasing the vital tone and cohesion of the tissues, enable the body to present a greater or less resistance to the impressions made by infectious miasms, and in this they are aided by mental excitement and confidence, and by the several stimulants and tonics, when these are so employed as not to be productive of consecutive exhaustion.

In the above attempt at classifying Therapeutical Agents, I have departed far from previous arrangements. Certain *Classes* or *Orders* have been created, whilst others have been omitted: of the former there is little to be remarked, and that little will be seen by the reader who is acquainted
with the subject. I have omitted the *Cl*
Antispasmodics, because there is really no cl
of medicines which possesses the property of
rectly arresting spasm; substances which ha
acquired this appellation, possessing their o
claims to it by their contingent action on
morbid conditions productive of spasm. So
writers have created a class of *Revellants*
Counter-irritants. But revulsion, or count
irritation, is merely the employment of me
comprised in CLASSES v. vii. and viii., in suc
manner as to induce irritation and consecut
vascular determination to parts at a distan
from the seat of morbid action, or to solicit
increase dflow of blood to viscera or organs,
promoting or exciting their functions. It
be perceived that I have arranged several s
stances under more than one class. This nec
sarily follows the varying and even different act
of the same substance, according to its dose a
modes of exhibition or combination. For v
enlightened views as to the operation and classi
cation of Therapeutical Agents, I may re
the reader to the more recent works on The
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THROAT, DISEASES OF — COMPRISING THE TONSILS AND PHARYNX.

1. *The parts*, of which the throat may be said to consist — The *velum* or soft *palate* and *uvula*, the *tonsils* and pillars of the palate, the *pharynx*, and the *root* of the tongue and *epiglottis* — may individually, or severally, or even altogether, be the seat of disease, especially of the various forms and states of inflammation, or of ulceration, or of sympathetic functional disorder. Whether they be individually or conjointly affected, the disease may be either *primary* or *consecutive* — *idiopathic* or *symptomatic* — *simple* or *complicated* — *local*, or *constitutional*, or *specific*, — and, as respects the state of vital power, *sthenic*, or *asthenic*, or *phagedenic*, or *gangrenous*. This last or malignant form is generally a manifestation of a general or specific contamination of the circulating fluids, in connection with reduced or perverted organic nervous power or vital action. It is comparatively seldom that one only of the parts comprised by the generic term, *Throat*, is affected, the others remaining healthy. Most commonly adjoining parts are more or less implicated; and, not infrequently in consequence either of previous disorder of the digestive functions, or of impaired vital power, or of interrupted excretion and morbid states of the blood, the disease extends to all these parts, and even still further, as to the œso-

phagus, or to the larynx and trachea — to both the digestive and the respiratory passages, especially during wet and unhealthy seasons and epidemic influences, and in low, humid and malarious localities. — Under the head PALATE and UVULA I have treated of *Relaxations* and *Inflammations of these parts.* — I have now to consider the *inflammatory and structural changes of the Tonsils* and *Pharynx,* and the *diseases of the throat,* which are not limited to one or other of these, but which often extend also to the palate, and even also to the epiglottis and larynx is one direction, and to the œsophagus in another.

I. INFLAMMATION OF THE TONSILS. — SYN. *Tonsillitis,* from *Tonsillæ,* the *Tonsils.* — *Synanche vel Cynanche Tonsillaris; Angina Tonsillaris,* Auct.—*Angina cum tumore; Amygdalite,* Fr.

CLASSIF. — III. CLASS. 1. ORDER (*Author*).

2. DEFINIT. — *Pain or uneasiness in the seats of the Tonsils, with redness, enlargement, and often with difficulty of swallowing and fever, terminating in resolution, abscess, or chronic enlargement.*

3. The *Tonsils* may be inflammed alone or chiefly, or in connection with other parts of the throat, most frequently with the fauces or pharynx, or both, especially where affections of the throat are epidemic, or complicate febrile and exanthematous maladies. Both tonsils are generally affected either contemporaneously or in succession. One only is rarely attacked, — not more than one in 15 or 20 cases.

4. *A. The causes* of Tonsillitis are nearly the same as those occasioning inflammation of other parts of the throat. The disease is not frequent in young children; it is rare during the period of lactation; but it becomes more and more frequent from five to ten years, and still more so from ten till about 20. From the latter age, or from 25 to 30, its frequency diminishes, until it is rarely seen at ages upwards of 50. It is nearly equally prevalent in both sexes; but the male sex generally furnish the greater number of cases, probably from a more frequent exposure to the exciting causes. Seasons of the year, states of weather and locality, favour its prevalence, so much so as to render it epidemic or endemic. Epidemic visitations of the malady have mostly occurred in spring or autumn; and although the disease appears at all seasons, it is most frequent when the weather is cold, wet, or changeable. Cold and humid situations, wooded and miasmatous places, and clay or absorbent soils, favour its prevalence. It affects most frequently persons of a fair complexion and those of the scrofulous diathesis; and it often recurs in the same individual, from exposure to cold or currents of air, especially when overheated or perspiring, or when the digestive functions are disordered.

5. *B. The symptoms* of Tonsillitis sometimes commence without any very manifest previous disorder. In other cases they are preceded by slight derangement of the digestive functions; and occasionally by most of the phenomena which usher in other inflammations, especially by chills or shivering, followed by heat of skin, excited pulse, thirst and headache; or merely by general uneasiness, by want of appetite, and pains or soreness of the limbs. Rapidly following, or even coëtaneously with these, more or less difficulty of deglutition, and a sensation as if a foreign body were present in the throat, are experienced; and, in a few hours, or in one or two hours, a continued pain, at first moderate, s etimes severe or acute, a sense of heat, a a constant desire to swallow, are complaine of. Deglutition becomes so difficult and painful to occasion, in some cases, contorsions or convuls ns; and in others it is impossible. A guttural c gh, a frequent desire of expuition, or of rejectin he saliva and the increased secretion from the th at; a hoarse and difficult respiration; and obsc ed, confused, or whispering and guttural articul on, or a voice entirely suppressed or lost, are gen lly present in the more severe cases. In som instances, when the tumefaction of the tonsils i ery great, and the discharge of the secretions fro the throat and mouth is difficult, paroxysms of yspnea, or of threatened suffocation, occur at ervals and heighten the distress and alarm the patient.

6. When the patient's mouth is opened ar the base of his tongue depressed, the tonsils ar een more or less swollen, protruding from betwe the pillars of the palate, and nearly approachi or even touching each other. The membrane ering them partakes in the inflammation; and s at first red and dry; but it afterwards is pa lly covered by whitish exudations, or by spe or patches of mucus or of lymph, or even y a membranous coating of these. In some inst ces, however, the tonsils continue more or les ree from exudations, and present a deeper and ker red as the disease proceeds. In most case the inflammatory appearances are not confined the tonsils, but extend also to the soft palat and uvula; and there is every reason to infer om the extension of pain to the interior of the e the crepitations which are heard, and the de ess complained of, that inflammatory change ten extend to the Eustachian tube at least, and ven in a slight grade to the interior of the ear. hen one only of the tonsils is attacked, the er gement may be so great as to pass the mesia line and to push the uvula to the sound side. The patient in such cases inclines his head fro this side, in order that deglutition may be less p ful. When both tonsils are affected as is most ommonly the case, and the swelling is gre the uvula is either thrown backwards and is con led behind them, or it is wedged between and ove them and contracted. Frequently the e gement of the tonsils is so great and so painfu s to render it difficult to open the jaws to far as see the state of the parts; but generally this may ascertained by the introduction of the finger.

7. In addition to those more strictly cal symptoms, others of a more sympathetic nat are often present. These are chiefly flushing the face, headache, thirst, loss of appetite or r sea, heat and dryness of the skin, scanty high co red urine, costiveness. In some cases the ient cannot swallow even fluid food, and a f attempts at deglutition are followed by the forc rejection of the substances taken, through the n rils. When this occurs, it may be inferred th the pharynx is also inflamed. The character the *symptomatic fever* varies remarkably. In sons previously healthy, and in open and high loc ies, the febrile diathesis is generally *sthenic* or gistic; but in the delicate or cachectic, and the inhabitants of large towns, or of low, cl , or humid places, the attending fever is of a lo or more *asthenic character,* and the local syn oms.

are ore extended to parts in the vicinity. In a f cases, and these the most robust, the febrile act is very slight, although deglutition may be ogether prevented by the swelling. In such cas the patients complain of hunger from this dej ation.

C. The *course* and *duration* of Tonsillitis is usu ly acute; and generally extends from seven to rteen days. The disease may *terminate* in five r six, and it is rarely prolonged to twenty-one days. The symptoms commonly become mo and more severe during the first third or half of ir duration. They then continue stationary for time, and subside afterwards with greater or les apidity. When the disease is slight or mo-der , or when the case is early and judiciously tre d, then resolution takes place and the swell-ing adually and quickly subsides. But in the mo severe attacks suppuration commonly super-ve in one or both tonsils; and is indicated by a c nge in the nature of the pain, which passes fro an acute and pulsating, to a dull or heavy ch cter; and sometimes by chills or chilliness, slig rigors, and a general perspiration. The diffi ulty of swallowing continues or increases; an upon introducing the finger, a softness, or eve fluctuation of one or both tonsils may be felt. W the parts can be brought into view, the pa to which the matter points may sometimes be en. The spontaneous rupture of the abscess, wh it is not opened immediately upon ascertain-ing he presence of matter, occurs either when ret ing or vomiting, or when coughing or speak-ing r when attempting to swallow or to throw ou e secretions from the throat. But the abs-ces nay break during sleep, the matter having be insensibly swallowed, and the patient feeling gr ly relieved when awakened. If the abscess th breaks spontaneously, the matter is usually fœ and offensive from its retention, the fœtor so times being the only indication of the rupture, wh the quantity of matter is small and mixed wi the secretions from the throat and mouth. In nces are rare, in which the matter makes its wa externally, or at the lateral and upper region of neck; but it has thus made its way either in e or in both sides, especially when a diffusive in mation of the adjoining cellular tissue has oc rred in connection with the suppuration of th onsils, particularly in the more malignant ex-an ematous complications of the disease; and in ll rarer cases, the matter has found its way al the vessels of the neck, into the chest.

Inflammation of both tonsils sometimes ter-mi tes differently as respects each; one terminat-in by resolution, the other by suppuration. G grene takes place rarely, and only in the ma-li nt and complicated states of the malady. T termination of tonsillitis in *chronic enlarge-m* of the parts, is not infrequent in scrofulous an cachectic subjects, and after repeated or peri-od attacks. These returns of the disease may be more or less frequent, or at certain seasons, or at certain times: they may recur, and leave the to ls either in a healthy state, or more or less en rged, the enlargement increasing and becom-in more permanent after each attack. This is fr uently the case after a recurrence of the com-pl t, the previous affection, or an existing en-la ement predisposing to subsequent attacks, so that the disease assumes the character of a remittent chronic tonsillitis. This is most apt to occur in the scrofulous diathesis, and in young persons of delicate constitution and weak digestive functions. In these more especially the enlargement may become permanent and more or less embarrass deglutition and affect the voice and speech.

10. *D. Enlargement of the Tonsils* commonly proceeds from changes which are purely inflammatory or the consequences of inflammation, although *other* changes also produce it in rarer instances, as is shown by he examination of cases, in which a fatal result has followed some other intercurrent or complicating disease. The appearances which proceed more strictly from inflammation, are thickening and injection of the membrane enveloping the tonsils; infiltration of a gelatinous and yellowish serum giving rise to thickening, enlargement, and induration in the cellular tissue situated between the follicles which constitute these organs, and purulent infiltrations or collections in the same situation. The parietes of the follicles are also sometimes thickened and indurated or softened. In those cases which are still more chronic and appear independently of inflammation, or in which inflammatory action is either doubtful or has long subsided, concrete friable matter, very closely resembling tubercular matter, is found in one or several of the lacunæ of the tonsils. When it is found in one cavity, the collection may be more or less considerable, and may have formed either in a single lacuna, or in several, the partitions between them becoming absorbed, and a single cavity being thus formed.

11. II. INFLAMMATION OF THE PHARYNX.—SYN. *Pharyngitis* (from φάρυγξ, the posterior part of the throat); *Cynanche Pharyngæa; Angina Pharyngæa; Dysphagia Inflammatoria*, Auct.;—*Angine Pharyngée*, Fr.;—*Schlundentzündung*, Germ.

CLASSIF.—III. CLASS.—I. ORDER (*Author*).

12. DEFINIT.—*Soreness or pain referred chiefly to the posterior portion of the throat, with increased pain and difficulty when swallowing, the substances taken being sometimes forcibly ejected through the nostrils; constitutional disturbance often slight, but oftener very severe or dangerous.*

13. *Pharyngitis* occurs in a great variety of forms, circumstances, and complication. It may be *mild, slight, catarrhal, primary, consecutive;* and *associated* with other disorders or maladies. It may exist *singly* or simply, or be *associated* with inflammatory action more or less manifest or pronounced, in either the soft palate or fauces, or in the tonsils, or even in the œsophagus, or in the larynx and epiglottis. The simple or unassociated state of the disease is much less frequent than the associations now mentioned, and of these the most common are those in which the soft palate and tonsils are more or less prominently affected. Pharyngitis in its simpler states is often symptomatic of disorder of the digestive functions, especially of severe or protracted indigestion; or of the more acute states of dyspepsia following an excessive indulgence in rich food and vinous or spirituous liquors; the eructations of irritating gases and fluids from the stomach, in these cases inducing irritation and inflammation of the pharynx. Pharyngitis in its associated

states presents every grade of severity, and all the forms or characters which are observed in diseases usually denominated inflammatory. It may be thus *sthenic* or phlogistic, either when simple, or when associated with tonsillitis or palatitis; or *asthenic* or *malignant*, when it occurs in the course of low fevers, during disorders of the digestive functions, during morbid states of the blood or general cachexia, and more especially in connection with scarlet fevers or with any of the other exanthemata. When thus asthenic or associated the inflammatory action always is extended to the adjoining parts of the throat, not infrequently to both the æsophagus and larynx, and even along the Eustachian tubes to the ears.

14. i. *Causes.*— Pharyngitis, in its simple and primary form is rarely observed; but associated as now stated, or even appearing as the more prominent part of an inflammation extending to adjoining portions of the throat, or even further, it is of frequent occurrence; and owing to the functions of these parts, and even of others in the vicinity, it is of much greater importance than has hitherto been attached to it. The most common manifestation of the disease is the *catarrhal;* and although it may be the chief affection, it is when thus characterised generally associated in the manner just stated. When pharyngitis is *mild* or *catarrhal*, it usually proceeds from exposure to cold in some form or manner (§ 4.). When more or less limited, it is frequently consecutive of acute attacks of indigestion, caused by the ingurgitation of too much food or fermented liquors; or it is more directly produced by swallowing acrid, corrosive, or irritating substances. Thus it may be caused by hot water; by acrid poisons, taken intentionally or by mistake; by mustard, given as an emetic in cases of narcotic poisoning; and by hot spices, or irritant medicines exhibited in excessive doses. In those circumstances, although the pharynx may be chiefly affected, the soft palate and œsophagus may be more or less implicated with other adjoining parts. *Catarrhal* pharyngitis generally proceeds from the same causes as those which produce tonsillitis, especially from currents of cold air passing over or near the neck or throat, from wet feet or damp clothes, from cold and wet seasons, and from changeable weather, especially about the equinoxes, when it is often epidemic. The more severe and dangerous forms of pharyngitis are those in which this local affection is merely a prominent manifestation of a constitutional or febrile malady, as in scarlet fever, small-pox, measles, scurvy, erysipelas, and other diseases in which the circulating fluids become more or less contaminated. In these circumstance the pharyngitis is asthenic, often characterised by pellicular exudations, but frequently not so characterised; always spreading, and generally, when thus symptomatic, occurring from infection, and often as an epidemic.

15. ii. *Description.* — Pharyngitis may be an extension of a catarrhal or mild inflammation from the fauces or tonsils, or from both; or it may be coëval as well as coextensive with these; or it may be associated with *œsophagitis* (see Art. ŒSOPHAGUS), either as the primary or the secondary affection. The catarrhal form usually commences with coryza and all the symptoms of a common cold or catarrh, or with those mentioned above in connection with *tonsillitis* (§ 5.).- d. The more acute or phlogistic form, espec lly when occurring in the sanguine temperament d in young robust persons, is commonly atte ed by symptomatic inflammatory fever ushered i y chills or rigors. With these a sense of l t, dryness, and soreness is felt at the posterior rt of the throat and posterior nares, and the su ce of the pharynx is seen, when the tongue is epressed, red, and injected, sometimes shi g. Soreness and pain are increased by attemp at deglutition, or as soon as the pharyngeal mu es are called into action. As the affection proc s, the pain and difficulty of swallowing incr e, and substances, especially fluids, are often for ly rejected by the nostrils. When the inflamm on is severe, the pain is often referred chiefly t he neck or the anterior aspect of the upper cer al vertebræ. The heat and pain in this situatio re somewhat abated as soon as the red and infla ed surface becomes covered in parts with a ck tenaceous mucous exudation. This exud on often increases, or is more and more abun t, but still viscid or ropy, and is discharged a a hacking or hawking or guttural cough; ye he disease may continue several days, or even pro ed to its termination, without this secretion l ng very manifest or considerable. If the infla ation extends to the epiglottis and larynx, the c gh is more severe, paroxysmal, or strangulating an when it is confined to the posterior part o he pharynx.

16. When the *lower portion* of the phary is chiefly affected, then the soreness and pai re referred chiefly to the superior part of the t at, behind the cartilages, and the increased pa on swallowing, and the difficulty of accomplishin his act, are experienced after substances have en seized by the pharyngeal muscles and are abo to pass into the œsophagus, at the top of which ey are felt to be arrested or to pass with diffi y. In these cases the inflammatory action en extends more or less down the œsophagus he soreness and pain being increased upon pre ng the lateral parts of the neck and throat. — In se cases the posterior part of the pharynx ma ot present a very marked state of inflammation, en when the root of the tongue is pressed downw s; the inflammation being often either lower wn than this, or affecting chiefly the anterior pa es of the pharynx. The voice is generally but le, or not all affected; and the cough varies in erity and in character with the degree in whic he epiglottis and larynx are implicated.

Whatever may be the exact seat and ext of the pharyngeal affection, the constitutiona isturbance is very various, being in some in nmatory or sthenic, in others asthenic, a in many slight or very mild. The severity o he accompanying fever depends much upon te rament, diathesis, habit of body and the a of the patient. It is more generally asthen or adynamic in the spreading and other states o he disease about to be noticed, in cachectic cond ns of the frame, and when the affection is a ominent complication of other febrile and nthematous maladies. Pharyngitis presents c in characters or forms which deserve notice.

17. *B.* The *catarrhal* is generally erythema or superficial, and extends more or less, with an a dant secretion, to the posterior nares, the fa s,

he tonsils. It often commences with coryza, resents a marked tendency to extend to the x and trachea, and to be followed by pul- ry catarrh, or by bronchitis,—especially dur- old and wet seasons, and in changeable wea- or during easterly winds.— In rare instances ngitis presents a distinctly *gouty* or a *rheu- character*. Of these two forms the *gouty* more frequent, and is generally consequent attacks of indigestion, often connected with ures to cold or wet, occurring in the gouty esis. The *rheumatic* is seldom observed, un- in connection with rheumatism of the face ck, and with biliary accumulations and dis- of the digestive organs. The association of ngitis with *erysipelas* is much more frequent is supposed; but this, with other states and *lications* of the disease, will be more fully lered in the sequel.

C. The *terminations* of pharyngitis are chiefly *solution*, by *suppuration*, and by *gangrene*.— *esolution* is the common issue in the catarrhal the superficial nature of the affection, and bundance of the secretion from the surface, ring this termination, which usually occurs ew days and is rarely prolonged beyond the enth day. In most cases the inflammation is ficial, or erythematous; but in others the ucous cellular tissue is also affected, and the toms assume a greater degree of severity, urface remaining longer red and dry, or quently becoming covered by a viscid secre- which is detached only after great efforts paroxysms of cough, sometimes attended by ings.—*b. Suppuration* occurs in rare cases of yngitis, owing to the extension of inflamma- o a portion of the cellular tissue connecting harynx to adjoining parts This termination ually announced by irregular chills or rigors, pulsating pain or sensation in the part chiefly ed, and sometimes by sweats. The matter st frequently formed at the posterior portion pharynx, or at the sides, or even anteriorly. l cases the abscess renders deglutition diffi- or almost impossible; and in the latter situa- it embarrasses respiration and affects the and speech. The abscess may break spon- usly; but if it be not opened early, or when it ot be reached, the matter may accumulate to l extent owing to its pressure on the larynx, may become offensive and contaminating, or y find its way externally at the side of the , or it may break into the trachea, especially it forms in the anterior or lateral parts of the ynx.—*c. Post-pharyngeal-abscess* is a rare re- f pharyngitis; and although it generally opens the pharynx, it may follow the course just stated; and it may, moreover, produce se—inflammation, caries, &c. of one or more cervical vertebræ. This issue is most likely cur in the complicated pharyngitis of ex- matous fevers, especially scarlatina, in which e met with two instances.— *Gangrene* very y occurs in simple pharyngitis; but it is not frequent termination of the severe and com- ted forms about to be noticed.

. *D. Chronic Pharyngitis.*—The mild or slight of the disease, as well as that which is more e, although generally terminating in resolu- in a few days, sometimes becomes *chronic*, lapses so frequently, or returns after intervals, and thus assumes first a remittent or intermittent form, and then ultimately becomes more continued and chronic. In this state of the disease, difficulty of swallowing, uneasiness, soreness, slight pain in the posterior part of the throat, relaxation of the uvula, sometimes hoarseness of voice and speech, hacking cough, and either dryness of the throat or increased secretion from the pharynx, or an alternation of dryness and augmented secretion, are the usual symptoms; and these commonly continue for a long period, with remissions and exacerbations, especially in persons suffering from, or subject to chronic inflammatory dyspepsia, or chronic bronchitis, or tubercular consumption. In some such cases, the chronic affection is readily excited to an *acute* or *sub-acute form*, by errors in diet, by cold or damp feet, by currents of air, or by any of the usual exciting causes.

20. III. INFLAMMATION OF THE THROAT WITH PLASTIC EXUDATION. — SYNON. *Plastic Inflammation of the Throat; Pseudo-membranous Inflamm. of the Throat; Angina Membranacea; Diphtheritis*, Bretonneau; *Angina Plastica; Angine Diphthéritique; A. Couenneuse; A. Pseudo-Membraneuse*, Auct. Gall.;—*Angina with pellicular exudation.*

CLASSIF. — As above.

21. DEFINIT. — *Soreness, pain and heat in the throat, often increased on deglutition; redness with an exudation of a buff or grey-coloured lymph in spots or patches, at an early stage; commencing in either the fauces, or the tonsils, or pharynx, and quickly extending to these, and often also to the larynx and œsophagus; the exudation becoming more continuous and firm, accompanied with fever, and appearing generally either epidemically or endemically.*

22. This disease has been confounded with *Croup*, on the one hand; with malignant angina or putrid sore throat, or *Cynanche maligna*, on the other. It is rarely seen sporadically, or in isolated instances; but chiefly in an endemic or epidemic form, owing to locality, season, weather, and exposure; and, even in these circumstances, the usual causes of inflammations of the throat have been concerned in producing it; more especially vicissitudes of weather, changes of season, cold and humid states of the air; low, miasmatous, and wet localities. It is most prevalent in children after weaning, and up to puberty; and it becomes less and less frequent with the progress of age. As this form of inflammation of the throat occurs endemically or epidemically, it has been viewed by some writers as infectious. The prevalence of it may, however, be assigned to local or more general causes, especially those just now mentioned. But as it is attended by much fœtor of the breath, the emanations from the affected surface occasioning this fœtor, may infect the throats of young and susceptible subjects, especially when sleeping with, or inhaling the breath of those already attacked. It may thus extend to all or the great number of the children in a family, when one is affected.

23. i. *Description.*—The *symptoms* of plastic inflammation of the throat vary much at their commencement; in some cases beginning and advancing insidiously, in others more manifestly and severely. In many it occurs with all or most of the symptoms of a common catarrh or sore throat, either with or without chills or rigors,

Generally slight soreness and pain are first experienced, with a sense of increased heat, and are increased on swallowing. Redness, of different grades, is seen in the soft palate, or its pillars or tonsils, and the uvula is relaxed. The inflammation sometimes commences in the posterior nares and extends to the pharynx, tonsils, &c.; but it more frequently begins in the tonsils and isthmus faucium, and extends to the pharynx, larynx, &c. Thus far the local symptoms are not different from those of common sore throat; but the constitutional disturbance is frequently more severe; nausea, vomiting, heat of skin, thirst, loss of appetite, and great acceleration of pulse being most frequently observed.

24. *A.* The *special* characters of the disease now supervene with greater or less rapidity. The tonsils, the velum palati, the pharynx, either successively or at the same time, present irregular patches of a yellowish, buff, or greyish-coloured exudation on the inflamed surface. These patches enlarge, coalesce, and extend to the nasal fossæ, or to the larynx with the usual symptoms of primary *croup* (see that art. § 32. *et seq.*), and often also to the œsophagus. In adults, the disease often commences in the nasal fossæ and extends to the pharynx. At the commencement of the fibrinous exudation, stiffness, soreness, and pain are experienced in the neck and throat. The face is pallid, sometimes red and swollen; the tonsils and the cervical and submaxillary glands are enlarged; and the neck is often also somewhat tumified. Deglutition becomes more difficult as the morbid exudation advances; and substances are frequently forcibly ejected through the mouth and nostrils, when attempting to swallow. On some occasions, when the disease has been epidemic, the parotid as well as submaxillary glands have been enlarged; and the membranous exudation has in a few hours extended over all parts of the throat, and occasionally over the cheeks and tongue. In some cases the morbid exudation has even appeared on the lips, in the nostrils, and behind the ears. With the development of the exudation the mucous surface, at its margin, is red and swollen. The patches become elevated, or partially detached in parts; and minute exudations of blood take place, which mix with a more or less abundant salivary discharge. The secretion in the mouth and throat is sometimes thick, viscid, frothy, and of a greyish or yellowish grey tint. In these cases it is often scanty and discharged with considerable difficulty. But in other instances, especially when the disease is very prevalent, the secretion from the throat is much more abundant, frequently serous, sanious, or sanguinolent, and always nauseous and fœtid. In the more severe and asthenic cases these characters are very marked; and a similar discharge escapes from the nostrils, epistaxis sometimes also taking place. As the disease advances, the pellicular exudation becomes detached in parts, and is discharged with the saliva and morbid secretion. Very frequently the exudation is formed anew, on the surface from which a portion had been detached; and this reproduction of it may take place in the course of a few hours, and even for the third time, each successive exudation being more scanty or thin. The disease may continue in this state from eight to twelve days, the exfoliation of the pellicular exudation going on the greater part of the time. But sometimes the exudation softens or breaks down, in the course of three or four s, or even in a shorter time mingles with the e fluid discharge from the inflamed surface, a is thus discharged, without presenting a contin us or membranous form. M. Guersent states t, when the exudation is only slight or partial, is sometimes absorbed as the disease subsides, d is not thrown off. With the resolution o he affection of the throat, the swelling of the ck and of the glands and the painful symp ms subside.

25. *B.* The *constitutional symptoms* vary n ch with the vital energy of the patient, with e predisposing, endemic, and exciting causes d with the character of the prevailing epidemic. In some cases, the disease presents a *sthenic*, or o-gistic, or sthenically inflammatory condition in others, it is *asthenic*, or putro-adynamic, or i r-mediate between these extremes. The *fo er* occurs most commonly in sporadic cases, in s ng or robust subjects, and in the well-fed, pleth c, and sanguine. In these the attending fever i n-flammatory; the face is red or flushed; the se frequent, full, and strong; and the skin dry d hot. There are thirst, scanty urine, and co ve bowels. The local symptoms are generally se e, and the membranous exudation is firm and n-tinuous, and rapidly and largely developed. he *latter* appears chiefly in cachectic, weak, or de te or ill-fed subjects; in low, close, and miasm us localities; in over-crowded or ill-ventilated a rt-ments, &c., and in epidemic visitations of the a-lady. In these circumstances the face is tu d, or bloated, or pale; the neck is swollen; the sh soft or flabby; the pulse is quick, soft, sma or weak; the skin hot; and the excretions offe e, scanty, or irregular. The discharge from he mouth is serous or sanious, and extremely offen e; a similar discharge often taking place from he nostrils. In these the exudation is much less n-sistent, sometimes pultaceous, more readily b ks down and mingles with a more offensive a more abundant discharge from the throat, th is observed in the sthenic forms of the malady.

26. *C.* A *less acute*, or a *sub-acute variety* a milder form of the disease—is sometimes see in which the local and constitutional symptom re less severe, less rapid in their development d more insidious at their invasion and in their ly progress, than in the forms just described. I is the affection of the throat is either more con d to one part, or is attended by much less exud on and fluid secretion. The pain and difficul of swallowing are not considerable, and the swe g of the neck and glands not very remarkable. he febrile symptoms are often slight, althoug e debility is frequently great. The sympton of the disease, both local and constitutional, us vary remarkably, according to the extrinsic d intrinsic circumstances of individual cases, d to the intensity of the causes, from the most ld to the most acutely and rapidly phlogistic on the one hand, to the most putro-adynamic e other.

27. *D. Termination and Prognosis.*—The li-cular forms of inflammation of the throat a ll more or less dangerous. But the danger es chiefly from the frequency of the extension e inflammation to the larynx; a contingency h may occur in the most severe cases, even in w

rs, after the full manifestation of the malady, which is more frequent in some epidemics seasons, than in others. In many instances, extension of the disease to the larynx, as de- bed in the Art. CROUP, (see § 12. *et seq.*), e earliest indication of the nature and danger e affection ; the antecedent symptoms having overlooked, owing to their mildness, or the early age of the patient. The disease is frequently fatal in these cases ; and when it ks delicate or badly nourished children, or weakened by previous diseases. It is less erous in adults, unless the constitution has me cachectic or debilitated, or injured by pation, or the blood contaminated by neglect e depurating functions. In these cases, the bid process may advance not only to the nx, but also to the trachea and bronchi, and to the pharynx and œsophagus. The in- states of the disease may *terminate* in twenty- hours, when the larynx is implicated, but frequently from the 3rd to the 7th day. less violent attacks may be prolonged until 14th, or even the 21st day ; but seldom be- the latter period. The disease very rarely nes a chronic form.

. The termination of the disease by *resolution* ended by detachment of the pellicular exuda- either spontaneously, or by the aid of treat- t. It most frequently occurs from the 7th to 21st day ; but it is often hastened even before ormer period by local treatment. The grey- r brownish flakes of exudation, when de- ed, leave the mucous surface of the guttural of a uniform red or rose colour, and covered arts by a puriform mucus. The tonsils are enlarged, or sometimes contain a small col- on of matter. In some places, erosions ap- , especially where the exudation was longest most firmly attached ; but these are either superficial or illusory.

. When the affection implicates the *larynx*, atient is seized with a short, dry, sibillous, or zing cough, which recurs frequently in short xysms ; and is soon followed by aphonia, and nse of impending suffocation (see Arts. UP, § 12. *et seq.* and LARYNX, § 55. *et seq.*). hildren and infants, asphyxia with convulsions rapidly terminate life ; but, in adults, the se more frequently is either arrested, or it nds along the trachea, the exudation becoming fluid or less consistent, and assuming the arance at first of a viscid mucus. It thus advances to the bronchi on both sides, and times terminates in *bronchitis* or *broncho-pneu- a.*

. *E. The appearances after death* vary with the d of the disease at which dissolution occurred, the states of vital power and of vascular con- nation. If death have occurred at an early d, owing to the extension of the pellicular ation to the larynx, the mucous surface and mucous cellular tissue are more or less in- d, the epithelium of the former being covered membranous exudation in more or less ex- ve patches. With the extension and *sthenic* acter of the inflammation, the exudation is rally continuous, and is either firmly attached rtially detached, according to the duration of isease. In the more *asthenic* cases, the exu- n is more soft, pulpy; or broken down or mingled with a sanious or dirty mucus; the mucous and sub-mucous tissues being dark, livid, congested, sometimes ecchymosed or infiltrated with serum or blood, or with both, and often as if excoriated ; the mucous surface being in numerous parts or spots deprived of epithelium, and eroded. These tissues are sometimes brown, livid, or of a dark grey colour, softened or friable, and emit a fetid odour. The cervical and sub-maxillary glands are much enlarged, of a brownish or violet red hue, softened, especially in their centres, and sometimes reduced to a pulpy or semi-fluid state, or to a sanious appearance nearly resembling wine-lees. The changes in this class of cases are very nearly the same as those observed in the more malignant cases of the scarlatinous cynanche, and described in the article on SCARLET FEVER (see § 20. *et seq.*). The lesions found in the *larynx* and *bronchi* are similar to those described when treating of inflammation of these passages, and in the CROUP.

31. IV. DIFFUSIVE INFLAMMATION OF THE THROAT: —SYNON. :—*Erysipelatous Cynanche.* — *Diffusive Angina.* — *Asthenic Angina.* — *Simple and complicated Cynanche.* — *Cynanche* vel *Angina simplex et associata.*

CLASSIF. : —as above.

DEFINIT. : — *Soreness or pain, with redness of the throat, increased on deglutition, accompanied with fever, and often with a diffused swelling, more or less evinced internally and externally : the constitutional affection presenting more of the asthenic, than of sthenic characters.*

32. *A. Causes.* This form of *angina* or *cynanche* is often general, or diffused, when it comes under the observation of the physician ; or it may commence in the arch or pillars of the palate, or in the posterior nares, or in the tonsils, or in the pharynx, and rapidly extend from either part to the others. It may be strictly erysipelatous, or be consecutive of erysipelas of the face ; and I have seen instances of its occurrence from the inhalation of the breath of patients dangerously affected with erysipelas and puerperal fever. I have most frequently met with it in persons, who have been previously attacked with scarlatinous sore throat in a very severe form, or who have been exposed to cold in some way whilst the digestive organs have been disordered, or the depurating functions impeded or interrupted ; or who are living in low and close or ill-ventilated apartments, in over-crowded sleeping-rooms, or in houses the air of which is contaminated by foul privies, drains, or cesspools, in which latter circumstances especially, it often attacks several, or many persons, particularly the younger, in the same family, the delicate, ill-fed, or convalescent from other diseases, or others similarly predisposed. In these circumstances, it may be viewed as a primary or simple malady ; but although it may appear as a primary, it is not a simple affection, but rather the more prominent manifestation of what is really a constitutional malady, organic nervous power and the vascular system and blood being more or less impressed and disordered. When thus apparently simple or primary, it may be either mild, or severe, or malignant, as well as when it is consecutive of erysipelas, or of scarlatina, or of small-pox, &c. In these latter or associated states, the cynanche may be said to be specific ; and the specific forms may not be limited to the several

exanthematous fevers, but extended to the *mercurial*, in which the tongue, gums, and salivary apparatus are particularly implicated, as described when treating of the mercurial POISONS (see § 568. *et seq.*), and to the *syphilitic*, as shown in the Art. on VENEREAL DISEASES.

33. The infectious nature of the diffusive form of cynanche, as well as of that next to be noticed, has been affirmed by some writers, and disputed by others. This difference of opinion is chiefly owing to the circumstances under which both the one form and the other generally appear. The local causes most frequently originating diffusive cynanche independently of the scarlatinous infection are such as often affect a greater or less number in one house or family; but instances have occurred of a person having transmitted the disease to others differently circumstanced as respects these causes; although it has rarely proceeded to a third series of subjects, unless the predisposing and existing causes were present, due ventilation and dilution of the contaminating emanation preventing infection. This form of cynanche, moreover, is very frequently a form merely of scarlet fever, the cutaneous affection being either wanting or overlooked; the spread of the disease being attributable rather to the fever, than to the state of the throat. But when, in simple diffusive cynanche, the disease is severe or malignant, or is attended by any degree of fœtor, the risk of infection should be dreaded, and the unaffected ought to avoid the inhalation of the breath of the affected; for I have seen this form of cynanche thus communicated when there was not the least evidence of a scarlatinous origin having been connected with it. This form of angina, moreover, may be caused by suppression of the catamenia; and it is not unfrequently favoured by, and complicated with, the gouty diathesis, and by biliary disorder.

34. *B. Symptoms.*—These vary with the causes, with their intensity or concentration, with the season, weather, and endemic or epidemic influences, with the predisposition and with pre-existing disorder. This affection may be slight, as in most cases of the catarrhal form. It is generally more severe in the morbillous or variolous states; and it is often most severe or even malignant or gangrenous in the scarlatinous and erysipelatous. Diffusive cynanche may be either mild or severe—also in the simple or uncomplicated states, or when it occurs independently of exanthematous infection, and is produced sporadically or endemically from the contaminating or poisonous causes already mentioned (§§ 32, 33.). It is, however, in the more complicated states, especially in the erysipelatous and scarlatinous, that the adjoining cellular tissues and glands are most liable to be infiltrated, contaminated, and softened; the organic nervous power to be depressed, and the circulating fluids to be altered. Generally in proportion to the severity of the local affection—to the diffusion of the inflammation—to the swelling, lividity, pain, heat, and difficulty of swallowing, and to the fœtor of the breath, are the febrile symptoms developed; the pulse being quick or rapid, the heat of surface increased, and the secretions and excretions impaired, suppressed, or interrupted. But the defect of organic nervous or vital power is more especially manifested by the softness, openness, smallness, and the great rapidity, or the unusual slowness of the p e; these varying states of pulse depending upo he quantity and quality of the blood, as well as on deficient organic nervous power. With th lividity of the inflamed throat, with its diffusi to the pharynx and œsophagus, or even to the bi- ratory passages, on the one hand, and t he mouth and cheeks, Eustachian tube and int hal ears, on the other, and with the swelling o he more external parts, the febrile symptoms he- rally present more and more of an asthenic ha- racter; and the blood more of an impure, i er- fectly oxygenated, contaminated, or poisoned n- dition — a condition varying according t he nature and concentration of the exciting c es, and to the extent of impaired or interrupte de- puration. In this advanced stage and low rm of the malady, the excretions become fœtid, pe- cially those from the bowels; the fœtor c he breath is remarkable, and the urine scanty, gh- coloured, and turbid. Sometimes diarrhœa s er- venes and becomes critical, recovery either er- wards taking place, or fatal exhaustion ng produced by it, accordingly as it is treated, as the constitutional powers resist its effects.

35. *C.* The *Duration* of this general or dif ive form of cynanche is very various. If the respi ory passages become early affected, or if the d ase assumes a very severe form, a fatal resul ay occur in the course of two or three days fro the commencement of the attack; but this s om takes place before the 5th or 6th day; ar oc- casionally it occurs at even a much later p od, owing either to vital exhaustion, to contami ion of the blood as stated above (§ 34.), to les of the respiratory passages and organs, or to cl ges in the nervous centres and their memb es. Recovery generally occurs from the 7th the 14th day, but sometimes much later. *Re* ses, or *repeated attacks*, of the disease may take ce; the intervals between them varying with t cir- cumstances or causes producing them; a the malady may even, from these and other c ses, thus assume somewhat of a *remittent* or *int* nit- *tent form*, or even become *chronic*, recover or a more acute attack supervening after an ind nite period.

36. *D. Terminations and Prognosis.*— *co- very* often follows early and decided treat nt; the inflammation of the throat presenting ess livid hue, the swelling subsiding, and degl ion becoming more easy. When these chang are attended by an improvement in the states the pulse and skin, and in the several secretio nd excretions, then this result may be expecte ith certainty. More unfavourable symptoms en than those already mentioned sometimes a ar, and indicate irritation of the nervous ce es, either by the contaminating operation o the miasms causing the disease, or by the interr ion of the depurating functions; the blood in her case being affected, and vital power depr ed. These symptoms are convulsions in chil n; delirium and restlessness in young person nd adults; followed by stupor, coma, pickings the bed-clothes, &c. These generally follow r lly upon the extension of the inflammation, or her of the local morbid action to the œsophag to the larynx, and trachea, and to the Eust ian tubes and internal cavities of the ears. T se- verity of the local symptoms, the diffused sw ing

Pr iced by the infiltration of the sub-mucous ce lar tissue, as well as by capillary injection an ongestion, and the viscid exudation from the dis sed surface, increase all the symptoms conne d with deglutition and respiration, and often thi ten, and sometimes occasion, death by asph ia, especially in children and young subje , convulsions often also accompanying this ev . The danger is generally great in proportio o the difficulty of respiration, to the dark hue an swelling of the throat, to the fœtor of the br h, to the tumefaction of the sub-maxillary reg ns and neck, and to the weakness, smallne and frequency of the pulse. Lividity of the fac lips, and tongue; a dirty, dark hue of the ge al surface, and blueness of the fingers and na are commonly fatal signs. Suppression of uri , and involuntary or unconscious intestinal ev ations, are also indications of impending dissol on, especially when they are preceded or att led by the foregoing symptoms.

. The dark colour of the throat, the sanious dis arge from the mouth, and the gangrenous or fœ odour of the breath, have induced a belief, es ially among some writers of the last century, tha *angrene* or sphacelation of one or more of the pa affected supervenes and occasions death. Bu ctual sphacelation of any of these parts rarely oc rs during the life of the patient; although the sw ing, sanious or sero-sanious infiltration, and so ing of the parts, are sometimes initiative of thi lteration, and approach it more or less soon aft dissolution. In the rare cases in which sp elation of a portion of the inflamed surface tal place, a slough usually sufficiently appare is formed, and, if the treatment be active and ju ious, it is thrown off, leaving an ulcerated ca y or loss of substance more or less manifest ac ding to the amount of the disease. In these cas , the danger may be less (recovery sometimes oc ring) than when the morbid action is more dif ed; the constitutional symptoms, or those co ected with the nervous and vascular systems, an with the state of the blood and of the excretio evincing by their severity a greater amount of k than is denoted by the local sphacelation. Th alteration, instead of constituting a distinct va ty of cynanche, is merely an accident, or res seldom supervening, and is as likely to occu n one form of the disease as in another, alt ugh it is consequent upon the severity of the loc affection, whether that affection be simple, or co licated with scarlatina or scurvy, or any otl constitutional malady. The *phagedenic* or ga renous stomatitis, affecting in rare instances inf ts and young children (see Art. Stomatitis, § *et seq.*), sometimes extends to the fauces an hroat, if it be not quickly arrested, and the po nous action of mercurials particularly in this cl of subjects, and in adults who are susceptibl f this action, is occasionally exerted in the th t and mouth in this destructive manner.

. E. *The associations or complications* of infla natory affections of the throat, in their partia or more general forms, are very numerous. Th are commonly at first *symptomatic* manifes ions of a more general or of a febrile nature; an hey not unfrequently become most troubleso and even dangerous complications, not merely fro their severity, but also from their extension, as own above (§ 36.) to one or more of the passages leading from the throat to other organs, and even to those organs themselves. In the exanthematous order of fevers, and sometimes also in the more simple continued fevers, these affections are often most serious complications. They are still more particularly so in scarlet fever, and sometimes in erysipelas of the head and face. They are often present in scurvy and other forms of cachexia; and they are frequently associated with the inflammatory states of dyspepsia, and in gastro-enteritic disorders, both acute and chronic. In many organic maladies seated in the abdominal and respiratory organs, chronic affections of the throat, and sometimes also of the mouth and tongue, often supervene, especially at a far-advanced stage of these organic maladies, and indicate depressed organic nervous power, and change of the circulating fluids; thus evincing an unfavourable and generally a fatal issue. The affections of the throat and mouth, in the advanced course of these maladies, especially of tubercular diseases of the lungs, often assume an aphthous appearance, and increase the distress of the patient.

39. V. Treatment.—i. Of Tonsillitis.—The treatment of tonsillitis is nearly the same as that of other forms of angina.—*A.* At the commencement of the complaint *acidulous* and *demulcent*, or *emollient fluids* may be used; and the open mouth may be frequently held over a basin containing about half a scruple or scruple of camphor and an ounce of vinegar, on which about a pint of boiling water is poured, the patient directing the *fumes* from these towards the throat by placing half a sheet of paper before and above his open mouth, and under his nostrils, so as to allow respiration to be free. If the *vapour* from these excite cough (which it will not occasion if the paper be adjusted over the upper lip, so as not to allow the fumes to be respired by the nostrils) either the quantity of water may be increased, or that of the other ingredients diminished. A sufficiently active aperient and alterative pill ought to be given at bed-time, and a *purgative* draught in the morning; and the feet and legs should be plunged in warm water, containing salt and mustard, the *pediluvium* being repeated according to circumstances. In mild cases, or in delicate persons, these means, aided by *diaphoretics*, and by *embrocations* to the throat and neck, will generally be sufficient to remove the complaint; but in strong, robust, and sanguine habits of body, or when the febrile action is considerable, is sthenic or phlogistic, *venesection*, or *leeches* applied behind the ears, or both modes of depletion may be practised. In large towns, and in persons living in low, close localities, and in the insufficiently nourished, *blood-letting* is as often injurious as beneficial. For males, *cupping* on the nape of the neck — the quantity of blood taken by it having due reference to the state of the patient — should be preferred; but for females, neither this mode of depletion, nor the application of leeches to the neck, is eligible, on account of the marks which are left by them. For these latter, therefore, *bleeding* from the feet whilst they are plunged in warm water, or the application of a few leeches below the groins, especially if the catamenia be delayed, suppressed, or difficult, or scanty, should be preferred. I have never seen much benefit derived from the application of leeches to the

neck in tonsillitis: and the recommendation of some writers to apply them to the inflamed tonsils is generally repugnant to the patient, and is seldom advantageous.

40. *B. Fomentations* and *poultices*, of an irritant nature by some, and of an emollient kind by others, have been advised; either of these may be of service, and either of these may be quite useless. I have generally prescribed *terebinthinate epithems* and *embrocations* to be applied around the neck, two or three folds of flannel being moistened by the substances prescribed, and covered by a napkin or handkerchief. These substances, conjoined with the turpentine, have been varied according to the features of the case, as directed in various parts of this work, and in the Appendix (see *Form.* 311.); and are beneficial in all the forms of angina. They may be so prescribed as to produce erubescence of the external surface, or as not to occasion this effect, according to the intention of the physician. In addition to the use of laxatives and aperients, or purgatives, and of diaphoretics, it has been usual to prescribe *gargles* to the throat. I have seldom seen them of much service. But refrigerant and emollient fluids, in the severe and *sthenically* inflammatory cases, as the nitrate of potass, solution of the acetate of ammonia or muriate of ammonia and mucilage, in camphor mixture, may be taken frequently, and held in the throat for some time, whilst the head is thrown back, before they are swallowed, or before they are thrown out.

41. *C.* The more *asthenic forms* of tonsillitis occurring in weak, ill-fed, or cachectic persons, or in those weakened by a foul atmosphere, or by previous disease, ought not to be treated by local or by general blood-letting. After the excretions and fæcal accumulations have been duly evacuated, organic nervous power and the depurating functions should be promoted by suitable means; and the local extension of the morbid action ought to be prevented by the applications which have been found most successful in attaining these ends. The action of the excreting organs should be increased by conjoining *tonics* with *aperients*, and these with the *alkaline carbonates*. These medicines may be taken at night or early in the morning, or at both periods; whilst the decoction of *cinchona*, with the compound tincture of cinchona and the solution of *acetate of ammonia*, may be given during the day. In many cases, the dilute *hydrochloric acid*, or the nitro-hydrochloric acids, or the pyroligneous acids, may be substituted for the acetate of ammonia; and each dose of such mixture may be held for some time in the throat, as just advised, before it is swallowed; or the same mixture may be used very frequently as a *wash* for the throat whilst the head is thrown back, and be afterwards ejected. I have in these cases also prescribed the sulphate of quina with compound infusion of roses, dilute sulphuric acid, &c.; but I have had reason for preferring the medicines now advised, to this last. In the more asthenic — in the gangrenous, putro-adynamic or malignant, as they have been termed — still more *astringent* and *antiseptic gargles* or *washes* for the throat may be prescribed, especially those with krameria, capsicum, sulphate of zinc, &c.; or those with the chlorides, or with chlorinated water or solutions; or others with decoctions of bark and pyroligneous acid or creasote. I have used with much advantage in thos ases gargles and washes with strong *tar water* and when this last is not too strong to swallow, en a portion of it will generally be taken into t stomach with manifest benefit. In these case also, the *fumes* arising from hot water poure over camphor, with myrrh, vinegar, or pyroli eous acid, and a little creasote, may be inha l or passed into the throat, as directed above (9.), or the weak fumes of tar may be similarly d— or the vapour of hot water poured on tar.

42. Several other measures, besides tho now mentioned, have been prescribed for tonsillit Dr. Monge has advised the tonsils to be *sca ed*; and in the more chronic and indurated st s of the disease this may be of service. M. R QUE prescribed the *pyroligneous acid* to the in med tonsils; M. Laënnec, of Nantes, the insu tion of *powdered alum*; M. Bennati, *gargles*, th a strong solution of alum; and M. G ON-Morveau, powdered *carbonate of lime*. ese, as well as other applications about to be n ced, are more beneficial in the chronic enlarge nt of the tonsils, than in the acute or early infl mations of those organs. *Gargles* of various nds have been advised by numerous writers ince the days of Hippocrates and of Avice A— cooling and emollient gargles in the more enic or phlogistic cases; warm, stimulating, an antiseptic gargles in the asthenic or malignan and astringent gargles when the disease is at ded by relaxation. *Dry-cupping* on the neck h been recommended by Hippocrates, Aretæus, P LUS Æginetus, Kortum, and others; but to useful it should be often repeated. *Emetic* were much used by the older writers in all infl matory affections of the throat. They are mos eneficial when such affections are complicate with torpor of the liver, or with biliary accumu ions in the gall-bladder and ducts. When ex ited after the formation of matter in the tonsil hey generally occasion rupture of the absce and immediate relief. *Blood-letting* has bee very generally employed for the sthenic forms guttural disease. Hippocrates, Celsus, Ar EUS, Cælius Aurelianus, Alexander Trall US, Avicenna, and many writers of the 16th an 7th centuries, advised the blood to be drawn fr the sublingual veins; but the practice has fall into so complete disuse, that no one at the prese day is able to give an opinion as to its merits. Bl ling from the feet was likewise advised by many w ers; but not so generally as bleeding from the nal veins.

43. *D.* When the disease has passed on to puration or to *abscess of the tonsils* (§ 8. *et seq.* s it generally does if the above means fail to a t it in a few days, then the distension attendi this state almost threatens suffocation, and the gh, difficulty of breathing, or the occurrence of chings, &c., tend to rupture the abscess, and lief is obtained. But before the distressing sym ms occur, and as soon as fluctuation is felt on lying the finger, an incision should be made the escape of the contents. Frequently the a ess bursts before the symptoms become urgen and the disorder soon subsides. If this shou not be the case, the local and constitutional ns already advised should be persevered in; , if a chronic remittent or intermittent state the disease follow, the means about to be notic vill

ge rally succeed in restoring the parts to a he hy condition.

. ii. THE TREATMENT OF PELLICULAR OR P tic INFLAMMATION OF THE THROAT has be the subject of much discussion both in this co try and on the continent. — *a. Blood-letting*, ge ral or local, or both, should be early em pl ed when the habit of body, age and strength of e patient, and the sthenic character of the lo affection and of the attending fever, in di e the propriety of the practice. But I ha never seen much advantage obtained from to copious or too frequently repeated deple tio in this malady. It should be recollected th the disease occurs chiefly in an epidemic fo , and epidemics seldom require large deple tic , even although vascular action may appear gr ly excited. In these maladies the excite m greatly exceeds the amount of vital power. *E tics* are more generally appropriate, and when bl -letting is proper, they should soon follow th measure, the terebinthinate *embrocations* al re y mentioned (§ 40.) being applied around th eck and throat. *Purgatives* are of use; but of uch less use than in the other forms of gut tu inflammation. The bowels, however, should be ept in an open state throughout the disease by m cines taken by the mouth or administered in en ata, and all the depurating functions ought to promoted.

. *b.* The *local treatment* of plastic angina is of th greatest importance, and especially for the se re and rapidly spreading cases. For these the di e *hydro-chloric or nitric acids* — the dilution be g less in the most severe, and proportionably gr ter in the milder cases — should be applied b neans of a piece of sponge firmly tied on the en of a piece of whalebone. Either of these ac , or a strong *solution of the nitrate of silver*, ou t to be thus applied over and around the pa covered by the pellicular exudation, and th pplication repeated according to its effects an the urgency of the case. It should be car ri sufficiently down into the pharynx and over th ase of the tongue and epiglottis to prevent th xtension of the exudation to the larynx. In th nilder cases, the *chloride of mercury*, or the *bi ate of soda*, mixed in fresh butter, or in ho y, in the proportion of from one to two dr hms of the former to an ounce of the latter, w prove quite as efficacious as the mineral acid, or e nitrate. Having arrested the disease by th means, or having so employed them as to ch ge the morbid action in the affected parts, and to revent its extension, the treatment about to b ecommended for the next variety — the simple an complicated forms of diffused cynanche — m be pursued, appropriately to the features of in vidual cases. In most instances, the *fumiga ti* and *embrocations* advised above (§§ 39, 40.) w be sufficient to restore the local affection to he th, when aided by the means requisite to pro m e the secretions and excretions, to allay febrile ac on when it is materially excited, and to sup p vital power when it is deficient. For these p oses, the measures already mentioned and th e about to be noticed are quite appropriate. M . BRETONNEAU and GUILLON at first advised th *insufflation* of a powder into the throat con si ng of either the dried sulphate of alumina, or c ride of mercury, mixed with powdered gum acacia; but it was found that the frequent passage of a portion of the powder into the larynx and trachea often occasioned unpleasant and even dangerous effects. The acids or the nitrate just mentioned — the former slightly diluted, the latter in strong solution, in the more severe epidemic cases — were therefore preferred by them and by others in this form of cynanche.

46. iii. TREATMENT OF DIFFUSED CYNANCHE, SIMPLE AND COMPLICATED. — *A.* This form of the disease is so frequently dependent upon disorder of the stomach, or of the biliary functions, or of the bowels, or of all these, that it is very often necessary to commence the treatment with an ipecacuanha *emetic*, promoting its action by drinking a warm infusion of chamomile flowers. *Blood-letting*, in this state of the disease, is seldom required unless in persons of a gross, plethoric habit of body, when it may be advantageously employed, the quantity and mode of depletion being adapted to the peculiarities of the case. After the operation of the emetic, a full dose of calomel should be given, either alone, or conjoined with other *purgatives* and aromatics or spices, or with camphor, and according to the character of the febrile symptoms, and be followed in a few hours by a stomachic purgative draught, and by a cathartic enema, if the operation on the bowels be insufficient. The terebinthinate *embrocations* and the *fumigations* mentioned above (§§ 39, 40.) should not be omitted, and the febrile or general disturbance ought to be treated conformably with the character which it may assume. In most cases, I have found that, after the due operation of the above means, the decoction of cinchona, liquor ammoniæ acetatis, the sesqui-carbonate of ammonia, and compound tincture of cinchona, or the decoction with hydrochloric acid, &c., have soon removed all disorder. In most cases, the *washes* and *gargles* of the throat already advised, have also been of use.

47. *B. The Guttural Inflammations* which occur as *complications* of either local, general, or specific diseases, are of an asthenic or diffusive nature, and usually require the *tonic* or *restorative*, conjoined with the *alterative*, means already recommended. At the same time, the treatment appropriate to these ought to be enforced; and most commonly the measures which are the best suited to the primary disease are most beneficial for the guttural affection. In these complications, the *fumigations* of the throat, with stimulant and antiseptic substances, and *washes* or *gargles*, with similar or with astringent medicines (see §§ 41, 42.), and *embrocations* applied externally as advised above (§ 40.), are generally indicated and beneficial. The functions of the skin, kidneys, and bowels, ought to be duly promoted by conjoining such depurating medicines as the states of these functions may require, with tonics and alteratives; the best alteratives being those which depurate the blood, and at the same time neutralise or remove, or counteract morbid materials or elements which may accumulate in the blood, either previously to, or in the course of, developed forms of disease. Of these sufficient notice has been taken above, and in the article on the principles of THERAPEUTICS.

48. *C. The Diet and Regimen* for inflammatory affections of the throat differ very much in different cases. In the more *sthenically* inflammatory

the regimen should be strictly antiphlogistic; and the drinks or beverages allowed ought to be refrigerant, demulcent or emollient, either of these properties predominating according to the states of the skin and urine. When the guttural affection is *asthenic* or diffusive, the beverages or drinks may be more restorative; and when the affection is severe or malignant, or is attended by an offensive or putrid odour of the breath, then *wine* more or less diluted, may be given in the intervals between the exhibition of the *tonic* and *antiseptic medicines* mentioned above. The *diet* and *regimen* — or rather a successful adaptation of both to the intimate nature of the case — must be directed mainly by a correct interpretation of the states of the pulse and of the circulating fluids; and this interpretation can be attained only after close observation, profound thought, and diversified as well as extensive experience. The physician, thus enlightened, will adapt the means to the end, and will direct such diet and regimen as will be congruous not only with the state of the patient but also with the internal and external remedies which are prescribed. Of the regimen, the most important part is the removal of the patient, from the operation of such miasms or exhalations as may have either caused or aggravated the complaint, to a pure or temperate and dry air. In all cases, also, however slight, moderation in the use of animal food, or even a temporary abstension from this food, as well as from malt or other fermented liquors, should be enforced, unless when wine or other beverages or drinks of a restorative kind are allowed medicinally. Wine ought to be restricted chiefly to the asthenic, diffusive, and complicated cases of the malady. — During *convalescence*, the diet should be abstemious, and chiefly farinaceous. As strength is obtained, particularly after the more severe and complicated attacks, the food should be generous but digestible; and change of air, tonics, and tonic and alterative mineral waters, ought to be prescribed. Travelling, voyaging, and exercise in the open air, will also prove extremely beneficial.

49. VI STRUCTURAL CHANGES OF THE THROAT AND TONSILS.

CLASSIF.—IV. CLASS, I. ORDER (*Author*, in *Preface*).

Structural Lesions of the *Throat* and *Tonsils* are generally produced — 1st. by inflammation, — 2nd. by the syphilitic infection, — 3d. by mercurial action, — 4th. by the scrofulous diathesis and tubercular disease, — 5th. by prolonged disorder of the digestive organs, — and 6th. by mechanical injury. These lesions may be confined to the tonsils, or to the pharynx, or to two or more of the parts forming the fauces and throat. Certain of them are noticed under the heads PALATE and UVULA, LARYNX, &c., and others are comprised under VENEREAL DISEASES, the *Mercurial* POISONS, and SCROFULA, owing to their being very important manifestations of these constitutional inflictions. In the brief view which will be here taken of structural lesions of the throat and tonsils, attention will be chiefly directed to those which are produced by inflammation, by disorders of the digestive organs, and by a cachectic or morbid diathesis, the exact nature and causes of which are often imperfectly ascertained. The *syphilitic* and *mercurial* sources of
lesions of the throat are fully considered un th
heads just referred to.

50. Organic lesions of the throat are mo re-
quently the consequences of some form of i m-
mation — sthenic or asthenic, common or s ific
— the character, severity or the duration of ich
is productive of alterations in the structure one
or more of the parts in which the inflamm ory
action has been chiefly manifested. These on-
sequences are, suppuration or abscess, ulcer on;
œdema or serous or sanious infiltration, eccl mo-
sis; varicose state of the venous capillarie and
congestion of vessels; exudations on the m ous
surface of either an aphthous, pulpy or em-
branous nature, with or without superficial ce-
ration or excoriation; softening, tumefaction, lpy
degeneration and discoloration of the m ous
and sub-mucous tissues; vesicular and pu lar
formations and ulcerations; phagedenic u era-
tion; sloughy or gangrenous disorganisati or
sphacelation. These changes take place in en-
dently of either the *syphilitic infection* or th er-
curial poison; although, in addition to the fo s of
ulceration and other structural changes pe liar
to these poisons, certain of the alteration ow
enumerated sometimes acknowledge the ame
origin.

51. i. STRUCTURAL LESIONS OF THE T SILS
AND FAUCES have been partly considered ove
(§§ 10. 24. *et seq.*). Superficial ulceration, r xa-
tion of the fauces, elongation and œdema the
uvula, tumefaction and induration of the t ils,
congestion or hyperæmia of the guttural s ace
extending to the Eustachian tubes and to the ttis
and rima glottidis, and increased muco dis-
charges from the affected surfaces, are the ost
frequent and the least serious changes which ese
parts undergo, and are generally the conseq ces
of catarrhal inflammation, or of those less d ger-
ous states of inflammation which depend pon
disorders of the digestive organs, or which c pli-
cate exanthematous fevers, especially wh the
former of these become chronic, or frequen re-
cur.—*A. Abscess* or suppuration has been a ady
noticed (§ 8.) as a frequent consequen of
tonsillitis. It may also, although rarely, ear
in the velum palati or the upper part of the f ces.
Œdema and *serous* or *sanious infiltration*, hy-
mosis, and softening of the fauces and sils
are most commonly the effect of the more as nic
or adynamic states of inflammation, as rem ked
in the guttural inflammations attending scar na,
erysipelas, &c., or are consequent upon stom tis,
especially when occasioned by the mercuri poi-
son. In these circumstances, the affected s ace
may be covered by greyish, shaggy or py,
dirty or sanious exudations. The plastic e da-
tion which characterises the pellicular fo of
cynanche (§ 21. *et seq.*), and the changes se-
quent upon affections of the throat in scarlet er,
are described under their respective heads.

52. *B. Vesicular* and *pustular formatio* are
rarely seen, and only in the severer forms of all-
pox. In these cases the mucous tissue is sof ed,
tumefied, and often covered by a plastic m ous
secretion. *Excoriations* and exfoliations o or-
tions of the epithelium of the fauces occur the
course of many of the affections of the th at;
and are often connected with the several sta of
exudation noticed at this and other places. *U ra-*
tion of the tonsils and fauces sometimes f ws

tachment of these exudations, but not so
ntly as is commonly supposed; nor is
lenic ulceration, or superficial sphacelation
seen, unless after the poisonous action of
ry, and in the complicated and malignant
of cynanche, as already shown (§§ 36—38.).
apidly destructive ulceration which charac-
noma or phagedenic stomatitis sometimes
ls from the gums and cheeks to the fauces.
nore *chronic* forms of ulceration are chiefly
quences of scrofula, syphilis, and mercurial
, and are noticed in other places.

C. In addition to *enlargement* and *induration*
TONSILS, these bodies may contain, in their
æ or in their structure, substances varying
earance and hardness from that of tubercle,
t of indurated calcareous formations — or
calculi.— They consist of concentric layers
e instances, and of agglomerated grains in
; are of a yellowish white or greyish hue;
ore soft and friable resembling tubercular
r; the harder containing phosphate and
nate of lime. They vary in size from that
nillet seed to that of a pea, and are often
ineously detached from the tonsil. They
robably the more permanent or saline remains
all collections of pus, or of small chronic
sses in the tonsils. Some of these contain,
the ingredients just named, a little fatty
r and a coagulated albumen. *Cysts* and
alocysts are very rarely seen in the tonsils;
ancer, in its several forms, is as rarely found
rily in the tonsils, although it not unfre-
ly attacks parts in the immediate vicinity, and
often involves these organs. The tonsils and
ns of the fauces may be destroyed by the
ation produced by phagedenic stomatitis, or
philis, or by mercurial action, and be followed
atrisation; the *cicatrices* ultimately contract-
o remarkably the aperture of the fauces as
allow the passage of the more solid kinds
od; but these occurrences are very rare.
us *polypi* sometimes occur in the fauces,
nuch less frequently than in the posterior
; and vary in form, as well as in firmness
tness. Their investing mucous membrane
nerally spongy, is often ulcerated and dis-
to bleed.

. ii. ORGANIC LESIONS OF THE PHARYNX.—
consist chiefly of *alterations of calibre*, of the
ges consequent upon inflammation — espe-
exudation, softening, abscess and *ulceration*—
of *fibrous* and *malignant formations*. (*a*)
ations of the pharynx may be general as re-
s the parietes of the tube, and extend to the
portion of the œsophagus, the parts thus
nting a *funnel-like shape*; or they may be
l, one side or part of the pharynx having be-
so much dilated as to form a *pouch* attached
e pharynx. In this latter case the muscular
are stretched, ruptured, or wasted, so that
ouch consists chiefly of mucous and cellular
s; but these tissues may have been pushed
etween the muscular fibres, thus forming, in
rst instance, a *diverticulum* from the pharynx,
has ultimately become dilated into a pouch.
funnel-like dilatations are often the conse-
ce of constrictions of some kind in the œso-
us. *Constriction* of the pharynx is generally
sequence of malignant disease, or of tumours
ing upon the pharynx and upper portions of the œsophagus, or of the cicatrisation following ulceration.

55. (*b*) *Inflammatory changes* are most frequently seen in the pharynx. These consist chiefly of *croupy* or *plastic exudations*, as described above (§ 20.) and in the Art. CROUP; of *aphthous exudations* in cases of thrush; and of *pustular formations* in very rare instances, in variola or after tartar emetic has been given in excessive doses. *Exudations of blood* from the throat sometimes occur during catarrhal or other inflammations of the pharynx or fauces, especially when these are attended by much irritation of the glottis and severe cough. The blood generally is seen in streaks in the viscid mucous expectoration. When the lower portion of the pharynx is affected, and when there are retchings as well as cough, the discharge of blood is occasionally more considerable; and it is then difficult to determine whether it proceed from the pharynx, or the œsophagus, or the stomach, or even from the bronchi or lungs; and whether it is merely an inflammatory exudation or a consequence of ulceration. These points can be determined only by the history of the case, by a careful examination of the sputa, and by a due consideration of all the phenomena. *Softening* of the internal coats of the pharynx, and especially of the mucous and sub-mucous tissues, is seen in typhoid, exanthematous and malignant fevers, and in scurvy and after the ingestion of caustic, alkaline or septic, or other poisons. — *Abscess* or suppuration of the pharynx has been already noticed when treating of inflammation (§ 18.). It may give rise to ulceration and to still more extensive and dangerous alterations of parts in the vicinity, as shown above; but *ulceration* is much more frequently produced by syphilitic infection (see VENEREAL DISEASES). Ulceration generally takes place in the posterior portion of the pharynx, although it has, in rare instances, attacked the anterior or latter portions and extended into the larynx or trachea.

56. (*c*) *Fibrous tumours* or *polypi* have been found in the pharynx, or implicating the upper region of it and the posterior nares; but they very rarely arise primarily from this portion of the alimentary tube. *Cancerous* or *carcinomatous* or *medullary formations* sometimes affect this part, but not so frequently as the œsophagus. In the cases of carcinoma of the pharynx which I have seen, the base of the tongue and the pillars of the fauces became implicated, and the canal or passage into the œsophagus narrowed, and ultimately so remarkably reduced as to render the conveyance of nourishment into the stomach most difficult or nearly impossible. The carcinomatous ulceration has in some instances been followed by fatal hæmorrhage before this change has supervened.

57. (*d*) *Foreign bodies* of various kinds, and especially the bones of fish or of other animals, may be fixed in the pharynx, or penetrate, partially or altogether, the parietes of the canal, and give rise to inflammation, abscess, &c. Foreign bodies of every possible kind may be swallowed or be attempted to be swallowed, and produce either immediate or more or less remote effects of a serious or dangerous nature, for which surgical as well as medical aid may be required — the former immediately, the latter subsequently. — Of

wounds of the pharynx it is not my province to speak.

58. iii. Treatment *of Organic lesions of the throat.*—*a. Enlargement and Induration* of the tonsils are generally the consequences of neglect of the slighter forms of tonsillitis, of repeated returns of the disease, or of the chronic remitting forms already mentioned, (§§ 9, 10.) especially when occurring in the scrofulous diathesis, and in delicate persons. For these states of disease numerous methods of cure have been employed. The scarifications and local means already noticed (§ 39. *et. seq.*) may be first tried; and if these fail, the measures about to be advised may be employed, and modified according to circumstances, whilst the general health should be promoted by change of air, and by a suitable diet. But, with the promotion of health and strength, the several depurating functions must be regulated and severally increased. Tonic infusions or decoctions with hydrochloric or nitrohydrochloric acid, or with pyroligneous acid, or instead of acids, the alkalies and the iodide of potassium, or the chlorate of potass, may be severally prescribed. The local application, by means of a hair brush, of a weak tincture of iodine, or of a strong solution of the nitrate of silver, or of dilute nitric, or hydrochloric, or pyroligneous acid, has often been found of the greatest service, especially whilst the iodine ointment, or terebinthinate embrocations have been applied externally.

59. *b.* The *removal* of enlarged and indurated tonsils has been advised since the days of Celsus down to the present time. Some surgeons have employed ligatures to the enlarged tonsil, others have had recourse to excision. Unless the enlargement have resisted scarifications and the means already recommended, after a sufficient trial has been given, and unless the enlargement greatly impedes the voice, speech, and deglutition, I would not advise either of these operations to be performed. For, knowing that the functions of the tonsils are to secrete a lubricating fluid, for the superior orifice of the glottis, and for the epiglottis and pharynx, it necessarily follows that the extirpation of these organs deprives these parts of what is essentially requisite to the healthy discharge of their offices. Hence the throat becomes unpleasantly dry and husky. Voice and speech are thereby remarkably injured and are incapable of being exerted for any considerable time. These effects I have observed to follow in numerous cases where the officious interference of surgeons has removed these organs. I have not known an instance of a female who had had a good voice who did not entirely lose it after the extirpation of the tonsils; and a similar result has often followed the excision of the uvula close to the velum palati.

60. *c.* The treatment of organic lesions of the throat and tonsils consists chiefly of the early opening of abscesses or small collections of matter when these form, as stated above (§§ 42, 43.); of the employment of the local and constitutional means already advised when the tonsils remain enlarged and indurated; of the fumigations and washes, astringent, tonic, and antiseptic, when ulceration, softening, &c., affect any portion of the throat; and of the several means above directed, and the diet and regimen recommended for the asthenic and chronic forms, and for the usual consequences of guttural inflammations. In all cases, support of the constitutional powers, attention to the state
of the bowels and kidneys, to the digestive
tions generally, and to diet and change of
most important. Air, food, and water, ar
influential both in producing and in remov
fections of the throat, whether functional o
tural; and upon a judicious attention t
avoidance or selection of these, appropria
the nature of each affection, the success o
ment will mainly depend.

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JSH.—SYNON.—*Aphthæ or Aphtha*, Αφθαι, p., Gal. (from ἅπτω, I inflame); *Pustulæ* , Haly Abbas;—*Ulcuscula Oris*, Auct.; *tomacace*, Ploucquet; — *Alphtha*, Sau- es; — *A. Infantilis*, Plenck; — *Aphthæ*, el;—*Aphtæ*, Pinel;—*A. Lactantium*, Bate- ;—*Cystisma Aphthosum*, *Typhus Aphthoides*, ng;—*Emphlysis Aphtha*, Good;—*Aphthes*, *guet*, Fr.; — *Schwämmchen*, *Mundschwam-* *chen*, *Mehlhund*, Germ.; — *Afte*, Ital. — *rsh*.

LASSIF.— III. CLASS, I. ORDER. (*Author in Preface*).

1 EFIN. — *Numerous white curd-like specks or ions on the tongue and insides of the lips, lly spreading to the interior of the cheeks and ; preceded and attended by fever or consti- l disturbance, and very often symptomatic rder of the digestive organs, or of structural* .

2 *Thrush*, or *Aphthæ*, was divided by DR. M. into three varieties: — 1. *Aphtha Infantum*; *Maligna*; 3. *A. Chronica*. The *first* and differ chiefly in the degree of vital depression ich each is attended. The *third variety* is symptomatic, generally of structural disease. *irst* has been considered as a primary or thic affection by some writers, but this may wed as somewhat doubtful, for it is very lly preceded by disorder of the digestive functions, and by more or less constitutional disturbance; and hence it may be viewed as contingent upon, or as a peculiar manifestation of, such disorder. It has been often mistaken for, or confounded with, the erythematic, the pseudo-membranous, and the ulcerated forms of STOMATITIS (*see that article*), from which it is quite distinct. In the true thrush there is neither pustulation nor ulceration, but an exudation, at numerous points, of a white, curd-like matter, enlarging and spreading more or less along the buccal, pharyngeal, and œsophageal mucous surface.

3. i. CAUSES.— This disease may attack all ages, but with a very different degree of frequency. It is most common in infants, especially those at the breast or only a few months of age. In these, particularly in the two first months of existence, it has been viewed as an idiopathic affection. However, this view is merely conventional, and may be entertained in respect of this affection with a considerable share of justice. M. VERON believed that this disorder may even affect the fœtus. I am not, however, aware whether or no it has been seen in any case at the time of birth. It is rarely observed in adults, and still more rarely in aged persons. When it occurs at a more advanced period than that of early childhood, it is generally symptomatic of, or at least complicated with, some visceral disease. It occurs most frequently in children of a feeble constitution and in those who breathe an impure air. The seasons have no very manifest influence in causing it. M. VALLEIX, however, considers it to be most prevalent in hot seasons. VAN SWIETEN says that it is rarely met with in very cold and very warm climates, but apparently from insufficient evidence. M. GUERSENT remarks, that in temperate countries it is somewhat more frequent in cold and wet seasons, and when catarrhal affections are most prevalent. This seemed to be the correct opinion; but the crowded or ill-ventilated wards of lying-in, or children's hospitals, and even such wards, however well aired; low, humid, and close apartments and localities; insufficient, unwholesome, and inappropriate nourishment; and whatever impairs the vital powers, are the chief causes of this affection, especially in children. Hence it is frequently observed in those who are attempted to be brought up by hand, or who have sickly nurses with poor or unhealthy milk; in the children of ill-fed or drunken mothers, and in those who are suckled by nurses with inflamed and irritable nipples. BOERHAAVE attributed the affection to protracted suckling in many cases, and to the premature or improper use of purgatives. It does not appear to be infectious or propagated from one child to another, although it may be produced in more than one by the unhealthy state of the nurse's breast or milk.

4. ii. SYMPTOMS.— According to M. VALLEIX, the thrush is very often preceded by erythema of the groins and the posterior and upper parts of the thighs, which may have existed several days before the affection of the mouth appears. This is certainly the case in many instances, and is an indication of irritation, or a disordered state, of the digestive mucous surface, the circulating fluids being also imperfectly elaborated, or containing excrementitious elements. At the commencement of the complaint, redness, dryness, and heat are perceived in the mouth, and the infant

evinces pain, fretfulness, or restlessness, or even disinclination to seize the nipple when applied to the breast of the nurse. At this time, dryness of the skin, frequency of pulse, and various other febrile phenomena are present. This may be called the *first* or *erythematic period* of the disease, and is almost identical with erythematic stomatitis — *Stomatitis erythematica.* (See STOMATITIS, § 3. *et seq.*)

5. *A.* The *characteristic features* of the disease, the *eruptive* or *second stage,* is shown by whitish points or minute white specks in the surface of the inflamed membrane. These specks first appear on the point of the tongue and on the insides of the lips and cheeks. They soon increase in number, enlarge, the nearest uniting and forming irregular but thin small patches, which remain separate or distinct, are after a time detached, and again renewed. As long as these minute albuminous exudations continue distinct — *aphtha discreta*— the complaint is comparatively mild; but they are successively thrown off in thin flakes, the inflammation subsiding at periods varying from seven days to three or four weeks. In severer cases, however, the patches of albuminous exudation increase in size and thickness, unite or run into each other, forming one continuous coating; and extend over the tongue, fauces, and pharynx — *aphtha confluens.* In these cases, the cream-like albuminous exudation covers the greater part of the mouth and fauces, becomes daily thicker or deeper; and, when it is thrown off, the mucous surface, deprived of its epithelium, reproduces a new exudation, softer and more curd or cream-like than the former. The colour of this is at first white, but it becomes yellowish in the course of a few days, the child being more and more enfeebled and emaciated. The pulse is now quick, weak, and small, the stomach irritable, the bowels disordered, and emaciation increased. Subsequently vomitings occur, the matters ejected being mucous, curdy, and of a yellowish or greenish tint; and the substances taken into the stomach being hardly changed. Diarrhœa often supervenes, with extreme prostration; but death sometimes takes place before diarrhœa becomes apparent or at least urgent, owing to the severity of the gastric symptoms, to the impossibility of deglutition, and the rapidly progressive exhaustion. In these cases the surface of the œsophagus, stomach, and duodenum presents a similar appearance to that of the mouth and throat, the villous coat being covered by numerous dirty, greyish, or yellowish elevated specks or patches of exudation; and the villous and subvillous cellular tissue being injected, tumid, softened, and most readily torn or detached from the muscular coats. When diarrhœa takes place and becomes urgent, and especially if tormina, straining, or dysenteric symptoms occur, the aphthæ disappear, almost or altogether from the mouth, the vomitings frequently cease, and food is sometimes even taken and retained. But the evacuations are frequent, painful, mucuous or curdy, sometimes streaked with blood, or contain shreds of lymph or exudation, and are often offensive or emit an acid odour. Excoriations appear at the anus, the sphincter being irritable and constricted, and miliary pustules occasionally break out in different parts of the body. Although in these the duration of the disease is protracted, the ultimate result is not much ore favourable than in the former class of cases

6. *B. After death* the small and large int ines present the most marked indications of ch ge; the appearances of these viscera, as well the symptoms during life, showing that the ease which had originated in the mouth had traver the œsophagus, stomach, and the whole intestinal al, the upper portions of this canal having been n e or less restored to a healthy state after the low portions had become affected. The bowels are c red interiorly by a pulpy exudation, more mar in some places than in others, and of a yel vish grey or brown tint. The villous and sub ous tissues are tumid, softened, and very lac ble, the epithelium being thickened and o que; Whether the morbid exudation be external, or beneath, the epithelium has been a sub t of discussion. According to my own obser ion, it appears to take place beneath this cover g in some situations, especially in the mouth and the anus, where the epithelium is more ful developed, and above or externally to it in ther situations, and to be attended by a thicken or a detachment of the epithelium in most pla .

7. *C. The nature of Aphthæ* has been dis sed by several recent writers referred to her ter. Aphtha is so very closely allied to the stic forms of stomatitis and cynanche, as to v rant the opinion that it is merely a modifica of these, resulting from the age, constitution, st gth, habit of body, &c., of the patient, in con tion with the extrinsic causes and influence producing it. According to the ages, habit of ody, states of the circulating fluids, and to vario external influences, aphtha, the allied af ions, named muguet or blanchet by French thologists, plastic stomatitis, pseudo-membran cynanche or quinsy (the diphtherite of B TRONEAU), and croup, are merely varieties one disease marked by different grades of ac ess, by the sensible qualities of the morbid ex tion which chiefly characterise them, and by th arts on which this exudation appears, and to hich they severally are most prone to extend. hilst aphtha, muguet, and plastic stomatitis, on one hand, most frequently occur in infants the breast, oftenest arise from intrinsic cause and most frequently extend to the alimentary nal; pseudo-membranous cynanche and croup, the other hand, more frequently affect older ants and children, oftenest proceed from extrinsic uses and influences, and most frequently extend the respiratory passages.

8. *Muguet* or *Blanchet*, which several ters have considered as a distinct affection rom aphtha, and from plastic stomatitis and cyn che, is merely a modification of these; or it ho an intermediate place, approaching very clo to aphtha in its sensible characters, and in its ked disposition to extend along the alimentary nal; and presenting appearances allied to the stic or pseudo-membranous forms of stomati and cynanche, especially as respects the morbi xudation, as seen in the mouth, or in other s of the digestive tube. Thus the variety of hese affections, termed *Muguet* by French patho ists, may be placed between aphtha and plast stomatitis, with which, as well as with pseudo embranous cynanche and with croup, it presen very intimate relations.

9. ll the affections now named are to be viewed rely as simple inflammations of the mu- surface or membrane in which they are or to which they extend, but also as special uliar in their states or characters, particu- the superficial nature of the inflammatory ; in the plastic condition of the morbid ion, varying, however in consistence, cohe- olour, &c., in each affection; in the manner h the epithelium of the affected surface is d in the exudation; and in the marked ion they all possess to extend along the mu- urfaces, without materially affecting sub- tissues. These characteristics, especially position to extend continuously, and the of the morbid exudation, may be ascribed aired, or originally deficient vital power, g the extension of the morbid action; to erfect power of limitation or vital resistance; the condition of the circulating fluids, these bounding most probably in albuminous and ctly assimilated elements and materials, and leficient in hæmatosine or duly developed globules.

1 *D.* Recent microscopic observers have de- in the cream-like exudations of aphtha, es- y in the advanced and most unfavourable f the malady, when vital power is most de- , *parasitic vegetable productions* of the most and lowest forms. These parasitic forma- ppear during life in these states of the dis- r immediately after death; and when they ring life they multiply remarkably after dis- n. They can be viewed only as the evolution lowest grades of organization in the morbid ons which take place from surfaces during st depressed conditions of vitality, and upon parture of the vital manifestations from the textures of the body; their multiplication place with remarkable rapidity, especially more exposed surfaces. They belong to ss *Cryptogumia*, and are low forms of *algæ* *ngi.* These, which appear on the mucous of the mouth and digestive canal, are chiefly llowing:—1st. *Oidium albicans* (Berg, , Robin); *Aphtophyie* (Gruby); the cryp- a of aphtha and diphtheritis.—2ndly. *ventriculi* of Goodsir; the *Merismopædia uli* of Robin.—3rdly. The *Lepiothrix* s of Robin; alga of the mouth.—4thly. The *coccus cerevisiæ*, Kutzing; the *Torula cere-* authors; the yeast-plant. Of the opinions entertained as to the formation of these and parasites some notice will be taken when which form in Tinea are mentioned.

1 II. Treatment:—The means commonly re- to by the ancients for this disease were in respects the same as those employed in the day.—*A.* Celsus advised alum in honey as application for aphtha; and Avicenna sub- tly, and Lindt and Stoll in modern times, nended the same. Honey, myrrh, crocus, rious detergents were prescribed by Paulus eta; and aromatic tinctures with honey, edlin. Borax and other detergents were yed, in mucilage, by Ackermann, in honey och, with cinchona, in honey by Loefler, syrup of roses by Starke. Camphor was cally in honey by Avicenna, and the syrup lberries by Riedlin. The pomegranate nd bark were also employed locally by Actuarius; the sulphate of zinc was similarly prescribed by Reil and Herz. Emetics were recommended by Hufeland: and when the sulphate of zinc is used locally with honey or syrup of roses, a portion of it is sometimes swallowed and acts as an emetic. Absorbents were mainly relied on by Harris and Chalmers; and the mineral acids, chiefly the hydrochloric, by Grant and many others.

12. *B.* The *treatment* of aphtha should be *Hygeienic* and *medicinal*—local as well as constitutional or general. Unless *hygeienic* measures be judiciously prescribed, the local and general medicinal treatment will generally be inefficacious. The *causes* which have produced the complaint ought to be removed as completely as possible, and the patient placed in a dry, temperate, and open situation in a well aired apartment. Change of air is in most cases more or less beneficial. The nourishment should be prescribed with care; and if the child be still suckling, the milk and health of the nurse ought to be objects of particular attention. The age of the milk, the habits and functions of the nurse, and the state of her nipples, require examination. If the nurse have suckled long, or if she be intemperate, delicate, unhealthy, or cachectic; if the catamenia have been present, or if the nipples are sore, another nurse should be obtained. If the child is being or about to be weaned, it may be necessary to defer the weaning for some time, if the nurse be healthy; but if the complaint be then or at any other time attributable to the state of the milk, another nurse must be immediately sought for. If this intention cannot be accomplished, or if the child have been weaned, the disease having been occasioned by the change of nourishment, or by improper food, ass-milk or goat's milk, warm from the animal, should be given in quantity or states of dilution, which the peculiarities of the case, or the effects produced, will suggest.

13. *C.* The medicinal treatment, local and constitutional, must depend chiefly on the causes of the affection, on the age, strength, and circumstances of the patient, and on the history and complications of the case. In most instances of this disease, local as well as constitutional remedies are required, the former to correct or remove the local affection, the latter to improve the strength and the digestive and nutritive functions. Washes and lotions for the mouth, to be used by means of a piece of sponge firmly attached to a stick or whalebone, when the child is too young to rinse the mouth with them, are generally required; but the selection of these should depend much on the peculiarities of the case. The biborate of soda conjoined with honey is most commonly used. When the biborate is freely employed it readily cleans the mouth, separates the morbid exudation, and destroys the parasitic production that often appears; but if much of it be swallowed, it irritates the stomach and bowels. If these be already in a state of irritation, the local means which are least likely to increase that irritation or most likely to remove it ought to be prescribed. In such cases weak solutions of chloride of lime, or chlorinated soda, or chloride of zinc, may be used as now advised; or a solution of the nitrate of silver, applied by a pencil or sponge, as already recommended; or mucilage, or honey, or syrup of roses containing diluted sulphurous, or muriatic acid, may be em-

ployed in a similar manner. The chief objection to these latter is, that when they are swallowed in any considerable quantity they often occasion severe griping pains, or increase existing disorder of the bowels. Dilute pyroligneous acid with minute doses of creasote may be tried in the same way as the preceding; or lemon juice may be substituted for the acid. Dr. Jenner has recently recommended the solution of a dram of the sulphite of soda in an ounce of water, as a wash for the mouth when the parasitic formations are developed. Many years ago I generally directed at the Infirmary for children a confection composed of powdered liquorice root, honey, and a small proportion (about ¼ to ⅛) of spirits of turpentine; and my experience has convinced me of its superiority over other means in the larger number of cases.

14. Various other washes or gargles for the mouth have been advised and are very commonly used, especially solutions of borax with tincture of myrrh, honey, or syrup of roses; or the solution of alum in the infusion of roses, with tincture of krameria or catechu and a small quantity of tincture of opium. If the bowels become much relaxed, the cretaceous mixtures, with the compound tincture of camphor and the tincture of krameria or catechu, and aromatic confection; the warm bath or semicupium, salt or mustard being added to the water, are commonly of service. If the powers of life are much depressed, warm stimulants should be added to whatever other means may be required. Of these the most beneficial are the carbonate and aromatic spirit of ammonia, camphor, capsicum, tincture of cinnamon, or of arnica, or of cascarilla, &c.; and one or more of these may be selected. If the bowels be constipated, magnesia and sulphur, rendered palatable with ginger and liquorice powder, may be prescribed, either with or without rhubarb, according to circumstances.

15. In all cases of thrush, the *hygeienic* treatment ought to receive especial attention. The food of the child should be selected with care, and the effects of each particular article of diet carefully observed, in respect of the functions of digestion and defecation. The other means already noticed under this head (§ 12.) should receive no less attention; for the use of detergent, astringent, or antiseptic applications, as above advised, ought never to supersede hygeienic measures, the restorative, tonic, and febrifuge remedies, and even the more active stimulants, which are often indicated in both the more simple and the complicated forms of this disease.

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TINEA.—Synon.—*Tinea capitis*. Αχωρ, *Favus*, Lat.—*Porrigo*, Celsus, Pliny, —*Tinea*, Sennert, Sagar, Sauvages, —*Phlysis porrigo*, Young.—*Ecpyesis* Good.—*Crusta lactea, Impetigo*, Auct.— *kleiengrind*, Germ.—*Teigne*, *Gourme*, *Tetter, Scall, Scalled-head, Ringworm.*

Classif.—See Skin—*Classification Diseases.*

1. Definit.—*A specific chronic disease ing chiefly the hair follicles, where specific tic plants are developed, and which are ca communicating the disease to parts suscep the infection.*

2. M. Bosquillon supposes that th *Tinea* was used for the first time by Etie Antioch, who, in 1127, translated the w Haly Habbas. It was afterwards adop Guy de Chauliac, and long subsequent ployed by Ambrose Paré. But from the use of the term, the greatest diversity of existed as to the varieties or forms which ease presented. Guy de Chauliac rec five forms of Tinea, which term was used nymously with *porrigo*; viz, *T. favosa*, *amedosa*, *uberosa*, and *lupinosa*. Ambrose described three varieties; *T. porriginosa*, and *corrodans*. Much more recently A admitted five species of the disease; name *mucous*, *furfuraceous*, *amiantaceous*, *gr* and *favous*. Willan described six specie the genus *Porrigo*; *larvalis*, *furfuracea*, *lu scutulata*, *decalvans* and *favosa*. It is that those as well as other writers compris der the generic term Tinea or Porrigo eruptions of the scalp which actually were ties of different diseases. Thus the *Porrig lis* of Willan corresponds with the *Achor* of Alibert, a variety of *impetigo*. The *favosa* is a true *impetigo* of the scalp, and same as the *granular tinea* of Alibert. Th*rigo furfuracea* of Willan, is the *Tinea f cea* of Alibert, and is merely *Pityriasis* the *Tinea amiantacea* of this latter write only a more chronic and severe form of th affection. Thus several varieties of *Eczem*

and *Pityriasis*, have been arranged under or its synonyme *Porrigo*.

3. t has been recently shown by BAZIN, and illustrated by DR. JENNER, that several ns of the scalp are connected with the oment of parasitic microscopic plants. affections are obstinate, contagious, seated in the hair follicles, have a tendency to in circles, and hence have been popularly ingworm. M. BAZIN and DR. JENNER have d under the genus *Tinea* those affections re attended, kept up, or produced by the oment of minute parasitic plants or spores; , *Tinea favosa, T. tonsurans, T. decalvans,* . *sycosa.* — Of these four species, three ll be considered at this place, the fourth, *a sycosa* — the *Mentagra* of WILLAN and AN, the *Sycosis* of numerous writers — has scribed under this latter appellation. (*See* COSIS).

4. . DESCRIPTION. — *A. Tinea favosa, Por- ivosa* of WILLAN and BATEMAN; *Favus* A. T. THOMPSON, SIMON and others. sease most frequently appears on the hairy out sometimes on other parts of the body. haracterised by dry, thick yellow crusts, are, when small, circular, depressed in ntres, and somewhat cup-shaped. A hair rally seen passing through the centre of rust. Some of the crusts are generally iall, whilst others have a diameter of one an inch, or even upwards. The larger in many instances as if formed in concen- gs, alternately yellow and brown, and have gular shape or outline, still, however, indi- their origin from distinct centres. The rregularly shaped crusts are pitted on the , and, from their resemblance—often how- ry slight—to the divided surface of a piece ycomb, the disease has been named favus. rgins of the larger crusts are considerably he level of the surface; whilst the centres omewhat sunk into the substance of the Upon carefully detaching the crusts from ace a distinct layer of epithelium is found them, whilst a careful examination of the crusts shows a layer of epithelium cover- m. The crusts of Tinea favosa are remark- r their thickness, dryness, brittleness and ed centres. It is not a pustular disease, is sometimes consecutive upon eczema, o, chronic lichen and herpes circinatus; stules are occasionally or sometimes formed iently to Tinea favosa, owing to the irrita- oduced by the morbid exudation, and by ing.

5. he hair, even at an early period of the may be easily pulled out from the centre little crust. It subsequently falls out of eased parts, and permanent baldness of arts results. When the disease is deve- or any considerable extent of surface is l, a peculiar offensive odour, which has ariously described, is generally perceived. as noticed by JOHN of GADDESDEN*, in his *nglica*, where he gives the following defi- f Tinea — "Tinea est scabies capitis, cum squamis, crustis, pilorum evulsione, colore et odore fœdo, et aspectu abominabili."

6. The parasitic plant, detected by the aid of the microscope, is different in species, and in the precise situation occupied by it in the several species of the disease. In *Tinea favosa*, as described by GRUBY, BAZIN, ROBIN and JENNER, the cryptogamic parasite is the *Achorion Schönleinii*. "This plant has mycelium, sporule-bearing branches, and sporules. The sporules are round or oval, and their diameter varies, according to GRUBY, from 0·003mm. to 0·01mm. The vegetable growth is first perceptible between the layers of epithelium, just at the orifice of the hair follicle; from this point it may spread downwards between the hair and its capsule, and upwards around and in the substance even of the hair." (JENNER.)

7. *B. Tinea tonsurans—Porrigo scutulata* of WILLAN, BATEMAN, and A. T. THOMSON; *Herpes tonsurans* of CAZENAVE and *Trichinosis furfuracea* by WILSON—is often mistaken for *Herpes circinatus* of the scalp, with which, however, it is sometimes associated. It is characterised by pallor of the affected part, and by decolorisation and brittleness of the hairs. Thin, white, powdery scales surround the bases of the hairs, and cover the skin between them. The affected hairs somewhat resemble "tow," and are remarkable for their bent and twisted shape, and resemblance to the fibres of hemp in colour and appearance. They are sometimes so brittle, that every hair in the affected spot is broken off close to the surface. The diseased patches are generally circular. Crusts form on the patches of Tinea tonsurans only when, from neglect, from scratching, or from the application of irritants, they become inflamed.

The parasite in this species of the disease is the *Trichophyton tonsurans*, "and is composed of spores only; the spores, however, are occasionally somewhat elongated and arranged in a linear series. They are round or oval, and their diameter varies from 0·003mm. to 0.01mm. The primary seat of this parasite is the root of the hair. Subsequently it extends up into the substance of the hair, and even outwards, according to BAZIN, on to the skin between the hairs." (JENNER).—The spores may be at first confined to the hair follicle. But BAZIN and ROBIN have described and delineated them between the fibres of the hair, which they had split up.

8. *C. Tinea decalvans* — *Porrigo decalvens* of WILLAN and BATEMAN; *Vitiligo of the Scalp* of CAZENAVE—is characterised by the falling out of the hair rapidly, from one or more circular spots, leaving a smooth bald surface, without crusts, scales, or eruption of any kind. When the bald surface is large, it becomes more irregularly shaped, with scalloped edges, and a tendency to preserve the circular form. The disease may spread over the greater part or the whole of the scalp.

9. In *Tinea decalvans* the parasitic formation is the *Microsporon Audonini*. "This plant is formed of branched filaments, on which the spores are developed. The spores are very small, from 0.001mm. to 0.005mm. The seat of the growth is the outside of the hair, and it forms a sort of sheath around the hair, from the surface of the skin, upwards, from 1mm. to 3mm. GRUBY first described this plant, and its relation to Tinea de-

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* admits the contagious nature of the disease, and s it to be caused by depraved humours and bad d by transmission from the parents or nurse.

calvans; and Robin says he can confirm the accuracy of Gruby's description."—(Jenner.)

10. *D.* For *Tinea sycosa*, see Art. Sycosis. These *four species* of Tinea are especially *characterised* as follows: Tinea favosa is remarkable for its crusts;—Tinea tonsurans for the discoloration and brittleness of the hair; — Tinea decalvans from baldness not preceded nor attended by an eruption; — and Tinea sycosa from inflammation, tenderness, hardness, and suppuration of the hair follicles.

12. ii. Causes. — It has not been decidedly shown whether or no the parasitic formations detected in these species of tinea, are the actual causes of them, or whether they are formed in the course of the disease. Those who espouse the former alternative, believe that the spores of these parasitic plants are given off, float in the air, and infect those who are exposed to them. Still they admit that these spores require for their growth a peculiar nidus. Dr. Jenner contends that, as all persons who mix with children affected with tinea do not receive the disease, a soil favourable to the growth of the spores previously exists, so that when a spore is conveyed to that soil it is developed and forms other spores, and so spreads and propagates. Remak applied the crusts of favus to his arm, and having removed them after a time, his skin appeared perfectly healthy; and it was not until a fortnight after that his arm had become diseased. Still this experiment does not prove, that the spores contained in the crusts produced the infection, but that the morbid secretion forming the crusts infected the parts to which it was applied, and that the hair follicles, thus becoming diseased, furnished the secretion in which the parasites were developed; and hence the experiment of Remak favours the latter alternative rather than the former; viz. that, the morbid secretions of the crusts having infected the hair follicles, parasitic cryptogamic formations were developed in the secretion lodged between the layers of epithelium and between the hair follicles and the roots and fibres of the hair. Those who believe that the conveyance of the spores from the developed disease to a soil suited to their growth, admit that the soil exists, and consists of an already morbid state of the hair follicles, caused by debility, scrofula, neglect of cleanliness; and that many persons, especially those thus predisposed, "have in their hair follicles a secretion suited to be the nidus of this plant." But this admission is in truth what I contend for; namely, that the disease, owing either to the strumous diathesis, to constitutional or local debility, to uncleanliness, to the lodgment of foul matter, or to the contact of contagious secretions, supervenes in the hair follicles, and the morbid secretion in these follicles produces, according to its especial nature or character, a parasitic formation peculiar to each species of the disease. Thus the parasite is consecutive of disease of the follicle, and not the agent by which the disease is propagated. Dr. Jenner almost admits this whilst he contends for the agency of the spores, by remarking that "the patient suffering from Tinea comes under our care for the perceptible disease, and will be well contented if we can cure him of that; but it would be better if we could also destroy the susceptibility to the disease,—if we could bring the hair follicles into a state in which they no longer secrete a nidus i which the plant can grow." The truth appears be, that in this disease, as well as in others where a morbid secretion is produced in states great general or local debility, and where tl e secretions remain long in contact with the rface producing it, and protected in these sit tions, parasitic formations of low grades of vita y and development take place, the morbid se tions forming the material of growth, and the tality emanating from the diseased part, imp ng to these materials the organisation which tl present.

13. iii. Treatment.—General and loc debility, a scrofulous diathesis, and want of cle liness predisposing to, if not of themselves pr cing the disease, contagion being an efficient exciting cause in many if not in all instan , the contagious agent being, moreover, either tl spore of the parasitic plants noticed above, o e secretion of the affected parts, the *indication* *cur* are quite apparent. These are—1st. tc rictly observe general and local cleanliness;— d. to improve the state of the constitution;— 3rd. to remove the local affection. These ii tions may be fulfilled contemporaneously. ut in many cases, especially of the *second* a *third* *species*, none of the predisposing causes j mentioned may exist; there may be neither bility nor the scrofulous diathesis, nor want c leanliness, and yet the disease is present. C agion or infection may be inferred without icient proof, even although the parasitic forma ns are detected by the aid of the microscope; fc may as reasonably be concluded, that the dis e has occurred sporadically, owing to debility othe morbid condition of the hair follicles, e secretion of these follicles giving origin th parasitic formations in the manner abov tated (§ 6. *et seq.*) *A.* In most instances, e cially where the conditions, often favouring the vera species of the disease, are present, frequ ablutions and poultices, in order to remove th rusts tonics and alteratives, aided by the usua ygeienic measures, change of air, exercise anc itabl diet, are requisite. But, at the same tir *loca* *means* are indispensable, especially such s may restore the hair follicles to a healthy st , and destroy the parasitic formations, to whi mon than due importance has been imput sinc their discovery by microscopic observers Thes means are remarkably numerous, but st o them are only occasionally efficaciou comparatively few being even generally succ ful.

14. *a.* Whilst constitutional treatment bein employed, the local means most to be rel upo should be strenuously continued. The h ough to be cut close; the crusts of favus soft d an removed by linseed or bread and wat poultices, and by ablutions with strong soft s , an the scalp covered by an oiled silk cap. Thes preliminary measures are always n ssary After these, the local remedies most to confided in, should be prescribed.—But, ore notice the substances that have been e recently recommended, I shall enumera tho which had previously been prescribed, a mo or less confided in. These latter have eral been employed in the form of *ointments*, *tions* or *washes*, or *plasters*. The *first* of the whe ever may be the active ingredient, s ld

wa ed off by means of soap and water, or any alk ine or detergent lotion, after having been ap ed for some hours, and immediately after- was renewed; for ointments often become more or ss rancid and irritant when they have been lon applied. Most of the fluid applications or lot s, whether solutions, dilutions, decoctions, or usions, require to be applied for some time to e affected part, by means of lint, especially f t crusts have not been entirely removed, and the hair of the diseased follicles is still re- ma ng. *Washes* may be selected with the do le intention of cleansing the surface and cu g the disease; this latter object being at- ai l either by destroying the parasitic plant or by moving the morbid condition producing the par ite, or by this combined action. *Plasters* ma be employed, after the hair has been cut off clo to the surface, with the object either of er ving the diseased hair, or of curing the aff ion, or of fulfilling both intentions.

1 *b.* The *ointments* prescribed for this complaint aft the crusts have been removed, have often fai . Those containing *mercury* in some form or er, although advised by very eminent phy- sic s, have not only frequently failed, but have som imes been injurious, especially when their eff s have not been carefully watched. Oint- ne s containing calomel are praised by HILDE- BR DT and others. Those with the white pre- cip te, or with the nitrate, have been employed by Pu IANN, VOGEL, LENTIN, MURRAY, and RING. *Su ur* ointment, or the balsam of sulphur, in he rm of an ointment, has been recommended by ULAND, HAMILTON, BARTON, and ALIBERT. Oi nents containing the *sulphate of copper* have bee prescribed by THOMANN, DESAULT, DUNCAN, an STARKE; that with *muriate of barytes*, by Hu LAND,—with *cantharides*, by WENDT,—with com on *soot*, by PELARGUS, THOMANN, and NIE- MA , — with *conium*, by QUARIN, STOERCK, Mu RAY, STOELLER, and HUFELAND,—with *tar*, by AN DER HAAR,—and with *empyreumatic oil*, by ACUTUS LUSITANUS and RUDOLPHI. The *un entum Jasseri*, which consists of the sulphate of nc and sulphur, is praised by SCHACK. It wa formerly in great repute in Germany, for the ure of this affection. Ointments with the *lsam of Peru* and *tincture of Lytta*, have ver often been prescribed by the author for the sec d and third species of the disease, with suc ss.

c. Lotions and *washes* have been as generally use n Tinea as ointments. Dilutions of the *acids* hav been advised by many,—of the *nitric acid*, by OLLA and TOMMASINI,—of *muriatic acid*, by THENIUS, PLENK and BRINCKMANN,—of *sul- phu c acid*, by AGRICOLA and others;—and the py igneous *acetic acid*, either alone or with cre ote, by myself. Solutions of the *bi-chloride of rcury*, either in dilute alcohol, or in water wit the muriate of ammonia, have been em- plo d by ZACUTUS LUSITANUS, BELL, DUNCAN, and thers, but they may be injurious. Solutions of *rax* either in distilled water, or in diluted ace acid and tincture of myrrh, have been pre- scr ed by the author. Besides the above, solu- tio of the *nitrate of silver*, of the sub-carbonates of e *alkalies*, of the sulphate of *copper*, of the sul ate of *zinc*, of the sulphate of *iron*, of the *sul uret of potass*, and of the *arseniate of potass*, have been severally employed by numerous authorities; whilst decoctions, infusions, &c. of *tobacco* and of various narcotic plants, have been advised by many writers. The *Ledum palustre* was used by LINNÆUS, and the *Tussilago farfara* by MEYER and HUFELAND.

17. The use of *tan-water*, as either a lotion or wash, after the removal of the crusts of favus is favourably mentioned by WEAVER. I have in similar forms and circumstances employed strong *tar-water* with complete success.

18. Other substances have been prescribed for this complaint either in the form of ointment or in a fluid state, as a lotion or wash, as the peculiarities of the case suggested. Of these the most important are *arsenic* and *tobacco*. My own observation has proved that these may be most dangerous when applied to a large surface after the crusts of favus have been removed, especially when incautiously used in a fluid state, or when ointments containing either have been too long applied or too frequently renewed. IUSTAMOND witnessed a case in which the use of a decoction of tobacco was fatal; and I have seen an instance in which arsenic applied to the scalp after the removal of the crusts of favus very nearly produced a fatal result. *Tartar emetic* has been advised by BLIZARD, and employed in the form of ointment and lotion; but it may be also injurious, if not carefully watched, and it is by no means of great service at any period of the disease.

19. *d. Plasters* of common *pitch*, or *Burgundy pitch*, have been employed with the object of removing the hair from the diseased follicles, and of restoring the follicles to a healthy state. *Ammoniacum*, made into a plaster with acetic acid, and applied after the crusts have been removed, has been prescribed with the same intentions as the pitch. Tar ointment, or tar mixed with melted suet, has been similarly used. *Tar* applied simply over the affected part, after the crusts and diseased hair have been detached, and covered by oiled silk, very seldom fails of success, especially if tar or pitch pills be given internally during the treatment.

20. More recently the preparations of *iodine* have been frequently prescribed, both in this disease and in several others of those which I have arranged under the ORDER, *Dermatites contagiosæ* (see Art. SKIN § 76.) As early as 1825, Mr. MORSON prepared for me an *iodide of sulphur*, which I prescribed in the form of ointment (from ℈j to ʒj in an ℥j) in cases of Tinea and psora, chiefly at the Infirmary for Children. About the same time and subsequently I frequently employed the tincture of iodine somewhat diluted, or the iodurated solution of the *iodide of potash*. These preparations were generally successful, especially if the preliminary part of the treatment was duly attended to (§§ 13, 14.) I have also employed various combinations of camphor, turpentine, and soap liniment after the removal of the incrustations; or the former of these with lime-water.

21. *B.* When favus is seated on the trunk or extremities, it may be easily cured by these means or even by alkaline, or sulphurous baths, or by frequent ablution with strong soft soap after the incrustations are removed by poultices. But when it is seated in the scalp, then most of the means above noticed may fail, or at least require

a protracted use, if the diseased hair be not removed. *Evulsion of the hair* was long ago directed by Astruc, Acrel, Fischer, Van der Haar, Morison, Lamotte, Sedillot and Plumbe; and more recently by the Messrs. Mahon of Paris, who facilitated and accelerated this intention by a depilatory powder, the composition of which they kept secret. The method formerly employed of extirpating diseased hair was by applying straps of plaister, variously prepared with pitch, ammoniacum, or other gums, after the removal of the incrustations, and by removing these straps forcibly after a day or two. Dr. Willis has justly remarked that any plan of treatment which combines the removal of the hair by gentle means, or when it has been loosened at its roots, with undeviating attention to cleanliness for about two months will be found to cure favus.

22. Very recently, the local treatment of Tinea has very satisfactorily been illustrated by Dr. Jenner, and in such a manner as to deserve particular notice and adoption. Professor Graham had suggested the use of *sulphurous acid* and the *sulphite of soda* for the destruction of parasitic formations. Dr. Jenner adopted the suggestion in the treatment of Tinea favosa; and it may be inferred that the means he has employed will be serviceable also in the other species of tinea. A solution of sulphurous acid is prepared, by passing a stream of the gas through water until the latter is saturated. Of this solution two ounces may be added to six ounces, to make a lotion, which may be used by means of lint, and frequently applied and kept wet for the removal of the crusts, and subsequently applied to keep the surface clean. Afterwards zinc ointment may be prescribed to heal the surface left raw or sore by the previous application. I have seen great benefit obtained from washing the scalp occasionally, or frequently, with tar-water, or solutions of creasote, or with terebinthinate lotions. When the disease is seated on the trunk or extremities, the saturated solution of sulphurous acid may be abundantly added to a tepid bath, immersion being continued for about half an hour, and repeated after intervals of two or three days: a very few repetitions of the acid bath appears to remove the disease. This treatment deserves a trial in the second, third, and fourth species of tinea, as well as in several other chronic eruptions, and especially in all those which I have classed under the order *Dermatites contagiosæ* (See art. Skin, § 76. *et seq.*).

23. *C.* Most of the means above noticed may be employed for the *second and third species of tinea*, due attention being paid to the states of the hair and hair-follicles; and the more stimulating applications, as the balsam of Peru, tincture of lytta, the essential oils, &c. being prescribed in pomades or ointments, after a due trial has been made of the sulphurous acid. After the acid has destroyed the parasite, these applications will be of service in restoring the functions of the hair follicles. (See art. Hair.)

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TONGUE — Diseases of the. — (Γ γλῶττα.—*Lingua*, Lat.—*Langue*, Fr.— Ger. *Lingua*, Ital.—*Lengua*, Sp.)

1. Those slighter affections of the tongu are symptomatic of either constitutional or diseases, and which furnish more or less tant indications of the seat, nature, and disease, have been passed in review when of the symptoms and signs furnished organ in the article Symptomatology. § 101., *et seq.*)

2. I. Neuralgia of the Tongue. — *Glossalgia* (from γλῶσσα and ἀλγέω, *Tic Douloureux of the Tongue*.

Classif. — See Neuralgic Aff

3. *A.* Neuralgia of the tongue is not of occurrence. I have seen only a few cases these the pain was, without an exception, to one or other side of the organ. The p sents nearly all the characteristics of ne It is sudden in its accession, most violen contracting the organ to the side affecte times causing an abundant flow of saliva, ducing sympathetically, more or less, co of the face. Its continuance may be mon its cessation being as sudden as its occu or it may be more protracted, with more remission and violent exacerbation. T sometimes resembles the passage of a strument, or of a hot needle from the sid base to the apex. The cases which I ha were unattended by neuralgia of any oth and I have viewed them as indicative of either at the origin, or in the course of, th supplying the side of the tongue affected; a not improbable precursor either of par the tongue, or of hemiplegia, or of apople

4. *B.* *The treatment* should be based inferred states of the general and cerebral

s respects either congestion, capillary ac- inflammation. If the neuralgic pain recur tly, or prove obstinate or protracted, notnding a due recourse to local depletions, lly cupping on the nape of the neck, or e mastoid processes, when general or local a or increased action exists; to purgatives obstruants, or to tonics, stimulants and smodics, with or without anodynes, when congestion nor inflammatory action is in- it will often be of service to pass a seton e nape of the neck, and to preserve a free ge from it. In some cases, especially when ed action or congestion exists, the shower the cold effusion on the head, whilst the e kept warm, or plunged in hot water, o be cautiously employed. The treatment espects should be the same as recommended rticle on NEURALGIC AFFFCTIONS. (See § eq.)

5. I. PARALYSIS OF THE TONGUE.—CLASSIF. —See art. PALSY.

6. *Palsy* of the Tongue *is characterised by or impaired movements of the organ, and im- utterance, or entire loss of speech.* The loss ower of motion of the tongue is generally ded by the loss of sensation. The sense is often not affected (SCARPA and myself) sis of motion when primarily affecting the is rarely so complete as to entirely prevent tion. But after a stroke of apoplexy, or in tion with hemiplegia or other paralytic the motions of the tongue are often so ined or impaired as to affect articulation, or less. When articulated sounds are her prevented, then the nerves of the are not alone affected, but those also pharynx are more or less implicated, den being also impaired, or very difficult. sis of the tongue is most commonly ob- at an advanced period of paralysis of or less general form, or after repeated , especially of apoplexy, and is a very unble sign. When thus appearing or asso- it is always attended by impaired or lost tion, and is followed by difficult or lost tion; the patient, however, being often car- by an apoplectic attack before this latter m occurs. Palsy of the tongue, in a more complete form, rarely precedes apoplexy or egia; but when it thus appears primarily, re the occurrence of an apoplectic or egic seizure, it is always a very dangerous m, and most rarely exists long without a or fatal attack supervening. When it thus primarily, it may or may not be accom- by impaired or altogether lost deglutition. seen several cases of primary paralysis tongue, with complete loss of articula- he first and most complete of these with INSTONE. In these no other sign of dis- as observed, and in all I inferred that se- r fatal apoplexy would occur in a short this result took place, and was rapidly fol- by dissolution. In a case recently at- by DR. N. GRANT and myself, the para- the tongue and pharynx disappeared upon ck of gout in the feet. The slighter states of ed movements of the tongue are, however, no ent precursors of apoplexy or palsy, and lly somewhat impair utterance or articu-

7. ii. *The treatment* of palsy of the tongue is in many respects the same as described in the articles APOPLEXY and PARALYSIS, and depends entirely upon the inferred pathological conditions—1st, of parts near the origins, or in the course of the lingual and pharyngeal nerves; 2nd, of the blood-vessels and blood; 3rd, of the organic nervous system; and 4th, of the excreting viscera. If a gouty diathesis be inferred; or if gout have been previously experienced, sinapisms should be applied to the lower extremities; *Mascatories* and *Errhines* have been much recommended by HAUTESIERCK and LANGE; a *seton* or open *blisters* on the neck, by HELWIG, &c., and active purgatives by RIEDLIN; but these are generally in use.

8. III. INFLAMMATION OF THE TONGUE. SYN. —*Glossitis* (from γλῶσσα, the tongue).
CLASSIF. — III. CLASS; I. ORDER. (*See Author, in Preface*).

9. DEFINIT.—*Pain, great swelling and redness of the tongue, more frequently towards its base, and sometimes confined to one side of the organ, with more or less febrile action, the character of which varies with the cause and nature of the local disease.*

10. *Idiopathic and sthenic glossitis* is sometimes a very severe and even a dangerous disease. It is not, however, often met with in practice, although the tongue is much exposed to the usual causes of inflammation. J. P. FRANK saw but one case during a practice of twenty-five years, and during forty-five years he treated only seven cases. I have seen only four cases of this form of glossitis in thirty-five years. Of these, two terminated in suppuration; one only having thus terminated in the seven cases seen by FRANK. The four which occurred in my practice either were limited to one side of the organ, or affected one side chiefly. The cases which were followed by abscess were limited to one side; and the inflammation in all the cases was chiefly seated in the thick part of the tongue. This immunity from the more usual sthenic form of inflammation may be ascribed partly to the muscular structure of, and partly to the abundant supply of nerves possessed by this organ.

11. i. ACUTE GLOSSITIS. — *Sthenically acute glossitis.*—This disease is readily recognised, as it comes directly before the senses of the physician. *It is characterised by redness, swelling, hardness: an acrid, stinging sense of heat, or a burning pain of the tongue, with either great dryness of the mouth, or a profuse flow of saliva, and the usual symptoms of inflammatory fever.* In proportion to the swelling are the functions of the organ impaired, and the voice, speech and deglutition affected; the two latter being generally either nearly or altogether abolished in the most severe cases. Sometimes the tongue is swollen to such a size as to press upon the glottis, or rather to prevent the rising of the epiglottis, and to fill up the isthmus faucium and mouth, and threaten suffocation. In other cases, the swollen and inflamed tongue is protruded from the mouth. This, however, is oftener the case in the sympathetic glossitis proceeding from cynanche (see THROAT, *Inflammation of*), and from the excessive use of mercury, when the simultaneous affection of the tonsils, parotids, and parts in the vicinity, and the consequent tumefaction of these, press the tongue outwards.

12. *A.* In some cases the attack is sudden; and in the most severe cases the tumefaction and the threatened suffocation are such as to place the patient's life in imminent danger. The surface of the tongue is generally covered by a thick mucous coating, or by an exudation of lymph. At the commencement of the disease the sense of taste is very acute, owing to the excited state of the nerves and increased vascularity of the papillæ; but, as the disease proceeds, taste is abolished, owing perhaps to the pressure experienced by the nervous fibrillæ from the turgid vessels, and fluid effused in the structure of the organ, and partly to the thick mucus or lymph covering the inflamed surface. To these are added unquenchable thirst, great anxiety and restlessness, head-ache, turgescence of the countenance, swelling and tenderness about the throat, and beneath the maxilla, watering of the eyes; sometimes anxious, pale or saddened expression of countenance, quickened circulation, costive bowels and high-coloured urine.

13. The *course* and *termination* of the disease are the same as of other inflammations. The malady usually proceeds as above, in a more or less severe form, and generally increases until the third, fifth, or seventh day, when it either subsides gradually under treatment, or terminates in resolution with critical phenomena, particularly profuse perspiration, hypostatic urine, or a copious discharge of saliva, or bleeding from the nose, or accession of the catamenia. If a favourable change does not take place at these periods, the disease may terminate in suppuration or in sphacelation; or it may occasion suffocation or apoplexy, neither suppuration nor gangrene having taken place, but these unfavourable results very rarely occur, unless the disease has been neglected.

14. *C. Abscess* seldom follows glossitis, owing to the muscular structure of the organ. I have seen only two cases in my practice, in which abscess occurred; and after a free opening was made the parts readily healed. Cases are recorded by Ebermajer, Frank, and others of this termination of the disease. Owing to the exudation of lymph into the substance of the organ, considerable hardness and enlargement sometimes remain long after the acute state of disease has been subdued. Hildenbrand supposes that this change may at last terminate in scirrhus or carcinoma; and in this opinion he appears to be supported by the observations of Loefler and Zeigler. I believe, however, that cancer very rarely or never supervenes upon sthenic forms of inflammation; malignant diseases of the tongue, commencing in a slow and insidious form, and independently of antecedent acute disease. When acute glossitis goes on to suppuration, very serious consequences may result from neglect of this state. When the disease comes under treatment previously to the commencement of suppuration, this result may be prevented; or if it be inevitable, danger will be avoided, by a judicious and prompt method of cure; unless it take place in sympathetic glossitis, or in persons of a cachectic habit of body, or in cases caused by animal poisons taken into the mouth, or by the stings or bites of poisonous insects or reptiles.

15. ii. *Asthenic Acute Glossitis.*—*A.* Inflammation of an acute asthenic character may take place either in a person whose constitution ha een exhausted and his blood more or less alte , or in the advanced stage of a malignant febri malady, as in exanthematous and pestilenti diseases, or by the application of such animal ons or deleterious matters as will be noticed the sequel, to the tongue or mouth. This state the disease, especially when occurring from the last-named causes, generally appears suddenl and proceeds rapidly with great violence. Th pain and tumefaction are very great, the inflame arts being livid, or dark-red, or brown, and accompanying fever being characterised b vital depression, by a very quick weak or i able pulse, and by signs of progressive contam tion of the circulating fluids. Asthenic acute ssitis is seldom seen in a primary and uncom ated form. It is most frequently met with as a co lication of scarlet fever, of small pox, of erysipe and of pestilential maladies. When it occurs pri rily it may generally be inferred that some poisonous substance has caused the attack whether appearing primarily or in the c se another malady, its diffusive nature is m ifest It often extends to the fauces, tonsils, p ynx surrounding cellular tissue and neck, mo specially when it is caused by animal or oth poisons, or by the sting of an insect.

16. *B. The course and termination* of this the disease are generally rapid and unfav able, unless very prompt and judicious means employed. When it is caused by the contact n oculation of poisonous matters, the local chan var with the cause. These changes may consi f tumefaction owing to the exudation of a dirt mph or serum, or the affected parts may be l , or otherwise discoloured, and more or le softened; or they may nearly approach a gan nous state. In some cases the inoculated poi may so affect the organic nervous and vascular em and the blood, as to occasion death in shor time, the changes found in the tongue and joining parts being insufficient to account the result.

17. iii. The Causes of acute idiopathic ssitis are chiefly poisonous, chemical and me nical agents. Animal poisons applied to the gue, or animal matter in a state of diseas or decomposition, or the blood or the di arg from foul sores or malignant ulcers, the es insects, &c., produce the more severe an sthenic form of the disease. The incautious accidental mastication of acrid and irritati substances, especially such as are poisonous, a ryony or wild vine, the mandragora, the arum a other poisonous plants have produced glossitis. saw a case of the diffuse and asthenic form of the lady caused by monkshood accidentally ma ated, Caustics, acids and acrid chemical com nds, cauteries; hot and highly seasoned article di and stimulating drinks; mechanical inj s, wounds, punctures, or bites during mastic on or epileptic paroxysms, operations on the h, or for ranula; burns or scalds, the irritation p uced by irregular or carious teeth, and the loc ction of irritating or stimulating substances int uced into the mouth during coma, have several occasioned glossitis. I saw a case following th introduction of mustard into the mouth to duce vomiting in a case of poisoning by opium The disease has sometimes been ascribed to t mor

on causes of inflammation, as exposure to
n any form, draught of cold water or the
f ice, suppression of the perspiration or of
omed discharges. Scheidemantel states,
e saw glossitis follow exposure to cold;
k from suppression of the menses, and
rrhoids; Wendt from suppressed perspira-
f the feet; and Delatour from sudden
ession of epistaxis.

The above have been viewed as the chief
t causes of this malady; but several of
may be considered as incapable of produc-
, without the concurrence of others, either
ing or reinforcing them. The chief or most
tial *pre*-disposing causes are, disorders of
ima via and digestive organs generally, es-
y those characterised by the accumulation
rbid secretions and mucous sordes; the
rheumatic and scrofulous diatheses, and
matory affections of neighbouring parts.
Mertens, Kemme, Loefler and others
too strongly insisted upon the occasional
ns of these diseases to glossitis. In rare
ces the disease has been said to have ap-
immediately upon the subsidence of other
mations. Thus Frank observed it after an
of hepatitis; Dr. Elliotson saw it after
itis; but such occurrences may be viewed
dly connected, or as mere contingencies.

iv. Symptomatic and Complicated Glos-
–Inflammation may attack the tongue con-
vely upon inflammation of adjoining parts, as
tonsils, fauces, gums, and pharynx. This
of the disease not infrequently occurs from
ive mercurial action of the salivary glands,
in some constitutions may be induced by a
nall dose of any *mercurial*. (See art. Poi-
568. *et seq.*) This unpleasant result is some-
induced by exposure to cold, or to currents
air about the head and neck, during or soon
e use of mercurials, or from the suppres-
f the salivary discharge by these causes.
the tongue is affected from excessive mer-
action, or suppression of the salivary flux,
is generally much more tumefaction than
inflammation of the organ; the inflamma-
tion even when present, possessing much
the true sthenic or phlogistic character
hen the disease appears in an idiopathic

Glossitis also occurs symptomatically, and
an important complication, in *scarlet fever*
small-pox. Reil observed it in several
f an epidemic fever which occurred in the
of Germany near the termination of the last
y (*Fieberlehre*, ii. p. 370.); and Van
en, Delamalle, Louis, Marjolin, and
, have seen it supervene in the progress of
ant fevers. When thus complicated, glos-
generally asthenic, diffusive, or spreading,
rts adjoining being more or less implicated,
e danger of the disease thereby greatly in
l. I have seen this complication also in
pelas, and have adverted to it when treating
disease.

v. Superficial and Partial Glossitis.
is generally a more chronic form of the dis-
an any of the foregoing. It consists chiefly
nflammatory state of the villous surface of
gue, and is much more common than in-
tion of the substance of the organ. This is very frequent in young children, consisting generally in an extension of inflammation either to or from the adjoining parts. It is thus very often met with in aphthous affections (see Thrush), in inflammation of the mouth and gums (see Stomatitis), and Cynanche maligna (see Scarlet Fever and Throat, &c.). In this partial and associated form of glossitis the edges of the tongue are chiefly affected, but the whole of its surface may also partake more or less of disease, and the organ may also be swollen. The inflammation may be moreover of a specific kind — not only of the kinds just mentioned, but *syphilitic*, with or without ulceration. This state of the disease is even occasionally met with in infants, and has been caused by the affected nipples of nurses. This partial form of glossitis may also proceed from mercurial action. It is attended in this case with more than ordinary loss of the vital cohesion of structure; the edges and sides of the tongue have an inflamed, swollen, flabby, and unhealthy appearance, and retain the impressions of the teeth, against which they are forcibly pressed by the tumefaction of the organ. This state of partial glossitis sometimes gives rise to fungous excrescences of a soft, flabby, and vascular character, shooting between the teeth, and bleeding on the slightest irritation.

22. Partial or superficial glossitis is much more frequently seen in the course of scarlet fever, small pox, continued fevers, &c., than the form of the disease noticed above (§ 20.) as complicating these maladies in rare instances. It often occurs, also, in the inflammatory affections of the throat, as an extension of these affections (see arts. Stomatitis and Throat); and not unfrequently it is symptomatic of disorder of the prima via, particularly of the stomach and liver, arising from the accumulation of morbid secretions. Owing chiefly to this cause, it is sometimes also observed accompanying several acute cutaneous eruptions, as urticaria, &c.

23. vi. Chronic Superficial Glossitis.—This form may be confined chiefly to the sides or edges of the tongue, or may extend over the whole surface. In either case I have seen it as the chief lesion or affection, whilst it has been more frequently associated with a similar affection of the gums, fauces, and pharynx. It is a common complication in *scurvy*, and then it is generally removed in due time by the means recommended for that disease. But in other circumstances it is a most obstinate, and often serious, but a rare malady. In some cases, the redness and peculiar raw appearance of the tongue have apparently extended not only to the fauces and pharynx, but also to the œsophagus and, in some degree, to the villous surface of the stomach. When the disease is confined chiefly to the sides or edges of the tongue, the irritation caused by carious or irregular teeth may have occasioned or prolonged it. But when it is more general, the digestive viscera are in fault, and owing to the nature of their disorder, the affection of the tongue varies in severity and duration. In a few cases of this disease which I have seen, the redness, pain, heat and soreness of the tongue, were very much complained of; and they had been of considerable or long duration before I saw them. The gums were also red, retracted from the teeth; and the fauces and pharynx were more or less affected. The surface of the tongue

was deprived of its papillæ, was raw and inflamed throughout, acutely sensitive, but the organ was not much swollen, although it was the part more especi- affected. Of five or six cases of this disease that I have treated, two went from under my observation after having been some time under treatment without much apparent benefit. The others were also obstinate, but recovery or relief followed the means about to be noticed. (§ 36. *et seq.*). One of the cases was imputed to the use of iodide of potassium in large doses. In all, the extreme tenderness of the tongue and mouth, the difficulty of taking solid food, or of masticating any food, the pain on deglutition, the disorder of all the digestive functions, and the occasional irritability of the stomach and bowels, the torpor of the liver, the state of the urinary discharges, &c., had occasioned more or less emaciation, with other indications of cachexia, and shown the relations of the disease. This form of glossitis appeared to have been, in all the cases, symptomatic of prolonged or neglected disease of the digestive organs, more especially of the villous surface of the digestive canal.

24. vii. The Prognosis of glossitis may be inferred from what has been stated respecting its forms and terminations.—*a.* When the disease has been produced by an animal poison; when the attack is sudden and violent, and the swelling is great; when the constitutional disturbance is very considerable and the pulse is quick and weak, the disease is then attended by great, or even extreme danger. The risk is generally greater in the *asthenic* than in *sthenic* cases: but, even in the latter, when the tongue is greatly swollen, or much discoloured, and the suffocative symptoms urgent, the danger is then very considerable. In the milder idiopathic forms, especially when the treatment is judicious and prompt, the prognosis is favourable. When the disease is *complicated* with any of the forms of cynanche, or is attended by much swelling, pain, and tenderness about the throat and angles of the maxilla, the danger is considerable; as the extension of inflammation either from or to the tongue indicates both a severe form of disease, and a faulty state of the vital power and habit of body of the patient.

25. *b.* The termination in *abscess*, although an unpleasant occurrence, is not generally attended by danger: indeed, in persons not otherwise diseased the constitutional symptoms not being very urgent, no risk may be apprehended, particularly if the abscess be limited in extent or confined chiefly to one side of the tongue. If suppuration, however, take place in an unhealthy subject, and be attended by a very quick, irritable pulse, by depression of the vital energies, by delirium towards night, coma, followed by a fatal issue, should be expected. Sphacelus and gangrene rarely occur, but recovery never takes place when they appear in this organ, as a termination of either primary or complicated glossitis.

26. *c. Partial* glossitis and *chronic* glossitis, especially when affecting aged persons, are often very obstinate diseases; the latter especially. When the partial glossitis is caused by carious or irregular teeth, or has often occurred, or has gone on to ulceration, it is very difficult of cure. The ulcerations may become indolent, or be followed by hardening, enlargement, or even by scirrhus and carcinoma. The tongue may thus present a very dangerous state, which, although a local, may, in its advanced stages and mal form, assume a constitutional and fatal char *Chronic* glossitis is always a protracted an favourable form of disease. In all the c have seen, it formed only a part of very plicated states of disease, but a very distr part, requiring both discrimination and verance in both the local and constitu treatment.

27. viii. Treatment.—*A.* Of Acute Glo — The treatment of this disease should b dified according to the causes producing it. it has arisen from causes the operation of still continue, as the irritation occasion irregular or carious teeth, foreign bodies these should be removed as soon as po When it has originated in causes which a depressing to the vital energies, the means o should be very different, or even opposite to which are required when it is caused by poi agents. In the former circumstances the presents a *sthenic* character, in the latter an *nic* form, both locally and constitutionally.

28. (*a.*) *Sthenic Glossitis.* In this for vital energies are not impaired, although va action be locally and generally excited. vascular depletions are promptly require an activity proportionate to the severity disease. Authors, however, differ as to the tion from which the blood should be abst Many recommend the application of a nun leeches, or scarifications and cupping, abo throat, angles of the jaws and neck, after section in the arm: others advise blood- from the raninal veins, or from the feet; some prefer the application of leeches to flamed tongue. The determination of this may be of some consequence, and it may b next in importance to the amount of blood should be taken away. In these matte physician should be guided by the caus the severity of the disease. But in acute glossitis, blood-letting, whether general or or both, will not of itself cure the disease, in its less severe forms; and in those whi severe, the raninal vessels cannot genera reached.

29. The very slight advantage derived fro cular depletion in this disease as usuall formed, has been long known to physicia has led them to the adoption of other me of a decisive character, and productive locally depleting effect, namely of *incision* into the substance of the inflamed organ. practice seems to have been first resorted Job Meckren in 1656, and it has been rally followed ever since. Delamalle, I berg, Stoeller, J. P. Frank, Arne Hildenbrand, Schneider, Delatour, Dekeere, Marjolin, and others, have pres it in many cases. Louis states that *incisio* failed only in those cases where they have b superficial; and he therefore advises tha should be deep, and consist of from two t made longitudinally near the edges of the o one or two on each side of the median lin the base to near the point. A copious dis of blood should be promoted from the in by emollient applications, by the steam of water or medicated vapours, by suitable

and washes, &c., which will at the same time fav r the termination in resolution. In the cas which I have seen, incisions were success- ful employed. In two cases, suppuration had ad nced before I was consulted, but incisions we directed and were equally beneficial.

Other antiphlogistic means are also required in s form of the disease, especially cooling purga- tiv and diaphoretics. Drastic purgatives are oft necessary at the commencement of the treat- me , and although **Broussais** and his followers — master and disciples of a now obsolete sch l—have inveighed against them, experience has demonstrated their utility. **Galen**, **Van Sw ten**, and many others, have recommended the . Their operation should be assisted by act purgative injections. The excessive thirst acc panying the disease may be calmed by a sol on of cream of tartar, with a little nitre in tan ind water. If deglutition be prevented by the wollen state of the tongue, the urgency of thi symptom may be moderated by tepid or wa bathing, by emollient lavements, and by coo g and emollient fomentations to the throat, an y applications to the tongue itself. Injections of similar nature should be thrown into the mo h, which the patient ought to be directed to gar e or wash frequently with emollient infusions an decoctions. **Speranza** advises an infusion of dig lis for this purpose. (*Annali Univ. de Med.* Ja 1829.) **Marjolin** recommends gargles and lot s with diluted vegetable acids. A solution of the borate of soda and bitartrate of potash, or of the rmer alone, in the decoction of marshmallows, or linseed tea, is one of the best gargles or wa es in this disease. I have employed it with be it in this form of glossitis, as well as in the oth forms which I have designated partial and su ficial. Linctuses, consisting of mucilages or ho y, or syrup of roses, and containing either the mu te of ammonia or the nitrate of potash, are also of nsiderable benefit, both in these states of the dis e and in the partial and superficial forms.

. In addition to the above means, external an nternal *derivatives* or *revulsants* have been res ed to, as *blisters* or terebinthinate *embroca- tio* applied beneath the lower jaw, or to the na of the neck, and repeated; *sinapisms* to the low extremities, stimulating pediluvia and manu- luv , drastic *purgatives*, and irritating *enemata*, &c. M. **Dupont** advised, after incisions or scari- fic ons of the tongue, an active *emetic*; and I be ve the practice to be judicious. Amongst oth means, substances calculated to excite the act n of the salivary glands have been recom- me ed by **Blancard** and **Marcus**. Mercurial pre rations may be prescribed for this purpose wh the disease is not of a mercurial origin, but the action is not sufficiently rapid nor certain. **Sp anza** advised lotions of infusion of digitalis.

. (*b.*) **Asthenic Glossitis**, especially when it be nes diffusive, or has been induced by the con- tac r inoculation of an animal or any other poison, oft assumes a very violent and dangerous form, the vidity and swelling of the organ being great, the ocal and constitutional symptoms indicating a p verful sedative influence on the system. Con se ently a different treatment from that advised ab e is required, and that treatment should be pr ptly decided on, and energetically carried ou Still the severity and the cause of the disease should decide the adoption and the selection of the means. Vascular depletions, as usually practised, are not required in this form of the disease, and are rarely productive of any benefit. Yet *incisions* into the tongue (§ 29.) may even here be practised with advantage. The cases of **Stoeller** prove their advantage in this state of the disease. Indeed, incisions may be more advantageous in this than in any other form of the disease, by allowing the discharge of the poisoned exuded fluids, causing the swelling and contamination of the organ. After they have been made, the tongue and mouth should be afterwards often washed with a decoction of cinchona, with either of the mineral acids, and camphor, or with a strong infusion of green tea, or of arnica, or with strong tar-water; or these ought to be injected into the mouth, when they cannot be otherwise taken into it; and full doses of the preparations of cinchona, of serpentaria, or of arnica with camphor, or with hydrochloric acid and hydrochloric ether, or with ammonia and its preparations, should be often administered, in such forms and vehicles and in such a manner as circumstances will suggest or require. If an animal poison has occasioned the disease, fluids containing the turpentines, or creasote, or the chlorides, &c., ought to be introduced into the mouth, and the tonics and stimulants assiduously administered, conjoined with alkalies, or with chlorides, or with other medicines already mentioned, both by the mouth and in enemata.

33. (*c.*) *Glossitis, symptomatic* of, or *complicated* with, eruptive or malignant fevers, is generally of an asthenic character. Blood-letting is injurious in these cases, beyond the local discharge proceeding from the incisions, which also may be necessary, and which should then be made, when the tumefaction and pain, or sensation of suffocation, are urgent. Whilst the primary or the special disease ought to receive due attention, and be treated appropriately to its form and stage, the local complication, according as it may present more or less of the characters appertaining to either of the states above described should be treated conformably with the recommendations already offered.

34. When the disease has gone on to *suppuration*, then incisions into the adjoining parts, and a free opening into the part in which the matter is either forming or is collected, should not be neglected. If there be little or no swelling unless that produced by the collected matter, a free opening into it will generally suffice. But when the matter is formed in the asthenic form of the malady, or after inoculation or contact of a poison, incision or scarifications of parts adjoining may be required.

35. The severe states of glossitis caused by mercury have been likewise treated by incisions by **Plenck**, **Delamalle**, **Friese**, **Schneider**, and others. **Louis** advises blood-letting, and agrees with **Plenck** and others, in the active administration of purgatives, drastic enemata, sudorifics, diuretics, astringent and cooling washes, and change to a dry and healthy atmosphere. Emetics have also been recommended, and I have prescribed washes with tar-water, with creasote, with the chlorides, and with several other substances, the affection continuing notwithstanding for a considerable time in some cases. (See art. **Poisons**, § 590. *et seq.* and **Stomatitis**, § 20. *et seq.*)

36. *B. Partial and Superficial Glossitis.*— Most of the local means already advised may be prescribed in this state of the disease; but in all cases due reference should be had to the predisposing and exciting causes, and to the states of the digestive, the assimilating, and of the depurating functions, and of the constitutional powers. The lotions, linctuses, &c., washes or gargles, mentioned above (§ 32.), or those prescribed in the article STOMATITIS (§ 14. *et seq.)*, or solutions of either of the mineral salts, as the sulphate of zinc, the nitrate of silver, &c., may be severally employed as circumstances will suggest. These last, or the dilute mineral acids in tonic or astringent decoctions, and used as washes or gargles, are most appropriate when ulceration is present. In most of the cases which come under the present category, the treatment and means advised under the heads STOMATITIS and THRUSH are quite appropriate.

37. *C. Chronic Glossitis,* whether it be limited to the sides or edges of the tongue, or whether it be more general and superficial, is always a most obstinate disease, and is often merely a severe local manifestation of a very general and serious malady, or at least of a protracted disease of the digestive organs. Hence, in addition to the local means already recommended—to the use of vegetable, of saline, and mineral astringents and refrigerants, of emollients and demulcents, &c.—general and constitutional remedies, directed especially to the restoration of the digestive, assimilative, and depurative functions, or to the removal of whatever lesion or disease which may be inferred to exist in any of the organs devoted to the discharge of these functions, should be prescribed, and their effects closely watched and aided by a suitable diet, regimen, and change of air. Cachectic symptoms should be combated; and when the diet, mode of living, air, water, or residence of the patient appear to have originated or concurred in producing the malady, these especially should all or severally be ameliorated, or altogether changed.

38. The principles now stated and developed above, as well as in other places in this work, must be guides to the inexperienced in the treatment of the diverse forms and complications of glossitis; for it is impossible to lay down rules, or to furnish illustrations or explanations of such rules, as will be altogether appropriate to the diverse cases which may occur in practice. In such cases, as in those of other diseases, the physician must think and decide for himself, and, by thus habituating himself, he will ultimately more certainly arrive at correct practical conclusions.

IV. ORGANIC LESIONS OF THE TONGUE.

CLASSIF.—IV. CLASS, I. ORDER (*Author, in Preface*).

39. The structural alterations of the tongue are consequences either of inflammation, or of unhealthy or cachectic states of the constitution, or of chronic disorders of the digestive organs. Inflammations, either primarily or consecutively affecting the tongue, are rarely of any considerable duration, without changing more or less the structure of the organ; still they cannot be viewed in their earlier stages especially as falling within the category of structural lesions. Cachectic states of the constitution may variously alter the organisation of a part or organ, independently of inflammatory action, by either impairing, increasing, or otherwise
altering the nutrition of that part, or by cha ng
its cohesion, consistence, bulk, &c.; and ro-
longed disorder of the digestive organs, may m-
pathetically occasion similar effects on thi art
Organic lesions of this organ may, moreov be
produced by specific poisons or infectants.

40. i. ULCERATION OF THE TONGUE.— his
lesion is frequently a consequence of part or
chronic glossitis, especially when limited t he
sides, edges, or point of the tongue. It is en
also a result of STOMATITIS and THRUSH; a of
exanthematous and continued FEVERS, more pe-
cially of SCARLET FEVER and SMALL-POX. re-
quently complicates SCURVY, and is often c ed
by the prolonged irritation of irregular or c ous
teeth. These antecedents are sufficiently in a-
tive of the nature and treatment of the lesion ut
the ulceration may be of a *specific nature* — d,
it may be, *primarily* or *consecutively* or se d-
arily specific: as such it falls within the cat ry
of VENEREAL AFFECTIONS. Irrespective of se
states of ulceration, there are others which nc n-
frequently are subjects of interest and conce to
the physician — which cannot be imputed to se
affections, and which require both a loca nd
constitutional treatment.

When ulceration of the sides of the tong is
the result of prolonged irritation of irregu or
carious teeth, both the nature and the treatm of
it is obvious. As a consequence of scarlet er,
small-pox, and fever, the ulceration gen ly
heals with the progress of convalescence. In
rare instances, however, it becomes obs te
and chronic, requiring the application of s ng
solutions of the nitrate of silver, or the bichl de
of mercury, of the tincture of iodine, &c. se
ulcerations are seldom on the dorsum or n le
superior surface of the organ; but, when ey
are thus situated, the constitutional disor is
then chiefly the cause, unless some local dis er
of the surrounding parts have complicated nd
increased the affection. One of the most fi-
cult cases of ulceration in this situation occ ed
in a case of typhoid fever; and was mani ly
caused by the patient having, in the cour of
his delirium, taken a tongue scraper and for ly
removed the long dark fur covering the ton e;
this fur evidently tending to protect the su ce
of the organ during the advanced stages o ne
fever.

41. Ulceration of the tongue may, how r,
take place without very manifest anteceden n-
flammatory action—at least without any s re
or prolonged state of this action; and wi ut
any evidence of the state of the opposite ch
being its cause. The conditions of the dige ve
organs, especially of the stomach and collat us
viscera, or of the system generally, are, in st
of these cases, the chief assignable causes; e-
cially when the ulceration does not present er
specific or malignant features. In som n-
stances, even when these features may be x-
pected, or are about to be developed, they y
not be clearly manifested; for the ulcer on
may be either indolent, chronic, and vari y
characterised; and yet it may be difficu to
state with certainty its cause, nature, or pro le
issue; the antecedents, concomitants, or hi y
of the case being the chief guides. An ulc n
the side of the tongue, when caused by the t h,
may be cured with difficulty, even after ne

ca e is removed; and when it has followed pr acted disorder of the digestive organs, or a sc outic attack, it is not readily healed in many ca , after the disorder of these organs, or after a neral cachexia, is either removed or greatly an iorated, especially in aged persons. The dr d of consecutive malignancy, or cancerous de neration, always suggests itself; and, alth gh such a result may not take place, we kn that it often has occurred in such cases; or th the cancerous nature of the ulceration does nc lways distinctly declare itself at first.

. ii. CANCER OF THE TONGUE is not infrequ t.—*A.* Dr. WALSHE states that out of 8,289 fa cases of cancer reported in the Paris regi rs in 1836, it was primarily or mainly seated in is organ. Scirrhus is its usual form, passin nto ulcerations; but fungous excrescences so times appear, or exhibit the encephaloid ch acter. It may attack any part of the tongue, es cially the sides. I have seen three cases w e it affected one side chiefly of the thick part or ase of the tongue, extending to the isthmus of e fauces and even to the pharynx, occasionin emarkable dysphagia and its usual symptoms. It ay commence as a small, somewhat knotty, ar irregular tumour, generally seated in the ante r part of the organ, midway between the raph and the edge, or rarely extending beyond the m le line. It sometimes appears as a small ex escence. In very rare cases the cancerous m er is deposited in erectile tumours. Simple ul rs of a chronic or indolent nature may beco e cancerous; but instances of this occurrence ar comparatively rare. In all cases, when the su ace ulcerates, the glands become affected in th usual way. Distant organs are not frequently im icated. There is generally an aching sensa n in the affected part and vicinity, with occa nal sharp or darting pains towards the ear or th at. Pain and difficulty in speaking, mastica g, and swallowing are always present, and in ease with the progress of the disease, until th functions can no longer be performed. Ince nt sputation is always present, and is most di essing. The cancerous cachexia and emacia on are always very remarkable. According to r. TRAVERS strong males, upwards of forty ye s of age, are the most frequent subjects; but th disease is not rarely observed in much yo ger persons and in females.

. *B. The Diagnosis* of cancer linguæ is someti s difficult. The history and antecedents of th ase should be duly considered. Cancer m be mistaken for *simple induration* of a part or le of the tongue, — an affection noticed by R SCH and PERCIVAL, and most frequently se d in the base of the organ. This induration m depend upon tubercular deposits, and be att ded by ulceration; but it is not apparently ma gnant, although it may possibly become so. M TRAVERS has described a *globular tumour* se d deeply in the tongue, which is characte ed by an unyielding and uniform surface. B these forms of lesion are best *treated* with to s and alkalies conjoined with the iodide of po sium. The *fissured and dyspeptic ulcer* m bear a near resemblance to cancer, but it ha ot the hard basis of the latter, is often in th middle line, the rest of the tongue being oft chapped or fissured. It is frequently complicated with psoriasis. *Syphilitic ulcers* are not easily distinguished from cancer linguæ. They are generally larger, have less marked and less circumscribed hardness of their margins: their discharge is less abundant, and they want the firm everted edge and sprouting edge of the latter. The history of the case should be strictly ascertained. "Dr. WARREN describes an *enlargement of mucous glands* occurring on the side of the tongue, with a red fungous appearance, but differing from cancer in being sensitive, not painful, and unattended by real ulceration or thickening of the organ. *Hypertrophy of the mucous membrane* sometimes gives rise to irregular fissured elevations on the surface." *Erectile tumours* are known by their pulsation; but they become seats of cancerous deposits.

44. *C. The Treatment* of cancer of the tongue is palliative only in most cases. As the disease often primarily attacks this organ, the removal of it by surgical operations may be attempted before the glands in the vicinity become affected. Successful cases of this kind have been published by Mr. J. M. ARNOTT and others (*see the Modern Works on Surgery.*).

45. iii. HEMORRHAGE FROM THE TONGUE rarely occurs unless from accidents or operations, or in the far advanced stages of diseases especially affecting the crasis of the blood and the vital cohesion of the tissues. In these latter circumstances it is chiefly met with in some extreme cases of mercurial affection of the tongue, and not infrequently in yellow or hæmagastric pestilence, and in scurvy. In these maladies the blood often exudes from the surfaces of the tongue and gums more or less copiously. J. P. FRANK notices a case of the latter disease in which the hemorrhage was so abundant from the tongue as to prove fatal. For these occurrences, as well as for others of a similar nature, the most appropriate *treatment* is the local application of spirits of turpentine, by means of lint or sponges, whilst the same medicine is taken by the mouth, in doses suited to the peculiarities and urgency of the case. The other means advised, when treating of *Passive* and other forms of HEMORRHAGE (see § 40. *et seq.*), may be employed if this fail.

46. iv. INDURATION OF THE TONGUE is rarely met with unless in connection with tumour (§ 43.), or some degree of enlargement. It has, however, been noticed by RUYSCH and PERCIVAL. It is occasionally seen in some degree in cases of syphilitic contamination. For such, the *treatment* should consist of the means advised for VENEREAL CACHEXIA. In other circumstances the alkalies with iodide of potassium, or the iodide of mercury, or the bichloride of mercury, with conium, may be prescribed.

47. v. ENLARGEMENT OF THE TONGUE, often to a very remarkable degree.—*Hypertrophy and Elongation* have been described by several writers.—*A.* The enlargement has been generally so great as to cause the protrusion of the organ two or three, or even four, inches beyond the lips, the thickness and the breadth of the tongue being also greatly increased. I had frequent occasion to see a very remarkable case of this kind many years ago in a female. The instances of it adduced by ZACCHIAS, BARTHOLINUS, CAMPER, TRIOEN, POILREUX, ARNEMANN, SCALIGER, SANDIFORT, PORTAL, and others, and

very recently by Messrs. Humphry, Hodgson, and Teale, as well as those described by the writers about to be noticed, present a remarkable similarity as to the appearance and nature of the enlarged organ. This lesion is well illustrated (by plates) and described by Mr. Humphry in the work referred to. The structure of the organ was not altered otherwise than hypertrophied. This disease is quite different from the tumefaction of the organ produced by inflammation or by excessive mercurial action; as it is permanent when not restrained by surgical treatment, and is not occasioned by the causes just mentioned. In the case which I saw the disease commenced in childhood, and had continued without change up to the period when I examined it, when the subject of it was upwards of 40 years of age.

48. *B. The Treatment* of this lesion is entirely surgical, and has been successfully conducted by 1st. Pressure; 2nd. Ligature; 3d. Incisions; and 4th. Amputation. The treatment by *pressure* has been employed successfully by Lassus (in two cases), Louis, Ruhbaum, Clanny, Freteau, Crosse, and Teale. *Ligatures* were employed by Inglis, Bierkin, Van der Haar, Mirault, Siebold, Edhold, Cooper, Wells, Liston, and Hodgson. *Incisions* were practised by Zacutus Lusitanus and Schneider. *Amputation* was resorted to by Pamard, Ficker, Klein, Percy, Harris (in two cases), Nevermann, Leber, Newman, Mussey, Pimpernell, Syme, and Humphry. The result was fatal in Siebold's, Liston's, and Syme's cases. *Pressure* would therefore appear to be the least dangerous mode of treatment.

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TREMOR.—Synon.—Τρομός, Gr. *Tremor*
Synclonus Tremor, Good.—*Tromos*, Swedia
Zittern, Germ.—*Tremblement*, Fr. *Trembl*

Classif. — 4. *Class*, 3. *Order* (Goo
I. Class; III. Order (*Author, in Pre*

Definit. — *An involuntary, rapid, and*
oscillation or agitation of some part of the
or of the whole body, appearing primarily
without fever.

1. Tremor has attracted the attention o
oldest writers on medicine. It has been n
by Hippocrates, Celsus, Aretæus, and G
Aëtius and Paulus Ægineta have de
chapters to the consideration and treatment
and many modern writers have taken a
comprehensive view of its morbid relation
symptomatic forms, and of the means of cur

2. I. Description.—Tremor is very frequ
a sympathetic and symptomatic affection.
is, however, sometimes a primary or idiopathi
order, or one which can be assigned only
state of the nervous system, or of the n
supplying the part affected, either at thei
gins or in their course. The *character* or *fo*
tremor varies much in different cases, and
the causes which produce it. Thus it ma
merely a *slight* but *quick oscillation*, or a
marked and *rapid* movement, or *to-and-fro m*
or it may amount to a *violent agitation*. It
present either of these features, and be a
rotatory or a *vertical motion*, especially whe
head, eyes, lower jaw, or limbs are affected
according to the muscles which are acted
It may, moreover, be only *temporary*, or of
or uncertain duration; or it may be *remitte*
intermittent, or continue a very *long* tin
the *whole of life*, without apparently short
the length of life. It may, in any of thes
either *general* or *partial*, as respects the f

y be a manifest and an important disease,
t of disease; or the patient may not evince
ther disorder. In the latter case it may be
d as idiopathic, or as constituting the com-
; in the former it is generally only a symp-
Although, when symptomatic especially,
es its character, not merely as stated above,
metimes still more remarkably, yet the oscil-
form, or to-and-fro motion, is usually pre-
l. The jerking and tremulous movements,
occur in other diseases, are observed
in CHOREA, in SHAKING PALSY, in ER-
M, in BARBIERS, and in HYSTERIA. In all
however, the anormal motion is a symptom
y, is often more irregular, agitative, or spas-
, than in tremor. The motions in this dis-
are very quick and very limited or slight in
, but always passive and usually very
ic, whilst they are in those diseases more
and acute. But many varieties of tremor,
odifications, are observed, and are to be
ed chiefly to the causes of this affection.
or is rarely observed when the patient is
ng, although he often starts in his sleep, and
he moves, the tremor is commonly very
est. It is also increased after muscular
, or even during these; and by mental
ment, especially during anger or any feeling
nper. Depressing emotions of mind, the
ction of accustomed stimuli, fatigue, in-
n, &c., also increase the tremulous motions,
n extend their sphere in the frame liable to
fection.

II. CAUSES. — Tremor may arise from
ne cause, or it may be result of the con-
ce of several. The causes which most
ntly *predispose* to it are commonly such as
s or exhaust the nervous energy of a part,
the whole frame. Of these the most re-
ble are original and hereditary conforma-
nsufficient or improper nourishment during
y and childhood, masturbation, premature
essive sexual indulgences and other secret
unwholesome air, and the several depressing
fully considered under the head DEBILITY
. Whilst many of these causes, especially
their operation is prolonged or excessive,
ingly occasion tremor, others more com-
excite it, after the nervous system has
e predisposed and susceptible. Of this
class the most common are fear, fright, or
; various moral sentiments, as passion,
excessive sexual desire, joy, &c.; con-
s or injuries, succussions, concussions of the
falls, fatigue, excessive or prolonged mus-
exertions, blood-letting improperly pre-
l, or excessive discharges of blood, or
nate secretion; the local injuries of nerves,
on, or the abstraction of accustomed sti-
and the abduction of animal heat, in any
whether rapid or prolonged. Most of these
produce merely a temporary state of this
on. Those which follow more frequently
on more prolonged or even permanent
, although variously characterised, as men-
above, especially as respects remissions,
issions, or exacerbations. Those more
tial causes are, the abuse of spirituous
rmented liquors or of narcotics; the ex-
use of coffee or green tea; the use of
o in any form, especially when carried to excess; the fumes of mercury, arsenic, or lead, or the actions of those poisons in any form or way; various vegetable poisons;* sexual excesses, inordinate mental exertion, invermination, and the suppression of accustomed discharges, eruptions, &c. The most permanent states of tremor result from old age and the changes in parts, or in the whole of the nervous system from prolonged debauchery and dissipation, and from organic change in or near the origins or course of the nerves, or implicating the nerves of the affected parts. Many cases of tremor of the simplest and most permanent kind, present no manifest cause, and can only be referred to the pathological causes just assigned, although many of the changes may be too minute or much beyond our senses to be detected.

4. Tremor has been divided into several *varieties* by some authors. Thus, J. FRANK has adduced the following:—1st. The Inflammatory. — 2nd. The Rheumatic and Arthritic.—3rd. The Gastric. —4th. The Atonic. — 5th. The Nervous. — 6th. The Metallic, or that caused by metallic poisons. Among the other divisions which have been assigned by writers, the following appear the most deserving of notice:—1st. Tremor senilis. — 2nd. T. potatorum. — 3rd. T. mercurialis. — 4th. T. febrilis. — And 5th. T. paralyticus. The subject may be elucidated by a few remarks on these varieties.

5. (*a*) The *Inflammatory* of FRANK would have been more correctly named the Congestive; inasmuch as the contingent occurrence of tremor is more frequent in congestive than in inflammatory affections of the nervous centres, and is more likely to take place from general or local vascular plethora, and from morbid condition of the blood, than from inflammation. (*b*) The *Arthritic* and *rheumatic* variety of tremor is not of frequent occurrence, and is an occasional symptom, oftener observed, however, during the earlier periods of convalescence from these diseases than during their course, and especially when those diseases have been neglected, or injudiciously treated by colchicum and other depressing agents. (*c*) The *Gastric* form of tremor, contended for by FRANK, is of rare occurrence; for although tremor may be often connected with gastric disorder, the former may no more depend upon the latter than the gastric disorder may depend upon the tremor — both states of disorder being merely concurrent manifestations of the condition of the nervous centres or nervous prolongations, either voluntary or involuntary. (*d*) The *Atonic* and the *nervous* varieties of this writer may be viewed as one and the same; for it matters little whether the efficient or immediate cause be debility, exhaustion, atony, or asthenia, general or local, since the effect is nearly the same, although the causes are generally very different or even opposite in their natures. (*e*) The *Metallic* and the *Mercurial* forms of tremor are distinctions which may be admitted as serving both to point out the cause and to suggest the treatment; but these terms fulfil this purpose in a very limited and insufficient manner; for tremor may be caused not by mercury only but

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* I have at present an officer under my care who was poisoned in the north of India and recovered with difficulty. Although a large and strong-looking man, he has ever since been subject to tremor, which is much increased by and after excitement. The treatment about to be noticed has been employed with only moderate success.

also by lead, and by arsenic; and even not merely by metallic substances, but also by several vegetable poisons, as by aconite, conium, stramonium, &c. (*f*). The *Senile* form of tremor requires no remark. It is in no respect different from the atonic and nervous. (*g*) The *Paralytic* is identical with *Paralysis agitans*, and is treated of in the article PARALYSIS. It often varies in character from the slightest tremor to a more violent agitation, as above stated (§ 2.) (*h*) The *Febrile* is observed chiefly in periodic, and in low or nervous fevers, and especially in the far-advanced stages of these and sometimes of other fevers, or during convalescence from them. In these the tremor is indicative of depressed or of exhausted nervous power, especially of depressed or exhausted organic nervous power, and of some degree of alteration of the blood.

6. Tremor sometimes pertinaceously follows attack of fever, especially those of a periodic type; and, in some instances, continues for a long period, even for months, exasperated, however, by exhausting or debilitating causes. A case of this description recently came under my care in a gentleman long resident in India, and often attacked by periodic fever. The tremor had been of very long duration; it was then his only ailment; and it was much increased by exhausting and depressing causes. It was ultimately removed by quinine, and tincture of sumbul. These cases of tremor are oftenest met with in persons who have freely lived.

7. (*i*) The most frequent form of tremor is that observed in *drunkards* and *smokers*, or in those who indulge in any of the fermented or *intoxicating liquors*, or in *tobacco* or *opium* in any form. In those persons the tremors are most observable in the mornings, or during the intervals between the abuse of any of the substances indirectly causing them, and are chiefly manifested in the extremities, especially the upper. The tremor in such cases may be either simple or associated with illusions of the senses, or with delusions of the mind. In this latter case the disease is essentially that which has been usually denominated *Delirium tremens*, and which I have described as DELIRIUM WITH TREMOR. But in the former, or when the tremor is simple, the affection may vary in its severity and characters, as already stated (§ 2.), especially in the intervals between the abuse of the intoxicating agents; for the tremor generally either altogether ceases or is mitigated, as well as the usually attendant feeling of depression, sinking and anxiety, or internal misery, by recourse to the intoxicating cause. Hence the affection is perpetuated or increased, until it terminates in paralysis, insanity, convulsions, or fatal exhaustion of nervous power, with more or less marked disturbance of the excreting organs.

8. (*k*) One of the most important forms of tremor, although hitherto not mentioned by writers, is that which may be termed the *Hysterical*. It is merely a modification of the atonic or nervous state of the disorder, which may affect equally either sex; whilst the hysterical occurs chiefly in the female sex, and is a most obstinate affection, owing to its cause, viz., manustupration — a vice which, when once indulged in, is seldom relinquished, until either the mind or body, or more commonly both, are completely broken down. Hysterical tremor is variously manifested, most frequently in the eyes and eyelids, sometin the hands or in the motions of the head or jaw, occasionally in the lower extremities in this last case, it is often associated with i plete hysterical paraplegia. A case of hyst tremor of the head and another of the lowe came under my observation some time ag former having been treated by Dr. N. GRAN myself. In both these the oscillations were zontal.*

9. (*l*) The last form of tremor which I notice is symptomatic of *intestinal worms* although this form is merely a symptom, an a rare symptom, of invermination, yet it de mention, as respects not merely this cause mor, but also the states of the nervous s which characterise both the primary disord the sympathetic affection. In verminous the organic nervous power is both depress susceptible of irritation, which is propagate the involuntary to the voluntary muscles, of the abdomen and trunk. The few cases form of tremor that I have seen, have been i sons from whom either tape-worm or th round worm has been expelled.

10. III. THE NATURE OF TREMOR may ferred from the causes and circumstances occurrence. Unless when it proceeds fron gestion at the origins of the nerves of the a part, and even in such cases also, tremor n viewed as an indication of impaired power o nerves, owing either to some change of the minute organisation, or of those parts of th vous centres in which they originate. T state of the circulation in the capillary ve those parts, or even of the blood circula them, as well as change of the structures or in the vicinity, may also occasion this af may be admitted, especially when we consi circumstances in which it occasionally under our observation, especially in the last of nervous fevers, in various forms of deliri the delirium of drunkards), in some cases of ing by narcotics or intoxicating poisons, & a few cases of hysteria, and in rare cases o tinal worms, tremor is a prominent sympto is in these a sympathetic affection reflected some external or voluntary part or parts fr internal seats of irritation—uterine and int —through the medium of the sympathetic glial order of nerves.

11. IV. PROGNOSIS. — Tremor often fu important prognostic indications. When occurs in old persons, it sometimes is th runner of paralysis; and when it affect already paralysed, it occasionally prece turning health. Its appearance in an earl of *fever*, or after the cold stage and dur period of increment, is an indication of cerebral affection; and in these cases, as its occurrence during or after the delir fevers, tremor is a dangerous affection. it occurs in cases of *cerebral congestion*,

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* A remarkable case of tremor, resembling a p motion, of the muscles of the throat, was some y attended by Mr. Liston and myself. The ques whether it was hysterical or aneurismal, as th ments were often synchronous with the contrac the left ventricle. The hysterical nature of became more manifest; and the patient retur the country, without having allowed us time to the further progress of the case.

serious symptom; but much depends upon the circumstances of the case. In *gouty* and *rheumatic attacks* it is less dangerous, as long as the extremities or voluntary organs are alone affected; but when either disease has retroceded or been misplaced — internal or vital organs being attacked — and tremor appears in these cases, then the danger is imminent. If this affection be slight; if it depend upon excessive exertion, or upon inanition; or if it be of recent occurrence, it may be generally removed with the causes which produced it; but, if it occur in habitual drunkards, smokers, or opium-eaters, or in the aged, and especially if it be associated with delirium, or illusions, or with delusions in persons addicted to *intemperance*, it either is not permanently removed, or if it be alleviated, it usually returns. Tremor is seldom or never cured when it is associated with *paralysis*, or when it appears in the *insane*. Although it is not a dangerous affection, when it occurs in *hysterical females*, yet it is most difficult to cure, especially if there be reason to infer that masturbation has occasioned it, or the associated hysterical disorder. It is less serious when it is symptomatic of *worms*. It generally admits of removal, when it has been caused by mercury; but it is cured with much greater difficulty when it has been produced by lead or arsenic; and, in many of these latter cases, it is often attended by great danger. Tremor in nervous persons, and in a slight or limited form, may continue for many years, or even to an advanced or very old age, when it is unassociated with any other disorder, and when the functions, both mental and bodily, are not impaired, or even not materially impaired.

V. DIAGNOSIS. — Tremor may be mistaken for several complaints, which either nearly resemble or are closely allied with it; or they may be confounded with it, more especially chorea, the cold stage of ague, the formative stage of continued or exanthematous fevers, shaking palsy, delirium tremens, the subsultus tendinum observed in the last stage of fevers, &c. — *a*. In *chorea* and in some cases of *palsy*, caused by disease of the membranes of the spinal chord, the motions are very different from tremor. In the former disease, the motion is caused by an irregular and frequent jerk, or momentary contraction of muscles, now affecting one part, then another; whilst in the latter, there is no tremor when the patient does not exert any volition on the affected limb; but, as soon as he attempts to move that part the movement is often tremulous, uncertain, and imperfect.—*b*. In *shaking palsy*, the tremor or shaking is constant, unless the patient is sleeping, when it is either absent or diminished, and the power of motion is impaired or lost, or nearly so. Sensation is generally but little affected.—*c*. In *delirium tremens* there is more or less tremor, generally of the hands, and often also of the lower extremities and tongue; but there are, also, illusions of the senses and delusions of the mind, and nervous excitement. But tremor is often caused by intoxicating fluids, without delirium being present; and in cases occasionally characterised by delirium, tremor is often experienced either before or after attacks of delirium, or it may continue during the intervals between those attacks. The *cold stage* of ague, or the *invasion* of continued fevers — the former especially — may resemble tremor. But, in the cold stage, there is a general feeling of cold, which is not present in tremor, whilst the motions of the former are more active, and more generally manifested in the frame than those of the latter, which are usually passive and limited to certain parts, or at least not so widely extended.—*d*. The *subsultus* of the last and most dangerous state of fevers cannot be mistaken for tremor, as the history of the case, and the nature and seat of the movement, are sufficient to distinguish between them. The tremor of the tongue, often observed in *low fevers* when this organ is protruded, as well as the tremor of the limbs on attempts at motion or progression, occurs only when volition is attempted, and is distinct from idiopathic tremor, which is always present; the former, or symptomatic, being a frequent attendant upon greatly impaired nervous power, and manifested only when voluntary motion is attempted.

13. VI. TREATMENT. — The means of cure should be selected with strict regard to the causes and pathological states occasioning this affection. When it is caused by mercury or other metallic poisons, the remedies advised when treating of these in the articles POISONS (see § 568. *et seq.*), and ARTS AND EMPLOYMENTS producing disease, should be adopted. Under this latter head the *prophylactic measures* that may be employed against the metallic poisons are fully noticed. *Sulphur* was strongly recommended for the tremors caused by mercury by Dr. LETTSOM; and *electricity* by DE HAEN, MANDUYT, and SIGAUD LA FOND, not only for the mercurial tremor, but also for tremor caused by other mineral poisons. ZACUTUS LUSITANUS advised *sulphurous* and *aromatic warm baths*, not only for those cases, but also for tremors produced by other causes. The treatment recommended by most writers for tremor, has generally been either empirical, or been based upon the presumed nervous character of the affection. *Antispasmodics* were prescribed by MARTINI; *blisters*, by MUYS; *musk*, by STARK and BANG; the *oxide of zinc* by FISCHER; *opium* by THOMANN; *purgatives*, by RIEDLIN; *cinchona* and its preparations, by BOUCHER and FILLEAU; and the *chenopodium ambrosioides*, by J. FRANK.

14. When tremor is occasioned by congestion or plethora of any part of the nervous centres, then recourse may be had to scarifications and cupping, or to the application of leeches, according to the circumstances of the case. If it be connected with gout or rheumatism, the remedies advised for these diseases are appropriate, but those which lower nervous power ought not to be adopted when this affection is symptomatic of these diseases. If it be caused by intoxicating fluids, the preparations of ammonia are generally most efficacious. When it is occasioned by cold, the warm bath, followed by frictions and ammonia, are indicated; and if these fail, cinchona, serpentaria, the calamus aromaticus, arnica, camphor, guaiacum, &c., may be severally employed. If congestion of the brain have occurred from this cause and produced the tremor, the arm or arms are most frequently the seat of the affection, and in this case, cupping, leeches, a blister to the nape of the neck, or behind the ears, or even venesection if the patient be plethoric,

as advised by Solbrig, may be prescribed. Cases have been recorded by André and others, which have recovered by means of a prolonged course of tonics conjoined with purgatives. Tremor may occur in such various, different, or even opposite circumstances and pathological conditions, whether appearing idiopathically or symptomatically, that it becomes impossible to state the means most appropriate to each of these, at least within the limits to which I am confined. In respect of this affection, as well as of most others, the physician must observe closely and judge for himself, selecting and devising his means with a strict reference to ascertained causes, and to inferred changes.

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TUBERCULAR CONSUMPTION.

—Synon. — *Phthisis*, (φθισις, from φθιω I waste or decay), Hippocrates, Pliny, Iuncker, Vogel, Sauvages, Cullen, &c.; — *Tabes*, Celsus; — *Phthoe*, Hippocrates; — *Phthisis pulmonaris*, *Phthisis pulmonalis*, *P. scrofulosa*, Frank, Pinel, &c.; — *Ph. pulmonalis tuberculosa*, *p. scrofulosa*, Auct.; — *Affectio Phthisica*, Hoffmann — *Hectica Phthisis*, Young; — *Marasmus Phthisis*, Good; — *Exulceratio pulmonum*, *Consumptio pulmonum*; — Lungensucht, Schwindsucht, Lungenkrankheit, Germ. — *Phthisie pulmonaire*, Fr.; — *Tisi pulmonare*, Ital.; — *Tisica*, Sp.; — *A phthisic*, *consumption*, *decline*, *pulmonary consumption*, *Tuberculous Phthisis*.

Classif. — 1. *Class*, 4. *Order* (Cullen) — 3. *Class*, 4. *Order* (Good) — IV. Class; II. Order (*Author, in Preface*).

1. Definit. — *Unusually quick respiration on slight exertion, short cough, hectic fever, and emaciation: expectoration at first wanting or scanty, afterwards varying with the progress of disease, sometimes streaked with blood, or attended by more marked hæmoptysis: colliquative perspirations and diarrhœa, or both alternately, generally supervening or hastening dissolution: usually occurring in the scrofulous diathesis.*

2. Pathol. Defin. — *The infiltration of tubercular matter in parts of the lungs; the morbid deposit undergoing metamorphosis, most com softening and more complete solution, follow erosion of the containing tissues, by ulcerati vities, by successive changes in adjoining especially by vascular congestion, sanguineou dation or extravasation, or inflammatory generally limited to the adjoining structure the bronchial canals communicating with t bercular formations.*

3. In addition to the above *symptom lesions characterising tubercular consumption*, are many others less commonly present, tha be comprised only in a more detailed desc of the several forms and stages of the disease these sufficient notice will be taken in the s Some of the topics more fully considered articles Scrofula and Tubercles, will he ceive a passing notice, in as far as they are especially connected with pulmonary ph The intimate connection of scrofula and cular formation, in all cases, and their identity as respects especially their cause constitutional relations, have been fully dis under the heads just referred to (*see* Scr and Tubercles, §§ 112—119. *et pluries*). therefore unnecessary to advert to these to connection with tubercular phthisis, especi they will be made apparent during the de tion of the causes and organic changes o malady.

4. The *forms* and *states* of pulmonary sumption—of tubercular disease, affecting the lungs — and the numerous complicati morbid associations, either developed in the of this malady, as contingent and interc affections, or existing in the frame as laten manifest disorders from the commenceme verally require due recognition and diagnosi claim the especial investigation and study physician. The early aberrations from which indicate the commencement of tube phthisis have been, during the greater part period of which my experience is cognisant, imperfectly estimated or overlooked; whil due attention has been, and still is, directed to that which, although fully deserving a du tion of attention, should not receive an und investigation — to *physical diagnosis* in the s forms and methods, in which it has recentl paraded, over-estimated, and lauded. Ow this one-sided study, to the fallacies insep from its nature and to those which arise fr rying conditions of vital influence and from different states of secretion and exc from numerous disturbing causes appearin tingently, and from habits of dogmatising w view of exhibiting a precision of acquireme knowledge beyond what has been prev reached, the cultivation, if not the advan of physical diagnosis, to the neglect of th mate observation of constitutional and ph gical changes, has been generally atte Manipulations which strike the senses of t tendants, and more than one sense of the p — examinations which may be seen, felt talked about, have a much more impressiv lasting influence upon both patient and spec than the close observation of symptoms ar pertinent inquiries of the profound and co hensive thinker. The former are lights the possessor places upon an eminence for h

ges ; the latter are lights intended entirely it the person for whose safety they are d. The one method strikes and impresses ent and those around him, the other is at imperfectly estimated, or even altogether d.

5. scultation, which is of great service in the of phthisis, is much less advantageously d at the commencement and even during y stage of the malady. Too great de- e upon, and a too *ad captandum* parade mode of diagnosis, sometimes even with iness and the flourishes of vulgar craft, ded to the neglect of those states of vital ation, of disordered functions, and of vas- tion, which, whilst they indicate incipient pulmonary disease, also characterise its nd point to the changes in which these iginate, and on which they continue more depend. The presence or absence of sounds on percussion and auscultation, s of developement and of mobility of the regions of the thorax, both individually elation to each other, are all of great im- e in themselves, but this importance is ed when they are viewed in connection ir causes and with existing conditions of nifestation, of morbid function and of vas- tion.

6. e usual modes of physical diagnosis in of tubercular consumption have been tly described, illustrated, practised, dis- praised, and confided in, since the days of c to those of SKODA, which nearly mark od comprised by my experience; but they ot always been received as immutable What was confided in by the batoned s of LAENNEC is now disputed by the l followers of SKODA. Doctors proverbially ut professed adepts as certainly disagree, t the disagreement may not be the less and continued, the one school misinter- misrepresent the dogmas of the other. As the microscopists, so among many of those tend to the greatest powers of auscultation split hairs in auscultatory diagnosis—the differences occur, in the early stages of especially. What is heard by one is often rd at all, or heard differently by another; requently rendering the sense of hearing ute and the physical signs more distinct. frequently the adepts—the *specialists* of lady, the would-be the greatest authorities, llible in this department of *speciality* — dence of tubercles in the lungs on auscul- nd percussion, where none exist, or have or could be detected after death.

7. As to the ORIGIN OF TUBERCLES I must re- reader to that article (see SCROFULA and LES); but I may here remark that much has itten upon this topic in former days, and at ent time it still remains a "*quæstio vexata.*" early epoch of pathological speculation ng it, the formation of tubercles was im- impaired vital influence, and afterwards essed nervous energy. At a more recent a morbid nutrition obtained credit for the f, although it might have been difficult to w nutrition, however morbid, could have what was admitted to be neither orga- or organisable. Then it was attempted by ROKITANSKI and his admirers to describe tubercles as transitions from organised to non-organised formations. Still more recently the origin of this formidable malady was laid in the blood; and if the actual existence of the tubercular matter could not be detected in the circulation by the far-seeing—or rather near-seeing—microscopists, after the most minute search, the elements of this matter doubtless existed. Upon this latter inference they could safely count. Indeed, this part of the conclusion could hardly be denied; for, where vascular assimilation is deficient, the materials for morbid formations must necessarily abound; and the developement of such formations will necessarily most readily take place in situations and structures most favourable to the morbid process, and most exposed to the influence of the causes which predispose to, or produce it. When organic nervous power is impaired, vascular assimilation and healthy nutrition must necessarily suffer; and those tissues and organs, which are the most disposed by function and organisation, and as respects their capillary circulation and their normal secretions, to experience the early effects of these changes, will be the first to manifest disease, and the most likely to experience disorganisation.

8. Dismissing, however, the consideration of this topic, and referring to what I have advanced respecting it under its appropriate head, I shall now very briefly advert to the constitutional states in which the formation of tubercles in the lungs generally takes place, and with which they are more or less intimately allied during the greater part or the whole of their progress. These states have been very imperfectly described and distinguished from each other, both in health and in disease; the great difficulty of assigning distinctions, arising from their mixed characters, the manner in which they pass into one another, and the association of temperament, diathesis, and habit of body being often such as to obscure the subject, and to render precise and accurate observation almost impossible. Nevertheless, these states have a more or less intimate relation to the forms or varieties of tubercular phthisis, and should hardly be separated from a due consideration of the influence and modus operandi of the predisposing and exciting causes. Certain of these, especially the scrofulous diathesis, and very probably this only, have a most intimate connection with the pulmonary disease, whilst others are much more doubtfully, or even are in no ways, related to it. They should, notwithstanding, be viewed in connexion with the causes, the courses, the morbid associations, and the intercurrent affections of tubercular phthisis. The imperfect attention which has hitherto been directed to this part of the subject must be my apology for the insufficient discussion of it at this place; my object being rather to indicate, than to supply, the deficiency: to this latter end precise observation and patient research are altogether wanting.

9. i. *The Scrofulous Diathesis or Taint* is the most common constitutional condition in which phthisis occurs. It is that intimate organisation of frame which results from those predisposing causes, referable to the parent and to the infancy of the offspring, and which, with these causes, I have described when treating of SCROFULA and

TUBERCLES (see §§ 3, *et seq.*). But although it is most frequently the basis of the tubercular formations in the lungs, whether latent or developed—the soil in which they grow—yet these formations may appear in other conditions of the frame than this, when the predisposing and exciting causes are in energetic or concurrent operation. In this condition, however, the tubercular formations in the lungs are most prone to pursue their usual course, especially after the age of puberty, and before the period of middle age. They may also assume the acute form, especially in the plethoric, and when their causes are more than usually active.

10. ii. *The Lymphatic Temperament* has been supposed, especially by French pathologists, to predispose to phthisis more frequently than any other temperament or diathesis, excepting the scrofulous. This may be the case, for I am not prepared to dispute it; but, if the question be put as to what constitutes the lymphatic temperament, and as to what signs this temperament may be recognised? but few will agree in the answer, or be prepared to answer it at all. This much may be said respecting it, that it is very closely allied to the scrofulous taint or diathesis, that the lymphatic system is prominently developed in persons possessing it, and that the lymphatic glands and serous membranes in those persons are very prone to become the seats of tubercular deposits, whatever may be their complexions or races.

11. iii. *The melancholic, phlegmatic, and bilious temperaments* do not predispose to phthisis. When this malady occurs in either of these constitutional conditions, it is generally caused by several concurrent influences, and it frequently assumes a very protracted form, or it remains long latent before it is openly and fully manifested. It may then be far advanced, and either assume in this state a chronic form, or proceed rapidly to the usual termination. It is often, however, very difficult to determine the diathesis and temperament of persons labouring under phthisis, especially in its advanced stage; and the comparative tendencies of either temperaments, diathesis, or habits of body, to this disease, have not been ascertained with a sufficient precision to enable me to state anything with confidence on this topic.

12. iv. *The nervous, the irritable, and choleric temperaments* present no very marked predisposition to phthisis, although this malady may appear in either of these temperaments when the causes are energetic. In these the disease is prone to assume an acute, rapid, and febrile character, or to be associated with bronchitis or laryngitis; and in the nervous temperament especially, it may, in its early course, present many of the characters of nervous fever, or, in children, of remittent fever. In either of these constitutional states various complications may occur in the progress of the disease, affecting either the lungs or other organs. Although hæmoptysis may take place in either of these, it is not so frequent in them as it is in the sanguineous temperament, or in the scrofulous diathesis.

13. v. *The sanguineous temperament* is probably more disposed to phthisis than those last noticed (§§ 11, 12.); but it is more especially so disposed when it is associated with the scrofulous diathesis. It is then apt to favour an acute or febrile form of the malady, which is frequently complicated with hæmoptysis, with pneumonia, and variou lesions of the lungs and pleura. As respe temperament, as well as the others, a more observation of phenomena from the com ment to the termination of phthisis, in a field of observation than I have possessed quired to illustrate this part of my subject, render it available to practical purposes.

14. II. DESCRIPTION OF TUBERCULAR CO TION.— In describing tubercular consump phthisis pulmonalis, I confine myself to t nomena produced by the formation of tu in the lungs, although I do not overlook that tubercles often exist in other organs wh are formed in the lungs, especially in you jects. Of this circumstance notice will b in the sequel. Pulmonary phthisis may be as a vital blight, which in the animal king in the vegetable, affects the circulating fl attacking the organs of assimilation an ration. Numerous vital and physical severally or concurrently, produce this whilst many influences, occasioning eithe sive waste or imperfect supply of assimil nutritious elements, exert a similar effect.

15. *Phthisis* may present numerous varia its course. M. LOUIS states that he has prove fatal within a period varying fro months to twenty years; and the tendenc disease to cause a simultaneous or succes mation of tubercular in different parts of th is one of the chief reasons of these variat have met with cases, the duration of wh been even much longer than just now me and I will make a more particular refe them in the sequel. The very different o occurrences and lesions, which may take the early course or advanced progress of independently of the influence of *diath temperament*, are such as to vary most ren the character of this disease. The deve of tubercles in different tissues and orga progress of tubercular deposit, and the tubercles; their softening, and the excr absorption of the tubercular and morbid intercurrent inflammations, bronchial ir or pleuritic attacks; the occurrence of tysis, its frequency or amount; attacks o gitis, tracheitis, or ulceration either i situations, or in the bowels, with many ot tingencies, either severally or in com impart a marked diversity in the characters and duration of this malady. In order, t that these variations, with their most sources and contingencies, may receive s attention, I shall notice: — 1st. *The mo form of tubercular phthisis,* — 2nd. *Th form of phthisis,* — 3rd. *The primarily ac of phthisis,* — 4th *The consecutively acu* — 5th. *The protracted form of phthisis,* — *phthisis in infancy and childhood,* and *phthisis in the dark races.*

16. Having considered the *forms* or *vari* the disease as fully as my limits permit afterwards take a brief view of the comp and intercurrent lesions which may appe course of these forms, more especially *Bronchial irritation and inflammation Hæmoptysis in its several states;*—3d. *I tion, ulceration, œdema, &c. of the larynx,* &c.; — 4th. *Inflammations or congesti*

gs. r *of the parts surrounding tubercular depo-*
, & —5th. *Inflammations of, effusion from, and*
esi s *of the pleura* ;—6th. *Perforation of the*
ura *pneumathorax, and hydro-pneumathorax* ;
7th *)iseases, especially ulceration of the intes-*
es ; 8th. *Fistula in ano* ;—9th. *Disorders of*
ut *ne functions and organs* ;—10th. *Diseases*
the *idneys and urinary organs generally, and*
ir *nsequences* ;—11th. *Diseases of the heart*
p *cardium* ;—12th. *Abnormal states of the*
d *l blood-vessels, at the commencement and at*
suc *ssive stages of phthisis.*

17. OF THE MORE USUAL FORM OF TUBERCU-
R PULMONARY PHTHISIS. — At its com-
nce ent phthisis may be manifest to the close
erv, or it may be inferred with uncertainty, or
ect with the greatest difficulty. But, as it
an s, it generally becomes evident to the
st c eless observer. The diagnosis, however,
uld ave reference not merely to the existence
his sease, but also to the progress it has made,
sho by the nature and combination of the
pt s and signs during its course. The divi-
o s course, therefore, into *periods* or *stages*,
ord g to the progress and extent of the pul-
nar nd associated lesions and to the nature
he mptoms, is of much importance, not only
mp ing a greater precision of description, but
sug sting more appropriate indications and
ans treatment.

8. FIRST STAGE. — *a.* In some cases before
res atory functions indicate any disorder, but
oth either contemporaneously with, or soon
r, s h disorder, the habit and appearance of the
ly ence more or less of falling off from the
lth ondition. Cough and shortness of breath-
, sl t at first, and hardly observed, are early
erie ed. The cough is at first short, slight,
urr g only in the morning when leaving the
l, c sisting only of a slight hack, and after-
rds curring only occasionally or more and
re f quently in the course of the day, or upon
rtio It is at first dry, or attended by a
ht, py or saliva-like fluid. The respiration,
ier eviously, subsequently, or about the same
e, is uick or hurried on the slightest exertion ;
l be mes more remarkably short, as the cough
tin or becomes frequent. At this period,
ver previously to either cough or shortness of
athi being experienced, the patient's spirits,
om ases, are much depressed, and the pulse
veal nd slow. This is more particularly re-
rked when the disease is produced or deter-
ed y exhausting or depressing causes, as
stur tion or depressing mental emotions. In
ny ses, the pupil of the eye is much dilated,
l the onjunctiva pale or pearl-like. Pallor of
cou enance and a deficiency of the carnation
t of e general surface are also often observed,
ilst e flesh is softer than natural, and some-
at aciated. There are a general indication
lang r, and a want of the elasticity of mental
l bo y health.

9. T se symptoms may continue for some time,
hou making much progress, or they may be-
ne re marked, but they are, after a longer or
rter me, according to the states of season,
athe climate, and numerous other influences,
lowe by greater and more general disturbance.
e pu e becomes quicker than usual, especially
vard evening or after meals. A chilliness, or sense of coldness, going down the spine, is experienced early in the day and again towards evening, followed by an increased heat of skin, the evening chill and heat being most complained of. The febrile paroxysm at noon may be slight, and thus overlooked, but that in the evening is attended by greater heat of skin, particularly of the palms of the hands and soles of the feet, which continues during the night, perspiration occurring towards morning. Owing to this febrile condition the patient is restless, and sleep is less sound and refreshing; cough often occurring during the night, when turning in bed, and as the disease advances. The patient readily flushes on any excitement, or after a full meal; and a tightness or oppression of the chest, or transitory pains, especially near the collar bones, are often experienced. The bowels are not much disordered, or are somewhat confined; the urine is not materially affected. The female discharges are at this stage not necessarily deranged ; but they may be either excessive in quantity or frequency, or they may be scanty, difficult, or suppressed, or replaced by leucorrhœa ; these disorders often accelerating, the last affection sometimes delaying, the progress of the malady.

20. Climate and weather, aided by various circumstances, very remarkably influence the progress of this stage, especially when aided by judicious treatment. With the advance of spring and summer, in this and temperate countries, the malady often appears arrested, and the general health improved. The patient sometimes gains flesh and strength ; but cough and shortness of breathing seldom entirely disappear; and as autumn advances and winter returns, they become exasperated upon the slightest exposure, or even without any known exposure, and the other symptoms also are aggravated, periods of exacerbation and of relief sometimes taking place irregularly, and tending to retard the progress of this stage, or even to carry it on to the following spring and summer, if the second stage have not previously supervened.

21. *b. This first stage* of tuberculous phthisis corresponds with the first stage of tubercular development. The lungs at this period contain a greater or less amount of tubercular deposit in what has commonly been denominated a state of crudity. The tubercles are generally of two kinds, as described in the article SCROFULA AND TUBERCLES (§§ 71, *et seq.*) ; the one more or less firm, greyish, and somewhat transparent; the other of a pale yellowish colour and opaque. At this stage, the adjoining pulmonary tissue and bronchial membrane may not have undergone any perceptible alteration, or both may present more or less redness or vascular congestion. If *hæmoptysis* have occurred in this stage, which is very frequently the case, and which I shall notice more particularly hereafter, these changes are generally present in a more or less marked degree. The symptoms thus indicating the first stage of tuberculous phthisis chiefly are, slight cough, shortness of breathing, languor, loss of the healthy colour of the surface, commencing emaciation and flabbiness of the flesh, slight hectic fever, and the state of the eyes already mentioned.

22. *c. The physical signs* in this stage are very often obscure. This, however, depends much upon the form in which the tubercular deposit exists in the lungs,—whether or no in that of isolated granules

or as a continuous mass infiltrated through the parenchyma. Isolated tubercles may be so minute as almost to escape observation; or they may render portions of the lung impermeable to air, either by enlarging and approaching each other, or by the formation of more recent tubercles between them. While the solitary tubercles are separated from each other by healthy tissue, physical signs may be absent or obscure; but when portions of the lung are impermeable to air by infiltration of tubercular matter, or by the development of solitary tubercles, these signs are rendered more or less manifest, especially in proportion to the greater or less extent and rapidity of the respiratory movements. The quantity and quality of the secretions formed in the bronchial tubes have, however, great influence on the nature of the physical phenomena.

23. *d. Solitary tubercles* do not, of themselves, produce the slightest change in the *percussion sound* of the lungs, even although they be scattered throughout the organ in considerable number. Any change of this sound depends upon an altered state of the portions of lung between these tubercles: the sound is tympanitic when the intervening tissue has lost its contractility; but the infiltration of blood, serum, &c. into the tissue, whereby the air is expelled from it, renders the sound dull. As long as the intervening tissue continues normal the sound continues normal; but it is less sonorous, if the tissue be more dense and hypertrophied than natural. Skoda disputes the statement of Dr. Stokes that solitary tubercles, when very abundant, produce a somewhat dull percussion sound. When they do so, the intervening tissue is then most probably congested, or infiltrated.

24. *e. On Auscultation* the signs of *solitary tubercles* are often indefinite, owing to their number, development, and the state of the bronchial mucous membrane. The inspiratory murmur may be distinctly or loudly vesicular, or it may be indistinct or altogether inaudible, though unaccompanied by râles, or whistling, or sonorous sounds. Râles of every kind, as well as whistling and sonorous sounds, may be mixed with the vesicular or indeterminate inspiratory murmur, or râles or whistling sounds alone be heard. The expiratory murmur may be altogether inaudible, or as loud and strong as that of inspiration, and like this, be associated with râles, and whistling, and sonorous sounds. (Skoda.)

25. As the deposit of tubercular matter increases, "and in many cases even at its first deposition, swelling of the bronchial mucous membrane, accompanied or not by secretion, takes place, and then the same auscultatory signs appear as those described under the head of catarrh. The slow development of tubercles almost invariably takes place in the upper parts of the lungs, and hence, in such cases, we frequently find the auscultatory signs of catarrh permanent there, the respiratory murmur being elsewhere healthy. Rapidly developed tubercles, however, do not manifest themselves in the first instance at the apices of the lungs, but are frequently scattered equally throughout the whole of a lung, or of one lobe."*

Skoda considers that there are no distinct
which the existence of acute miliary tuber
be diagnosed. Dr. Stokes states that '
case presenting the signs and symptoms o
bronchitis, or in which we observe a crepitat
continuing without intermission, we find
plete dulness over a considerable extent
surface of the thorax, unaccompanied wi
chial respiration; and if the stethoscope
that the lung is almost everywhere perm
air, and obstructed only at certain plac
the crepitation be too feeble to account
dull percussion sound, we may diagnose t
inflammatory development of tubercle."
ing, however, to the experience of Skod
cases of acute tuberculosis are unaccomp
any of those signs, and every one of them
present without the disease being tubercul

26. *f. Tubercles in Masses and Tubercul*
tration.—*a.* In by far the greater number of
tubercular disease of the lungs, of some d
the *percussion sound*, under one or both cla
duller and emptier than natural, or is cor
dull, whilst over the other parts of the tho
sound is normal, or louder, or duller t
dinary. This is owing to the conglome
tubercles in the upper parts of the lungs
they are slowly developed, increase in si
coming in contact with each other, form c
able masses. Tubercular infiltration also
in the form of a slow process of develop
the upper parts of the lungs, and then giv
this change of sound under the clavicles.
rally when the sound under the clavicles
than natural, it is abnormally loud in the
regions of the thorax, the lower part of
being more than usually distended, owi
spiration being impeded above. Acute tu
infiltration takes place most frequently in t
lobes of the lungs. It produces the same
sion sound as hepatization.

27. *g. Auscultatory Signs.*—As long as th
cular mass, or the tubercular infiltration, is
limited extent as not to contain within it
one large bronchial tube, it will not g
either to bronchophony, or to bronchial br
or to any consonating sound. "Vesicular
tion may continue audible beneath the
even when tolerably large masses of tuber
present in the upper lobes of the lungs, p
there be sufficient healthy tissue to pro
and the bronchial mucous membrane
swollen nor covered by secretion. Bu
not generally the case, for we almost in
hear an indeterminate inspiratory mur
different degrees of strength, often, inde
strong, and in most cases attended by mo
or by hissing, whistling, and sonorous sou
expiratory murmur is nearly as loud,
louder, than the inspiratory, and is likewi
bined with different kinds of râles, and w
and hissing sounds." (*Op. cit.*, p. 302.)

28. If the tubercular masses or infiltrati
such extent as to embrace bronchial tu
which the voice or the respiratory murm
consonate, bronchophony and bronchial br
will be heard beneath the clavicles, provi
tubes are not filled by fluid or solid exu
and should there be any râles, or whis
sonorous sounds in the trachea, or in a larg
chial tube, consonating râles, or whis

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* *A Treatise on Auscultation and Percussion by Dr. Joseph Skoda; translated from the fourth Edition, by W. O. Markham, M.D.*, p. 300.—The best authority on Auscultation.

sounds, will also be heard. But if the l tubes in question be obliterated, neither phony, nor bronchial breathing, nor any ing râles, will be audible, these being re- ther by indeterminate respiratory mur- ith or without dull râles, or no murmur. It is often observed, owing to the l tubes being at one time filled or ob- by mucus, and at another freed from it ing or expectoration, that in the course minutes bronchophony is heard alternat- a dull resonance of the voice, bronchial n with indistinct breathing, and a clear th a deep dull râle, &c. Consonating consonating sounds may be also heard at time. (Skoda.)

29. ould the tubercular masses or infiltration veloped in the upper lobes, the respiration the clavicles may be quite natural; ory signs being presented over those parts est which correspond with the affected of lung. The parts which are healthy, or ntain only solitary tubercles, yield either r loud vesicular or indeterminate respi- murmur; or every variety of râle and and sonorous sounds may be audible, as the bronchial tubes are or are not n catarrhal affection. "There are no ory signs pathognomonic of tubercular f the lungs; and there are none which ble us to determine that no tubercle is a lung, or in any part of it." (Skoda.)

30. Of the *physical signs* in this stage, it may at, unless there is an obvious difference the sounds emitted in the relative situa- opposite sides, these signs are not much pended on; and in very many cases an s to the disease has to be formed chiefly local and constitutional symptoms. In es, with the same symptoms, the physical ord unequivocal indications of the ex- tubercular disease. The sound elicited ssion is evidently less clear under one the respiration less soft and easy, and decidedly more resonant than under the clavicle. And, even at this early period, ns of the upper parts of the chest during n may often be seen to be unequal; of the thorax being more fully expanded spiration than the other, the side least being generally that which furnishes the lent signs of the presence of tubercles. bercles are diffused over a large portion ngs, a degree of puerile respiration oc- y indicates their presence. "A marked y in the sound of the respiration in dif- rts of the chest also affords strong sus- tubercular disease, when such inequality therwise be accounted for."

31. Second Stage.—*a.* The transition from o the second stage may be gradual and anifest, or it may be rapid and evident. It ed chiefly by a change in the expectoration. um, instead of being colourless, slightly nd frothy, either becomes muco-puriform ains specks or streaks of blood, or pre- nute specks of opaque matter, of a pale olour. These specks gradually increase er and in size, until they form curdly surrounded by the transparent portion of ctoration. The increased sputum is accompanied with more frequent, often more severe cough; the chills or sense of cold running down the spine, the evening heat of skin, the restlessness in the early part of the night, and the morning perspiration, although more severe on some days than on others, or on alternate days, become more remarkable; and hectic fever is unmistakeably established. The pulse is always accelerated, more especially in the evening; the respiration quick, although the patient be at rest; and the emaciation and flabbiness of the flesh increase. Languor, debility, and an inability of bodily and mental exertion, are experienced. The face is generally pale in the morning, but it becomes flushed after a meal, and in the evening, when the fever and heat of skin are present, the flush in the cheeks being more and more circumscribed as the disease advances. The pains sometimes complained of in the first stage are more frequently felt in this; and are referred most commonly to the vicinity of the collar-bones, or to one or both shoulders, occasionally to either side, and not infrequently to the back, or to one side of the upper half of the sternum. The pain is generally dull or aching, resembles chronic rheumatism; but it is sometimes acute, especially when it is referred to either side, and is then owing to the extension of inflammatory action, of a sub-acute or chronic form to the pleura. Before, in some cases, and more frequently after, this stage is formed, slight or more decided hæmoptysis occurs. In many instances the expectoration is merely streaked with blood, in others the blood is discharged in considerable or large quantity, and unmixed with the sputum.

32. *b.* These symptoms are occasioned by the *softening* of the tubercular matter, and by the changes in the parenchyma of the lungs and in the bronchi which attend it. The softened and diffluent matter, forming the expectoration, proceeds from the dissolution of the tubercles, from the tissues surrounding them, and from the bronchi, into which the softened tubercles open, and along which the softened matter passes, in the course of its excretion. The bronchi and tissues surrounding the tubercles, irritated by the morbid matter, furnish an increased and altered secretion, which, with the softened tubercular matter, constitute the sputum; and this varies in character with the extent and intensity of the inflammatory irritation induced by this matter in the adjoining tissues and in the bronchi. The cough depends upon, and is modified by, the amount and properties of the matters proceeding from these sources, and the degree of irritation thereby produced in the trachea and larynx. While these changes are proceeding in the earlier tubercular deposits, and in the adjoining structures, the inflammatory irritation thus induced extends to the pleura covering the portion of lung chiefly affected, and lymph is effused from it. The exuded lymph, coming in contact with the surface of the costal pleura opposite, gives rise to adhesions, which become cellular, and vary in firmness and extent with the duration and severity of the disease. These pleuritic adhesions are generally greatest over, or are confined to, the parts where the tubercular deposits are greatest; and, especially owing to the inflammatory action producing them, account in great measure for the pains experienced in the upper and lateral regions of the chest. The consequences of the softening and

breaking down of the tubercles are the formation of *cavities* and various *changes* in the adjoining tissues and in the bronchial tubes. These cavities are first formed in the superior lobes, whilst the lower portions of the lungs are gradually becoming tubercular, the disease generally advancing downwards.

33. *c.* The *cavities* may be formed by the dissolution of either solitary tubercles, or of conglomerated tubercles, or of tubercular infiltration. They are of all sizes, from the size of a pin's head to that of a large orange, or even larger. Their walls consist either of the lung-tissue infiltrated with tubercular matter, forming a more or less dense layer, and being in some cases of such firmness as to prevent any dilatation or contraction of the cavity, or merely of a membrane, or membrane-like sac, attached to the surrounding tissue of lung. In very old cavities the internal cavities often present a more or less dense, polished or smooth, and serous or sero-fibrous surface, whilst in others recently formed the surface varies, in firmness or softness, presenting neither of the appearances just stated, in any marked form. Between these the changes of the surface are very diverse, according to the size and duration of the cavity. The cavities generally communicate with one or more of the bronchial tubes; and are rarely free from puriform mucus, or from pus, or an ichorous pus, or from blood. Owing to these differences in the size, in the walls and contents of the cavities, as well as in the surrounding structures, and to other circumstances, the physical signs which cavities present are very different and varied.

34. The extent to which the lungs have become tuberculous, as Sir J. Clark justly remarks, varies, in this stage of phthisis, very remarkably in different cases, without a corresponding difference in the severity or duration of the symptoms. Two patients having symptoms exactly similar, may be the subjects of a very different extent of pulmonary disease. In some cases a few weeks may suffice to develope cavities of greater or less extent, while in others many months, or even years, may pass without any remarkable increase or diminution of the symptoms, or even of the pulmonary lesions. In a small proportion of cases a curative process is established, as will be noticed in the sequel (§ 145, *et seq.*) by which the tuberculous changes are arrested or partially obliterated; and if the patients' general health be maintained, the indications of tubercular deposit may gradually disappear, or at least advance no further. But by trusting to symptoms alone, the state and progress of the tubercular lesions, without having due reference to physical signs, cannot be ascertained with any degree of precision. It must be evident, however, that a degree of importance beyond that which these signs possess should not be accorded to them, and that the fallacies to which they are liable should be duly estimated.

35. *d. Physical Signs.*—The upper parts of the chest are at this period less freely raised during inspiration than in the healthy state, and this is often more evident on one side than the other.—*a.* The *sound on percussion* is dull under one or both clavicles. Skoda remarks that when the cavity is formed within a portion of air—containing tissue, the percussion sound remains unchanged; and this is true not only of a small, but even of a tolerably large cavity. The only sound which
cavities situated within a healthy structu
the cracked-pot sound, but this only in r
where the cavity approaches the wal
thorax, contains air, and is not small
pleximeter. The sound in these cases
tympanitic over the situation of the cavi
other parts of the chest. Cavities conta
even when deeply seated within a portio
infiltrated with tubercular matter, wi
tympanitic sound if their size be not le
walnut. Several smaller cavities, se
together, will produce the same sound.
flexible and moveable the walls of the t
more readily is the tympanitic sound
The sound is clearer the nearer the cavit
to the surface of the lung, and fuller
the cavity. The cracked-pot is most rea
when cavities are large and superfic
cavity will not yield a metallic ringi
unless it be the size of a fist, but it do
cessarily emit such a sound, though it
size."

36. *e. On Auscultation*, a dry or large
crepitant râle is heard over large cavities,
walls are yielding, and dilate and contr
respiration, the lung being attached to
pleura. This râle is most readily he
there are several or many cavities, of th
pea or bean, scattered through the lo
never heard alone, but in combination
râles or whistling or sonorous sounds,
the presence of muco-puriform or oth
exudations in the affected portion of lu
vicinity. If these latter be very loud t
tion may not be heard. Skoda obs
when a few deep-seated cavities are pr
lung which is otherwise healthy, th
breathing, interrupted by a few bul
muffled râle, may be heard over them;
however, the murmur in such cases is
lar, but indeterminate. "Cavities
branous walls, situated in the midst
taining tissue, even though of large size,
rise to bronchophony, bronchial brea
consonating râles." These râles and
and sonorous sounds may take place
the walls of which have a thickness
several lines; and if their thickness b
able, the breathing and the voice may
panied by metallic tinkling and amph
ance. When the walls are thick and
there is neither increase nor diminution
of the cavity during inspiration and
the air neither entering into nor passing
cavity, and consequently no murmurs a
from the cavity; those which appear
from it are *consonating murmurs.* Bu
may be produced within the cavity, if
flexible, and permit the entrance and
during respiration, especially if adhes
pulmonary with the costal pleura ex
near to the cavity. Râles and whistl
can be produced in a cavity only whe
rent of air is interrupted by the morbi
contained in it, or in the bronchial tub
nicating with it. The movement whi
cretion undergoes during inspiration,
ally during coughing, is attended by r
whistling sounds, when air as well as f
sent in the cavity.

37. From the above, and owing to

o the situations, to the walls, to the con-
and to other circumstances, of cavities, it
be manifest that *percussion* and *auscultation*
very few certain signs of the existence of
s. In this opinion, I am fortified by that
ODA — the most experienced observer of
al signs in Europe. I may remark, how-
hat tubercular masses and tubercular infil-
s do not exist for any considerable time
t producing cavities. Cavities may, there-
e safely inferred to be present whenever
ercular disease is of considerable standing,
hen the constitutional symptoms mentioned
have existed for some time. SKODA justly
s that "loud bronchial breathing, loud
ubbling râles and bronchophony are often
over cavities ; but we as often, and oftener
, meet with cavities which do not reveal
lves to us by auscultatory signs."

C. THIRD STAGE.—This period of the disease
ly the former gradually increased in severity
second gradually lapsing into this. But dur-
progress various complications, and addi-
phenomena, present themselves, caused by
ent of lesions in the lungs — the increase
ties, formation of additional ones, and more
ive tubercular deposits ; by the contamina-
the circulating fluids, and by disease of re-
r remote organs.—*a*. The thorax at this stage
rally flat instead of round or prominent ;
vicles appear remarkably prominent, owing
depression of the ribs, to a hollow space ex-
between them and the upper ribs, and to
ulders being raised and brought forwards.
ub-clavicular regions are nearly devoid of
during respiration ; and during *a full* in-
on, the upper regions of the chest seem to
ed forcibly instead of expanding with the
ity and ease of health.

The constitutional symptoms are still more
than in the former stage. The pulse be-
quicker and weaker ; the hectic symptoms
ronounced ; the flush in the cheeks more
l and circumscribed, particularly in the
g ; the emaciation and debility greater ; the
and expectoration more frequent, especially
t and during the morning, and the breathing
and more oppressed. During this stage,
ient is exhausted by copious perspirations
tacks of diarrhœa, the one sometimes alter-
with the other. These assume a colliqua-
aracter, and their accession at the com-
ment of, and continuance during, this stage,
ed to the denomination of *Colliquative stage*,
has usually been applied to it. In addi-
these, the feet and ancles often become
atous ; the nails of the fingers, if not before,
w incurvated ; the cough and restlessness
night increase ; copious perspirations break
soon as the patient falls asleep ; pains in
est, collar-bones, and shoulders, or in the
re much complained of. The sweats and
ative diarrhœa rapidly increase the emaci-
the integuments covering the more promi-
rts of the back becoming inflamed, sore,
ble to ulceration from the pressure to which
e subjected. Nevertheless, the patient's
e is often not materially diminished, and
of recovery are generally entertained nearly
e last. With the emaciation and exhaus-
e mind becomes enfeebled, although the imagination is often active. During the last few days or weeks of existence, the mouth, tongue, or throat, or all these, become aphthous ; the features sunk, collapsed, and sharp ; and, in some cases, mild delirium, very rarely violent delirium, followed by sinking or coma, closes the scene.

40. The severity and rapidity of the symptoms and progress of the malady vary remarkably in different cases. In some a progressive wasting, with little pain, without much cough, but with diarrhœa and perspiration, in the last stage is chiefly observed ; sanguine hopes of recovery being entertained. In others, and these the majority, the chills and sinkings following the perspirations during the night and mornings ; the exhaustion and distress produced by the diarrhœa, the harassing cough and difficulty of expectoration ; the dyspnœa and sense of suffocation ; the pains in the chest, and sometimes in the bowels ; the mental struggle between hope and fear, especially in the latter part of this stage, mark not only the severity of the disease, but also the distress experienced by the patient. The termination of the malady is thus characterised by a state of tranquillity, ease and gradual sinking, in some cases, and by a painful and distressing struggle in others.

41. *b*. *The Physical Signs* are generally the same as, or more fully pronounced than, in the second stage. *Percussion* generally emits a dull sound over the superior parts of the chest, although the excavations which partially occupy the upper lobes, and the emaciated state of the parietes, may render the sound less dull than in the preceding stage. On *auscultation*, the respiration is obscure in places, or even inaudible, whilst in others it is particularly clear, bronchial, or tracheal, or the cavernous of LAENNEC. There is a mucous râle, produced by the morbid secretion in the bronchi ; and a gurgling sound on coughing ; pectoriloquy is frequently distinct, although as often absent, in one or both sides, or present at one time and not at another.

42. *Pectoriloquy*, or the resonance of the voice in a cavity existing in the chest, is one of the most uncertain signs in this and the second stage, for the reasons stated above (§§ 35—37.). Various indeterminate sounds are also heard in different parts of the chest, often with the signs of pleuritic, pulmonary, or bronchial inflammation.

43. ii. OF CERTAIN SYMPTOMS AND SIGNS DIAGNOSTIC OF PULMONARY PHTHISIS.—The diagnosis of pulmonary phthisis is usually easy in the second and third stages, but often difficult in the first ; for in this the physical signs furnish no more certain aid than the constitutional symptoms. Various aids, however, to the diagnosis have been recently recommended.—*A*. *Observations of the time during which the breath may be retained after a full inspiration* have been recommended, (the patient being sometimes desired to count as far as he can), in the first stage of phthisis, in order to assist the diagnosis, and are of some use when carefully made ; but the results vary so much in different persons in health, and still more so in other diseases of the chest, which are not strictly consumptive, as emphysema, chronic bronchitis, chronic pleurisy, and pleuritic effusions, diseases of the heart, &c., that little dependence can be placed upon them, unless when viewed in connection with the exist-

ing phenomena and with the absence or presence of the symptoms and signs of these diseases.

44. *B. Observations by the Spirometer* are in some degree liable to the same objections as those just now stated. This instrument, invented by Dr. Hutchinson for ascertaining the capacity of the lungs for air in diseases, may however be used in incipient phthisis with some advantage, but it can be employed only in public institutions. The indications of the extent to which the lungs are obstructed by tubercular deposits, must necessarily have reference to the average capacity of the lungs, of persons of the same size, in health. Consequently it was requisite to ascertain this latter point in the first instance; and he found, after a very great number of observations of the capacity of the lungs for air in persons in health, that this capacity increased with the height of the individual in a very determinable proportion. To this part of the subject it is unnecessary further to refer, than to state that the "vital capacity of the lungs for air" was inferred from the average of upwards of a thousand persons in health, whose lungs were thus measured. *The following table shows the comparison of healthy lungs, and of lungs in the first stage of phthisis, or before softening, all cases being males:—*

No. of Cases.	Age.	Height.	Vital Capacity.		Difference.
			Healthy.	Diseased.	
		ft. in.	cub. in.	cub. in.	cub. in.
1	28	5 8	238	186	52
2	28	5 4¼	206	140	66
3	37	6 2½	286	270	16
4	20	5 3½	198	120	78
5	27	5 7	230	85	145
6	45	6 0½	270	200	70
7	36	5 6½	222	182	40
8	36	5 5½	214	170	44
9	35	5 7	230	160	70
10	38	5 10¼	254	140	114
11	33	5 7	230	80	150
12	28	5 7½	230	180	50
13	27	6 1½	274	260	14
14	24	5 6¼	222	190	32

45. Cases Nos. 5, 10, and 11, present a great deficiency. In these both sides of the lungs were much diseased, and in the two former emphysema also existed to a considerable extent. The foregoing table, as well as the following, are taken from "*The Medical Report of the Hospital for Consumption.*" The next table shows *the comparison of Healthy and Diseased cases in the second stage of Phthisis, or after softening, all being males:—*

No. of Cases.	Age.	Height.	Vital Capacity.		Difference.
			Healthy.	Diseased.	
		ft. in.	cub. in.	cub. in.	cub. in.
1	27	5 6	214	86	128
2	21	5 5½	214	60	154
3	45	5 9½	246	85	161
4	30	5 6¾	222	70	152
5	33	5 8½	238	70	168
6	26	5 6¼	222	50	172
7	28	6 0	262	70	192
8	38	5 8	238	60	178
9	41	5 9¾	246	90	156
10	42	5 8	238	60	178
11	29	5 5½	214	50	164
12	32	5 7	230	70	160
13	42	6 0	270	140	130
14	29	6 2	286	150	136

46. All the cases in the above table show a very marked deficiency of vital capacity. In Nos. 3, 7, and 8, and probably in others, both lungs re extensively diseased. In the following ble "*the vital capacity of phthisical patients ex hibited, indiscriminately, without reference t he stage of the disease, compared with that of the ne number of healthy individuals:*"—

No. of Cases Observed.	Mean Vital Capacity.		Difference.	Diff ce per t.
	In Health.	In Cases of Phthisis, all Stages.		
415	cub. in. 222	cub. in. 129	cub. in. 93	cul

47. *The following table shows the compari of healthy individuals and of cases of phthisis i he first stage, or before softening;*—

No. of Cases Observed.	Mean Vital Capacity.		Difference.	Diff ce per t.
	In Health.	In Phthisis, 1st stage.		
241	cub. in. 223	cub. in. 149	cub. in. 74	cul

48. *Table showing the comparison of health rs- sons and cases of phthisis in the stage after softe g.*

No. of Cases Observed.	Mean Healthy Capacity.	Mean Diseased Vital Capacity.	Difference.	Difl ce pel t.
174	cub. in. 221	cub. in. 105	cub. in. 116	cu

49. C. *Hæmoptysis* is often the first sym m which excites the alarm of the patient in pht is, and the attention of his friends. The older w rs often considered hæmoptysis a cause of pht s, whereas modern research has shown that is a sign of this disease, tubercular deposits ng its cause. The following table, from the R ort of the Hospital for Consumption, shows *th ex istence or non-existence of Hæmoptysis in* 1 31 *cases of Phthisis, arranged according to the es, without reference to age.—Males,* 910; *Fem es;* 471; *total,* 1,381.

	Males.	Per Cent.	Fem.	Per Cent.	Total.	
Hæmoptysis - -	563	61·9	307	65·2	870	
No Hæmoptysis -	347	38·1	164	34·8	511	

50. The reporters remark that a large propo on of the above cases was seen at an early peri of the disease, and that not a few of them were y a short time under observation. Hence mai of those in whom this symptom had not occu d when the cases were noted, would in all pro- bability be sufferers from it during the fu er progress of the malady. It may, therefore e assumed that the proportion of cases in w h hæmoptysis occurs is still greater than that sl n in the table. It would result from the a e that nearly an equal proportion of *males* and fe- *males* are found to present this symptom. e following table *shows the existence or non-exis ce of hæmoptysis in* 1,084 *cases of phthisis;*

ma , 706—*females*, 378 ; *arranged according to the xes in decennial periods. Also the percentage of e cases in which hæmoptysis occurred* :—

ge.	Hæmoptysis occurred.		Hæmoptysis did not occur.		Total of Cases observed.		Hæmoptysis occurred per Cent.	
	M.	F.	M.	F.	M.	F.	M.	F.
o 5	0	3	2	4	2	7	- -	42·9
o 15	7	32	14	9	21	41	33·3	78·0
o 25	124	107	85	45	209	152	59·3	70·4
o 35	175	59	71	42	246	101	71·1	58·4
o 45	115	35	48	25	163	60	70·6	58·3
o 55	29	7	23	8	52	15	55·8	46·7
o 65	3	0	10	2	13	2	23·1	
o 75	0	0	0	0	0	0	- -	
ls -	453	243	253	135	706	378	64·2	64·5

Di ing the age of 70 into two equal periods—into tw 5 years — the percentage of cases of phthisis males was 64 in both periods, whilst in *females* it w 67 for the first 35 years of age, and 54·6 for the cond 35 years. In females, also, from 5 to 25 ars of age, hæmoptysis occurred in the ratio of per cent; whilst between the ages of 35 and 55, appeared only in the ratio of 55 per cent. Th eporters further state that the *stage* of the dise e in which hæmoptysis occurred was notice in 696 cases, of whom 453 were *males*, and 243 *emales*, as in the following table :—

	Males.	Per Cent.	Females.	Per Cent.
Be softening -	333	73·5	176	72·4
Aft softening -	120	26·5	67	27·6

Th table shows that hæmoptysis is much more frec nt (nearly as 3 to 1) in the first period of pht is than in the second and third conjoined, and early equally so in both sexes. It is very diff lt to account for this greatly increased freque y of hæmoptysis in the first stage of the dise e ; but it is probable that it appears greater in s stage than it actually is in practice, the wh progress of the disease having been obser l ; inasmuch as the reporters admit that ma of the cases were only a short time under obs ation, and were not seen in the far advan d progress of the malady. There can be no ubt, however, that the occurrence of hæmo sis in so large a proportion of cases in the first age establishes it as an important diagnostic sym om of phthisis.

5 *Hæmoptysis* is generally a symptom, but ver arely a cause, although it may determine the evelopment, of tubercles in the lungs of a s ofulous person, or the debility induced by a v y abundant hæmoptysis may have a similar ect ; and, as M. Andral has shown, the infil ation of a portion of the effused blood into the r-cells and pulmonary structure may form a n us for the primary deposit of tubercles. No ithstanding these exceptions, as far as they may be considered as such, hæmoptysis may be nsidered as generally produced by tubercle although it may be conceded that, in some cas especially when slight or moderate, it may be viewed as the result, in common with the tubercular deposit, of the sanguineous congestion of the lungs, often preceding and attending the early stage of phthisis, especially in the scrofulous and sanguineous diatheses. It should not be overlooked that the hæmoptysis may be produced by the pulmonary congestion consequent upon impaired vital action, or upon structural lesion of the heart, and by the severity of the cough, either independently of or in connection with these conditions of the heart, the blood effused into the pulmonary tissue and air-cells proving the matrix of tubercles, as Andral contends. When hæmoptysis proceeds from these morbid states it is usually copious, and is often less dangerous than the slighter states of it, more obviously dependent upon the early stages of phthisis. Baillou remarked that large discharges of blood from the lungs are less dangerous than small ; and, although this is very frequently but not absolutely the case, it by no means deserves the importance attached to it by Portal. M. Louis remarks, respecting this symptom in this and other diseases, that, with the exception of some cases in which it depended upon external injury, or was connected with suppressed catamenia, it indicates, with a high degree of probability, the presence of tubercles in the lungs ; and Sir James Clark states that his experience supports this conclusion. According to Louis, hæmoptysis occurred more frequently in females than in males, in the proportion of three to two,—a proportion much higher than stated by other observers ; and he considers it most frequent in females from forty to sixty-five, that is after the period of the cessation of the catamenia ; but in this also he is not supported by other observers in different fields of observation. The frequency of the attacks, he remarks, was generally in proportion to the duration of the disease ; the more copious discharges having rarely occurred oftener than twice or thrice in the same persons. "In all his cases it was present, in a greater or less degree, in two-thirds ; and the numbers in which it was copious and inconsiderable were nearly equal." In some it was a frequent symptom during the whole course of the disease, in others it never appeared. In persons advanced in life and in young children it rarely occurred, and then chiefly towards the close of the disease. In rare cases it was the first symptom, even before the cough, occurring suddenly, and, as M. Louis asserts, in the midst of perfect health, and without any appreciable cause. This latter assertion does not agree with my experience, nor with that of Sir J. Clark, who very justly remarks that he has generally found the aspect of the patient to have been by no means indicative of perfect health, although he may not have complained ; and that he has more frequently known the hæmorrhage to succeed bodily exertion, such as running, ascending heights, or long speaking, than when no such evident cause had occurred. In these cases, the hæmoptysis often does not appear until a few hours after the exertion. I entirely concur in the opinion here expressed in opposition to M. Louis.

52. The quantity of blood expectorated varies remarkably from a teaspoonful or tablespoonful to one or even two pints ; most frequently, it is only about two or three mouthfuls. In some, the blood merely appears in clots or streaks in the sputum, in others it is distinct and in some quantity ; when the

latter, it is generally pure, sometimes frothy or florid; at others dark or slightly clotted. Very large quantities are brought up with varying remissions; but at an advanced stage of phthisis the hæmorrhage is usually continuous, until several pints are discharged, and the patient is sunk by it or suffocated. This copious hæmoptysis is generally owing to the erosion of a considerable vessel by the tubercular ulceration. It is not very often that great hæmorrhage occurs at an early period; and yet I have known cases in which upwards of 100 ounces were lost at the commencement of the disease. Hæmoptysis, therefore, taking place either before or after cough or shortness of breathing, should be viewed as indicating tubercles of the lungs, although it may arise from disease of the heart, associated with the same symptoms only in very rare instances.

53. *D. Cough* is generally the earliest symptom of phthisis, but it is often so slight as not to excite the attention of the patient or his relatives; and for some considerable time it may occur only or chiefly in the morning. In such cases, and at this early period, the character of the cough, the state of breathing, and the appearance of the features, particularly of the eyes, ought to be examined, and the representation, often adduced, that it is merely a stomach-cough, or from laryngeal irritation, should not receive any attention; for it may be either or both of these, and not the less depend upon, or be connected with, tubercular deposits in the lungs. The continuance of the cough for weeks, or even months, without any expectoration, is of itself sufficient to cause strong suspicions of its origin. The association of the cough with shortness of breathing, any exertion causing cough or increasing the quickness of respiration, is an additional proof of the nature of the disorder. The cough is after a time observed in the course of the day or upon suddenly changing the apartment or the temperature, or upon reading, exerting the voice, &c., and it is afterwards followed by the expectoration of a transparent frothy fluid, which is often represented as coming from the pharynx and fauces. The cough generally increases with the progress of the pulmonary lesions, but such is not always the case; for, as will be stated hereafter, it may be very slight, or almost absent throughout the disease, or appear only a few days before death. Such instances have been remarked by PORTAL, LOUIS, ANDRAL, CLARK, and myself. In the course of the chronic and more protracted cases of phthisis, even when tubercular excavations undoubtedly exist, it is not unfrequently observed that, in favourable circumstances, cough and expectoration disappear for weeks, but return upon exposure, or from errors of regimen. In the advanced progress of the malady, cough is generally severe, occurs at all times, often without any evident cause, but especially at night and in the morning, disturbing sleep, occasioning pain in the chest, or even in sometimes causing vomiting. In the last stage it is often followed by breathlessness amounting to a sense of suffocation in some cases, or to sinking in others. The cough at the commencement of phthisis is entirely owing to sympathetic irritation of the larynx, and not to a fluid which requires to be expectorated. As the malady proceeds, it is chiefly caused by the discharge of the morbid secre ns from the bronchi, or from both the bronchi nd the cavities.

54. *a.* Tubercular or *phthisical cough* y, however, be confounded with the *cough of cat h,* or of *influenza*, or of *gastric*, *hepatic*, or *ne us disorders.* Of the *first*, it may be said, tha e attack is readily referred to its cause, is ll marked and preceded by the usual sympto of catarrh, either slight or acute. It is en attended by hoarseness, by soreness of the st or trunk; and although at first dry and ho e, it is soon followed and accompanied with ex ctoration, which is at first colourless, frothy ut afterwards opaque or mucous, yellowish, or uco-puriform; both cough and expector on generally diminishing with this change o e sputum, and shortly ceasing altogether. W n, however, the catarrh assumes a chronic for or becomes exasperated, and passes into bronc s, the difficulty of diagnosis may be much gre r. *Bronchitis*, acute or chronic, will readily be stinguished by the symptoms and signs describ in the article BRONCHI — *Inflammation of*; d *chronic catarrh* will be readily recognised as h, although, in consequence of the state of the l gs before the catarrhal attack, it may pass to phthisis; the shortness of breathing, the incre d severity of the cough in the morning, the chi in the early part of the day, the age of the pa t, the appearance of the eyes, and the occurren of hæmoptysis, evincing the transition into, o pre-existence of, tubercular disease.

55. *b.* The cough of *Influenza* canno e readily confounded with the cough of phthi if the character of the constitutional sympton of the former, especially the pains in the head, l k, and limbs, the general malaise, and the preva g epidemic be taken into account. Influenz as well as measles, hooping-cough, and other idemic diseases, when attacking persons w e lungs are prone to tubercular deposits, may etermine or excite the phthisical malady, or y develope it into a very manifest, acute, and r d form, if it had previously existed in a latent f n, or in its first or least apparent stage.

56. *c. Gastric Cough* is readily mistaken r the early stage of phthisis, but it is louder d harder than the latter, is more paroxysmal, d often manifestly excited by some of the e prominent symptoms of indigestion, as by f lency, acidity in the stomach, acid or acrid e tations, by a loaded tongue which is red a e point and edges, and by various other dysp c phenomena, especially by disorders of the bo s and liver, and by a loaded or high coloured e of the urine. Gastric irritation may, howe , be associated with the first stage of phthisis; when this obtains, the diagnosis will be n e difficult; but the former disorder will gener y declare itself, and claim the chief atten , as the readiest and surest indication for ai g the latter affection. A *stomach-cough*, o of much severity in the morning, when a tenacious mucus is expectorated — the co being severe in consequence of the difficult bringing up the tenacious phlegm — is not readily mistaken for a phthisical cough, as generally observed in connection with man signs of indigestion, and in persons of mature or advanced in life, and of a gouty or rheum

di iesis, or in those addicted to full living, or to th njoyments of the table.

7. *d. Hepatic Cough*, owing to its dryness, or to e slight mucous expectoration attending it, m be mistaken for the first stage of phthisis. B due attention directed to the state of the he tic functions and to the region of the liver; th pale, sallow, and sunken appearance of the c ntenance; the disorders referrible to the st ach and bowels, and various other sympa- th c phenomena contingent upon biliary and he- p : affections, will sufficiently indicate the source o e cough, when due attention is directed to it.

8. *e. Nervous* and other *Sympathetic forms of c h* are occasionally observed, especially in d ate persons; and, chiefly as occurring in these, b excite suspicions of phthisis, and require in- v igation. A *nervous cough* is apt to occur in fe les both after and before puberty, and espe- ci y as a sequela of hooping-cough, or of mea- sl and often excites alarm, not merely as it si lates, but as it may actually complicate, the fi stage of phthisis. This cough is generally p xysmal, is severe, and in protracted attacks, b g sharp, barking, or tracheal, and without, or w merely a slight watery, expectoration. In fe ales it frequently presents a hysterical charac- te with indications of nervous irritability and of u ine disorder, as catamenial disturbance, leu- c hœa, pains in the loins and the lowest part of th spine or sacrum; it is often occasioned by m turbation, and not infrequently disguises, as w l as complicates, the first stage of consump- ti . *Intestinal worms* may occasion a cough, e cially in young persons, which, owing to the p or, flaccidity of the tissues, and emaciation, as w l as to the short, dry, and hacking form of the c gh, may be mistaken for incipient phthisis. A ntion to the abdominal functions, to the state o vacuations, and inquiries as to the symptoms of v ninous disorder, will generally indicate the n ure of this cough.

9. *f.* Although the *diagnosis* of phthisical c gh from other forms of cough is important, y the mere determination of this point ought not t ead us to overlook the fact that they may s erally complicate phthisis, especially in its first st e, may mask this stage, and may, moreover, e er excite and determine its existence, or de- v pe it into active and manifest forms, when it h previously existed in a slow or latent state. W ether, however, these forms of cough occur in pendently, or as a complication of phthisis, th r removal by judicious treatment is requisite, in much as they are injurious to the constitution, e when existing independently, and are sources o ggravation to the pulmonary disease, when th are complicated with it.

0. *E. Shortness or Quickness of Respiration and D pnœa.*—Quickness of breathing is one of the e iest indications of phthisis, especially when oc- c ring in connection with a hacking or short c gh, (§§ 53.). It has generally a marked re- l on to the quickness of pulse, and the severity o he febrile symptoms; in the more latent and c onic states of the disease it is not experienced u ess more or less physical exertion be used; but o ascending a height, or on other occasions of e rtion, the breathing is not only quick, but is also a nded by more or less dyspnœa and sense of op- p ssion in the chest. As the malady advances, especially in its more febrile forms, and when cough and expectoration are considerable, respiration is very quick, the acceleration being much greater in proportion to that of the pulse than in health or at an early stage; and the sense of oppression and dyspnœa are also greater. These symptoms are evidently caused by the extent to which the lungs are rendered incapable of their functions—to which the capacity of the organ to receive and hold air is impaired by tubercular deposits, by condensation of portions of the pulmonary structure, and by sanguineous congestion of other parts; the occurrence of hæmoptysis, by removing the latter morbid states, often relieving the cough and the breathing for a time. The state of the heart's action, an impaired contraction of its parietes, distension of its cavities owing to impeded circulation through the lungs, may severally also increase the pulmonary congestion, and the oppression and quickness of respiration, and favour or even occasion an attack of hæmoptysis. In many cases, quick or difficult breathing is not experienced until after an attack of hæmoptysis. In these it may be inferred that the hæmorrhage either increases the weakness of the heart's action, and favours congestion of its cavities, or infiltrates the bronchi and air cells, or structure of the lungs, so as to impair the capacity of the organ for the reception of air; an increased frequency of respiration being consequently required to make amends for the diminution of capacity. In all cases, therefore, the state of the respiration should receive attention, and the cause of its increased frequency or its difficulty ascertained, particularly as respects the existence of lesions within or without the lungs—in the bronchi, air-cells, and pulmonary tissue, or in the cavity of the pleura, or in the heart.

61. *F. Expectoration* is not usual until the cough and acceleration of breathing, with quickness of pulse, has continued for some time. It is at first scanty, transparent, ropy or tenacious, greyish or frothy; often resembling saliva. After an indefinite period, specks of an opaque matter are seen in the transparent frothy fluid. "These specks differ in appearance, being at one time white, at another yellow, or even approaching to green, and again very frequently of an ash colour; partly sinking in water in little masses." The greyish and ropy portion of the sputum partly float in it, in the form of striæ, suspending the minute tubercular masses. Before or about the time of the change of the sputum to this state, streaks, or specks, or even small clots of blood are occasionally seen in the expectoration. As the malady proceeds, the sputum becomes more opaque, of a yellowish hue, and is coughed up with more ease, and in more distinct masses. At a later period, the sputum is of an ash colour, and is brought up in distinct, rounded, flocculent-like masses, enveloped in the transparent ropy portion. If the patient be directed to expectorate in a glass vessel two-thirds full of water, some of these masses will be seen to sink to the bottom; others, which are frothy, will float on the surface, and parts of these will be suspended at different depths, often retaining the minute, cheese-like, or flocculent, tubercular specks or masses, or allowing these to sink to the bottom, yet connected with the surface by the more fluid and ropy portion of the expectoration. This change of the

sputum into ash-coloured, distinct masses, with more or less of a thin mucous fluid, occasionally occurs only a few days before death, but more generally it has continued for many weeks or even months before this event. In some instances it retains the yellowish, puriform appearance, and forms smooth, flat patches; and in rarer cases it is semi-transparent, tenacious, and gelatinous, and, as in bronchitis, is separated with great difficulty from any vessel containing it. "During the last days of life the expectoration is in a more dissolved state, and sometimes of a darker hue; about this period, also, and often long before, it has a very fœtid odour; finally it diminishes gradually, and often disappears entirely some days previous to death." (Clark.)

62. Such are the usual appearances of the expectoration; but the periods at which it commences, and at which the changes take place, differ in different cases. Its characters also vary, or differ much, as certain complications or intercurrent affections occur in the course of the malady, as catarrhal or bronchial attacks, inflammation of the lungs or pleura, &c. The transparent, tenacious, and frothy sputum, although generally accompanying tubercular deposits, is only a secretion from the bronchi, and may take place independently of these deposits. The yellowish-green sputum, often also observed, is frequently discharged in chronic catarrh, and towards the termination of bronchitis. These, although often abundant in, and forming the chief part of, the expectoration in tubercular phthisis, proceed from the bronchial membrane. The two characters, however, which may be considered peculiar to that attending phthisis, are the striated mass, with a mixture of whitish fragments in it, and the ash-coloured, globular masses, which are observed in the more advanced stage of the disease. I agree with Sir James Clark in considering these as very rarely unaccompanied with tubercular disease.

63. The quantity of the expectoration varies remarkably in different cases, and is by no means commensurate with the extent of pulmonary lesions. It may be very small, or almost altogether absent, although large excavations are found after death; the disease having advanced rapidly to this issue. Even in an early stage, and while it is still transparent, the quantity is often very great; the disease also in these cases assuming a febrile or rapid form. Portal, Andral, Clark, and the Author, have met with rare cases in which the expectoration has been entirely wanting, and the cough very slight up to the very close of life, and yet small tuberculous vomicæ and most extensive tuberculous deposits, in some cases, and large excavations in others, were found after death. The cases of this description, which occurred in my practice, had been mistaken before I saw them for low nervous or typhoid fevers, although the rapid pulse, the still more rapid breathing relatively to the quickness of the pulse, the appearance of the features, the night-sweats, the emaciation, and the appearances of the fingers and nails, might have shown the nature of the malady, independently of the physical signs. As to the sources of the expectorated matter, it must be evident that, before softening of the tubercles has occurred, and before they have communicated with the bronchi, the bronchial membrane has supplied it, in consequence of the irritation extended to this membrane fr the morbid deposit, and of the congested stat the pulmonary vessels, of which the tubercu deposits and the expectoration are the comn and combined results. The softened tuber and the surfaces of the cavities consecutiv formed also supply a part, often very small the sputa, more especially that part which is most characteristic of the malady. In c where the expectoration is either scanty nearly wanting, the severity of the constitutio symptoms, the rapidity of their progress, and indications of a contaminated state of the culating fluids, render it extremely probable t the morbid secretion from the surface of cavities as well as the liquefied tubercular matt are absorbed, or imbibed by endosmosis, carried into the blood, which it thus poiso thereby heightening and accelerating the sy ptoms. From the above it may be inferred, t the state of the expectoration should always viewed in connection with the other phenom of the malady; that it affords little evidence tubercles in their early or crude stage, but wl the change takes place in the sputum, and debris of tubercles are present in it, then a v satisfactory proof is thereby furnished of existence of the disease in an advanced sta Besides the appearances of the sputa alre considered there are two others, which deserv special notice, viz.: *hæmoptysis*, from its frequer and importance (§§ 49. *et seq.*); and *calcare* *concretions*, from the various considerations s gested by them.

64. *The expectoration of calcareous concreti* from the lungs, occurs either months or years a the appearance of pulmonary symptoms — ge rally after years have elapsed,—the patient eit having recovered, or partially recovered, a having experienced a relapse. The size of th concretions varies from that of a hemp-seed that of a pea or small bean. This last size is largest I have seen, and was expectorated b lady in the last stage of the malady, which l been of many years' duration. A medical frie was sent up the Mediterranean in 1820 change of climate in the first stage of phthi. He recovered, but expectorated these concreti on several occasions long afterwards. He is n alive and in good health. Another medical fri lately called upon me and stated himself to ha been then, and long previously, in good heal with the exception of a loud whistling noi during both inspiration and expiration, whi could be heard in any part of the apartment which he was. He told me that he was c sidered to have been consumptive many ye before that time. I said that he would so expectorate one of these concretions, and he so in a few days. It was of the shape and size a split pea. He is in good health. But th concretions are not met with in these circu stances alone, but also in others much more rious or altogether hopeless, as in the last sta of the more chronic and protracted cases. Th are then especially brought up with a copi expectoration, sometimes without any blood, others with streaks of blood, but rarely with more copious hæmoptysis. In a case now un my care the patient, in the third stage of phthi has expectorated a number of these concretio

S has been consumptive for many years; and fo several years before the disease had reached th stage had occasionally brought up, with li e apparent ailment, one or more of these conci ions. When they appear in a state of appare health, they are unattended by much or even ai sputa beyond a little mucus, or mucus st iked with a little blood or bloody specks. The p ological conditions in which they are usually fo d will be noticed hereafter (§§ 146.).

5. *G. Pain*, especially acute pain, rarely attends th early stage of phthisis; but a slight or aching p is often felt, although not often mentioned b the patient, in the shoulders, or near the cl icles or upper regions of the chest. In the se nd and third stages, pain, often of a severer cl racter, is frequently experienced, and is genera referred to either side, or to the situation w re the tubercular lesions are most advanced o xtensive, and where the pleura has become in licated. When adhesions are formed betw n the opposite surfaces of the pleura, pains of severe are experienced, not only in one or b sides, but also in the back or under the sh lder-blades. They are different from those o atarrh, bronchitis, and influenza, which are e rienced chiefly under the sternum when coughin and are characterised by a sense of soreness ra er than by acuteness or sharpness. In some ca s pain has been felt under the short ribs, and, o g to the lowness of the situation, has not alw s been referred to its true source. But it will g rally be found to proceed from adhesions of th pulmonary, to the diaphragmatic or costal p ra. When the bowels are disordered it may b caused by the state of the colon, but in this ca the pain is not persistent and often shifts its si tion.

. *H. The pulse* often furnishes important indicati of phthisis, even before any of the phenomena al dy noticed can be detected. In persons about o fter puberty, who are of a scrofulous diathesis, a equent pulse, or a pulse above 80, should b iewed with suspicion, more especially if it be, as ciated with a dilated pupil, a clear or blue, o early conjunctiva, and shortness of breathing. In any chronic cases, the pulse may not be acce rated, even throughout the disease, or until it lose, and may be considerably under 70 in he minute, especially in phlegmatic and bilio temperaments. A slow or natural pulse, the b thing being not much accelerated, is observed o in the more protracted cases, and when th are indications of amendment. Great quickne , smallness, or softness of pulse occurs chiefly in e more febrile or rapid cases; and in these th hances of amendment are very few.

7. *I. Hectic fever* approaches generally slowly ar nsidiously in phthisis, often appears in its slightes orm early in the disease, and becomes more m ked as the second and third stages are reached. In ome cases, however, hectic is wanting, or is so ight as not to excite notice until it breaks out su enly and severely with all the symptoms of a dvanced and acute state of the malady. It is nnecessary for me to add at this place to what I ve advanced upon this topic, when describing th uccessive stages of phthisis, and when treating es cially of the several states and causes of *hectic fe* r. To that article I therefore beg to refer the re er. See FEVER, HECTIC, (§§ 292, *et seq.*).

68. *K. The digestive functions* are generally more or less impaired at the commencement of phthisis, and even before pulmonary symptoms have appeared; assimilation and nutrition being also imperfect. The bowels are often not materially disordered at an early stage. They are, however, frequently more or less slow or confined, but very readily become free, or even profuse, after recourse to aperients. As the malady advances, especially as the pulse becomes frequent and hectic fever developed, the bowels are irregular in action, are sometimes costive, and afterwards spontaneously and very freely relaxed, or even purged. In more chronic cases, the bowels often continue regular, and the stools are well coloured with bile, for a long time; but when the disease is far advanced, and especially towards its close, *diarrhœa* generally supervenes, and rapidly emaciates and exhausts the patient. In most cases, even early in phthisis, an active purgative, given to remove costiveness, not infrequently acts excessively; and a gentle aperient at an advanced period often produces the same effect, and occasions a diarrhœa which it may not be easy to arrest. It is chiefly in the second and third stages that diarrhœa becomes severe or obstinate. M. LOUIS found it in one eighth of his cases from the beginning until death; in the majority during the latter stages; in some during the last days of life only; and in four out of 112 cases it did not occur. It is often a most distressing symptom, is preceded and accompanied by severe pains, followed by great sinking and exhaustion, and is followed by rapid emaciation. The evacuations are at first yellow and bilious; but they often become watery, curdly, offensive, or emit a sour odour; the diarrhœa depending, as I have shown at another place, upon the state of the follicular glands and mucous surface of the bowels, produced by the morbid condition of the blood, and by the elimination of morbid or effete matters from the circulation, by the intestinal follicles, disease of these follicles and ulceration ultimately taking place (See Art. FEVER, HECTIC, § 306.). Diarrhœa often diminishes the cough and expectoration, but it seldom abates the morning perspirations.

69. *L. Emaciation* is generally present unless the patient is carried off, before it has advanced far, by some complication or intercurrent affection. Frequently more or less wasting may be observed early in phthisis, and in some it is the first symptom which attracts attention, especially when the disease is occasioned by vitally depressing and exhausting causes. In other cases the malady is advanced far before emaciation is considerable. This symptom is often associated with some degree of pallor and indications of deficiency of red globules, or of a thin or poor state of the blood; and this is the more remarkable, as well as the rapidity of emaciation, as the febrile symptoms and the diarrhœa increase. The state of the blood, even early in the disease, and the arrest of assimilation and nutrition, the consequent waste of red globules, and the impaired or deficient development of others, readily account for the emaciation, and the state of the circulation, as regards both vascular action and the vascular contents. Emaciation is an early symptom in many obscure cases, especially in persons above thirty or thirty-five years; it is not so generally observed at a very early period in young persons,

especially in females, who are still regular or nearly so in their menstrual discharges. When it occurs without any manifest cause, and especially when it is attended by quickness of pulse, by morning chills, or by a sense of cold in the course of the spine, or by a short hacking cough, or by shortness or oppression of breathing, tuberculous disease of the lungs may be inferred; and, if all these symptoms be present, the fuss, parade, manipulation, and charlatanry of a physical examination of the bare chest, so often unnecessarily and even injuriously practised, may in most cases be dispensed with.

70. *M. The fingers and nails* often early, but frequently also not until an advanced period, betray the existence of phthisis. The nails become uncated or bent inwards upon the extremities or tips of the fingers, which are wasted; the last joints appearing enlarged or rounded, and clubbed or terminating in a coniform shape. This appearance is most remarkable when emaciation exists, and, with the symptoms just mentioned, or even alone, is a most unerring sign of tubercular phthisis.

71. *N. Œdema* of the extremities, especially of the lower, is observed chiefly or only during the last stage of phthisis. It may, however, appear earlier in delicate females, and when the catamenia are suppressed. It is sometimes so remarkable as to amount to anasarca; and, when this occurs, tubercular deposits in the structure of the kidneys, or albuminous changes in the urine, may be suspected.

72. *O. Morning perspirations* are amongst the most distressing symptoms of phthisis. The disease may be far advanced, and hectic symptoms long present, before the perspirations become copious, or are complained of. When they appear, the second, if not the third stage of the malady may be considered present; and they are then excessive, in relation to the chills and febrile reaction which precede them. This symptom is rarely absent, but it sometimes does not appear until nearly the close of life. LOUIS states that he has found it wanting in one tenth of his cases. When it has been wanting, I have observed the surface of the skin remarkably harsh or rough, abounding in epithelial scales, and foul or sordid. In these cases perspiration breaks out about the face and neck. It usually occurs about the same period of the disease as the diarrhœa, and depends upon the state of the blood occasioning that affection. It has been said to be vicarious of the diarrhœa, one being diminished when the other is increased; but this is not commonly the case, or in a slight degree only. The perspirations take place chiefly in the early hours of morning; if at all present early in the disease, they are only slight, or are confined to the head, neck, and chest; but when abundant, or at a far advanced period, they break out generally over the body, and whenever the patient falls asleep. Occasional intermissions or remissions of them are observed. When they are abundant a rapid termination of the disease may be inferred. The state of the perspiration is diagnostic of the stage rather than of the existence of phthisis; for when this symptom is manifest there can be no question of its nature.

73. *P. Aphthæ* are common in the last days of phthisical existence, during a week or two before death. They are sometimes slight, and in others severe. They may extend over the mouth, fauces, and pharynx, rendering deglutition difficult, pa ful, or even nearly impossible. When seve the patient rarely lives many days; and yet, two cases of chronic or protracted phthisis un my care, the patients rallied, and lived two ye in the one case, and three in the other, a aphthæ were present for a considerable time i severe form.

74. *Q. The hair* falls out in the advanced sta of the febrile or acute cases, and becomes m and more thin, and in the mornings wet with p spiration. But in the chronic and protrac states of the disease, it generally continues ab dant, or in its usual state, nearly to the last, until a short period before death. It often f out very early when the malady has been cau by masturbation or premature or excessive sex excitement.

75. There are various other contingent p nomena which sometimes supervene in course of phthisis. Some of these either acc pany certain forms of this disease or result fr complications which will be noticed in the seq Irritability of temper, nervous susceptibility, mors, sinkings, &c., are often observed in course of the malady, are consequences of exhaustion of organic nervous power, and consequent impairment of assimilation and nu tion, and the waste of the tissues and blood-g bules. Nevertheless, the appetite of the patie although fastidious and various, is generally remarkably impaired. In the more chronic ca it is often natural, or but little diminished, u the last days of life. The mental powers are materially affected. The reasoning faculties the imagination are even unusually acute. some cases, of the febrile form especially, sli or mild delirium occurs towards the close, bu is seldom violent unless the membranes of brain become the seat of increased vascular acti with or without tubercular deposits, or the tre ment is injudicious.

76. iii. OF CERTAIN FORMS OR MODIFICATI OF PHTHISIS.—The *more usual form* of phth having been described, with due reference to stages and prominent symptoms, and to th physical signs which indicate the commencem and progress of the malady, in as far as they entitled to confidence, or deserve to be made basis of diagnosis, I proceed to notice bri the more marked forms which the disease m assume under the influence of constitution, thesis, predisposition, and causes. On this part my subject much may be advanced, both as pics of speculation and as matters of import practical interest; much also may be remarl requiring further elucidation and more accur investigation. Where the data are not positi doubts may lead to more patient research, and more positive knowledge.

77. *A.* THE LATENT FORM OF PHTHISIS.—T form is always insidious in its accession and p gress. The patient is debilitated, indolent, m tally and physically depressed, and often compla of general malaise. The health is impaired, a lowness of spirits experienced. Emaciation slight, and advances slowly. This state may c tinue some months or even years, and may viewed as owing to nervous debility, or as proaching to hypochondriasis. The digesti assimilating, and nutritive powers are more or

mafestly impaired; the surface is pallid and co the conjunctiva of a pearly hue, and the pus usually dilated. The pulse is at first slily or not at all accelerated, or quick or sm; but becomes rapid on slight excitement, wh also the breathing is short. Slight chills arefterwards felt, or a sense of cold in the course of spine, followed by heat of the palms of the has or soles of the feet, and an increase of pu. A short or slight hack or dry cough is obsved, especially in the morning, or after exert, when the breathing becomes short or oppred. These symptoms are commonly but litt attended to by the patient, although they oft excite the anxiety of those about him. Acng pains are also sometimes experienced ab the clavicles and upper regions of the thox, but these also often fail to excite attention, or viewed as rheumatic. Upon examination, a sli dulness on percussion, a feebleness of respiion, and a slight tracheal character of the vesular murmur, or a louder or longer expiratorund are the chief physical signs.

Latent phthisis may occur in all temperames, especially in the lymphatic, nervous, and bils, and at all ages, and not infrequently in the age In younger persons these symptoms sometimes disbear after change of climate and judicious trenent; or they increase and are followed by thegreyish expectoration attending the first sta (§ 18.); but generally, after many months, or en some years, the disease passes into one of more declared forms about to be noticed; or patient, having either partially or altogether recered, expectorates the calcareous concretions notd above (§ 64.), often with little cough ancanty sputa; the expectoration of these sometim occurring at intervals, or ceasing permanery, recovery being complete. Most frequly, however, after exposure, or after difficult, scay, or suppressed catamenia, or after a severe cath, bronchitis, or limited pneumonia, or after infnza, measles, fevers, hooping-cough, &c., and evewithout any manifest cause of exacerbation, thesease passes into a chronic or a protracted, butpen and manifest phthisis, or into a consecutive acute form, with the usual expectoration, perration, diarrhœa, emaciation, &c., and with thehysical signs attending the far advanced stat of the malady. Hæmoptysis is not frequent in t form unless in its latter stages. The diseasnay continue latent in females, often masked by her ailments, as hysteria, chlorosis, uterine diselers, dyspepsia, bronchitis, or by pregnancy, unt upon the disappearance of the catamenia, or aftearturition, or suckling, it breaks out into an ope and acute form, and terminates rapidly, genally with fever, and sometimes with delirium.

7 This form of phthisis sometimes follows depssing or exhausting *causes*, or prolonged or glected dyspepsia and impaired assimilation andutrition, or catarrhal or bronchial affections, or hteria, or pneumonia, or pleurisy, or affections of throat, or partial anæmia; and these, or oth contingent or intercurrent disorders, may ma its early course, in both sexes, and at all ageuntil it assumes one or other of the manifest for about to be noticed. It is frequently connecl in its origin and progress with a poor state of t blood, or deficiency of the red globules; this statof the blood, in connection with impaired organic nervous power, either occasioning or developing the tubercular deposits.

80. The *lesions* most commonly seen in the lungs in this form, are cicatrices in the upper lobes, with or without calcareous formations in or near their centres; crude and softened tubercles; both old and recent cavities, the former being somewhat contracted and having their surfaces smooth, or presenting a fibro-serous appearance, and adhesions both old and recent between the opposite surfaces of the pleura in one or several places.

81. *B.* PRIMARY ACUTE OR RAPID PHTHISIS.— This form occurs in persons apparently in good health, breaks out suddenly, and runs its course rapidly — in from five or six weeks to three months — owing either to the extent and severity of the morbid action, or to the feeble powers and defective vital resistance of the patient's constitution. This state of the disease occurs chiefly in young persons, and is often developed by measles, fever, scarlet fever, influenza, catarrh bronchitis, pneumonia, or hooping-cough; and, although symptoms of tubercular disease were not evident before it supervened upon these maladies, or otherwise rapidly broke out, it may be inferred that it had previously existed for some time in a latent state, and that, when it had reached a certain extent, the symptoms and signs of its presence became rapidly manifest. In some cases severe physical exertion, fast running, loud speaking, has determined an attack, with more or less hæmoptysis and all the more violent and unfavourable symptoms of the malady. In these cases, the diseases just mentioned and other efficient causes have called the latent tubercular deposits into activity, not merely developing and accelerating their progressive changes, but also exciting morbid actions in the structures surrounding or adjoining them. That this view is correct is shown by the occurrence of this form chiefly in the scrofulous, lymphatic, and inflammatory diatheses, and in members of a family in which others have been subjects either of external scrofula or of phthisis. That the diseases just mentioned, or attacks of pulmonary congestion, or other causes should have so rapidly given rise to tubercular deposits as the history of this form may indicate, is not very probable. It is most likely that the tubercles, at an early and latent state of their formation, had existed previously to operation of these causes, and had been thereby developed into a rapid maturity.

82. This form of phthisis may be divided into *two varieties*; viz., that in which the more characteristic phenomena of phthisis are present in a remarkable or severe degree; and that in which these phenomena are nearly if not altogether absent; the disease being often mistaken for low nervous or typhoid fever. — *a*. In the *former* of these the patient is attacked by chills, quickness of pulse, oppressed and rapid breathing, an aching pain and anxiety in the chest and præcordia, the pain or aching extending to the spine and shoulder-blades; a short cough, which is afterwards constant and severe, with a scanty and frothy expectoration at first, which soon becomes copious and yellowish; and acute hectic fever, the pulse being very rapid and soft, the remissions slight, and the perspirations excessive, and almost continued. The sputum now is generally similar to that ushering in the second stage of the more common

form (§ 31.). The countenance is anxious, pale, covered with perspiration, the conjunctivæ clear, and the pupils dilated; the surface of the skin has a pallid or dirty hue, the tongue is dark or loaded, and the prolabia somewhat livid; the cough, oppression, and dyspnœa are so distressing as often to prevent the patient from lying down, and the breathing is short, shallow, and rapid. Hæmoptysis to a moderate extent sometimes occurs, but rarely produces relief. Vomiting takes place in rare cases. Diarrhœa occasionally appears towards the close, but is seldom severe, yet emaciation is considerable. At last the pulse can hardly be counted, and the dyspnœa is most distressing, and the cough almost suffocating. Slight delirium supervenes, the fingers and lips become livid, the nails dark and uncated, and death ensues, from four to seven or eight weeks from the attack, preceded for a few hours either by coma, or indications of impending asphyxia. On percussion a dull sound is heard over nearly all the chest. Respiration is very weak in some places and bronchial in others, and a mucous râle is generally present. No crepitation is heard, nor is the sputum characteristic of pneumonia. It is usually yellowish, is sometimes streaked with blood, or contains small clots of blood.

83. This form of the disease generally occurs in young persons. I have seen it most frequently in females, especially after measles, influenza, and hooping-cough, and the suppression of the catamenia. In these the attack has often been produced by exposure to cold; and in some cases to which I have been called the disease has been considered either as bronchitis, or as pneumonia of both lungs, both which it nearly resembles. Indeed it may be said to be very nearly allied to congestive bronchitis on the one hand, and congestive or nervous pneumonia on the other; but the previous history of the case, the scrofulous diathesis, the effects of treatment, the remarkable rapidity of breathing, the character of the sputa, and of the physical signs, indicate the difference, as well as the alliance, between these diseases, and the appearances after death fully confirm this relation (§ 132.). In 1853, a case of this kind occurred in a near relative; and, in 1854, I was called to a recently married couple, both under twenty-five years, both of the scrofulous diathesis, and viewed by the father of one of them, himself a physician, as possessing a strong tendency to phthisis. Both were attacked with measles a few weeks after their marriage; and on recovery they went to the sea-side. They resided there for a short time, and, on returning to town, were exposed to cold. The lady had had the catamenia in excess; but she had passed the usual period two or three weeks, without indications of pregnancy. Soon after her exposure she was suddenly seized by chills, oppressed breathing, cough, and the other symptoms just mentioned. The attack was viewed as congestion of both lungs. External derivatives, a moderate cupping over the sternum, followed by dry-cupping in this situation and between the shoulders, and the treatment described hereafter, were prescribed. The disease proceeded as above, and terminated fatally in about five weeks. Her husband was seized in nearly a similar manner, but not so severely, very soon after her death. During her illness he appeared pallid, depressed mentally and physically, and slightly anæmied; his pu was very rapid and weak. He had soon aft wards a very slight short cough in the morni no expectoration, but hurried breathing on slig exertion. He did not wish to be considered and refused medicine. Immediately after wife's funeral, and more than usual exposure, was seized with the acute symptoms mentio above, and in a few weeks these termina fatally, with slight delirium and coma.

84. *b. The lesions* in this form of phthisis h been considered by Andral as those of a form pneumonia, attacking the scrofulous diathesis, grey tubercular granulations found after death be regarded by him as the results of inflammatio f the air-cells. But the crude and more advan tubercles formed in addition to these granulati , the quantity of tubercular matter infiltrating consolidating portions of the lungs, the m general extension of these lesions throughout lungs or to the lower lobes, the indication f vascular congestion of the pulmonary structu , and even of the bronchi, and the presence of s degree of œdema or serous infiltration of th structures; and still more the occasional existe of small recent cavities, partially evacuate f their contents, and without lining membranes, e evidences that the tubercular deposits, from t r extent, and the sudden production of conges of the pulmonic and bronchial tissues, had d loped, more or less rapidly, a state of vasc r action in these tissues, of an asthenic chara , that had reacted on the tubercular deposits, d had accelerated their development; the sev y and rapid fatality of the disease being occasi d by the great extent of these deposits, and by e associated changes in the lungs.

85. *c. The second variety* of acute phthisis cl y simulates either nervous, remittent, or typ d fever, according to the modifications it pre ts in individual cases, whilst the *first variety* cl ly resembles congestive or nervous pneumonia e Lungs, Inflammations of, (§§ 62, *et seq.*) in e respects, and asthenic bronchitis of both lun in others (see Bronchi, &c. §§ 37, *et seq.*). — is variety of acute phthisis is rarer than the prece g, and has not been noticed by those who have ad ed diseases of the lungs for their speciality, th x- amination of the bared chest for the grand *co* of fussy diagnosis, and the stethoscope as the l on of transcendental medical knowledge, if n of actual inspiration. This neglect is most e a- ordinary on the part of those who usually n- sider every case which comes under their vie as pertaining to that region of medical science w h they suppose themselves to be alone capab of cultivating. As in the preceding variety, in this, the patient has appeared in good health d if he have not felt this to have been the ca e has not admitted it; nor have his friends det d it until he is seized by an outbreak of diso rs which obliges him to keep to his bed and hav e- course to medical aid. If this aid be of a p er kind, it will be found and admitted, at lea in some cases, that a degree of ailment had en experienced for a considerable time befor e accession of acute disease; that depressi of spirits, indolence or indisposition to menta d physical exertion, debility, loss of appeti or indigestion, acceleration of breathing whe s- cending a height, weakness in the joints, occa al

ss, followed by heat in the palms of the or soles of the feet, especially at night, some of restlessness in the early part of the night, colour or complexion, in some cases loss of an unusual brightness of the eyes, &c., en present for some time, but that each or hese were so slight as not to excite the of the patient, or they were not so mani- to rouse the fears of his friends. The now feels a general prostration, has a pulse, with the usual symptoms of a re- form of fever, which in a few days as- a more continued type, the symptoms being, r, somewhat severer on alternate days. owels become irregular, at first confined terwards inordinately relaxed; the per- ns are usually abundant; the tongue is loaded; the urine rather scanty and high- d, with copious deposits; the position in on the back, with the head and shoulders r less raised, or partially turned to either he features are somewhat sunk, the face and the general surface dusky, with a y perspiration, which is abundant over the ace, neck, and chest; and aching or dull are occasionally felt about the clavicles, back, and under the scapulæ. During urse of these symptoms little or no cough rved; if it be present it is commonly slight, d insufficient to attract attention; but the ng is remarkably quick, somewhat op- l, and shallow. There is little or no ex- tion, the sputum and other local symptoms insufficient to direct attention to the state lungs, or to excite suspicions of the existence d febrile phthisis; both cough and expec- n being apparently absent. The pulse is nd more rapid, slight or wandering deli- ccurs, especially when the patient doses or to a waking sleep; the hair becomes thin; rface more dusky; the emaciation very and extreme; and bed sores readily form more prominent parts. Death soon en- generally in four or five weeks from the ncement of the acute attack, either from haustion consequent on diarrhœa, or from or sinking following delirium.

8 *d. Lesions.*—I have seen four cases of this of febrile consumption, to which I was in consultation at an advanced period of ourse; and at that time the symptoms and f phthisis, in its third stage, were more or anifest, upon a careful and minute exami- , and with due reference to the history of se and to the health of other members of nily. In three of these an *inspection after* was allowed, and in all several cavities ound in both lungs mostly altogether empty early dry. The blood in the lungs was of colour and only partially coagulated; few adhesions were found between the opposite es of the pleura; and the lower lobes were ch diseased as the upper. The intestinal lar glands, both solitary and aggregated, more or less enlarged and ulcerated. Three se cases occurred in females. The youngest 8 years of age, the oldest of all was 27 It may be inferred, that the cavities, were small, mostly empty, and the smallest in two or three instances, full of these tubercular and fluid matters, had not communicated with the bronchi, or that the bronchi in connection with them had been rendered impervious in the parietes of the cavities, from the condensation of the surrounding tissues, and that the morbid matters in these cavities had become absorbed, had contaminated the blood, and occasioned acute febrile symptoms of a typhoid or adynamic character. The circumstance of the softened tubercular matters in the cavities, and the morbid fluids flowing into them from their ulcerating parietes, not having passed into the bronchi, accounts for the absence not only of expectoration but also of cough; whilst the emptiness of the excavations shows that their contents must have been absorbed, and being carried into the blood, explains the acuteness, the rapidity, and the typhoid character of the attendant fever.

87. *C.* CONSECUTIVELY ACUTE PHTHISIS is different from the two preceding varieties, chiefly as regards the character and duration of the symptoms preceding the exacerbation of the disease, and the development of the more acute and dangerous form. In these varieties the patient seems in tolerable health to those about him, and believes himself to be so, until the acute symptoms make their appearance, although the experienced observer cannot fail to remark indications of the approaching evil.—*a.* But the variety now about to be noticed is preceded by a slower and more manifest disorder of the respiratory functions than that preceding these varieties, and is in every way similar to the *latent* form of the malady, described above (§§ 77, *et seq.*), although by no means latent to any attentive observer. After pallor of the countenance, or slight indications of anæmia, with or without emaciation, debility and inactivity, mental depression, languid or soft pulse, shortness of breathing, or short cough on exertion, and sometimes after the expectoration of calcareous concretions, have continued for a very considerable or even a long time, or for several months, or even years; and generally soon after exposure to cold, or after unusual exertion, the patient experiences chills or shiverings, or a sense of cold running down the back; or he is seized with hæmoptysis, and all the acute symptoms are fully evolved. Hectic fever, at first remittent, but afterwards nearly continued; a rapid, weak pulse; very quick respiration; cough and copious expectoration; pains about the clavicles, scapulæ, or the sides, or the upper regions of the chest; colliquative perspirations, diarrhœa, rapid emaciation, aphthæ, sometimes with, but oftener without, slight delirium, ultimately supervene, and terminate life.

88. *b. The lesions* most frequently observed after death in this variety are, tubercles in various states of softening; small, or nearly cicatrised, or contracted cavities, with gritty, calcareous, or cheese-like matters in or near their centres; larger cavities, partially empty or containing blood, if hæmoptysis had preceded dissolution, and their parietes varying in appearance with their duration; condensation of the pulmonary tissue around the excavations, or congestion of portions of the lungs, and redness of the bronchial mucous membrane, &c.

89. *D.* PROTRACTED PHTHISIS may commence either in the usual form, or continue for years, first in a more or less latent, and afterwards in a

manifest state. It occurs chiefly in the phlegmatic and bilious temperaments. It is often characterised by slowness of the pulse, which seldom rises above 70, and often not above 65 in a minute, by attacks of hæmoptysis, or more rarely by the expectoration of calcareous concretions; but, when the latter occurs, I have very seldom observed the former, unless in a very slight degree. It is sometimes simple or uncomplicated, but it is oftener associated in various periods of its course with one or other of the affections and lesions about to be mentioned. The nature of the disease is generally manifest; and the experienced observer will rarely fail to form a correct diagnosis, even without the aid of a physical examination, between it and bronchitis or chronic pneumonia, with either or both of which, however, it is often associated, at different periods, and even also with partial pleuritis. Percussion and auscultation are of use chiefly as showing the progressive changes and complications of the disease, although they are liable to the fallacies noticed above (§§ 35—37.), owing mainly to the states of the cavities, when they exist, and of the bronchi, arising from the presence or absence of the morbid matters that usually collect in them.

90. Several cases of very protracted phthisis have come under my notice, several of them in medical men. Dr. T. was attacked by hæmoptysis at the age of 20 when studying in Edinburgh. His circumstances having admitted of his relinquishing practice soon after entering upon it, and having experienced returns of the hæmorrhage with other pectoral symptoms, he travelled or voyaged to several parts in the West Indies, and in the south of Europe, generally passing a part of the year in one or other of these, and returning to England in the summer. Nevertheless his phthisical symptoms never left him, were exacerbated after considerable intervals, and the hæmoptysis also returned, and was sometimes alarming. This state of health continued for many years, and he continued to pass his winters in some mild climate, most frequently in that which he found to agree the best with him. At about the age of 57 or 58 he first called upon me, told me his case, and informed me that he had consulted all the consumption doctors, and that they were almost equally divided as to the existence or non-existence of cavities. I told him, after a careful examination, that there were cavities in both lungs, but that they were small, and that they most probably were filled up by the accumulated morbid secretions for a considerable time, and thus they escaped detection. He continued under my care for several years, during the periods of his residence in London or its vicinity. But the attacks of hæmoptysis were more frequent, so much so ultimately that he always carried with him pills consisting of the ergot of rye, and a bottle of turpentine. He took the former as soon as the hæmorrhage appeared, and if that failed, he had recourse, as I had directed, to the turpentine. These means generally succeeded, but the other pulmonary symptoms gradually advanced. When about the age of 67, he was seized with hæmoptysis when getting out of a railway-carriage at Paddington, had recourse to his usual remedies, and sent for me.

91. Before I reached his residence he was dead, suffocated by the hæmorrhage. The body was inspected the following day. Several
were found in both lungs. None of the
large. The smaller were apparently cont
their parietes were smooth, fibro-serous,
most fibro-cartilaginous in parts; and one
of them so much reduced as to be almos
trised; the parietes being quite smooth an
cartilaginous. The surrounding tissue wa
densed. Some of the cavities had a memb
parietes, whilst in others the walls consiste
somewhat condensed pulmonic tissue, with
openings, chiefly venous or bronchial. Th
ties were all filled with blood, as were a
larger bronchi, and contained but little
puriform matter. This case had evidentl
of forty-four years' duration; and it present
pearances, as respected the cavities, of the l
and shortest duration.*

92. *E.* Phthisis in Infants and Chi
occurs chiefly in the scrofulous diathesis,
consequence of protracted or neglected diso
the digestive and assimilating functions, wl
children may generate both the scrofulous
sis and tubercular disease. Disorder o
functions may in all temperaments so affe
circulating fluids as to develop that habit o
in early life, which constitutes the scrofulo
thesis, and which, in its more manifest stat
plicates not merely the lungs, but other
also. When treating of *Scrofula* and *Tub*
I have shown that the scrofulous diathesi
either be inherited or generated by the p
and by the offspring in childhood, by causes
depress or exhaust organic nervous powe
paired digestion and assimilation of the hæ
sine, and imperfect nutrition resulting theref
and thus engrafting scrofula and tuberculosi
any temperament. It is therefore most imp
that this disorder of the digestive and assimi
functions in childhood should be recognise
traced to its causes, and that these causes s
be removed.

93. The aspect of children thus affected
gests the idea of imperfect organic power.
child is languid or fretful; the flesh is fla
the skin harsh, dry, and unhealthy to the sig
touch. It is disinclined to play or to active

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* Dr. W. H., who had been Editor of the "L
Medical and Physical Journal" in the years 1819
and 1821, in 1823 evinced indications of pulmona
ease, and in the following year he had a most seve
tack of hæmoptysis. He came under my care,
advised him to pass the following winter at Naples
returned to England in June, but was more or less
invalid all the summer and autumn. He went t
coast of Devonshire the next winter; and he thu
tinued to change his place of residence for many
often returning to London or its vicinity during
tions of the summer and autumn. The pulm
symptoms were sometimes slight, at other times se
He died about 25 years after his first attack, in t
cinity of London. The treatment of this case, a
Dr. T.'s, was conformable with that which I shall
to recommend in the sequel.

Miss L. came under my care about nine years ag
the third stage of phthisis. The symptoms and sig
cavities in the lungs had previously been recognise
the physicians whom she had previously consu
When I saw her these were unmistakeable. Durin
years which have intervened since my first visit, sh
experienced intercurrent attacks of bronchitis, of
tial pleuritis, &c., which have been successively
come; and during the severe winter and spring of
she was not confined a day to her apartment, and
rarely to the house. The physical signs and
symptoms of cavities in the lungs still exist. I c
adduce numerous other instances of the protracted
of this disease, if it were necessary to do so.

The face is pale, pasty, or faded. The pear large; the pupils are dilated, and junctivæ white. The tongue is whitish, ted with small red points, the extremity es being red, and the root and centre or more or less furred, especially in the g. The appetite is variable, often craving atural; thirst is not infrequent, and the s fœtid. The bowels are irregular, most tly costive, but sometimes very loose; and cuations are offensive, often pale, greyish y: occasionally mucus and imperfectly di- ood are observed in the stools. The urine high-coloured at times, scanty or abundant, r pale. The extremities are usually cold; p is disturbed, and often followed by partial eats. The child often talks when asleep, s his teeth; and hence the complaint is scribed to intestinal worms, with which, r, it is not infrequently complicated.

94 f the complaint continue, the symptoms only increased, but others are superadded. ntenance is more faded and pasty; the p is thick, tumid, or fissured; the throat ces red or sore, or the tonsils enlarged; ids and tarsi are inflamed, or the pupils ted, the conjunctivæ pale or pearly; the are somewhat swollen or sore, or discharge mucus; and mucus, mixed occasionally ood, is passed from the bowels with fre- offensive and griping motions. These ms may continue for some time, the ss and emaciation increasing, and be- associated with quick respiration, cough, cous expectoration, occasionally streaked ittle blood. The skin is harsh and dry, ats break out during the night; languor bility increase; the pulse and respiration tly accelerated, and the quickness of the elatively to the former increased. The ic symptoms become, in most cases, more t, but vary much with the age and tem- nt, or habit of body, of the child. In the ung, they are often marked by disorder bowels, which frequently appears urgent, nore or less connected with tubercular de- n the mesenteric glands. In others, the ze of the head and the emaciated state of bs lead to the suspicion of incipient dis- the brain or its membranes, which indeed actually commencing, either as softening entral parts of the organ, or as tubercular ons in the membranes; but these changes, as those in the mesenteric glands, may be poraneous with tubercular deposits in the lso, the amount of disease in this organ redominating or advancing *pari passu* with the others. In many, especially the very the pulmonary tubercles never reach the f dissolution and tubercular vomicæ, the of the brain, or of the mesenteric glands wels, or the extent of tubercular infiltration lungs, even of the lower as well as of the lobes, terminating life before this stage is ched or advanced, although the emaciation, oppression and acceleration of breathing, reme.

95 In these cases the cough and expectoration slight; but the dulness on *percussion*, and d motion of the ribs, are generally remark- The other *physical signs* are nearly the same as stated above in respect of the early stage of phthisis (§§ 24, *et seq.*); but those of percussion are more to be depended on than of auscultation, especially in young children; and, in those particularly, hæmoptysis rarely occurs, unless at an early period, and then as merely streaking the expectoration: but slight epistaxis is sometimes observed. The younger also the child, the more general are the tubercular deposits in the several organs, especially in the lungs, in the bronchial glands, in the mesenteric glands, membranes of the brain, &c.

96. *F.* THE DARK RACES are much more exempt from phthisis than the white; but very much depends upon race, and upon continued residence in the same or similar climate, on the one hand, and migration to a colder climate, on the other. Of the degree of prevalence of this malady in different races, some notice, although insufficient, will be taken in the sequel; and I can here only mention the much greater prevalence of this malady in these races, especially the negro race, when they migrate to a temperate, or a cold or changeable climate. As to the usual course of the disease, when it attacks individuals of either a black, brown, or copper-coloured race, I am not enabled to speak with confidence; but, from what I have seen, it commences silently and insidiously, and advances more and more openly and rapidly to its fatal issue. In some cases the attack appears as a vital blight, by which the lungs are especially affected; a lower range of temperature or greater exposure than heretofore experienced, or other depressing or exhausting causes, whilst they impair organic nervous power, and the assimilating functions, thereby develop tubercular deposits in the lungs, as the parts most predisposed, by structure and exposure, to experience this morbid change, generally without any inflammatory precursors or complications. These races, as far as I have had occasion to observe, rarely or never present the protracted and very chronic states of the malady sometimes seen in the white races; whilst the more rapid or acute forms are frequently met with, but these generally with fewer indications of febrile or excited vascular action than in the white races. Hæmoptysis is, I believe, less frequently observed as a symptom or complication of the disease in the negro than in the latter races, whilst it is a severe and frequent symptom in the mixed races of South America.*

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* DR. ARCHIBALD SMITH, in a very interesting *account of the Diseases of Peru*, states that "in Spring, a season when many severe cases of pneumonia present themselves, the commonest catarrh generally appears under a more febrile form, and when it unfortunately affects one of a consumptive tendency, it is frequently the exciting cause of a galloping decay. For at this season it is remarked that consumptive patients, with which the hospitals in Lima are well supplied, die very speedily, while at other seasons they linger on for a longer period. Persons who are habitually subject to chronic *bronchitis*, and troubled with what they call crude phlegm, or much mucous expectoration, are apt to fall into a fatal decay, as a consequence of an acute attack originating in cold; and others, who have been in a lingering state of health for some time, with a slow fever and a short dry cough, or a cough accompanied with expectoration, especially in the morning, of clear and frothy sputa, are prone to have their fever increased, and to be hurried into a state of catarrhal consumption. In cases of the latter kind, it is probable that tubercles may have previously existed in the lungs, and that the exception of catarrh only serves to bring phthisis into more decided action. And, indeed, it may be made a question whether those cases of chronic bronchitis to

97. iv. **The States of the Blood in Phthisis.** — Before a precise idea can be formed of the states of the blood in this disease, the healthy conditions of the blood should be considered, with reference to *sex*, *age*, and *temperament*, in order that the degrees in which the former differ from the latter may be seen. It should not, however, be overlooked, that the *chemical analyses* of Denis, Lecanu, Becquerel, Rodier, Andral, Nasse, Gavarret, Simon, &c., have presented slight differences, even at the same age, in the composition of the blood in health, so that the results at which they have arrived may be viewed rather as a close approximation to the truth than as absolute certainty. In addition to the differences arising from sex, age, and temperament, others, hitherto not inquired for, may also exist, especially those depending upon race, climate, and season. After examining the mean results furnished by the above writers, I here give those assigned by Becquerel and Rodier, as the st precise and as nearly approaching the mean c he other observers.

98. *a*. The following table, containing the an of a number of analyses of the blood of *healthy* rsons, between the ages of 21 and 55 years, s ws the differences between the constituents of is fluid in *males* and *females*, in1000 grains, or s.

	Male.	Fem
Density of defibrinated blood	1060·0	1057
Density of serum - -	1028·0	102
Water - - - -	779·0	79
Fibrin - - - -	2·2	
Sum of fatty matters - -	1·60	2
serolin - - -	0·02	2
phosphorised fat -	0·488	54
cholestrin - -	0·088	90
saponified fat -	1·004	46
Albumen - - - -	69·4	7
Blood corpuscles - -	141·1	12
Extractive matters and salts	6·8	
chloride of sodium	3·1	
other soluble salts	2·5	
earthy phosphates	0·334	54
iron - - -	0·566	41

99. *b*. The differences of the constituents the blood at different *ages* have not been deter hed with sufficient precision; but according the researches of Denis, the water in the bl l is somewhat increased after 50 *years* of ag the solid residue slightly less, the blood-corp les are materially diminished, and the al nen nearly the same in quantity. In *childho* the water is increased, the solid residue son hat less, the blood-corpuscles considerably les nan at mature age, and the albumen nearly th ime as at that age. Becquerel and Rodie tate that, after 40 or 50 years of age, there is decided and progressive increase of cholestrin the blood. As puberty approaches and as the nerative organs are developed, the blood-corp cles and iron increase, and the relative propor n of water diminishes; the corpuscles and iron rve to maintain the energy of these organs and until the powers of these organs begin to ag, the blood experiences little or no diminut of its red corpuscles.

100. *c*. The *constitution* has considerable inf nce on the state of the blood. At equal ages, the lid constituents and hæmato-globulin are less ndant in the blood in weak than in strong c stitutions. According to Lecanu and other the blood of persons of *lymphatic* and *phleg tic temperaments* is much poorer in solid constit its, and especially in red globules, than that o ersons of sanguineous temperament; the qu ity of albumen being the same in all. The foll ng are the results in 1000 parts:—

	Sanguineous Temperament.		*Lymph and Phleg Temperam*	
	Men.	Women.	Men.	n.
Water - - -	786·584	793·007	800·566	
Albumen - - -	65·850	71·264	71·781	
Blood Corpuscles -	136·497	126·174	116·667	

101. *d*. The *chemical analysis* of the bl in threatened and incipient phthisis furnishes th me

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which I have referred may not, sometimes at least, be instances of bronchial irritation, and consequent expectoration of a mucous secretion, sustained by the presence of tubercles. Whatever be the particular form or primary character of pulmonary consumption, certain states of the atmosphere, depending on different degrees of altitude, appear to be either hostile or favourable to its existence or development, according to the particular locality in which the patient happens to reside. Thus on the coast it is a common disease, terminating in purulent expectoration and death, in whatever way it may have originated; but, on the intermedial mountains, and in the temperate valleys of the interior, pulmonary consumption is a rare malady.

"A failure of strength and health coming on gradually, or as it were by stealth, with impaired appetite, a slight dry cough, with or without pain at the breast or shoulders, a febrile pulse, with nocturnal heat and restlessness, are symptoms frequently precursory of those which characterise confirmed consumption. This slow fever, so much dreaded by every one as the harbinger of phthisis pulmonalis, and often aggravated by daily provocations, or fretfulness and anger, is always accompanied, if not always preceded, by a diseased condition of the digestive functions. This affection is, I think, well described by Tissot as a disease to which men of letters are subject:—"This slight fever, to which some men of letters are liable, and which, by impairing the nutritious lymph, renders them pale and thin, and throws them at last into a state of decay and consumption, a fever which itself depends on this, that sometimes a strong mental emotion excites the action of the heart and accelerates its pulsations; but more frequently it arises from bad digestion, and a faulty condition of the chyle, which irritates the organs of circulation, and so becomes the cause of the fever; and, also, if the organs of respiration are delicate and sensible, of a cough, which, united to the fever, may degenerate into hectic fever and phthisis.—*De la Santé de Gens des Lettres*, p. 33. In conformity with these views, which are as applicable to the ordinary cases of incipient phthisis in Lima, as to the explanation of the origin of pulmonary affections in men of letters, according to Tissot, I would remark that the chests of the Limenos, especially the male part of the white population, are commonly contracted; very rarely open and spacious, except among the dark and labouring classes; and every practitioner entrusted with the medical treatment of these people should constantly bear in mind that their respiratory organs are so delicate and easily affected, that sometimes shaving and washing the face in cold water bring on catarrh; and I have already shown how this latter affection may be the precursor of confirmed consumption."—*Edinburgh Medical and Surgical Journal*, vol. liv., pp. 6—9.

Dr. A. Smith has here shown the very intimate connection of phthisis with impaired digestion and assimilation, and the want of originality, as well as the limited views of those writers who, since the days of Tissot, have espoused a somewhat similar doctrine. Of *hæmoptysis*, in connection with phthisis in Peru, Dr. A. Smith remarks:—"Spitting of blood from the lungs is exceedingly common in Lima, and not confined to persons of any particular class or colour, though more prevalent among the fairer inhabitants of European descent;" and he points out the frequency of attacks of hæmoptysis, not only as a prelude, but as an attendant upon the early stages of consumption amongst the several races peopling Peru.

res s as those stated in the Article on SCROFULA AN TUBERCULOSIS (§§ 93, *et seq.*). When pht is is further advanced, the changes in the blo are more and more manifest. ANDRAL and GA RRET state that, in all periods of the disease, exc ting the last, the fibrine seems on the incre , and the red corpuscles are on the decrease, pro essively throughout; but that the proportion of increase on the one hand, and decrease on the her, varies with the progress of the malady. If tubercles be in a crude, unsoftened state, the crease of fibrine is only small, and its whole am nt may be estimated at about 4. This, howeve according to the researches of DR. FRICKE, of ltimore, and others, is too high an estimate. Th decrease in the corpuscles in this stage is per ptible, but not very great. As the tubercles soft , the quantity of fibrine slightly increases, and he corpuscles decrease. Upon the formation of v nicæ, or cavities in the lungs, the fibrine is som what further increased — to 5·5 according to AN AL — but it never reaches the amount observ l in pneumonia. The results vary, however, wit the nature of the associated lesions, which mos of chemical observers have not taken into the count; for the occurrence of severe attacks of h moptysis, or of partial, sub-acute, or chronic pne nonia, or pleuritis, or peripneumonia, will inc se the fibrine and greatly diminish the red glo les. In the last stage of phthisis the blood bec nes still poorer; the fibrine decreases in nea the same ratio as the other solid constitue , and even often falls below the healthy sta rd. The following table furnishes the results of analyses by ANDRAL and GAVARRET, and 9 b BECQUEREL and RODIER, in 1000 parts, of the ood in phthisis :—

	In Men.			*In Women*	*By Andral & Gavarret.*
	1st Venesect.	2d Venesect.	3d Venesect.		
W r - -	794·4	799·8	821·0	796·8	809·7
S Constit. -	205·2	200·2	179·0	203·2	190·3
Fi ne - -	4·8	4·2	3·6	4·0	4·4
F - - -	1·55	1·44	1·06	1·729	
A nen - -	66·2	65·0	62·0	70·5	
B Corpuscles	125·0	122·7	103·5	119·4	100·5
E ctive Mat- and Salts	7·7	6·7	8·9	7·6	

1 . Mr. ANCELL has adduced the results of a gre number of researches into the constitution of blood in phthisis. He views the disease to ive its origin from morbid states of the blo . The chief differences existing between the ews of that gentleman and those entertain by me, as stated under the head SCROFULA and UBERCLES (§§ 101, 102.), are, that I consider the anges observed in the blood, the nature and ext of which I fully admit and describe, not as the igin of tuberculosis, but as effects of originally eficient, or consecutively impaired, power of organic nervous system — of that system whi endows the digestive, assimilating, circulating nd nutritive organs — defective assimilation of chyle, and an unhealthy condition of the blo , being the consequences of this state of the org c nervous system, and only intermediate link n the chain of pathological results, the extren ies of which chain are the state now assigned and he tubercular lesions.

103. *e.* I may adduce the following as the results of my own observations of the state of the blood in the early and in the advanced stages of Phthisis:— At an early period, or even before the disease has fully declared itself, the blood is thinner or poorer than in health; the colourless globules are more or less abundant, and the red globules less numerous; the clot is somewhat smaller, its crasis less, and it sooner loses its cohesion. As the disease advances, and as febrile action is established, the fibrin is somewhat increased, and this is more certainly the case, if hæmoptysis, or intercurrent inflammations of any of the pulmonary structures, take place; the red globules are diminished, and the albumen and fatty matter are not very materially changed in quantity. The alkaline salts are slightly deficient, and lime is somewhat in excess. It should not, however, be overlooked, that, among the numerous analyses of the blood in phthisis, there are very great differences in the quantity of fibrin, of albumen, and of fatty matter. I have here given what appears to be the more correct results. Probably the quantity of each of these is not so different as the quality, the intimate constitution, and vital relations. In the last stage of the disease, the blood appears still more watery, owing chiefly to the deficiency of red globules: and the colourless globules more numerous than in health. The greater abundance of colourless globules is probably owing to impaired assimilation, or metamorphosis, of these into red globules. The colourless globules in this, and indeed in earlier stages of the disease, have been mistaken for pus globules, the existence of which in the circulation is doubtful, or at least not satisfactorily demonstrated. The vital crasis, as well as the size of the clot, progressively diminishes. It does not appear that the *microscopic appearances* of the blood in phthisis are different from those now stated, or that the observations which have been made with the aid of this instrument have furnished any additional facts to those now adduced. (See Art. SCROFULA and TUBERCLES, §§ 93, 94.)

104. v. COMPLICATIONS OF TUBERCULAR PHTHISIS.—It is manifest that tubercles in the lungs, in their several states and stages, being the effects (as shown in the art. SCROFULA and TUBERCLES, §§ 101, 102.) of originally deficient, or subsequently impaired, organic nervous power, and of the consequent changes in the blood, should not be viewed as a special disease of the lungs, or as limited to these organs only, but as a malady, in which the constitution—the whole frame, is more or less implicated. The earlier changes of organic nervous power and of the circulating fluids being such as now stated, it may be inferred that numerous associated and consecutive alterations will appear at early and advanced stages of the malady, more or less intimately connected with the original mischief, or tubercular vice, either as associated or related changes, or as more remote results. As these severally, and often in various associations, may be expected to present themselves in the course of phthisis, it becomes important that a brief view should be taken of them, as they are most frequently presented to us in actual practice, and nearly in the order as to frequency in which they occur.

105. It will appear from the foregoing, as well as from the circumstance of my not having taken

particular notice of a form of phthisis, recently called *dyspeptic phthisis*,—a form which Dr. A. Smith has shown above (*see note to* § 96.) to have been first insisted on by Tissot,—that I do not consider this as a variety of phthisis, inasmuch as digestion is, as noticed by Dr. Smith, an early attendant upon all the forms of this malady, although in different grades; and even when dyspepsia may be so slight as to be overlooked, especially as regards the functions of the stomach, healthy assimilation and nutrition may be very remarkably impaired. Original or acquired defect of the digestive, assimilating, and nutritive functions is not only the attendant upon the commencement and progress of the several forms of phthisis, but it precedes their origins in more or less manifest grades. Indeed, the malady may rationally be viewed as presenting this procession of morbid phenomena, if we admit the earliest change from health in tubercular persons, whether hereditary or acquired, to be impaired function of the ganglial nervous system, or, in other words, defective organic nervous power—a power which endows and actuates the digestive, circulating, and nutritive organs and functions.

106. *A.* Hæmoptysis.—I have already considered this occurrence as a symptom of phthisis (§§ 49, *et seq.*). It may also be viewed as a *complication* of this disease; and it may supervene upon tubercles of the lungs coexisting with either functional and congestive disorder, or with organic lesion, of the heart. Hæmoptysis may, however, be caused by congestion of, or impeded circulation through, the cavities of the heart, independently of the existence of tubercles in the lungs; but this occurrence is comparatively rare. The blood may proceed — 1st. as a simple exudation from the bronchial mucous membrane, in consequence of the irritation and congestion caused by the tubercular deposits, whether within or without the air-cells and capillary bronchi, and by the impediment they occasion to the circulation in the pulmonary veins;—2dly, from the surface of a cavity owing to the erosion of one or more of the vessels passing to it,—a circumstance of much more frequent occurrence than was formerly supposed; — 3dly, into the structure of the organ, without any previous cavity, little or even none of the blood being expectorated, asphyxia having been suddenly produced by the extravasation (see § 134, and art. Lungs, §§ 186, *et seq.*).

107. The hæmoptysis which takes place at the commencement or at an early stage of phthisis may generally be ascribed to the first of these pathological states; but it may also proceed from the disorders and lesions of the heart already alluded to (§ 51.), either independently of, or in connection with, tubercular deposits in the lungs. It should not, however, be overlooked that the hæmoptysis may appear in females as a vicarious menstruation: and as such it may be connected with tubercular deposits in the lungs or morbid states of the heart, or with both states of disease, or it may be independent of either of these. When the hæmoptysis takes place vicariously of menstruation, the lungs are very rarely free from tubercular formations. But, in whatever mode hæmoptysis takes place, the blood, which remains for a time in the bronchi, from or into which it is effused, generally excites more or less irritation, often amounting to inflammation of the bronchial
mucous surface, thereby further complicatin
malady. (See art. Hæmorrhage *from the*
ratory organs, §§ 96, *et seq.*)

108. *B.* Bronchial Irritation and Inf
mation.—Bronchitis, most frequently limitec
either acute, sub-acute, or chronic, is a con
complication of phthisis. It may exist in o
other of these states. It is generally confined t
bronchi in a portion of one or both lungs,
more especially to the bronchi in the vicinit
or communicating with the seats of tubercula
posits or cavities. In the first stage of pht
these deposits most probably occasion mer
state of irritation, or of sub-inflammation, o
mucous membrane of the adjoining bronchi;
even in this stage, when external agents, or
causes, aid the operation of this pathological
dition, then a more active disease of this
brane is developed, especially if one or
attacks of hæmoptysis have occurred, and
acute or even acute bronchitis results. The
of this bronchitis, although limited, as now st
is to develope the crude tubercles and to h
their softening. When this has taken place,
the softened tubercular matter has made its
into the adjoining bronchi, then a very ob
cause of irritation and of inflammatory acti
superadded to those previously existing. B
during, and subsequent to, the softening—d
the second and third stages, the sputum bec
much more abundant, and its quantity is c
chiefly to the morbid secretion from the infl
bronchi—unless, indeed, in those very rare
when the bronchi is not materially irritated b
disseminated tubercles, or when the softened
ter is absorbed and does not pass off by the
chi. In these stages, the discharge from
surface of the cavities, or the contents of r
tubercular vomicæ, are the chief causes o
bronchitis and of its perpetuation; for it i
quently observed, that the morbid appeara
both inflammatory and ulcerative, exist chief
or are limited to, the bronchi communicating
the vomicæ or cavities, and that these ch
may be traced in, and from, these bronchi to
larger trunks, until the trachea is reached, v
also, as well as in the larynx, the same altera
are not infrequently observed (§§ 109, 110.); v
the bronchi which present not this communic
or which extend only to crude tubercles, are
exempt from these changes or present them
slight degree. Dr. Carswell detected ulcer
even in the minute bronchi communicating
cavities, showing the extension of the morbi
tion from the latter by means of the discl
from them.

109. *C.* Inflammation, Ulceration, Œd
&c., of the Larynx and Trachea are
complications in the course of phthisis. Th
quency of this association depends upon the
nal, concurrent, and consecutive causes, and
influences and agents acting in the course o
malady. The affection of these parts is t
imputed chiefly to the same changes as occ
the bronchitis—to the tubercular and other
charges from the originally diseased parts;
often the morbid appearances may be traced
the bronchi communicating with cavities t
trachea and larynx. In some cases, however
affection of the larynx, and even of the epigl
commences previously to the softening of

ber s, and may be ascribed in these to the
eate susceptibility of these parts, in the early
ages f phthisis, to the usual exciting causes of
flam ation and its consequences, and to the
itat extending to them,—by sympathy and
ntir ty from the pulmonary and digestive mu-
ous rfaces. In the early, as well as in the
lvan d, stages of phthisis, the digestive mu-
ous rface furnishes many indications of irri-
tion iving rise to heart-burn, acrid eructations,
c., ich very sensibly affect the larynx and
iglo s, and kindle disorder, which is not readily,
d e n never, put out. That it may thus partly
igin in the digestive organs, is shown by the
ecur ance of the lesions being sometimes either
nite to the larynx and laryngeal surface of the
iglo s, or chiefly found in these parts, the tra-
ea ing comparatively exempt or nearly so.
ot r cases, both these and the trachea are
fect more or less; and not infrequently the
flam atory changes, ulcerative, &c., are limited
the rachea, and found chiefly either in the
oster or membranous portion of the trachea, or
war the side of it corresponding with the cavi-
s w ch exist chiefly or only in one lung. This
nita n of the ulceration to one side of the tra-
ea, ry probably is caused by the passage of
e m bid secretion over it during the position of
e p ent in bed, which is most frequently on the
ck, r towards the side most diseased, so as to
ve ater freedom of respiration to the lung
ast ected. In some cases, the ulceration of
e p erior part of the trachea is very extensive,
d s e of the ulcers very deep, even so much
as give rise, in rare instances, to a fistulous
eni into the œsophagus, one instance of which
me nder my observation. (See art. LARYNX
d ACHEA.) The larynx is rarely attacked
ima y, or independently of tubercular deposits
the ngs; it is chiefly in connection with tu-
ercu disease of the lungs and with syphilis
at ions of this part occur. M. LOUIS states
at 180 persons, who died of chronic diseases,
ot hisical or syphilitic, he found one only
ith ceration of the larynx; but that one in
ve l ulceration of this part or of the epi-
otti and one in three had ulceration of the
ach , among those who died of tubercular con-
mp o.

110 *flammation* or ulceration of the larynx is an
npo nt complication of phthisis; and when the
ffect of these parts is severe, and that of the
ngs ot well developed, or at an early stage, the
sea has often been called *laryngeal phthisis*.
ut, those cases, the affection of the larynx is
ere symptomatic of the tubercular formations
the ungs, which is often masked by the former
ffect , especially when it is severe or the tuber-
ular eposits not far advanced. In this state of
e l ynx there is either hoarseness or loss of
oice vith pain in the region of the os hyoides,
spec ly when ulcerations have advanced. The
oug s characterised by a harsh grating sound.
t is fficult, suffocative, or attended by a whis-
ing ise. The *ulcerations* in the trachea are very
equ t in the more chronic states of phthisis, and
re ely manifested during life in these slow
ases M. LOUIS observed in some instances that
ensa ns of heat and obstruction were complained
f be d and above the sternum.

11 *D.* INFLAMMATIONS OF THE LUNGS, *limited to portions of them, and both of these portions and of their bronchi*, especially to parts adjoining the tubercular masses, vomicæ and cavities, often occur at all stages of phthisis. In the first stage, when the tubercles are crude or disseminated through the organ, the inflammatory action may, from its grade, or its congestive or scrofulous character, or from being masked by the tubercular deposits, be imperfectly manifested either by the rational symptoms or the physical signs. In this stage it is very difficult to determine whether the tubercles be the cause of the inflammatory irritation, or the latter the produce of the tubercles. It is not improbable that, however originating, the one morbid state acts, and is acted, on by the other. As the tubercles advance to softening inflammatory or congestive appearances may be detected around them, and the same are often seen around the vomicæ or in or near the walls of cavities, the bronchi, both capillary and large, participating in these changes. In many instances the structure of the lungs is condensed or infiltrated with tubercular matter around cavities or vomicæ, the change being a result of inflammation of a scrofulous or congestive character, limited to the situations in which the tubercular deposits are, or have been, most abundant or developed. In other instances, especially at an early stage, the attacks of Hæmoptysis, especially when considerable, diminish or subdue the inflammatory condition, and leave the portions of lung not yet disorganised in a better state than previously for the performance of their functions. In some cases, especially where the deposits or vomicæ are near the surface of a portion of lung, the inflammatory action in the adjoining structure extends to the pleura, giving origin to the next complication, namely, intercurrent *pleuritis*, which is very frequently associated with one or more of those already considered.

112. *E.* INFLAMMATION OF THE PLEURA—in an acute, sub-acute, or chronic form—most frequently limited, but sometimes very considerably extended—generally very sensibly expressed, but occasionally almost latent or not expressed, or rather overlooked during life, is a most common lesion in cases of tubercular consumption; for it is very rarely found on dissection that the lungs in this disease are altogether free from old or recent adhesions. The pleuritic lesion usually arises as just stated, and is in most cases manifested by the pain commonly experienced, and if not by pain, by the physical signs. The inflammation of the portion of pleura covering tubercular deposits or vomicæ agglutinates it, by the exudation of lymph, to the opposite or costal pleura, thereby preventing, unless in rare instances, the *perforation* of the pulmonary pleura, and the consequences which would follow. The lesions supervening in the pleura in the course of tubercular phthisis, and the contingent results which sometimes ensue, more especially *perforation of the pulmonary pleura*, are fully considered under the heads PLEURA, *inflammations of* (§§ 112, *et seq.*), and *structural Lesions of* (§§ 201, *et seq.*), and PNEUMATOHORAX, and to these I refer the reader for the further elucidation of these complications of phthisis.

113. *F.* SEVERAL ABDOMINAL COMPLICATIONS are manifested in the course of phthisis, and evince the general or constitutional nature of the malady — or the origin of it in the organic or ganglial

nervous influence endowing the vascular system and the circulating fluids. These complications may appear at all stages of phthisis, or they even may precede the first stage.—*a.* The complication with *disease of the digestive mucous surface* is one of the most important. The stomach, the lower parts of the ileum, and the cæcum and colon, are most frequently affected. M. ANDRAL justly remarks that "softening of the mucous membrane of the stomach, hyperæmia of the different portions of the intestines, ulceration of the small intestine, accompanied in many instances by a development of tubercles, are all of such frequent occurrence in phthisis, that they may fairly be considered as constituent parts of the disease." These lesions of the digestive canal most frequently occur in the course of the pulmonary disease, often not until an advanced stage, especially in persons somewhat advanced in age; but they sometimes precede it, particularly in children and younger subjects; and, in some cases, the pulmonary and abdominal affections appear to commence at the same time or nearly so.

114. (*a.*) This is more especially the case as respects the complication with *disorder of the stomach.* At the commencement of phthisis this complication is usually of a dyspeptic character; but it may, as the disease advances, or even from the first, assume a severer form and be attended by nausea, pain, or vomiting. Tenderness, a sense of heat or burning pain, increased by pressure, are present in these cases, and may arise either from inflammatory softening of the villous surface, or from ulceration. These symptoms and lesions, although early observed in some cases, the vomiting and pain occasionally being severe and obstinate, commonly appear in the second or third stages of phthisis—oftener in the third. As far as my experience extends, young females have more frequently presented this association than males. *Increased size of the stomach* was observed by M. LOUIS in more than two-thirds of the cases examined by him after death, whilst only two instances of it were seen in 230 subjects who died of other diseases. In some cases the organ is double or treble its natural capacity, descending in these as low as nearly to reach the pelvis, its coats becoming thinner in the ratio of its increased size.

115. (*b.*) *Disease of the intestines,* chiefly of the follicles of the lower portion of the ileum, commencing with tubercular deposits in the solitary and agminated follicles, and terminating in ulceration of these, is a very common complication of phthisis. The follicles are first distended, enlarged, and projected on the mucous surface by the tubercular deposit; they afterwards burst, discharge their contents, and ulcerate; the ulcers being seated chiefly in the patches of agminated follicles in the lower portion of the ileum, and in the side opposite to the attachment of the mesentery. In the large intestines, especially the cæcum, the ulcerations are disseminated irregularly. The small ulcers in the ileum generally coalesce, and the ulcers often pass under the mucous surface and detach portions of it. They often proceed deeply, as shown in the article on the DIGESTIVE MUCOUS SURFACE (§§ 36, *et seq.*), but they rarely perforate the intestines in phthisis, for as soon as they approach the peritoneal surface, lymph is thrown out on it, and the nearly perforated part is agglutinated to the opposite peritoneal surface. This lesion of the intestines is generally attende
obstinate diarrhœa which occurs in the sec
third stages of phthisis, in the latter especia
has usually been termed *colliquative diarr*
is chiefly to be ascribed to two morbid
tions, or to either of them, namely to the e
of tubercles in the intestinal follicles, or t
of these follicles excited by the morbid
the blood, in the course of the eliminatio
morbid elements from this fluid by th
licles.

116. The earlier the ulceration of the i
takes place in phthisis, the more rapid
is the progress of the malady, and the loss
and strength of the patient. In the more
and protracted cases, this lesion seldo
venes until shortly before their fatal ter
M. LOUIS states, that he found tuberculou
ation of the small intestines in five-sixth
cases he inspected; and almost as frequ
the large intestines; the mucous membra
often red, thickened and softened in about
of these cases. In the whole number of p
bodies examined by this physician, the l
testines were in a healthy state througho
extent in three instances only. In the case
I have inspected, I have always found the
more or less ulcerated; and in some I had
to infer that this portion of the canal was t
to be affected; perforation of the cæcum a
cæcal abscess or fistula having taken place
cases in which I was consulted.

117. (*c.*) The *mesenteric glands* are ofte
tuberculous, especially in young subjects,
connection with tubercular ulceration of
testinal follicles. In the phthisis of very
children these glands are rarely exempt.
VOINE says that he found this lesion in one
the cases of phthisis in children. This pro
is less than I have remarked in this class
jects. In adults, LOUIS found these glands
culous in one-fourth only.

118. (*d.*) The *liver* is found remarkably c
in a very large proportion of phthisical case
change consists in the deposition of *fat* in it
ture, this organ becoming enlarged, fawn-co
and of diminished consistence, in proportio
amount of fatty degeneration. The fatty
nature of this change is at once shown
scalpel on dividing the liver, or by pressing
tion of it on paper, or by subjecting it t
The organ is equally changed throughout, a
a rapidity nearly equal to that of the tub
malady, with which this alteration is inti
connected, and upon which it is dependen
LOUIS states that of 49 cases of this degene
47 occurred in tubercular phthisis; whilst
subjects of other diseases, nine only present
alteration of the liver, and seven of these
bercles in the lungs. He further remarks,
is independent of the patient's age, and
known cause excepting the existence of tub
and that it is not attended by any eviden
ptom except enlargement, the functions
organ not being disturbed. Sex appears
fluence its occurrence, as of the forty-nin
seen by LOUIS, only ten were males. Th
remarkable instances of this alteration in c
tion with phthisis which I have seen, occu
females addicted to the abuse of spiritu
quors. In a young female who was thus a

childhood, who had never menstruated, and
ied of phthisis about the age of nineteen, the
fawn-coloured liver was so remarkably en-
l as to fill the abdomen, the lower edge of it
ng upon the bladder and pelvic viscera, the
nearly equalling in weight the whole body.
ese cases tubercles are rarely found in the
unless in children. From my own observa-
and from a remark made by Sir J. CLARK,
hange of the liver is not so frequently seen
thisical subjects in this country as in France,
nctional disorder of this organ is often ob-
l in the course of phthisis.

9. G. *Various other lesions* take place, es-
lly in the advanced course of phthisis, but
are merely contingent occurrences, and
m, or even rarely, met with. The most im-
nt of these are lesions of the heart, in rare
, occasioning sudden death in the course of
sis; obstruction of veins from coagula in
canals; hæmorrhoids and fistula in ano;
cular and granular lesions of the urinary
s, and disease of the sexual organs. These
re merely a few passing remarks.—*a. Soft-*
and slight dilatation of the ventricles is some-
observed in the course of phthisis. In the
of a lady, death took place suddenly in the
d stage of the chronic form. The body was
ined in my presence, and the only apparent
of the sudden dissolution was this alteration
e heart. I have, however, seen this change
her cases of phthisis; but, although it may
accelerated the course of the malady, sudden
has not appeared to have been caused by it.

0. *b. Coagula in venous trunks*, especially in
xtremities, form in rare cases at an advanced
of phthisis, occasioning great œdematous
ing of the limb; and are the results of the
id state of the blood, and of impeded circu-
in the venous trunks rather than of inflam-
n of these vessels.

1. *c. Hæmorrhoids* are occasionally a compli-
n of phthisis, and are produced as much by
f the most frequent causes of the latter, as
ritation of the rectum by frequent action of
owels, and by interrupted or impeded circu-
in the portal vessels, namely, by masturba-
which determines the circulation to the
tures in the vicinity of the anus, and which,
one of its consequences, constipation of the
ls, favours congestion of the hæmorrhoidal
s.

2. *d. Fistula in Ano* sometimes occurs in
ourse of phthisis, more frequently in the early
s. It may be imputed to the same causes as
uce hæmorrhoids. It has the effect of pro-
ing the duration, or to a certain extent arrest-
or some time, the progress of phthisis. Hæ-
hoids, when they discharge at intervals, have
ilar effect to fistula in ano on the progress of
isease, as I have observed in several cases.

3. *e.* Alterations, more particularly tubercu-
, of the *urinary* and *sexual* organs, seldom
rvene, in the course of phthisis, although the
tions of these organs, especially of the uterine
ns, are more or less disordered. Tubercular
ations are sometimes formed beneath the
ous surface of the urinary passages in the
isis of children; and in female adults the cata-
ia are generally delayed, painful or suppressed
e advanced progress of the malady, which generally assumes a more severe and rapid form when this disorder supervenes. In a case of a young lady, who died about the age of twenty of phthisis, and who had never menstruated, the body was inspected in my presence, and the ovaria were found very small, and their coverings thickened and almost of a fibro-cartilaginous density. The disease had been attributed by me to masturbation, the non-appearance of the catamenia, and the alterations of the ovaria, probably having been caused by this most noxious vice.

124. III. PATHOLOGICAL ANATOMY OF PULMONARY TUBERCLES. On opening the thorax after death from phthisis, the lungs generally do not collapse, or collapse imperfectly. They are more or less increased in weight, in some cases very remarkably. DR. CLENDENNING found the average weight of the healthy lungs of an adult to be 46½ ounces; and DR. BOYD, as stated by MR. ANCELL, ascertained that, in a considerable number of adult males, the average weight of tuberculated lungs was 72⅓ ounces. The increase is due partly to the tubercular deposit, and partly, in various degrees, by an increased quantity of blood in the vessels, the secretion of tuberculous pus, serous effusion, red or grey hepatization of the lung, or extravasation of blood."

125. In the early stage of uncomplicated phthisis, when the tubercles are distinct, the pulmonary tissue is crepitant around them, and those which are most superficial somewhat raise the pleura. Distinct tubercles in the lungs, according to HASSE, are never larger than hemp-seeds; when they are described as larger, a congeries must be understood. *Grey* and *yellow* crude miliary tubercles seldom co-exist in the same lung, unless they are deposited at distinct periods. (See SCROFULA and TUBERCLES, §§ 65—90.)

126. i. *The seats of tubercles in the lungs* are somewhat different in adult and young subjects. In adults tubercular deposits are chiefly aggregated in the upper lobes. Miliary tubercles are most abundant in the posterior parts of the lungs, and through the parenchyma at some distance from the pleura, but there are many exceptions to this distribution. In children the whole lung, or large portions of both lungs, are the seats of deposits, which have appeared to have taken place about the same time. CARSWELL attributed the earlier and the more abundant formation of tubercles in the apices of the lungs, to the motion of these parts being more limited than those of the lower lobes. The former also are more exposed to the influence of cold externally, and are more accessible to the air, in its varying state of temperature and humidity. LOUIS, ANDRAL, and others consider that tubercles are more frequent in the left than in the right lung. HASSE, however, disputes this, but I believe with insufficient reasons. The question as to the tubercular deposit being *within* the air-cells, or *external* to them, or in other words in the parenchyma of the organ, is still disputed. MAJENDIE, CARSWELL, SCHRÖDER VAN DER KOLK, and RAINEY contend for the former; whilst ANDRAL, ANCELL, and others consider that tubercles may occur in either of these situations, and in any tissue where nutrition or secretion takes place. According to MR. RAINEY, the earliest indications of tubercles in the lungs are deposits of a transparent or greyish; or yellow-

ish substance in the air-cells, sometimes completely filling and distending them; the minute blood-vessels of the parietes of the cells surrounding the deposits being still perceptible. The deposits sometimes occur in a few only of the cells, but more frequently they fill all the cells of one lobule; and in this case they press upon these vessels, which soon disappear, the whole lobule appearing, after a while, entirely formed of tubercular matter. Tubercles in the lungs thus, according to Carswell, originally assume the shape of the air-cells, and are somewhat acuminated in proportion to their projection into the bronchial tubes. When they have been of slow growth, or are deposited in large groups, and occupy numerous cells of a lobule, they resemble the sprout of a cauliflower, the pedicle occasionally extending far into the bronchial tube. In the lungs of ruminating animals, tubercular matter is often seen plugging up the bronchial tubes. As the tubercle increases in size, the central parts become further removed from the vessels by which this matter is deposited; and consequently these parts have the greatest tendency to lose their vital cohesion, and they consequently are softened; this process generally beginning at or near the centre of the tubercle. (See Scrofula and Tubercles, §§ 78, *et seq.*)

127. ii. *The distribution of tubercles in the lungs* varies much with the age of the patient and the form of the malady. In adults, in the usual and more chronic forms, the tubercular deposit commences, although in different amounts, generally in the apices of both lungs, and descends gradually downwards to the lower lobes; the larger and older cavities existing at the apices, smaller ones lower down; and accumulations of softened or crude tubercles, or of both, at the base. This cannot, however, be viewed as an absolute law. The tubercles also in one lung, as the left, may be generally further advanced in all their stages than those of the right. Besides one portion of a lung may be the seat of cavities or softened tubercles, all the rest, or the greater portion, of the lung being quite sound. Tubercles which are formed rapidly, are generally miliary and nearly equally dispersed through the lungs. In the more acute states of phthisis they are thus deposited, or are infiltrated more or less extensively or densely.

128. iii. *Lesions of the lungs associated with tubercles.—A. Pneumonia*, or inflammation of portions of the lungs, and its usual consecutive changes, are often found associated with the several stages of tubercles. The inflammation may have passed on to red or grey hepatisation; and it may have preceded the tubercular deposits, or may have been consequent upon them, induced by the usual causes of pneumonia; or it may have been produced by the irritation developed and kept up by these deposits. It should not be overlooked, that the changes taking place in the lungs of scrofulous subjects during inflammatory action, may be attended by tubercular formations. Yet this may not necessarily be the case; and these formations may exist in the lungs even of scrofulous and sanguineous temperaments without inflammatory action in the lungs being produced by them; this action being chiefly a contingent or intercurrent result of causes unconnected with the tubercular disease.

129. *a.* According to Louis, Grisolle, Hasse, Ancell, and others, *inflammation primarily*
tacking the scrofulous subject, may produce
exudation of lymph differing from the exuda
occurring in pneumonia affecting the hea
person, chiefly in its tuberculous characters,
the disease may run its course, and the exuda
may be absorbed: but as frequently, perh
the pneumonia of scrofulous subjects is follo
by tubercular deposits and their usual co
quences. Rokitanski calls this latter cha
hepatisation with tuberculous deposit, which,
being absorbed or becoming purulent, ultima
passes into yellow tubercle. According to H
this alteration is found more frequently in ma
than in females, and in persons from 18 to
years of age, than earlier or later in life.

130. The alterations producedby *consecu*
or *incurrent inflammation* of portions of the lu
during the progress of phthisis is manifestly m
more frequent than the primary form. L
states that he observed the results of the
stage of inflammation, commonly occupyin
limited space of the lungs in 23 out of 123 ca
and the stage of red hepatisation, generally in
lower lobe in 18 cases. He regards the inva
of pneumonia in these cases as preceding d
only a few days, and not peculiar to phth
as he observed it as frequently in deaths f
other chronic maladies. Although the pat
may die of pulmonary tubercles without any
flammatory appearances, yet the tubercles
very liable to irritate and inflame the surroun
tissues, and to render the patient more suscept
of the operation of the usual exciting cause
inflammation.

131. *b.* This secondary pneumonia generall
sumes the *lobular* or *vesicular form*, and sel
appears until the tubercles have been develo
or have formed aggregated masses, and occasio
irritation in the surrounding structure. The ma
exuded by this state of inflammatory action aro
the individual tubercles or masses, is gener
peculiar, scrofulous and gelatinous; the spa
between being healthy. Sometimes, however,
inflammatory changes are not limited to the patc
around tubercles, but extend to the vesicular str
ture of an entire lobule, and pass on to red
grey hepatisation, or even assume in part
yellowish colour; the pulmonary structure be
quite impermeable to air, firm and friable,
tubercles contained in it being more or less
tened. In this state of the disease, the associa
or intercurrent inflammation presents the us
scrofulous characters, modified by the pecu
structure and antecedent tubercular deposit.

132. *c.* The alterations found after death fr
the *acute form of phthisis* (§ 84.) present m
of the appearances consequent upon inflamma
of an acute form, in the scrofulous diathesis, a
ciated with tubercular deposits, either anteced
to, or coeval with, the inflammatory action.
in other cases of inflammation in cachectic or
healthy constitutions, the changes produced
it are peculiar, being diffused, œdematous,
marked by loss of the usual vital cohesion of
tissues. Hasse has well described the appe
ances in these acute cases. He states that one
both lungs are diseased. I have always fo
both lungs remarkably affected, although not
an equal amount or extent. In very mar
cases the lungs from their apices to their bases

loa l with isolated miliary tubercles, mostly yel-low i and soft, but sometimes greyish and more soli The yellow and soft tubercles are in the cen s of red or grey hepatised structures ; while the ey are imbedded in a texture loaded with a blo y serum. The lungs are tumefied, do not col se when the chest is opened, are very dark col ed throughout, preternaturally soft, and gor l by dark fluid blood and serum. The tu-ber s have everywhere the same appearance ; the ılmonary structure around them, for about a line s more or less altered, the intervening struc-tur eing still permeable. The bronchial mucous sur e is either dark-red or violet. Recent ad-hes s between the surfaces of the pleura are not see If adhesions exist, they have been formed pre usly to this disease. When the malady has bee lower in its progress, the tubercles are more uni l into groups, or are more densely crowded at t apices and superior lobes, than in the lower lob

1 . *d.* In the more *chronic and usual forms* of pht is, the alterations often associated with the tub ular deposits are those which are clearly attr utable to chronic inflammatory action, and con t of hepatisation of a red or grey colour, or of rieties of hue of which these are original typ The parts thus altered are dense, imper-me e to air ; the bronchi are filled with a dense wh h matter, and the natural structure cannot be ced, the part being firm, but friable, or rea y torn. The cut surface is speckled with gre nclining to yellow, is diversified with white stri s and arborescent black patches, and is de-voi f the granulations of acute pneumonia. The inc on is not followed by any exudation, and pre re yields only a little turbid greyish fluid. Th nferior lobe of one or both lungs is thus chi y affected ; the alteration proceeding up-wa , and meeting the tubercular deposits as they adv ce downwards. According to Hasse, this ass ated inflammatory alteration, which differs fro he effect of common pneumonia in the indu-rat of the lung, invades only the lower portion of e lung only, whilst the tubercular deposits exi n both.

4. *B. Extravasation of blood* in tubercular lun is met with in either a fluid or clotted state : — . It may occur as a simple exudation from the bro hial mucous surface ; —2nd. It may proceed fro ulceration of the bronchi ; —3rd. Blood may be filtrated into the parenchyma of the lungs in nnection with congestive pneumonia compli-cat tubercles ; — 4th. It may be infiltrated not onl nto the parenchyma, but also into the air-cel ; —5th. It may be effused from a laceration of t structure of the lung ; — 6th. It may be ef-fus from the ulceration of a number of capil-lar in the parietes of a cavity, or of one large ves ; —and 7th., It may proceed from the rup-tur f a cavernous band, or of a vessel or vessels in h band. In most of these the blood is found eit in a frothy or fluid state in the trachea and br hi, or partially coagulated ; and coagula are co ined in cavities, and sometimes in the bron-chi tubes. In these several forms, excepting the tw ast, the effused blood may become the seats of ercles. Extravasation of blood is met with in stages of tubercular phthisis. According to H e, it is found chiefly where tubercles have be rapidly formed in connection with inflammatory action, or when the lungs are replete with densely clustered tubercles. Carswell considers, that the sanguineous effusion is in many cases owing to the compression of the pulmonary veins by the tubercular masses, and to the consequent prevention of the return of the whole of the blood sent to the organ. Both of these explanations may be correct as respects different cases.

135. *C. Œdematous infiltration* of the lung is sometimes seen, but generally only to a small extent ; and chiefly in the acute form of the disease, in the more cachectic and phlegmatic habits ; or when phthisis is complicated with disease of the bronchial glands, or of the kidneys. Rilliet and Barthez consider that serous congestion or œdema of the lungs is sometimes connected with the deposit of tubercles in children ; that it may be produced by this deposit ; but that it most frequently depends upon compression of the vessels by enlargement of the bronchial glands.

136. *D. Emphysema.*—Vesicular emphysema is frequently found in tubercular lungs, in chronic cases, in connection with various other lesions, chiefly in the superior and anterior parts. It occurs at an early stage, generally in a diffused form, and is produced by the pressure of disseminated tubercles upon the minute bronchi ; the more powerful act of inspiration filling the cells, whilst the less powerful expiration fails in emptying them. Emphysematous portions of the lungs rarely contain tubercles. But this alteration is seldom found to a great extent, and generally in cases where it had not been detected by the physical signs : " it is usually seen in the upper parts of the lungs, and often in conjunction with cicatrized and collapsed portions. The healing process, by absorption of the more liquid parts of tubercles and of tubercular vomicæ, by shrivelling the remainder, by cicatrization of the ulcers, and obliteration of blood-vessels and bronchial tubes," produces a vacancy in the space within the thorax, and this space is gradually, or more or less, filled up by the sinking inwards of the walls of the chest, and by the dilatation of the air-cells in the adjoining still permeable portions of the lung; this latter result sometimes preventing the occurrence of the falling inwards of the parietes of the thorax.

137. iv. *Softened or liquified tubercles.*— I have stated above (§ 126.) the views of Mr. Rainey as to the softening of tubercles; and those of Laennec, Louis, Schröder Van Der Kolk, Hasse, and others have been stated in the article Scrofula and Tubercles (§§ 78, *et seq.*). It is not improbable that the process of softening may not be limited to one only of the modes contended for by these pathologists, but that when it commences or proceeds in the centres of the tubercles, it may also be advancing in their circumferences, owing to the irritation produced by them, and to the fluid effused from the irritated tissues surrounding them ; the softening thus advancing from the centre to the periphery, and from the latter to the former of the tubercle. Generally it is found, that softening of tubercular deposits first takes place, conformably with the progress of the deposits, in those nearest the summits of the lungs, and proceeds downwards. With the process of softening, the pulmonary tissues surrounding the tubercles become more vascular, and inflammatory or congestive changes take place, extending

more or less in the parenchyma, and ultimately to the pleura, as already shown (§§ 111, 112, *et seq.*). The results of the softening are, discharge of the liquified matter into the bronchi communicating with these tubercles, and the formation of a cavity, which enlarges by successive tuberculation and softening, by continued discharge, and by the coalition of two or more softened tubercles and small cavities.

138. v. *Tubercular Cavities and Vomicæ.* — *A.* Tubercular vomicæ, as MR. ANCELL justly states, are either,—1st, pulmonary,—2nd, pleuro-pulmonary,—3rd, broncho-pulmonary, or—4th, broncho-pleuro-pulmonary, according to their connections with the principal structures of the lungs. The most frequent *seat* of vomicæ and cavities is the summit of the superior lobes of the lungs. They are sometimes seen only on one side, tubercles on the other side being still crude or softening; but when the disease is of long duration they have formed on both sides. When they are found in the lower lobes, or at the base of the lung, they are generally more numerous, larger and older in the summit. Proceeding from above downwards, the following grades or succession of tubercular alterations are observed: — 1st, old cavities, with firm or almost smooth parietes, generally empty: —2nd, more recent cavities with tuberculous deposits in their walls, or softened irregular parietes, containing matters about to be noticed: — 3rd, softened tubercles, either isolated or aggregated:— 4th, crude tubercles:—5th, semi-transparent grey granulations; and, — 6th, healthy crepitant lung. This succession arises from the progressive development of the tubercular deposit from the summit to the base. The cavities are generally seated deep in the lung, but in some cases they are superficial or near to the pleura. In the former case they commonly open into the bronchi; in the latter, they are disposed to perforate the pleura, but are prevented by the adhesions formed by this membrane (§ 112.). Large excavations are usually seated nearer to the posterior than to the anterior surface of the lungs, where they extend to the interlobular fissure, and even sometimes communicate with other cavities in the lobe below.

139. *B. The dimensions and form* of the cavities vary much. Their size varies from that of a pea to that of a large orange; small cavities are generally spherical or oval; but as they enlarge, their form is more irregular, owing to the softening and disorganisation of the parietes having proceeded more rapidly in one direction than in another. Where several large cavities communicate, one unequal and sinuous excavation is formed, sometimes with fistulous tracts, and is very irregular in shape, direction, and size, but terminating in one or more ulcerated bronchi. The *number* of cavities is often considerable, the largest frequently arising from the union of several small ones. A single excavation is comparatively seldom met with. A cavity is surrounded by crude miliary tubercles, with very rare exceptions.

140. *C. The contents* of excavations may be air; or viscid, purulent, or sanious fluids, containing whitish, curdy, tubercular matter, more or less softened; or purulent secretions of a dirty greyish, or yellowish, or yellowish-green colour, sometimes streaked, tinged or mixed with blood; or blood more or less pure, fluid or coagulated. The fluid puriform contents are sometimes fœtid, owing to
their long retention, a communication with a l n-
chus not having been formed. Old cavities e
often empty; recent ones frequently contain u-
rulent or sanious matters, and the softened ren is
of tubercles. These matters are thus the secr n
from the parietes of the cavity, and the debr of
tubercles and of the surrounding tissues, al d
more or less by retention in the cavities or b he
action of the air. Fragments of the pulmo y
structure are seldom found in the excavation it
when seen they are more frequently attache o,
than detached from, the parietes. Bridle or
chords are occasionally found stretching acr a
large cavity: these consist of *blood-vessels*, w se
coats had become inflamed and thickened, ir
contents coagulated, and, having resisted th s-
organising process of the adjoining tissues, d
been reduced to chords.

141. HASSE describes the blood-vessels for ig
bands across cavities as often having their ts
reduced to a single, uniform, lardaceous substa e;
and their canals, which still continue alth gh
narrowed, become eventually filled with a n,
reddish, fibrinous plug. The bands, or c s,
thus formed by the blood-vessels are, in re
cases, either partially destroyed or torn asu r,
before their canals are completely closed: d
thus the more violent attacks of hæmorrhag n-
sue, and often prove fatal, the cavity and br hi
corresponding being found full of coagulated b d,
and which also often fills, in a frothy state ne
trachea. The *bronchi* are early destroyed; t,
even when completely ulcerated, they ofte lo
not admit air into the cavity, nor the exit o ne
matters contained in a cavity; for they are plu ed
by lymph formed within the parts nearest th a-
vity, or by tubercular matter or deposits fo ed
within them. The bronchi are not found in se
bridles, which are thinner in their middles th at
their extremities, the former having been l er
exposed to the morbid processes.

142. *D.* The *Parietes of Cavities*, when recen re
merely the pulmonary tissues somewhat cond ed
by exuded lymph, or infiltrated with a gr sh
matter, or with grey granulations and crud u-
bercles. They are very rarely smooth, and fo ed
only of the condensed pulmonary texture. In re
cases they are coloured by a brownish or bla sh
melanotic deposit. External to these par s,
which may not extend above a line or two to
the pulmonary structure, the parts immedi ly
surrounding them are healthy and crep it.
Somewhat older cavities are lined with a sli ly
adherent and soft false membrane. This lini is
friable, white or yellowish, resembles con te
pus, and has no vascular connection with the r-
rounding tissues. It seems as a deposit o he
surface of the cavity from the matters therein n-
tained. In still older cavities, external to th e-
posit, a membranous, organised layer, of a gr sh
fibro-cellular substance is formed, and is cl ly
adherent to the pulmonary structure. This n-
stitutes the true cyst or parietes of the ca y.
This capsule becomes after a time more orga l,
and, from fibro-cellular, it is fibro-serous, i-
transparent, and in patches, or more extens y
fibro-cartilaginous, unless where bronchi pas to
the cavity. These latter changes are obs ed
only in very old cavities; and vary in co r,
vascularity, density, and appearance, with ir
duration. The internal surface of these parie or

cap les no longer presents the concrete matter firs leposited, and forming the early false mem- bra , but appears, at a much later period, smooth or lvety, and of a pearl-grey, pinkish, or red- dis ue.

1 . E. *The discharge or the absorption of the con- ten f vomicæ* are matters of interest. The *dis- cha e* takes place by means of the bronchi, which are estroyed in the seats of vomicæ, and which bec ne irritated, inflamed, and ulcerated by the ma rs formed and passed along them ; the dis- cha e from the bronchi, communicating with cav es, being often greater than that proceeding fro the latter. When the matters contained in vor æ are long retained without having commu- nic d with bronchi, they often become very of- fen e and irritating to the bronchi and trachea du g their discharge, and occasion the inflam- ma y appearances observed in these parts.

4. F. The *absorption* of the contents of cavi- ties nay be inferred when they are found empty, wit ut any manifest communication with bronchi, — en this cannot be detected upon dissection, and hen the history of the case furnishes no proof of discharge of these contents during life. I hav already alluded to instances of acute phthisis wh terminated fatally without expectoration and ough, but preceded by the typhoid symp- ton characterising contamination of the blood by the sorption of morbid matters ; and in those the cav es, generally small, were empty, their parietes bei soft, or covered by a semi-concrete puri- for substance.

5. G. *The healing processes presented by tuber- cle f the lungs* have been described by ROGET, Bo ET, LAURENCE, BAYLE, BENNETT, ANCELL, and thers. HASSE conceives that the cicatrisation of ercles cannot take place if the amount of tu- ber lar deposit be considerable or great ; and if the ftening be, as it usually is, attended by the co ued formation of tubercles. The degree, or the rocession, of morbid change in the lungs ad- mi g of remedy cannot be defined, even if both we objects of precise observation. The states of ganic nervous power and of the circulating flu should be viewed as the chief sources, from wh the local lesions are to derive reparation. An this end can be attained only by supporting thi ower, by enabling it to improve the diges- tiv nd assimilating processes, and thereby ren- der g the circulating fluid more vitalised, and less apable of forming or perpetuating the tuber- cul deposits. Under the influence of this sys- ten and of the improved condition of the blood, mo id products are more sparingly formed ; those wh are formed have their more fluid parts ab- sor d ; they are consequently atrophied, and the more solid, earthy, or saline parts, as re- spe s tubercles especially, alone remain, either in assive or inert state, and are increased by sul quent depositions, or exist in such condi- tio s gradually advances their discharge. This is t course usually pursued in the removal of tub cular deposits before cavities are formed, an as thus been termed the process of *cretifica- tio* (§§ 146, 147.)

6. *a.* As regards *the formation of these concre- tio* it may be inferred that the organic elements of ercle are absorbed, and carbonate and phos- ph of lime deposited in their place ; so that the co etions cannot be viewed as the mere solid remains of the pre-existing tubercles. HASSE remarks that the calcareous deposit, in some cases, especially in young subjects, takes place somewhat rapidly, the outside of the tubercle being then changed into a hard crust, while the central part retains its softness. Occasionally the calcareous matter appears to have been deposited at intervals, producing a series of hard, distinct superimposed strata. Most frequently when the process advances slowly, the tubercles appear like to moist chalk. Thus the volume of the entire mass continues to diminish, so much so that a considerable portion of lung, as may be inferred from the size of the bronchi leading to it, becomes reduced by obliteration and shrivelling, to a hard shell, holding in its centre a chalky tubercle no bigger than a pea. This healing process is by no means rare, its traces being often found in the lungs of very aged persons who have died of different maladies, and not unfrequently also in much younger subjects.

147. *b. Tubercular cavities heal* in the same manner whether they are connected with several bronchi, or shut out from the air-passages. In the latter case exactly the same capsule, resulting from inflammatory induration of the surrounding structure, is found, wherein the enclosed tubercular mass is converted first into a chalky pulp, and ultimately into a *hard calcareous concretion*. The majority of these concretions originate in the small and still closed cavities. They are irregularly shaped, with a granular rough surface, are hard or friable, and often contain mealy or soft nuclei. They are found most frequently at the summits of the upper and of the lower lobes, firmly impacted within a shrivelled and condensed structure. "In rare instances the residue of tubercular matter, left within the larger cicatrised cavities, is by degrees converted into earthy granules. These are loosely held within the scar-contracted cavity, where they mingle with tubercular and muco-purulent fluids, and may become ejected during a violent fit of cough, provided the implicated bronchial tubes still remain open."— (HASSE, &c., p. 340.)

148. *c. Cavities cicatrise* in different ways. They may disappear altogether, or contract only to a limited extent. In the former case they are united and filled by a cellulo-fibrous substance. In this case the membranous lining or paries of the cavity becomes thickened by a deposition of plastic exudation or lymph, either upon its external or internal surface, most probably upon the former. The membrane thus grows and contracts towards the centre, until the cavity is filled with a fibro-cellular substance. The gradual obliteration of the cavity is further effected by the condition of the adjoining parts. If the vomica be near the surface of the lung, the pleura becomes much thickened, and the walls of the thorax sink inwards, so as to favour the shrivelling process. The corresponding bronchi are closed, and the healing of the cavity is effected, the remaining scar being either thick, or roundish, or elongated.

149. When the cavities contract only to a limited extent, and simply lose their original characters, their walls are moulded out of the aforesaid layer of shrivelled parenchyma, which now neither contains nor secretes tubercular matter. "These extinct vomicæ are frequently seen at the apex of the lungs, and might readily be taken for mere

bronchial dilatations, were their real nature not disclosed by the relations of the surrounding pulmonary texture, by the co-existence of cretaceous masses, and above all, by the character of the membranous lining, which essentially differs from, and does not immediately unite with, the mucous coat of the bronchial tubes." This internal lining usually adheres firmly to the indurated walls of the cavity, and is either thick, reddened, and velvety, or pale, smooth, and thin.

150. The state of the pulmonary structure, both adjacent and more remote, is influenced by the above healing process ; and the consequent changes are well described by HASSE. The inflammatory exudation upon which the above alterations depend, often involves the whole of the apex, if not the entire upper lobe of the lung, while the collective bronchial tubes degenerate into white, thread-like ramifications. The involved parenchyma of the lung is now converted into an almost cartilaginous mass, impervious to the air, very scantily supplied with blood-vessels, and presenting, when cut, a smooth glistening surface. Obliterated pulmonary vessels, closed bronchi, cicatrices, and parenchyma infiltrated with plastic materials, are hardly to be distinguished from each other ; and the whole adheres firmly, by means of the thickened semi-cartilaginous pleura, to the sunken walls of the chest. A few cretaceous tubercles are still found scattered throughout the hard, nearly homogeneous mass, which, below, merges sometimes gradually, but more often suddenly, into the healthy texture.

151. *d.* The deposition of *black pigment* into the lungs during the healing process is a very remarkable fact. It is found wanting only, or almost wanting, in the rare instances of the repair of tubercular disease by means of calcareous deposits in youthful subjects. In older persons the black pigment is so constant, and so considerable that it might be doubtful whether it be the cause, or the sequel, of the cure of phthisis. "Not alone the parts closely adjoining calcareous tubercles and cicatrised cavities, but, in like manner, the entire mass of those extensive indurations of the upper lobe, just described, are found densely loaded with this pigment. Even the moist chalk-like residue of tubercular masses is often so imbued, as to exhibit a slate-grey or a bluish black tinge." In other cases, where tubercles are more limited, and in young persons, the pulmonary structure is puckered, without induration or extensive obliteration ; the cicatrices appearing elongated, the cretaceous residue as isolated granules, and the black pigment uniformly but less densely disseminated in the interstices of the air cells. The cicatrices are surrounded by emphysema and dilated bronchi, and the thorax is seldom found depressed.

152. *H. In children* the lungs are less the predominant seat of tubercles than other parts, especially the mesenteric and lymphatic glands and the bones. When deposited in the former in excess the tubercles pass through their stages rapidly. In very young children the pulmonary deposits are often latent, death ensuing from the co-existence or supervention of disease of other parts. In those subjects who have died of other maladies, the lungs contain greyish, transparent semi-fluid granules or tubercles, not confined to the apex, but existing equally in the lower lobes. The bronchial glands are at the same time very tuberculous. BILLARD with five instances of tubercles of the lung new-born children ; HUSSON and KENNEDY in fœtus. I have seen the disease in the lung several infants of the age of a few months o The disease in young children is generally ac and it usually is of this form up to the ag seven or eight years. In young children the bercular deposits may be as great or even gre in the bronchial, mesenteric, and cervical gla in the liver, spleen, brain and its membranes, kidneys, as in the lungs.

153. *I.* The tubercular and other lesions, f in the several organs of *adults* dead of phthisis often very numerous. Many of them have already described when noticing the *complica* and intercurrent affections of the disease. In advanced stages, pleural inflammations oc productive of every variety of false membr of adhesions, of miliary tubercles upon the pl and within the exudations on its surface, an turbid, reddish, serous or purulent effusion. W the trachea and larynx are affected, as descr above (§ 109.), as well in many other cases bronchial glands of the neck and those se along the trachea are similarly affected, and hibit all the phases of tubercular disease. heart is quite devoid of fat in most cases. G states that he always found the blood within larger veins and the heart in phthisis to co pus-globules, to which circumstance, much o constitutional symptoms may be referred. L and BIZOT have remarked that the aorta is al more or less contracted. The alterations of liver and alimentary canal are always remark and described above (§§ 114—118.). From searches of LOUIS, MOHR, and HASSE, it w appear that tubercles exist in other organs be the lungs in the pulmonary phthisis of adults in following ratio. The bronchial glands were berculous in about one-fourth the cases ; the cous membrane of the trachea and larynx in twentieth only ; the cervical glands in the s proportion ; the intestinal canal in one-half cases ; the mesenteric glands in more than third ; the mucous membrane of the stomach rarely ; the serous membranes very often, in the following order of frequency : — ple peritoneum, arachnoid, pericardium. The l spleen, urinary organs, brain, spinal chord, occasionally implicated. The testicles, and mucous surface of the Fallopium tubes are sometimes affected. With the exception of brain and the heart, the absolute density weight of most organs, more particularly of lungs, liver and spleen, are augmented in bercular phthisis. It therefore follows, that enormous loss in weight sustained by the b amounting, on an average, to about 50 lbs., is to the loss of adipose substance.

154. IV. TUBERCULOSIS OF THE BRONC GLANDS. — *Bronchial Glandular Phthisis.* — bronchial glands may become tuberculated, ei *primarily* or *consecutively*, of similar deposits i lungs. It is chiefly to the *primary form* of berculated bronchial glands that attention is to be offered. This is almost exclusivel *disease of childhood.* In this primary form, o nating in adult or advanced age, bronchial g dular phthisis is comparatively rare ; and in aged it is almost always the mere attendan

ging pulmonary phthisis. Primary tuber-
ulo of the bronchial glands generally com-
ens between the first and second dentition,
d nishes its course with the appearance of
ab y; although its consequences are some-
ne manifest beyond this period. It is obvious
at is form of the disease may be associated
ith berculosis of the lungs and of other organs.
m , however, and often does, run its course
ith t any tubercles being deposited in the
ng or the lungs may become implicated at
ny riod of the glandular malady, and be dis-
ga sed with the glands; or, lastly, bronchial
an lar phthisis may subside.

15 The course of bronchial glandular phthisis
g erally chronic; and the destruction and
riv ling of the affected glands proceed so
rad lly as to allow the organism time to com-
ens e for the loss. "Hence it readily admits of
pa ion; nor is it in itself perilous, although
ci tal circumstances may render it fatal."
(HA e, p. 349.) The glands at the bifurcation
f th bronchi are earliest attacked, and first pass
hro h the several morbid stages. Thence the
or process generally diverges into three dis-
nct irections: — first, to the symphatic glands
llo ng the ramifications of the bronchi into the
uln ary structure; secondly, to those placed
etw n the pericardium and the lungs, and along
e c ophagus in the posterior mediastinum; and,
hird , to those which accompany the large ves-
els the anterior mediastinum, and pass from
en to the trachea and the cervical plexus.
Only where tubercles are primarily seated in the
mese eric glands do they appear to advance to
hos lands which follow the course of the œso-
hag , passing thence to the cervical plexus. In
ome nstances they probably originate in the
lan of the neck.

15 An occasion seldom offers of examining
ube es, in these situations, in their nascent states.
n th e states they then appear as grey or yellow
ran es, up to the size of millet-seeds. In a
hort me the glands become so infiltrated with
ube es as to form a yellowish white friable sub-
tanc in which no vestige of the former healthy
extu is discernible. They thus enlarge remark-
bly those at the bifurcation of the trachea often
ttai g the size of a pigeon's egg, those within
he l g, that of a hazel nut, their size decreasing
with eir remoteness from the part first affected.
Thou n but loosely attached in the midst of cel-
ular sue, in the healthy state, they now coalesce
y it medium with the adjoining parts, especially
with e bronchi, acquiring from the lardaceously
ond sed cellular tissue a firm isolating envelope.
(HA .)

15 These glandular enlargements but seldom
rod e very marked symptoms of compression of
nerv or blood-vessels, although important trunks
and anches run in their vicinity; but it is not
mpr able that the little attention hitherto paid to
he l ons of the bronchial glands in children has
ed t he misinterpretation of the symptoms and
ffec produced by them, and to the disorders
ctu y caused by them being imputed to other
our . It is extremely probable that *spasmodic*
crou see Art. CROUP, §§ 13, 14.), *Laryngismus*
strid us, and other affections of the *trachea* and
bron , are either caused, or aggravated, or per-
petu d, by tubercular enlargements of these glands, although nervous filaments and arteries are found, on careful dissection, traversing the localities of, and obviously pressed by, these glands. The veins, however, are more susceptible of pressure by them; but the bronchial canals are seldom much affected by them, owing to the resistance furnished by their cartilaginous rings, and to the more yielding structures adjoining. In some cases, notwithstanding, as shown by ANDRAL, the pressure has acted injuriously on the bronchi; and it may, even in adults, be connected with the pathology of some cases of *asthma*.

158. The tuberculous deposit in the bronchial glands may long continue without much change; but more frequently it undergoes softening. HASSE states, that when the softening proceeds from the centre, one or more small excavations are found containing a purulent and gritty matter, and the process is tedious. When the softening commences at the circumference, the filamentous sheaths of the glands are highly vascular and puffy, constituting at last a mere cyst around the thick, yellowish, tuberculo-purulent fluid. From this period the tumour collapses, its contents either becoming gradually absorbed, or escaping through a passage made by them. Absorption proceeds very slowly, being carried on chiefly by the external vascular coat of the tumour, the inside of which coat has a red velvety appearance. Like a vomica, it generally possesses an unorganised membranous lining, formed of thickened pus and tubercle. The cavity thus produced does not, however, like the pulmonary excavation, continue to enlarge: its walls receive no additional deposition of tubercle, but rather protect from this occurrence; and in no case do two adjacent glands communicate or form one cavity. On the contrary, as the fluid contents are absorbed, the cyst contracts upon the more consistent residue, which, lessening gradually, acquires a cretaceous character, and ultimately is converted into a hard concretion. These products are often met with, even in youthful persons, in the place of one or other of the bronchial glands, especially at the bifurcation of the trachea. (BECKER.)

159. "When the tuberculous mass has remained fluid until long after puberty, or the disease has arisen at a later period, black pigment becomes deposited, both in the unsoftened portion, and in the pap-like matter." It is so intimately combined with the latter, as ultimately to form an uniform, black, smeary pulp. In such cases the tumour, whilst gradually contracting in dimensions, retains the same soft condition for years. Sometimes separate calcarious nuclei are found in the midst of the blackened mass. "This deposition of pigment within glands, totally degenerate and partially destroyed, is the more remarkable, as furnishing a proof of connection with the lymphatic vessels. It can scarcely be reckoned an immediate secretion from the glandular cyst and *necessarily* concerned with tubercular cicatrisation, because this process in other organs (the lungs excepted,) and especially in lymphatic glands, is scarcely attended by any deposition of black pigment." (HASSE.)

160. Softened tubercle often escapes by perforating the bronchi, generally from without inwards, the tuberculo-purulent fluid bursting through the bronchus. Years are in such a case required for perfect recovery, which is brought

about either by the gradual healing of the aperture, whilst the subjacent gland shrivels away; or by the closing of it, ere the contents of the gland are entirely voided; the remainder afterwards passing through the several phases, until it undergoes the calcareous change. Sometimes the irritation is renewed at a subsequent period, and the concretions come away.

161. Various other consecutive lesions supervene contingently upon those now mentioned; but these are individually of so rare occurrence as hardly to deserve enumeration. The chief of these are—1st, the escape of the tuberculated contents of a bronchial gland into the parenchyma of the lung;—2dly, perforation into the pleural cavity, where the softened glandular mass is situated immediately under the pleura, at the interlobular divisions (Berton, Rilliet and Barthez);—3rdly, perforation of the œsophagus (Berton and Lablond);—4thly, simultaneous perforation both of the œsophagus of the trachea and of the pericardium (Syme);—and 5thly, perforation of the parietes of one of the large blood-vessels. Of each of these only two or three instances have been recorded.

162. In *children*, in whom alone this disease appears primarily or independently, the lymphatic glands of other parts, especially of the mesentery, often afford the sole evidence of concurrent disease. The lungs are, in particular, sometimes quite free from tubercles. Papavoine states that of forty-nine children affected with tubercles of the bronchial glands, but thirty-eight had tubercles in the lungs. Rilliet and Barthez never found other organs in children tuberculous, without the bronchial glands being pre-eminently so. Still bronchial glandular phthisis in children often induces acute tubercular disease, the lungs, the liver, the spleen, the kidneys, the serous membranes, &c., being all found, in various degrees and frequency, to contain recent tubercles. In *adults*, on the contrary, in whom either recent, or the remains of former, bronchial glandular phthisis may be discovered, tubercular disease of the lungs always predominates, and is in itself fatal. (Hasse.)

163 V. Duration of Tubercular Consumption. — It is not improbable that tubercles may exist in the lungs of a person, hereditarily or constitutionally predisposed to phthisis, from an early age, in a quiescent state, or without advancing to the stage of softening, without shortening by many years the duration of life. This is more likely to occur when the determining causes of the disease have either been avoided, or have not acted with much intensity. Instances have come under my own observation that have been characterised by the chief symptoms of the first stage, and by occasional attacks of hæmoptysis, from an early period of life, and yet they reached to upwards of 60, and in two cases to 68 and 69 years. I have no recollection of an instance of 70 have been passed in such circumstances; but Dr. Gregory mentions a case of a person who was consumptive from 18, and died of the disease at 72 years of age. Phthisis, with the few exceptions arising from the occurrence of acute states of the disease, is essentially chronic or protracted. In general its duration is much shorter in hospitals, and wards containing a number of cases of the disease, and in crowded workshops and manufactories, &c. In 215 fatal cases at the Hospital for Consum —in 193 cases observed by Louis, and in noted by Bayle, the duration was as follows

Duration.	*Hospital.*	*Louis.*	*Ba*
Less than a month -	- -	1	
In one month -	- -	3	
From 1 to 3 months -	1	11	
From 3 to 6 months -	22	52	
„ 6 to 12 months -	66	62	
„ 12 to 18 months -	34	24	
„ 18 to 24 months -	22	17	
„ 2 years to 3 years -	29		
„ 3 years to 4 years -	13		
„ 4 years upwards -	14		
„ 2 years to 8 years -	- -	23	
„ 8 years to 20 years -	- -	- -	
Doubtful - - -	14		

Although tubercles in an early stage may remain latent or quiescent, yet when they to soften, there is every reason to suppose their advancement is progressive, although rying rates, or even so slow as to be nearl tionary. It is manifest that numerous ci stances after the commencement of phthisis tend to accelerate its progress on the one ha to retard or arrest its course on the other. continued or occasional operation of any causes of the malady—seasons, weather, cli age, sex, constitution of the patient, m treatment, diet and regimen, may operate in way. In the Hospital for Consumption it w served that of those who died within eighteen m 60.5 per cent. were males, but only 50 pe were females; whilst of those who lived b eighteen months, 31.9 per cent. were males, bu per cent. were females. According to the tal Louis and Bayle, the duration of the disea twenty-three months, which nearly agrees wi Andral's experience at La Charité. Sir J. C remarks that in the upper ranks of society, patients have all the advantages of the best men, of change of air, and of medical treat the average duration of phthisis is probabl much short of three years.

164. VI. The Prognosis of Phthisis.- result in most of the cases of consumption w come apparent from what has already been adc *A*. The slower the pulse, and the less accele remarked in it by change of posture, coug mental excitement, the more favourable m the opinion formed of the duration, if not ultimate issue, of the disease. The absence flocculent and puriform characters of the sp the advanced stages, and of the symptom signs of pneumonia, pulmonary congestion, risy, &c.; an increase of flesh, strength, weight, or even the arrest of progressive en tion; the non-appearance of night or m sweats or diarrhœa; the respiration rem only moderately accelerated, or not being a rated in a much greater ratio than the pulse absence of marked anæmia, emaciation and lity, and of the other complications besides just mentioned; the persistence of accus discharges, and the continuance in females catamenia in the natural or accustomed stat tolerably regular discharge of the several sec and excreting functions, especially those bowels; quiet repose during night; a mild of the hectic fever, and an improvement in o more of the chief symptoms and signs of th lady, may severally or all be viewed as indic

w or protracted, if not of a curable state isease.

B. Much *less favourable*, and indeed most nly *unfavourable*, are the following:—Raoftness and smallness of the pulse, or a nging about or above 110 in the adult; ss of respiration above the ratio which the ion bears in frequency to the pulse; the the sputum indicating the second or third f the disease; the appearance of aphthæ on gue or mouth, or the symptoms or signs of the chief complications described above 4, *et seq.*); the occurrence of profuse r diarrhœa, without any obvious cause; to lie on either side; great emaciation or duction of bed-sores; manifest anæmia ed with great rapidity and smallness of great dyspnœa and oppression throughout ax; suppression of accustomed or natural es or evacuations; a clubbed and fusiate of the fingers, and incurvation of the oss of the hair, with profuse perspiration e scalp, neck and chest; pain and con extending between the sternum and the occurrence of a wandering delirium he febrile exacerbation of the evening and and the loss of appetite for food, are the dications of a progressively fatal state of ase.

The hæmoptysis so frequently indicating mencement and progress of phthisis, as being an important complication, may, ng to its character and amount, be either rable or unfavourable occurrence. If it be or incipient occurrence, the pulse being very frequent nor small; if the pulse fall ency, and if oppression in the chest, and y of breathing be diminished by it; if it be derate amount, or even if it be very abund be followed by an amelioration of the ms, it may prove even beneficial, by re pulmonary congestion and incipient intory action, although the presence of a of the blood in some of the bronchi may inflammatory irritation of their mucous When, however, the hæmoptysis is anty, or merely streaks the expectoration, be brownish, rusty or black, and at the me scanty or very moderate, it then may be as an unfavourable circumstance, or as in of active congestion, or of congestive nia of a portion of lung; if it be abundant, ed, and the blood very dark and gelatinous, f of the oppression and dyspnœa following if, in either case, the pulse becomes even equent, and the respiration more rapid, the is great. In a case of this last description I saw a few years ago at Lowestoft with ORTHINGTON, an arrest of the hæmorrhage ocured by means of the oil of turpentine, recovery became complete under the treatdvised in the sequel. Hæmoptysis at an ed period of the disease, more especially avities are formed in the lungs, and the blood large, is always an alarming symp The same opinion should be formed if the oration be a sanious, ichorous, or offensive ter, or if it contain shreds or small pieces hes of disorganised substance or tissue.

The existence of cavities, although clearly ed by all the usual physical signs, is not a sufficient reason for viewing the disease beyond amelioration or even cure, if the pulse and respiration be not greatly accelerated, and the other symtoms be not unfavourable, and especially if the flesh and strength of the patient be not very much reduced; for one or even more cavities may exist in the lungs, and still sufficient healthy structure may remain to perform the functions of respiration, provided that these functions be not too heavily taxed, and that the remaining lungs be not the seat of inflammatory action or congestion, or of tubercular deposit. The falling in and immobility of the parietes of the chest, with great acceleration of the respiration and pulse, difficult respiration, sweats, diarrhœa and aphthæ are in such cases the indications of a not far remote dissolution. If the patient, not having retrograded during winter or spring, experiences an aggravation of all the symptoms upon the sudden occurrence of warm or hot weather, it may be inferred that no amelioration can be expected; for I have observed, that patients thus affected by the transition to a range of temperature of about 70° or upwards, generally do not survive above a very few months; and that those who are improperly sent to a warm climate at an advanced stage, soon have their existence terminated by the injudicious change.

168. VII. THE CAUSES OF TUBERCULAR PHTHISIS may be supposed to be fully ascertained, and their influence in producing the prevalent and fatal malady duly estimated, individually and concurrently, by the numerous writers who have treated of its forms and symptoms; yet have these causes been often imperfectly ascertained, or incorrectly imputed, in respect of certain states of the disease, and their sources, nature and co-operation very insufficiently investigated. Hereditary predisposition is fully admitted, but the other remote or predisposing causes, which appertain especially to the parent or parents, and influence the organisation of the offspring, are insufficiently recognised. The predisposition, also, which is generated, and the more direct effects produced in the frame by the causes which depress the vital influence — whether mental or physical—whether morally or corporeally exhausting—in circumstances peculiar to the individual, by the removal of agents to which the frame has become habituated, or which are necessary to health, and by the action of other agencies, which are either obscure or concealed, or are merely concurrent in their operations with more prominent or commonly admitted causes, are often overlooked or not known; and thus the advantages connected with their prevention and removal are altogether lost. Hence, these *causes* being unknown or unsuspected, their *effects* cannot be prevented; and the means necessary to the removal of the former or the cure of the latter, are either altogether neglected, or employed accidentally, empirically, and often inappropriately.

169. When treating of SCROFULA AND TUBERCLES (§§ 13, *et seq.*), the *causes of these generic states of the disease* were then fully described; but the *causes*, which, whether acting singly or in combination, develope *this species of malady*, require attention, more particularly with reference to their modes of action. Certain of these causes, however, which have been fully considered in the article now referred to, will hardly be noticed, or noticed only with reference to this specific disease;

whilst others will receive that attention which their importance demands, with due regard not merely of the *causation*, but also of the prevention of this malady.*

170. i. The Causes appertaining to one or both Parents.—*A. The hereditary transmission of phthisis* is proved,—1st. By the frequency of the disease in the offspring of parents of a scrofulous diathesis or taint, whether quiescent or manifested by internal or external tuberculosis;—2nd. By the presence of tubercles in the fœtus, and in infants of tuberculous, phthisical or scrofulous parents; — 3rd. By the existence of tubercular consumption in the offspring of a scrofulous mother or scrofulous father; and the scrofulous parent having died, the children of a parent of a sound constitution, in cases of a second marriage, having been exempt;—4th. By the occurrence of the malady in a family, in which no other cause exists;—5th. By the hereditary transmission of the disease in the lower animals. Del ND states that a phthisical ram produced the d se in from sixteen to twenty sheep.

171. Phthisis may be transmitted to the offs g, —1st. As a predisposition, or proclivity, or dia is, or taint—terms which are nearly synonymo —2nd. As a latent germ, which may be qui nt for many months or years;—3rd. In a m or less developed state in the fœtus. The scro us taint of the parent, although quiescent, ma ve rise either to external scrofula, or to in al tuberculosis in the lungs, or in some other n, or in several organs or tissues, especia in children and young subjects. External scr la, or external glands which have fully suppura , is less likely to be followed by phthisis tha he quiescent scrofulous taint; but either con on will transmit phthisis to the offspring. The ns-mission may not take place in the childre nd yet appear in the grandchildren. The pred si-

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* CLASSIFICATION OF THE CAUSES OF TUBERCULAR CONSUMPTION.

i. The Causes appertaining to one or both Parents.
A. *Hereditary Constitution, or Predisposition.*
a. Transmission to the fœtus, or infant.
b. Extent of hereditary transmission.
B. *Diseases of the Parents productive of Tubercular Consumption.*
a. A syphilitic cachexia.
b. A constitution impaired by mercurial courses.
c. Exhaustion of vital power, or debility caused by excessive sexual indulgences, or by masturbation.
d. A gouty diathesis.
C. *The Ages and the Social Condition of the Parents.*
a. Premature congress in respect of either parent.
b. Far-advanced age, especially of the male parent.
c. Influences of circumcision or uncircumcision.
d. Intermarriages.
e. The occupation of the parents.
D. *The Modes of Living of the Parents, in respect of Food and Drinks.*
a. Insufficient or unwholesome food,—pork, bacon, &c.; blood and viscera of animals, &c.
b. A vegetable and animal diet considered; fish, &c.
c. Intemperance, and addiction to spirits, — in the male, in the female.
d. Causes acting on the female during gestation and lactation.

ii. Causes acting chiefly during early Life, or previously to Puberty.
A. *Inappropriate Food, Drink, and Regimen of Infants and Children.*
a. During infancy. The milk of strumous or phthisical nurses.
b. Insufficient or unwholesome food in childhood.
c. Sleeping with the aged, debilitated, or phthisical.
B. *Contaminated, cold, and Humid States of the Air.*
a. Overcrowding, congregating, or sleeping in great numbers, in a close apartment, &c.
b. Exhalations from privies, cesspools, drains, or from swamps, &c.
c. Emanations from the lungs and skin of the phthisical.
C. *Employments, Exercises, Amusements, and Regimen, previously to Puberty.*
a. Sedentary employments, irksome occupations, &c.
b. Deprivation of out-door exercises and amusements.
c. The congregation of numbers in factories, rooms, houses, and sleeping apartments.
d. Dress, day and night clothing.
e. The influence of light, sunshine, and temperature, especially the deprivation of these.
f. The influence of low temperature, humidity, and exhalations, &c., during sleep; sleeping apartments, &c.

iii. Causes most frequently acting during and subsequently to Puberty.
A. *Amusements, Exercises, Occupations, Clothing.*
a. Studies, amusements, and exercises, in both sexes.
b. Positions of the trunk of the body, supports, stays.
c. Clothing in respect of the several regions of the body.
B. *Trades, Employments, and Conditions of Li*
a. Trades which are injurious by preventing er-cise in the open air.
b. Occupations in which dust, or other irr ing matters are inhaled, — grinders, sculptor c.
c. Occupations which are exposed to great si-tudes of temperature and weather.
C. *The instinctive Desires and Emotions.*
a. Premature or excessive sexual indulgence.
b. The vice of masturbation.
c. Celibacy.
D. *Mental Exertions and Affections.*
a. Intense or prolonged mental exertion,
b. The depressing mental emotions and affec s.
c. Nostalgia.
d. Prolonged anxiety. Disappointed hopes af-fections.

iv. Causes consisting of contingent or asso ED Influences or Circumstances.
A. *Sex, Age, Diathesis, and Temperament.*
a. Sex, age, &c.
b. Diathesis and temperament.
B. *Seasons and Atmospheric Conditions.*
a. Humidity, dryness, temperature, and other no-spheric conditions.
b. The seasons,—winter, spring, summer, a au-tumn.
C. *Climate and Locality.*
a. Climate and locality of various countries.
b. Climate in connection with modes of living
c. Climate in connection with religious and ial observances.
d. Prevalence in England, London, &c.
D. *Influence of Confinement in Prisons, Work et, and of Expatriation.*
a. Prisons, hulks, &c.
b. Workhouses, &c.
c. Expatriation, &c.
E. *Vicissitudes of Fortune*, &c.
a. Poverty and distress.
b. Loss of reputation, of friends, &c.

v. Pathological Causes of Phthisis.
A. *Previous Diseases of the respiratory and circ ing Organs.*
a. Catarrh, catarrhal fever, influenza.
b. Bronchitis, pneumonia, broncho-pneumoni
c. Hooping cough.
d. Vascular lesions of the heart, with or w out hæmoptysis.
B. *Exanthematous Diseases.*
a. Vaccination, small-pox, &c.
b. Measles, scarlet-fever, &c.
C. *Suppressed or excessive Secretion and Excret*
a. Suppression of the cutaneous excretions.
b. Excessive secretion or excretion,—prol ed suckling.
c. Disordered, suppressed, or excessive catam
D. *State of organic, nervous, or vital Power.*
a. Hereditary debility.
b. Acquired debility.
E. *Morbid State of the Blood.*
a. Anæmia.
b. Chlorosis.
c. State of the hæmato-globulin.

sing either from the scrofulous taint or eclared tubercular disease of some organ e, may remain dormant through life, not been roused by the exciting and deter- causes into activity, or developed in the her of glandular enlargement, &c., or of lar consumption, so that it cannot be , that the offspring of a scrofulous or al parent or parents, who has not been with either scrofula or phthisis is, there- ee from the constitutional taint, or in ords, from the hereditary predisposition. anifest, however, and it will appear still anifest hereafter, that a very varying pro- of those attacked with phthisis in any ity or climate shall have been thus af- rom hereditary predisposition, numerous edisposing and exciting causes being suf- o develope the malady in those not here- or even constitutionally liable to the .

a. As to the proportion of cases of phthisis y be referred to hereditary taint, authors dely. **Ruysch** says that four-fifths are he- ; M. **Portal**, two-thirds; Mr. **Ancell**, d; M. **Piorry**, one-fourth; **Briquet**, 36 90; **Rufz**, 24 out of 35. Mr. **Ancell** hat in the Consumptive Hospital 24½ per consumptive patients were born of phthi- arents. M. **Roche** considers that the of phthisical parents are doomed to the and such may be the case if they be sub- o one or more of the causes which occur sly to, or during puberty and early man- M. **Lugol** states, that more than half the s of tuberculosis have consumptive proge- Of 141 persons affected with scrofulous whose family history was investigated by **lman**, the following accounts were fur- —

thers died of phthisis in	9
ne or more deaths occurred from phthisis in the families of uncles and aunts on the father's side of	61
randfathers on the father's side died of phthisis	11
randmothers on this side	17
	98
thers died of phthisis of	11
ne or more deaths from phthisis in the families of uncles and aunts on the mother's side of	38
randfathers on this side died of phthisis	9
randmothers	20
	78

In 30 of the 141 scrofulous persons, no rom phthisis in either parents or collateral s were ascertained; but whether the latter ed signs of tuberculous taint or disease ot appear. In the Hospital for Consump- 669 *males*, 122, or 18.2 per cent.; and of *males*, 124, or 36.3 per cent. were predis- by the disease having existed in a parent nts.

b. As to the relative frequency of the trans- of phthisis in the two sexes opinions are op- and statistical information is very imperfect. **ank**, J. **Frank**, M. **Briquet**, **Richard**, and **ips**, favour the more frequent transmission by the father, whilst **Nasse** and others entertain an opposite opinion. From the Report of the Hospital for Consumption it would appear that, omitting those cases in which both parents were consumptive, the father transmitted the disease to sons in 59.4 per cent., and to daughters in 43.5 per cent.; and that the mother transmitted the malady to daughters in 56.5 per cent., and to sons in 40.6 per cent. The numbers from which the above results are calculated are, however, insufficient to be relied upon; nor can the facts be determined with precision, especially as respects the absence of any taint in either parent. In a few cases in which I observed with care the constitution of both parents, the taint existing only in one parent, was communicated in very nearly an equal ratio to both sexes of the offspring.

175. *c.* The question may be asked, *In what manner or way is the hereditary predisposition transmitted?* Is it by the general organisation or constitutional formation, or by the blood, or by miliary germs? But previously to the consideration of this topic, it may be asked, Is the tubercular taint, either quiescent or manifested by internal or external tuberculosis, necessarily transmitted from parent to offspring? That it is thus transmitted, when both parents are predisposed or tainted, cannot be doubted. The taint may be latent, not having been developed into active disease owing to the inefficiency of the exciting causes. When, however, one parent only is thus tainted, all, or only some, or even none, of the offspring may be predisposed, the taint being limited to one or more, or extended, in various grades to several or to all. That the constitutional taint may exist in the offspring in the form of *miliary germs* is possible, inasmuch as several observers as well as myself have detected these germs in the fœtus where the taint has been manifested in either or in both parents; but this cannot therefore be considered as the usual manner in which the evil is transmitted. It has been supposed to be always conveyed in the blood — the taint existing in the blood of the fœtus and of the individual into which the fœtus is developed in all the stages of growth and existence. This supposition may be correct, but various considerations militate against it.— 1st. There is no proof, either chemical or microscopic, of the fact.—2nd. The predisposition or taint being permanent, it cannot be inferred as always existing in the blood, which is continually undergoing changes by the functions of secretion, nutrition, and excretion—by the processes of assimilation and of waste—by the metamorphosis of the globules from the states of those existing in the chyle, through those forming the red blood, to their final extinction by the secreting and excreting organs. — 3rd. If it exist in the blood, it must necessarily vary with the changes and constitution of the blood, or even be eliminated from the blood, during the processes just referred to, or by the agents often passing into and affecting the circulation, or in the course of diseases which sensibly alter the states of the blood; but no diminution or alteration of this taint has ever been produced in consequence of any or of all these agencies. That this predisposition or taint is one not existing primarily in the fluids, although more or less manifestly affecting these fluids, both the circulating and the secreted, may therefore be inferred; and that it is

present in those parts of the solids upon which digestion, assimilation, and nutrition mainly dedepend, must necessarily appear as a rational conclusion — that it is as much a part of the constitutional conformation—of the intimate organisation of the tissues and organs, as of the conditions and contour of the several parts and features of the individual, and of the states of intellectual and moral development and power.

176. *B. The Disorders of the Parents predisposing to Tubercular Consumption in the Offspring* are chiefly the scrofulous taint; the syphilitic cachexia; a constitution impaired by mercurial courses, or by excessive doses of mercury; exhaustion of vital power, or the debility caused by age, sickness, excessive sexual indulgences, or by masturbation; and a gouty diathesis. Certain of these have been fully discussed when treating of SCROFULA and TUBERCLES (§§ 23, *et seq.*); and the dependence of phthisis upon the scrofulous taint fully insisted upon, as regards a very large proportion of the cases, both under that head, and above (§§ 170—175). Others of these sources of predisposition require merely a few remarks at this place. Excessive sexual indulgences, and more especially masturbation, particularly as regards the male parent, have a very marked influence upon the constitution of the offspring, if indeed any offspring be produced by persons thus exhausted. In most instances, the children of these parents are puny, very generally tuberculosed, the membranes of the brain, the substance of the lungs and other organs being often the seats of the tubercular deposits to an extent incompatible with the duration of life for any number of years or even of months; or if the effects are not so severely and early manifested, a predisposition is at least communicated to the offspring to external scrofula, in childhood or about the period of puberty, or to pulmonary tubercles about the same epochs or at later ages.

177. *a. The Ages and Social Conditions of the Parents* are not without influence in favouring a predisposition to phthisis in the offspring. Amongst the most important of these, are premature sexual congress, in respect of either or both parents, and far advanced age, especially of the male parent. The effects upon the offspring are, in all respects, the same as those just enumerated; namely, a very early mortality from internal and external tuberculosis, and a predisposition to tubercular phthisis at early or advanced epochs of existence.

178. *b.* The influences of *circumcision* and of *uncircumsion*, the former as tending to prevent, the latter as favouring, a predisposition to the scrofulous taint, have hitherto been entirely overlooked; or if any attention, even the least, have ever been directed to the matter, it has certainly been by no means adequate to its importance, as respects the constitutional and mental powers of the offspring. The subject has hitherto been viewed entirely as a religious rite, altogether superseded by the doctrines of Christianity; but unjustly superseded by the earliest schismatics in the Christian church — by some of the apostles themselves. Circumcision, however, as practised by the followers of MAHOMMED is very different from that inculcated by ABRAHAM. By the latter, the whole of the prepuce was directed to be extirpated at a period of life most proper for the operation; whilst the former resorted merely to an incision. The advantages of the Jewish rite are not merely t which have usually been imputed to it; nan the prevention of the usual effects of the rete of the follicular secretion under the prepuce; chiefly the prevention of that excitement to turbation about the period of puberty, experie by, and so frequent among, the uncircumc especially in warm countries; and the more longed act of sexual congress, and the complete as respects the female, than in pe otherwise circumstanced. The general resu connection with other predisposing causes fluencing the constitution of both parent offspring, notwithstanding several powerful c teracting circumstances, are more prolific riages, and the less frequent occurrence o scrofulous, phthisical, and gouty constitution the Jewish than in other races.

179. *c. On Intermarriages, or marrying in in*, amongst particular races, families, and reli sects, &c. I have already offered some rem when treating of SCROFULA and TUBERCLES (§ showing the unfavourable influence this exerts on the offspring. As to *the influence the several professions and occupations of life lowed by the parents* may exert on the heal the offspring, it is most difficult to arrive conclusion, as statistics can furnish no p data. Whatever injurious effect may be duced, is certainly manifested in the guise berculosis, in one or other of its forms and The only inference which can be drawn justice from the professions and employmer the parents is, that such as are most conduc the promotion of health and strength, will be likely to favour corresponding effects in children.

180. *C. The Modes of Living of the Pare to Food, Drink, &c.*, have been too generall regarded in our speculations on the causes disorders and diseases of childhood, and constitutional powers and predispositions of th spring.—*a.* The injurious effects of insufficien unwholesome food, and of the frequent u pork and pork meats, and of the blood an cera of animals — not only on the parent, bu on the offspring; and the respective influen a vegetable and an animal diet, were consi when treating of SCROFULA AND TUBERCLES (*et seq.*). To these topics I need not revert; b use of fish, or a purely fish diet, including shell has not been satisfactorily investigated. I Shetland Isles, where I resided up to the age teen, and visited for short periods for several afterwards, the labouring classes live chief rather entirely, on fish, potatoes, meal, and bages, — the kinds of fish being the most w some and best, — the cod, ling, the torsk, hal haddock, whiting, skate, coal-fish, &c.; and are very generally taken with the oil of the livers as the only sauce. Those who live i manner are healthy, enduring, and but littl ject to visceral disease. Shell-fish is more ductive of cutaneous affections than the fis mentioned; and the former is more freq followed by other injurious effects, especia persons of a peculiar idiosyncrasy. (See art. SONS, 428, *et seq.*).

181. *b.* There can be little doubt of *the inj influence of the intemperance of the parents o offspring;* and there is as little doubt th

s effects are mainly evinced by the scro- liathesis thereby generated in the children, veloped either into external and internal losis in infancy, or into tubercular con- n in early or late epochs of existence. It ult to say in what sex or parent this vice productive of these maladies in the off- It is, however, evident that the female dicts herself to the abuse of intoxicating and especially during pregnancy and n—and there are many both in the middle ver classes who thus devote themselves eir infants to perdition — will bear an hy fœtus, or one which will be imbued diathesis and seeds of disease just men- and, if it live so long, will communicate r evil to its offspring. How efficiently legislators providing the incentives to the ion of health, constitution, and morals, licenses and encouragements furnished out the kingdom to the abuse of in- ng liquors! But what are these impor- tters, to the higher consideration, to them, cratic interest, family patronage, and the e of party?

Other causes besides intemperance may so e mother during the child-bearing period and during pregnancy and lactation, as to the development of a scrofulous and lar disease in the fœtus and infant. Too ing, unwholesome meats, especially the usive use of pork and bacon, anxiety of and all the distressing and perturbating s, are more or less injurious to the offspring, the way just stated, more especially when ed with the other causes of ill health, abound in all cold, low, humid and ill- localities; in crowded and ill-ventilated and apartments, and in crowded or close ctories and manufacturing towns.

c. The use of tobacco in any way, either by , snuffing, or chewing, is most injurious, ly in early life, and as respects its effects e constitution of the offspring, more par- y when either of these vices are indulged to by the male parent. Numerous instances me before me of young men who have habitual tobacco-smokers in early life, o, having married, have either failed of a progeny, or had children that could not ed; or if they reached any of the early of life, were subjects of tuberculosis in one of its forms or seats, and especially of lar consumption. (See Art. *Poisons,* 523,

ii. The Causes of Tubercular Consump- at act chiefly during Infancy, Child- nd early Life, or previously to Pu- have been so fully discussed under Scro- d Tubercles (§§ 30—64.) that very little or me to add at this place. The reader the several agencies arranged under this onsidered at the place now referred to. re, however, a few topics thus arranged equire notice, as being of some importance phylactic point of view.—*A. Sleeping with and debilitated persons* is certainly pre- to the healthy, both in predisposing to lar consumption, and determining or de- g the disease in those predisposed by a us diathesis or other influences. It may also be associated with other causes, and the results become more immediate and severe.

185. *B. Infection.—Emanations from the lungs and skin of persons, in the second or third stages of phthisis especially,* are certainly sometimes productive of consumption, more particularly in young persons of a scrofulous diathesis, and in those who are predisposed by other causes, or who are subjected to several concurring influences. The inhalation by the healthy of the emanations from the lungs and skin of the consumptive, and the consequent appearance of the disease in the former, may, as in other cases of infection, be productive of its injurious effects only in the circumstances now stated, but the disease is caused by infection nevertheless, although the fact is stated loosely by many writers as one of the propagation of phthisis by contagion, and denied by others, as indeed the infectious nature of nearly every disease has been denied by some, who consider belief in infection to be credulity, and scepticism to be a proof of a "strong minded" physician, or rather of an incredulous old woman. Although phthisis, in the circumstances favourable to infection, may be communicated to others, especially when the healthy sleep in the same bed or apartment with the sick, and although this result is, perhaps, more likely to occur in persons under or about the period of puberty than at a much more advanced age, yet for many years after puberty the person thus exposed and predisposed may be attacked; and this result is the more likely to take place in the cases of married, especially recently married, persons. I state this as the result of my observation; and, although the matter has been discussed from the days of Galen, and the occasional transmission of the disease by infection believed by him, by Riverius, Morton, Van Swieten, Narducci, Roncalli, Chavet, J. Frank, Hufeland, Hildenbrand, and many others, and denied by Salmade, Castallani, Portal, and numerous other writers, it still remains in dispute.

186. *C. Employments, exercises, amusements, and regimen previously to puberty.*— Sedentary employments, irksome occupations, and confinement in close or dark apartments, are more or less influential in predisposing to, or more directly occasioning, tubercular phthisis. The deprivation of out-door exercises and amusements, so requisite at this period of life to the development and strength of the constitution, and the congregation and confinement of numbers in ill-ventilated factories, houses or sleeping-apartments, blight the vital endowments of the frame; and of all the structures and organs, the lungs, like the leaves of a plant — both being the respiratory organs of their respective bodies—are the first to experience, and the most disposed to sustain injury. Nor are dress, night and day clothing, the influence of light, sunshine and temperature, at this period of life, undeserving attention as respects both sexes; for although either of these singly may appear of little importance, yet operating, as they often do, in combination, their effects on the general organisation are often remarkable. The frequent practice of leaving portions of the body uncovered by the dress, without reference to the weather and season, during the early periods of life; the very low temperature of sleeping-apartments during the winter season, in this and some other countries, whilst the confinement of the air by closely drawn

curtains around the beds causes the repeated respiration and consequent contamination of the air, thereby inducing feverish, restless and unrefreshing sleep, and a contaminated state of the blood, are amongst the most influential occasions of an imperfect development of the body at a period of life when all the aids to health and strength are most especially required. Not infrequently also other agencies are brought in co-operation with those just mentioned, and these too of no mean influence. Deprivation of light and sunshine—of the salutary influence of the sun's rays on the frame — not infrequently, especially when aided by the causes already noticed, produces an etiolation similar to that occasioned by this cause in plants; and, although the body grows in height, and the vessels extend in the direction of their axes, as in plants, yet the various structures are loosely, weakly and insufficiently formed, each one being deficient in tone, firmness and vital cohesion. Associated with this state of imperfect organisation, the blood presents a similar defect of assimilation, and an arrested development of the red-globules. It is thin, watery, and, although it may abound in colourless globules, or in those not yet metamorphosed into red globules, these last are very much diminished in number, or in their usual proportions. Nor should the mental depression, the irksomeness, the weariness of both body and mind, occasioned by the circumstances noticed under this category, and their effects upon the youthful constitution, be overlooked. These circumstances, when acting either singly, but protractedly, or in various combinations, exert their injurious influence primarily, although not always manifestly, on the lungs. These organs, although generally the first to suffer, are not always the first to indicate disorder. The functions of digestion, assimilation and nutrition often furnish the earliest indications of disease to the casual or superficial observer, but the experienced eye, and the informed mind, detect the antecedents of these, and carry the analysis of the morbid phenomena much farther, and until the agencies producing them are fully disclosed. (See Scrofula and Tubercles, §§ 39, *et seq.*)

187. iii. Causes operating during and subsequently to Puberty. — *A.* It is manifest that when the mental *studies* of the upper and middle classes of society, at this period of life, are pursued too far, or to the neglect of those amusements and exercises requisite to health, and to the proper development of the frame, pulmonary consumption will follow in a large proportion of cases, especially when the constitution is predisposed by original conformation, by the strumous diathesis, or by other causes acting in earlier life, or concurrently with this. If these studies are rendered still more injurious by stooping positions, or by pressure of the side against a desk, whereby the actions of the respiratory apparatus are hampered or confined within too narrow limits, the injurious effects will be more certain. But, where these latter causes are not present, others equally injurious may operate; and these may either be too close cinctures of the lower regions of the chest, the pressure of unyielding, or insufficiently yielding supports in the stays worn by females; the use of steel supports, which conduct the electricity of the frame from the body into the air, and thereby deprive the nervous system of a
salutary stimulus; and insufficient clothing o
neck, upper regions of the chest, and shoul
or even the complete exposure of these
without any clothing whatever, are not wi
their influence, either as exciting or concu
causes, especially where a predisposition to
disease already exists. (See also art. Scro
and Tubebcles, §§ 57. *et seq.*)

188. *B. Trades, employments, and conditio*
life are conducive to pulmonary consumption
they prevent exercise in the open air; when
are followed in cold, low, close, humid, and
apartments or situations, or in confined, be
cramped positions of the body, as by miners
As to the comparative liability of persons
suing different trades and occupations, no p
information has been furnished, as the num
persons occupied in each of these trades, in
nection with the number attacked with ph
can rarely be obtained. It is manifest, how
from the researches of Drs. Guy and Lom
that the deaths from this disease in those wh
low in-door occupations are about doubl
deaths of those who pursue out-door employm
Shoemakers, tailors, milliners and dressm
and other needlewomen, clerks and shop
weavers and glovers, compositors and pri
servants, bakers, &c., are amongst the
most liable to phthisis. Beddoes stated
butchers are less liable to this malady than
following any other employment, and late
servations have confirmed the statement.
Trotter made a similar remark in favo
sailors, and this is rendered more obvious b
more liberal diet allotted to them now
formerly. Dr. Withering considered s
boys, grooms, post-boys, and dragoons, less
to phthisis than other employments, and
appears upon the whole, to be the case.
occupations in which dust and other irri
particles, whether mineral or vegetable, a
haled into the lungs, are especially product
diseases of these organs, and particularly of
monary consumption, bronchitis, asthma,
various complications of these, either with
another or with other lesions. But this sub
and the several topics connected with it,
especially with relation to the causation of
monary diseases, are fully considered unde
head Arts and Employments *as Caus*
Diseases.

189. *C. The instinctive emotions and desir*
more important causes of tubercular phthisis
is generally supposed by either medical me
others; and this category of causes are most
fluential in young persons of a scrofulous diat
and in those who are otherwise predisposed,
especially by the causes already mentioned.
Premature or excessive sexual desires and in
gences, and still more the crime of self-pollu
are the chief of the class of causes in produ
tubercular phthisis, and several other mala
This crime, for it is no less than a crime, and
most severely, but not unjustly, punished by
Mosaic law when detected, is one more frequ
practised by both sexes than may be believe
those who have not had occasion to inquire
the matter; and it is most prevalent in those
are sanctimonious and pharisaically censoriou
others. The injurious effects of this crime
probably greater in the male than in the fem

ecially in causing tubercular phthisis; and it ıot improbable that the rite of circumcision ɔng the Jews was instituted partly with the ntion of preventing the excitement to the ımission of it, that is liable to occur in the ircumcised. Various mechanical contrivances the prevention of the vice in females were ɔloyed from very early ages, and several of se adopted in the middle ages may be seen in seums of antiquities. No more certain means exciting females to this vice can be supposed n riding. Instances have come directly to my wledge of females having relinquished horsek exercise entirely on this account.

90. *b. Celibacy* may be viewed as a cause of ercular phthisis, although the reason of its ıg a cause may not be obvious to many. It however, more generally known that the avee duration of the life of bachelors is much ler that of married men. This is mainly owing the circumstance of their having become aded to the crime of masturbation. A very ;e proportion of those who are thus addicted impotent, and many of them are conscious of : fact, and do not marry; whilst others conıe this vice in preference to sexual congress, l often pay the penalty by inducing this or er diseases. Several instances have occurred my practice of persons having admitted, when icted with phthisis, or with any other of the ladies entailed by this vice, that they were conɔus of the cause only when too late, and often en their minds and the powers of volition were much weakened to resist the impulse to its nmission. Even married men who had become licted to it previously to marriage have conıed it subsequently; as they have themselves ıfessed to me in several instances.

91. *D. Mental exertion and the moral emotions. a.* Mental exertion, especially when prolonged intense, is more frequently a concurring than exciting cause, unless where an original or ļuired predisposition to phthisis already exists. is injurious chiefly about or soon after the iod of puberty, when the frame, in all its parts, ıot fully developed and consolidated, and when rcise in the open air, and in light and sunshine, ich it often prevents, and which is requisite to fect bodily organisation is neglected. This ıse is often also heightened by the position of body, especially by the stooping position, ich during mental application is often too long ained.

192. *b.* The depressing emotions and affections, ;iety, longings after the objects of affection, either sent or lost, disappointments, losses of fortune or nds, &c., severely depress the organic or vital luence, impair digestion and assimilation, and dispose to, if they do not actually occasion, this lady. — *c.* Under this category may also be ced nostalgia in its various longings for early odes, scenes and objects, and for the society of ly or beloved friends. (See also Arts. DISEASE, *Causation of*, §§ 22. *et seq.*, and SCROFULA d TUBERCLE §§ 61, 62.)

193. iv. CONTINGENT AND ASSOCIATED INFLUCES OR CIRCUMSTANCES AIDING OR CONCURRING OCCASIONING PHTHISIS. — *A. Sex.* — According the Registrar-General's returns, the deaths ring two years and a half (1837, 8, and 9) in gland and Wales from phthisis were 146,338, being 69,009 males and 77,329 females; and in 1847 the deaths from this disease were 25,083 males and 28,234 females. Mr. ANCELL says, that "from the Irish Reports, it appears that of 135,590 deaths from phthisis, 63,635 were males, and 71,955 females. In London, however, and in the large manufacturing towns, the proportion of deaths from phthisis in males and females was different. In London, from 1843 to 1846, the deaths were greater in males than in females, by nearly six per cent. According to the returns of 1847, the deaths from scrofula, tubes mesenterica, and hydrocephalus were 8105 in males and 6542 in females; and from phthisis 25,083 males and 28,234 females, thereby showing that, whilst the former scrofulous diseases were more fatal in males than in females, the latter, or phthisis, was more fatal in females by nearly six per cent. (5·9). In this country, therefore, it appears that females are slightly more liable to consumption than males. In the Metropolitan district, however, the deaths in 1838 from phthisis were 4057 males and 3630 females; and in 1839, 3749 males and 3355 females. The deaths in this district, in 1838, from phthisis were 7687, whilst in the southern counties, the population of which is somewhat greater, they were 5805.

194. *B. Age.* The several tubercular maladies present a greater or less frequency of occurrence at one epoch of life than at another. Tubercular meningitis and hydrocephalus are most frequent during infancy; mesenteric decline in early childhood, or about the period of weaning; external scrofula from the period of weaning till puberty; and phthisis from puberty until advanced age. The following abstract from the returns for 1845 and 1846 will show the deaths from phthisis, *in London*, at successive epochs of life:—

Years of Age.	Mortality from Phthisis at successive Epochs.			
	Males.		Females.	
	In 1845.	In 1846.	In 1845.	In 1846.
Under 5 years	354	234	316	269
5—10	88	88	114	92
10—15	59	61	107	104
15—20	191	219	214	228
20—25	343	387	349	362
25—30	405	450	426	434
30—35	436	456	379	383
35—40	431	454	328	401
40—45	379	397	279	305
45—50	312	346	218	211
50—55	240	234	133	135
55—60	155	179	97	99
60—65	111	104	72	60
65—70	73	66	46	48
70—75	21	36	15	15
75—80	9	14	9	6
80—85	4	1	1	3

195. In 1845 the deaths from phthisis *in London* at all ages, were 3624 males, and 3107 females; and from all causes, at all ages, 24,496 males, and 23,836 females; the deaths from phthisis being in both sexes 6731, and from all causes 48,332. In 1846 the deaths at all ages from phthisis were 3729 males, and 3161 females; and the deaths from all causes, at all ages, were 24,941 males, and 24,148 females; the deaths from phthisis, in both sexes, being 6890, and from all causes 49,089. From these returns it appears that the proportion of deaths from phthisis among persons advanced in age, the number of persons

thus advanced being considered, continues great to very mature age.

196. The following table is an abstract from a more extended one by Mr. Ancell, which he has made from the Registrar General's returns for 1847,

in which the deaths by phthisis, in all *England*
Wales at the several epochs of life, are stated
compared with the mortality by all causes,
with the number of persons living of the spec
age in the middle of that year.

	Mortality from Phthisis.			Mortality from all Causes.			Estimated Population of that Age in 18		
Years of Age.	Males.	Females.	Both Sexes.	Males.	Females.	Both Sexes.	Males.	Females.	Both Sexe
Under 1	1,251	1,164	2,415	49,547	39,237	88,784	215,150	234,959	450,1
1 to 2	676	656	1,332	16,666	16,019	32,685	230,463	230,038	460,5
2 — 3	318	345	663	8,900	8,513	17,413	233,383	235,187	468,57
3 — 4	212	212	424	5,870	5,803	11,673	217,806	221,556	439,36
4 — 5	179	182	361	4,123	4,137	8,260	215,225	215,026	430,2
5 — 10	780	876	1,656	9,768	9,369	19,137	1,020,042	1,022,576	2,042,61
10 — 15	910	1,432	2,342	5,101	5,330	10,431	942,534	915,115	1,857,64
15 — 20	2,294	3,232	5,526	6,615	7,126	13,741	836,845	865,094	1,701,9
20 — 25	3,221	3,899	7,120	8,241	8,324	16,565	774,542	888,360	1,662,90
25 — 30	2,983	3,683	6,666	7,216	8,190	15,406	657,138	722,120	1,379,25
30 — 35	2,373	3,094	5,467	6,626	7,623	14,249	601,706	646,972	1,251,67
35 — 40	2,212	2,545	4,757	6,833	7,387	14,220	465,847	482,871	948,71
40 — 45	1,847	1,903	3,750	6,909	6,917	13,826	466,338	486,047	952,38
45 — 50	1,534	1,401	2,938	7,135	6,462	13,597	315,472	349,380	694,8
50 — 55	1,261	1,111	2,372	6,981	6,684	13,665	328,848	351,469	680,31
55 — 60	1,025	874	1,899	7,615	6,982	14,597	202,956	217,199	420,1
60 — 65	749	715	1,464	8,703	8,725	17,428	223,801	247,912	471,71
65 — 70	515	505	1,020	9,220	9,323	18,543	129,211	149,231	278,54
70 — 75	253	246	499	9,935	10,782	20,717	111,365	129,120	240,48
75 — 80	128	109	237	9,357	10,552	19,909	59,546	69,089	128,6
80 — 85	41	26	67	6,651	7,799	14,450	33,295	42,745	76,04
85 — 90	9	10	19	3,487	4,380	7,867	10,770	14,881	25,6
90 — 95	2	3	5	1,006	1,571	2,577	2,662	4,333	6,99
95 et sup.	—	—	—	302	538	840	622	1,175	1,7
All Ages - -	25,083	28,340	67,964	113,076	207,901	420,977	8,368,914	8,755,174	17,124,0

197. *C. Diathesis and Temperament* predispose more or less to phthisis, but it is difficult to determine the extent to which they have this effect. It is even more probable, and more agreeable with experience, that original or early-acquired conformation of the body, arising from causes affecting the parents, has more influence in predisposing to phthisis than the temperament, as they have hitherto been described by physiologists, or conventionally admitted by medical writers. Temperaments are so mixed with one another, with diathesis, habit of body, and with states of vascular plethora, or its opposite, as to be rarely distinguished with precision, or to be viewed only as states of constitution, which every physician estimates conformably with his own views, although he may not be able to describe them with precision, or agreeably with the conceptions of others. I have nothing to add at this place to what I have observed above (§§9, *et seq.*) on this subject, and that is much less satisfactory to myself than I wish.

198. *D. Seasons, weather, and atmospheric conditions and vicissitudes,* have less direct influence in producing phthisis than has generally been supposed. They are, however, frequent concurrent and determining causes, and when they appear most efficient in occasioning this malady, they often act by producing catarrh, bronchitis, or pneumonia, either of which may develope quiescent phthisis, into a state of action, or call the latent predisposition into a more manifest form. Cold conjoined with humidity, especially when the already predisposed, or those not accustomed to these atmospheric conditions, are exposed to them, and sudden vicissitudes of cold, warmth, and humidity or dryness, or rapid alterations of these, are certainly powerful agents, especially in low situations, in developing phthisis. The rapid transference of terrestrial electricity into the atmosphere, during humid states of the air, has an injurious influence on persons predisposed to, or

labouring under phthisis. The vicissitude
temperature to which many expose themse
by passing from a very warm apartment into
cold external air, or from the latter into the
mer, and by sleeping in a chamber the tempa
ture of which is many degrees below that of
apartments used during the day, are certa
more or less injurious to persons dispose
phthisis. In cold sleeping-chambers, altho
the body is protected by warm bed-clothes,
lungs are exposed either to a low range of ter
rature, or to a higher range generated by bre
ing the same air repeatedly in consequence o
confinement of the air by bed-curtains. No s
injury is often also produced by over-exciting
over-heating the body, so as to produce cop
perspiration, which often chills the surface,
throws the momentum of circulation inwa
favouring pulmonary congestion, especially w
the external surface is not protected by fla
next to the skin. Living in damp or ill-dra
houses, removing into recently-built houses be
the walls are quite dry, and living in those w
are built on a humid or clay soil, without s
areas around them, or without sufficient space
ventilation, are more frequent causes of dise
and especially of pulmonary consumption,
they are generally supposed to be, especiall
persons of a scrofulous diathesis, or otherwise
disposed.

199. The influence of *seasons* on phthisi
but slight, and almost undetermined. Med
statistics give very little information on this to
and that little is deficient in precision. The
turns of the Registrar-General furnish no
respecting it, for the deaths from phthisis du
the four quarters present little difference a
numbers; and when the very remarkable dif
ences of duration presented by this disease
considered, it cannot be expected that the de
can be an index to the seasons in which the
lady was occasioned.

00. *E. Climate and Localities.*—*a.* As to the
nate of different countries, and as to the influ-
e of situation and locality, either in favouring or
reventing the prevalence of phthisis, our know-
ge is altogether imperfect. Much that has been
erted on this subject is more or less inaccurate,
inaccuracy being often in proportion to the
matism with which the matter is treated.
it some climates and localities present a much
ater prevalence of this disease amongst their
abitants than others is an admitted fact; but
degree of prevalence, or the amount of influ-
e attributable to climate only, and the shares
ich may be imputed to situation, circumstances,
its, customs, &c. of the inhabitants, especially
natives, are either very imperfectly known, or
known at all; even at the best an approxima-
to the truth only is to be expected. Several
ters have stated that pulmonary diseases, and
re especially consumption, are rare within the
pics, and in the natives of these countries par-
ilarly; but Dr. WEBB states that the "records
cases of natives of every part of *India* show
t phthisis and pulmonic affections are at least
uncommon diseases among natives of India,
l only yield in frequency to fever, cholera, and
sentery, presenting every form and variety that
o be met with in any other part of the world."
. GREEN states that pulmonary consumption is
revalent disease in the lower provinces of Ben-
; and Dr. WEBB, who quotes this statement,
narks that he has himself "observed the disease
ensively among the Hindoo race, and the Pu-
rrees inhabiting the lower belt of the Hymalya
ge of mountains." The same writer refers to
. GODEVE's report of the prevalence of pulmo-
ry disease in *Upper India;* wherein he states—
ubercular phthisis we have had abundance of,
the detailed autopsies forwarded every month
w." (WEBB's *Pathologia Indica*, p. 100. *et seq.*)

201. *b.* Dr. ARCHIBALD SMITH, in some valu-
le communications he kindly sent me respecting
diseases of *Peru*, remarks that "In the negro
moptysis is less frequent, perhaps, as a symp-
n of phthisis, than it is of disease of the heart
aneurism of the aorta. Hæmoptysis is also
ry often observed in the congestive stage of fever
the Peruvian negro; but with the fever the
guineous sputa disappear. Comparatively
eaking, phthisis is decidedly less common in the
gro than in the cross between the negro and
ruvian Indian, or pure Indian bred in the moun-
ns, but migrated to the coast. The mixed races
th preponderating Spanish type or blood, con-
tuting the creole white race, nurtured in luxury,
eness, and pleasure, and consequently with an
healthy physical and moral training, are deli-
te and feeble of organisation; and therefore, of
the different races, the most prone to ailments
d failing health, and also most subject to tuber-
lar consumption. In the *purely* white race
thisis is comparatively rare, except among such
uths as are sent from Europe with pulmonary
mplaints. But, as these are found in mercan-
e establishments, they are usually sent from one
tion to another, without trying the benefit of
ountain air; for in the mountains there are few
uropean mercantile establishments. In 1792
ma contained 52,000 inhabitants, of whom
,000 were whites, 23,000 of the negro race,
000 of the cross of white and Indian, and 3,000 only of the pure Indian. At that period the races were treated in their respective hospitals. The whole deaths by hospital and parochial returns were 2795 for the year given. From the *white* hospitals 650 dead were buried, while 692 died in the negro and Indian hospitals; thus showing a much greater mortality among the whites in general (including the creoles). Now, rest assured that phthisis always maintained its relative position among the causes of death next to fevers and dysentery. In the Indians on the coast the relative mortality is far beyond that of the negro. In Lima phthisis and intermittent fevers are less common in the negro than in the white and Indian races. But diseases of the liver, of the heart and aorta, and of the gastric and intestinal viscera, especially dysentery, commit more havoc in the negro and other dark members of this family, than among the other races."

202. In other parts of *South America* the occurrence of phthisis appears to be infrequent, especially among the unmixed dark races; but the information respecting these parts and races is very defective. In *Mexico* this disease is said to be rare; as respects the city of Mexico this may be owing to its high position above the level of the sea, and to other circumstances; but no information is furnished as to the comparative immunity of different races in this country. According to Dr. HANCOCK phthisis is almost unknown on the coast of *British Guiana*, and very rare in the mountains. This immunity must have reference chiefly to the native races, as instances of death from phthisis have occurred among both whites and blacks who have removed to that country. Col. TULLOCH states that in St. HELENA the mortality of the population from diseases of the lungs is about 3·2 per 1000 annually.

203. *c.* Upon reference to my notes respecting the diseases of those parts of the *west coast of Africa* which I visited and resided in for short periods many years ago, and which were inhabited almost entirely by true negro tribes, individuals of the white, Arab, or Moorish races being very few, I find it stated that phthisis, remittent and intermittent fevers appeared very rarely to occur among the former; but when they migrated to somewhat colder climates, even to the West Indies, phthisis was sometimes observed among them; and this became the most fatal malady to them, excepting small-pox, when they were sent to temperate or cold climates. Although dysentery and chronic diarrhœa were amongst the most prevalent and fatal maladies among negroes in those parts of Africa, yet the liver appeared less frequently diseased than the spleen in this race; and much less so than in the purely white and mixed races. Amongst negro children, however, I remarked that mesenteric disease was not uncommon.

204. *F. Race.* After considering the distribution of heat over the globe as displayed by the isothermal lines of HUMBOLDT (see Art. CLIMATES), and by the later researches and illustrations of Professor DOVE, I infer that less is owing to temperature than to *race* and modes of life in the causation of phthisis. There are numerous circumstances which concur with temperature in producing a climate either favourable or unfavourable to the prevalence of phthisis; and of these coldness and humidity of the air, low elevations from the surface of the ocean,

sudden and frequent vicissitudes of temperature and weather, are amongst the most influential elements of a climate which favours the production of this malady; whilst a moderately warm and dry atmosphere, considerable elevation above the sea, especially in warm countries, and regularity of season and temperature and weather, greatly diminish the prevalence of the disease, and favour recovery in the early stage of the malady. But these conditions, favourable and unfavourable, are so associated with numerous other agencies, especially with the influences of race, of social and domestic conditions, of food, habits, and modes of living, &c., that it is impossible to determine the amount of influence which may be ascribed to each.

205. There can be no doubt, however, that the disposition to phthisis existing in different *races or varieties of our species* should be viewed in very intimate connection with the climates in which they reside, and with the food and modes of living adopted by them. Having ascertained the frequency of the disease in the aborigines of a country or climate, it is next of importance to know how far that frequency may be modified — diminished or increased—by change to other countries, either colder or warmer, or of higher or lower elevation, &c., and by the adoption of different food and other habits. Our knowledge of these subjects is deficient, and the difficulties in the way of improving it are many; but, before I endeavour to draw a few brief inferences closely connected with it, I shall succinctly notice such information as I have found calculated to remove a few of these difficulties. Several of the most important topics connected with this subject, and more especially in connection with pulmonary consumption, are discussed in the Article CLIMATE, to which I must refer the reader.

206. In countries in which the isothermal lines of annual temperature range from 70° to 85°, phthisis appears to be rare among the aborigines; but it is more or less increased in frequency in mixed races, and in those who have migrated from very warm to cooler districts, or from a dry and elevated situation to low and humid localities; but the amount of increase under these circumstances cannot be shown. *Upper Egypt* and other parts of *Northern Africa*, and those places in *Western Asia* where the annual range of temperature is not much above 75°, or below 65°, phthisis is very infrequent, although numerous circumstances combine to occasion external tuberculosis, especially in children, and probably also mesenteric disease; and of these circumstances the most influential are evidently insufficient and unwholesome food, and want of cleanliness. The immunity of these countries, more particularly of Egypt, from phthisis, was well known to the ancients from the days of ARISTOTLE; and hence this country was recommended by them as a place of residence for consumptive patients. It is stated by CHARDIN, FRYER, KAYE, KERNS, and others, that consumption is seldom observed in *Syria* and *Persia;* and MM. BROUSSAIS, BOUDET and other French writers remark that phthisis is rare in the natives of *Algiers* and of the *Barbary Coast*, the mean annual temperature varying from 68° to 72°. The former of these writers observe, that in Algiers, where periodic fevers prevail, of 40,000 cases in the French army only 62 were consumptive; and that the deaths from this disease were 1 in 102, while in the army in France they were 1 i . In the *West India Islands* the annual mean t perature varies from 75° to 80°. The statem s respecting the prevalence of phthisis in these lands vary remarkably, and are often contradict ; but upon the whole it appears that this dis e is not infrequent among the dark races, especi y negroes who have been brought from Africa, d among creoles. Drs. MUSGRAVE, DAVY, d HUNTER say that it is rare among the indigen s inhabitants. The reports of Col. TULLOCH give e deaths from disease of the lungs annually in 1 0 of the population in Jamaica; and a greater m tality from phthisis among white troops statio d in these islands than in their own country, bu a much less mortality when stationed in the E t Indies.

207. The *East Indies* furnish a variety of imates, according to latitude, elevation above e level of the sea, and the other elements consti ing climate (see Art. CLIMATE.). The ann l isothermal lines vary accordingly from 66° o 82°; and although cases of phthisis amongst e native races are not rare, especially in the ls and other places, where several causes con r with race and climate in occasioning the dise e. According to the accounts furnished by STEW T, JACKSON, BALFOUR, SYKES, and others, it app s that external scrofula and phthisis occur, e cially the former, in the several races in the E st Indies, but in very different degrees of freque y. The writers on this subject generalise from v y limited sources of observation, in respect both f climate and race. It is, however, agreed that berculosis, both external and internal, are m st prevalent in the half-castes, or cross between e whites and natives. Col. SYKES states tha n 267,456 cases of all diseases treated during e years at the dispensaries in *Bengal and No* *West Provinces* there were 115 cases of exte al scrofula and three deaths, and 187 of phth is and nine deaths; thus showing a low rate of berculosis in the natives of India. Dr. BALF R states that phthisis is very rare in the nat s serving as troops in the *Madras* Presidency, e deaths annually from this disease being only 4 or ·3 per 1000. It should not, however, e overlooked that negroes, when removed eithe o the West or East Indies, are more liable to ph sis than in their native countries.

208. As to the frequency of phthisis in *Mad a* accounts are most contradictory; some wri s stating extreme opinions on the subject. U n the whole it appears, that the disease is not in quent among the natives, and that it is even c mon among the lowest class. In *Malta*, in *It* , *Spain*, *Portugal*, *Greece*, *European Turkey*, d southern parts of *France*,—in all the places o which consumptive patients are so often sent fr this country,—the disease is more or less prevale ; generally as frequent in all these places as in s country, and in some even more frequent. . ANDRAL states phthisis to be very prevalent n the Mediterranean Archipelago. Mr. SPENC R WELLS says that one-third of the deaths at e Royal Naval Hospital in Malta was from s malady; Dr. BURGESS, LUGOL, ANDRAL, M RYON, and others, phthisis is most fatal, especia y in certain localities, both in *Italy* and *Fran* ; and of these Orleans, Rheims, Montpellier, M seilles, Nice, Rome, Naples, &c., are not s

st remarkable. Mr. Ancell gives the follow table of the ratio of deaths from phthisis to all ths in the civil and military hospitals of these ntries :—

ghorn	Civil and military	1 in 10·75
rence	Civil	1 in 11·5
me		1 in 3·4
ples	Average of three hosp.	1 in 2·33
	Military	1 in 3·85
ris	Civil	1 in 3·25
	Military	1 in 12·2

Marseilles the deaths from this disease are ted to be one in four, in Naples one in eight, Nice one in seven ; but these can be viewed as proximations only to the truth. There can be doubt that, even omitting the deaths from other ercular diseases, those which occur from tuberlar consumption among the inmates of children's spitals or institutions, and those brought up in se institutions, are even greater than any just ticed in either of these cities. Dr. Caspar of rlin gives the following table of deaths from thisis in different cities in Europe and the United ates, the average being about one in six :—

erlin dur.	10 yrs.	1 death fr. phthisis in	5·7	deaths
aris	4	1	5·5	
ndon	2	1	6·2	
amburgh	3	1	4·6	
uttgardt	10	1	4·7	
ew York	11	1	5	
iladelphia	7	1	7·7	
altimore	8	1	6·7	
oston	7	1	5·9	

Belgium and *Holland* phthisis is quite as prelent as in England and France. In *Sweden* the aths from this disease are said to be about one nineteen of all deaths. Dr. Gellerstedt rearks that the mortality from this malady in the ilitary hospitals in Stockholm is eight in 1000, d that the life of a soldier is favourable to the oduction of phthisis, which he believes to be the increase in Sweden. According to a writer the British and Foreign Review, this disease is re in *Denmark*, and still rarer in *Norway*, *Lapnd*, *Iceland* and the *Feroe Isles*. In *Canada*, twithstanding the severity of the winters and dden alterations of temperature, the air being y, tubercular maladies, and especially phthisis, e comparatively rare. In *Russia* this disease is uch less frequent than in the southern countries Europe, although both Sir A. Crichton and r G. Lefevre state that external scrofula is ry prevalent, especially in St. Petersburg and loscow, and remark that those who bear about em scars from scrofula are supposed to be exnpt from phthisis.

209. " In the *Southern Temperate Zone*, between e isothermal lines of 40° and 70°, comprising e southern part of South America, the Cape of ood Hope, with a portion of South Africa, nearly e southern half of Australia, Van Diemen's and, and New Zealand, all accounts lead to the nclusion that tuberculosis is much less frequent an in countries situate to the north of the northn tropic." This comparative immunity is owing the remarkably less liability of the native races the disease, and to the general dryness of the r, notwithstanding the sudden vicissitudes of temperature. Other conditions, either not known, or imperfectly appreciated, may also concur to produce this result. In many parts of Australia, however, the quantity of dust so frequently floating in the air, during the hot and dry seasons, in some measure counteract the other beneficial influences of the climate as respects phthisis.

210. From the statistical information which has been furnished respecting the prevalence of phthisis in different parts of the globe, and which may be consulted in the works referred to hereafter, the influences of race and of the food adopted by races and by the inhabitants of different countries, are not sufficiently considered, or are even altogether overlooked. Although statistics may nevertheless furnish much that is important on this subject, yet there are other circumstances besides these which have not been taken into the account. Of these not the least important are, the influences of religious institutions and rites ; of the states of social intercourse ; of modes of living and of warming apartments, in cold and in temperate countries ; the effects of the soil, of vegetation, of water, and of the emanations from them. Of the agency of these, either in favouring or in counteracting the prevalence or frequency of phthisis, our knowledge is very deficient.

211. From the imperfect information furnished by statistics and by other sources of knowledge, and from what I have stated under Climate, I venture the following inferences as comprising most of what is known of the influence of climate, and of its more important effects, in causing tubercular consumption. — *a*. Phthisis is more or less prevalent in the northern temperate zone, especially in the countries of Europe and the United States of North America.

212. *b*. This prevalence is most remarkable in the Caucasian race, and in the crosses of this race with any other, more especially with the negro and other dark races.

213. *c*. The natives of countries to the northward of the temperate zone are rarely affected with phthisis while they reside in these countries and continue the habits and modes of life — of clothing, lodging, sleeping, living, and feeding — which are generally adopted by them ; but when they are removed to more temperate climes, and adopt the habits and modes of life of these climates, they evince a manifest tendency to phthisis, which is probably heightened by the nostalgia to which they are subject when removed from their native countries and from accustomed pursuits, habits, &c.

214. *d*. The negro and dark races inhabiting intertropical countries, and the dark races peopling the islands within the tropics, and those in the southern temperate zone, are rarely subject to tubercular consumption as long as they remain in their native countries and islands, and continue their usual habits and modes of living; but the offspring from a cross with the Caucasian race, especially when they remove to a temperate or cold and humid climate, and still more these native races when they migrate to such a climate, are even more liable to phthisis than the inhabitants of temperate countries.

215. *e*. The immunity of the natives of the countries to the north of the temperate zone from phthisis is mainly attributable to their active vocations in the open air, to the nature of their food,

and its adaptation to the temperature and climate, to the general dryness of the air, to the warmness of their clothing, whereby the skin preserves its depurating functions, and to the warmth of their sleeping places. (See CLIMATE, §§ 24, *et seq.*)

216. *f.* The immunity, or comparative immunity, of the negro and dark races from phthisis while they reside in their native countries, is chiefly to be attributed to their outdoor modes of living and exercises, to the adaptation of their food to high ranges of temperature, to the influence of miasmatous districts in counteracting the tendency to tubercular consumption, and in no small measure to the increased functions of the skin in these races; these functions being in them more decidedly supplementary of those of the lungs and liver,—more actively depurative of the blood than in the white race. (See Art. CLIMATE, § 22.)

217. *g.* The greater liability of the dark-skinned races to phthisis when they migrate to a temperate or cold climate, is mainly attributable to the asthenic diathesis of these races, to the depressing influence of cold, especially in cold sleeping apartments, upon the vital condition of their lungs—to the blight which a low range of temperature produces upon the organs of respiration; to the change in their habits, modes of living, food, &c. The proclivity of cross-breeds to this malady is partly owing to the causes just stated, in connection with their indolence, their debauched habits, their venereal excesses, and indoor occupations—if occupied at all. The dark races and mulattos, when they migrate to countries whose annual range of temperature is much below that of their native climates, are disposed to congestive or asthenic inflammatory affections of the lungs; in which, owing to the low grades of vital power and vascular action, the morbid exudation is incapable of the usual changes consequent upon sthenically increased vascular action; but, instead, assumes the tubercular form, or that state which is incapable of organisation, and equally incapable of absorption, and which undergoes the alterations characteristic of tubercular matter.

218. *h.* The Mongolian race, especially as typified by the Chinese, does not appear to be more liable to phthisis than the natives of the northern provinces of India and of the countries in Asia between China and Europe. Of the Chinese, as well as of these latter countries, our knowledge is very imperfect as respects the relative prevalence of disease. But from what I can learn, tubercular phthisis is not a prevalent disease among them, at least as long as they remain in their native climates and pursue their usual occupations, habits, and modes of living. How far the various races and tribes inhabiting these vast regions may be liable to this malady when they migrate to either colder or warmer countries, is not known; but the results must manifestly depend upon the many circumstances attendant and consequent upon such migration.

219. *i.* The food of man increases the disposition to phthisis in as far as it is not adapted to the constitution and wants of the races in their native countries—to the different races inhabiting cold, temperate, and tropical climates; to each of which it requires to be appropriate in its nature, as shown in the article CLIMATE (§§ 26, *et seq.*). This adaptation of food to race and climate extends to the beverages used by the inhabitants of different countries; the neglect of this princi of Hygienne being demonstrated by the destr tive effects of ardent spirits in the dark-skinned ees, which are so little injurious to the natives o old countries.

220. *k.* The influence of clothing upon t frequency of phthisis requires, equally with fo , a reference to race; and the considerations ich apply to the one appear in great measure to ply to the other. In all races the clothing, and the dark races the inunctions of the skin, in ad ion to the slight clothing required by the viciss des of season and weather, tend to promote the re lar discharge of the cutaneous functions; the air-skinned races of Europe and America being ose in which these functions are least active in h lth, and most liable to interruption.

221. *l.* Religion and religious rites m be viewed by many as exerting no influence o the frequency of phthisis or of any other dise in any climate. I believe, however, that rel ous rites exert some influence, but the extent o hat influence I cannot state; indeed, it would b impossible to ascertain it, especially in Mohamm dan countries, and in countries to the eastward a the north of the former. There can be no c bt, however, that the strictness of diet, and the tes of the Jews, notwithstanding several counterv ling influences to which they have been exposed d ing many centuries, have rendered scrofula, ph sis, and gout less frequent among them than a ong other peoples in their vicinity (§ 178.).

222. *m.* In our estimates of the influen of climate on the frequency of phthisis in the hite races, a cold moist climate, and low situatio and without being miasmatous, or a variable and mid climate, is the most favourable to the prod ion of this disease; whilst a dry, temperate, and derately elevated situation, with a regular proc ion of the seasons, or a limited range of temper re, is that which is most likely to diminish th frequency or arrest the progress of the malady. her considerations connected with climate wi be entertained when the prevention of phth is discussed.

223. G. *Confinement in prisons, barracks, lks, workhouses, hospitals, and expatriation,* &c. are severally productive of phthisis, both in the redisposed, and in those who have evince no marked predisposition; but in the former ost especially. In prisons, hulks, and workh ses several injurious influences, physical and m tal, combine to produce a more or less marked ect. Insufficient ventilation and exercise in the en air, want of light or sunshine, deficiency external warmth, low grades of temperature, onjoined with humidity, low and moist situa ns, and insufficient or unwholesome food, gen lly combined with depression of spirits, longings fter liberty, and weariness of prolonged or ho ess confinement, are the frequent causes of ph isis among the inmates of these places. Dr. LY states that, in a period of eighteen years in the ilbank Penitentiary, nearly half the deaths an alf the pardons on medical grounds were due to t ercular disease, the frequency of this disease rogressively increasing after a few months' co nement; and the ratio of mortality in this son being nearly four times more than that of th etropolis, as regards this malady. Dr. BAL has further shown that a similar increase of pl isis

ong prisoners occurs in other places of con- ement, both on the continent of Europe and in states of North America. Dr. ALLEN WEBB narks, on the authority of Dr. GREEN, that in jail of Midnapore, in Upper India, in 22° ″ north latitude, and 87° 25″ east longitude, d in the Calcutta prison, phthisis frequently curs, although in a hot climate, where this ease is but slightly prevalent. In these intertro- al prisons the malady often follows attacks of eumonia, or it assumes the acute and febrile m, or that described as most common in children § 92, *et seq.*).

224. Many of the conditions existing in prisons , to some extent, present also in *barracks* and in *rkhouses*. According to the *Army Reports*, the itish foot-guards are much more liable to con- mption than the general London population; d in most stations, both in temperate and in warm mates, the mortality from phthisis in barracks much greater than among the officers or the neral population of the country. As respects guards, something may be owing to the height the men, tall men being more frequently pre- posed to this disease than those of middle size; t much more is certainly owing to the congre- tion of numbers in a limited space, to the irre- larities and vices of a barrack life, and to the fluence of a vitiated atmosphere. The results e similar, and often more remarkable, in large blic or private schools, where a large number ep in one apartment, and breathe repeatedly the me air.

225. Confinement in *workhouses* and *hospitals* is jurious chiefly by inducing tubercular disease, in me form or other, and especially in that of thisis. In the hospitals for children this is pecially the case, as shown by MM. RILLIET d BARTHOZ. The continued respiration of the of an hospital or workhouse, without removal m the wards or apartments into the open air, is en more injurious than breathing a more impure r than that in these places, when exercise in the re open air is enjoyed during the day; the con- ued respiration of even a slightly impure air ing more injurious than the respiration after tervals of a much more vitiated atmosphere. he impurity of the air in these places is caused the numbers breathing the same air in a con- ed space, by the exhalation from the bodies of e inmates, and by the effluvia proceeding from seases, morbid discharges, &c. Infants of omen confined in lying-in hospitals often become nerally tuberculous if they remain long in these aces, as I have observed on several occasions hen consulting physicians to one of these insti- tions.

226. *Expatriation*, either by transportation for imes, or by emigration, unless the climate to hich expatriation takes place be dry and tempe- te, is generally followed by an increase of mor- lity caused by tubercular consumption. Even moval from the high lands and from the scenes early youth to the low and humid situations in e same latitude, although the temperature be ilder, causes an increased disposition to phthisis. his is partly owing to the mental emotions con- quent upon the removal so frequent in young rsons thus circumstanced, and is greatly in- eased by the nostalgia produced in these in- ances (§ 213.).

227. *E. Poverty, and the vicissitudes of fortune and of life* have no mean influence in both predisposing to and exciting tubercular consumption. MM. LOMBARD, D'ESPINÉ, and LEBERT have furnished sufficient evidence that this malady is much more prevalent among the poor than among the middle and highest classes of society. M. LOMBARD states that the combined statistics of phthisis in Vienna, Paris, Hamburgh, and Geneva, show that the disease is doubly more prevalent among the poor than in the higher classes. Every competent observer must have remarked the occurrence of phthisis after the loss of fortune, honour, and friends, and have seen mental depression, conjoined with poverty, slowly developing this disease in its most irremediable form, in all temperaments and constitutions, and even independently of hereditary or other states of predisposition. (See also §§ 170, *et seq.*).

228. v. PATHOLOGICAL CAUSES OF PHTHISIS. — Previous disorder or disease more frequently both predispose to and directly occasion tubercular consumption than is commonly supposed; and the effect is produced not merely by calling the tubercular germs into activity where they already exist, but also by causing their formation and progressive development where no evidence either of a tuberculous diathesis or of their existence had been previously detected. If we endeavour to trace the pathological changes as they successively occur, and remark their nature, from those characterising the previous disorder, to those which interpose between that disorder and those which constitute the incipient stage of phthisis, we shall be especially struck by the influence produced upon the vital and constitutional powers by the disorder, although apparently slight, which has occasioned this malady. Several of these disorders are so insidious, and others of a more important nature are in some cases so mild, as not to excite any apprehension as to the effects they may produce, and thus they are allowed to proceed, or are exasperated by exposure and neglect of proper treatment and regimen, until the changes or states which either indirectly lead to tubercular deposits, or directly produce them, more or less fully supervene. In other cases severe attacks of disease, either inflammatory or exanthematous, are injudiciously treated or neglected towards and during convalescence, owing to the desire of the patients or their friends to get rid of medical attendance; or are imprudently or prematurely exposed to the various internal and external causes of disease, and especially to those which in such circumstances more particularly depress organic nervous power, disorder digestion and assimilation, and blight the vital functions of the respiratory organs. During convalescence from epidemic and exanthematous maladies, and from inflammatory affections of the respiratory passages and organs, the patient is often left, by his own self-will and ignorance, without those means which are required to restore his exhausted vital energies, to renew the vigour of the organic nervous system, to improve digestion and assimilation, and to promote the healthy metamorphosis of the colourless chyle globules into the red globules of the blood. In many diseases, and especially in exanthematous and other fevers, the waste of the hæmatoglobulin is progressive, and at the period of incipient convalescence it is generally greatest, and

the blood is then poorest and most deficient in red globules. Now, if these states of exhausted organic nervous influence, and of impoverished circulating fluids, be not improved by judicious treatment and regimen, or by change to a healthy air, &c., and more particularly if they are influenced by injurious exposures or agents, digestion, assimilation, and nutrition are liable to be perverted, and tubercular germs are thereby rapidly developed, or are directly or primarily produced.

229. *A. Previous disease of the respiratory and circulating organs* has no mean influence in predisposing to, or in directly occasioning phthisis. Frequent attacks of catarrh, catarrhal fever, influenza, hooping-cough, bronchitis, broncho-pneumonia, pneumonia, &c., are severally calculated to develope phthisis, particularly in the scrofulous and lymphatic diathesis. In these diseases the evil is not always to be ascribed to the development during their course of the germs of tubercle which had previously existed, but to the primary formation of these germs or deposits during their progress and decline, or their periods of decadence, constituting the early stage of convalescence. In this stage excited action has subsided into more or less of exhaustion, vital power is locally or generally impaired, the circulating fluid somewhat wasted as respects its most assimilated elements, and the digestive and assimilating functions considerably weakened. Diseases of the heart, especially valvular diseases, causing either congestion of the lungs or hæmorrhage from the bronchial tubes, have also no mean influence in developing phthisis; for the congestion thus occasioned is not unfrequently productive of an exudation either into the air cells or into the parenchyma of the lungs, which passes into the tubercular form, or is converted into or becomes the nidus of fully developed tubercles. Similar results may also follow the exudation of blood from the bronchi, especially if the fluid pass into the air cells.

230. *B. Exanthematous diseases* are often followed by phthisis; and this latter malady is more likely to originate during the decline of these diseases, or in their early and advanced stages of convalescence, than at an early period. Of all this class of diseases there is none that is more productive of phthisis, or more rapidly developes it, where the germs of the malady already exist, or where a predisposition to it is present, than *measles*, and this is more especially remarkable in persons about or above the age of puberty. I have often observed persons who, by diathesis, hereditary predisposition, or other circumstances, were possessed of a consumptive tendency, pass through measles without any marked pulmonary complication, or any pulmonary disorder that could be detected by auscultation or otherwise, and yet, during the progress of advanced convalescence, or soon afterwards, indications of incipient phthisis have appeared, especially if any exposure or want of care had favoured the development of the malady. In this, and in others of the exanthemata, the decadence of the disease, and the consequent convalescence present, as just stated, the most favourable occasions for the origination of phthisis, and these should be carefully guarded against.

231. Of all the exanthemata, there is none so
unfrequently followed by phthisis as *small*
It would appear that this latter malady ei
carried off most of those predisposed to phth
when smallpox was a more prevalent dise
than it is now, or it destroyed the predispositio
phthisis. I have long remarked, and I beli
that others have also remarked, the very r
occurrence of phthisis in any one even but sligl
marked with smallpox. It is manifestly ot
wise with *vaccinia*, for what I have stated w
respect to its influence on the frequency of Scr
ula (§§ 47—49.), is equally applicable to phth
It does not appear that *scarlet fever* is influen
in producing or developing phthisis further t
that the debility consequent upon it, during con
lescence, requires a careful protection from
posures and other exciting causes of this la
malady. Scarlet fever is often attended or
lowed by enlargement and suppuration of
glands of the neck, especially in scroful
subjects; and in these cases, as well as in o
scrofulous cases, when these glands suppur
the liability to tubercular consumption is ther
greatly diminished.

232. *C. Suppressed or excessive secretion or*
cretion is often more or less concerned in occas
ing phthisis. The suppression of an accusto
evacuation or discharge, or the drying up of
issue, seton, or ulcer, or the healing of a fistu
ulcer, as *fistula in ano*, has been followed
phthisis; but in all such cases as have fa
within my observation the disease had c
menced previously, or had even made some
gress; the suppression of the discharge, especi
of hæmorrhoids or the catamenia, or of
cutaneous excretions, having been followed
more acute form of the disease, or having
veloped a chronic, or slow and insidious stat
phthisis, into the congestive, inflammatory, ac
or hæmorrhagic, according to the diathesis
habit of body of the patient.

233. On the other hand, excessive dischar
whether hæmorrhagic, secretory, or excret
may so weaken the constitutional powers—ma
depress organic nervous energy and impove
the blood, by wasting its hæmato-globulin, a
be followed by tubercular phthisis, either wh
a predisposition to it already existed, or wh
causes tending to blight the vital condition of
lungs were in operation, as cold, humidity, &
excessive losses of blood, by operation or f
hæmorrhoids, from menorrhagia, flooding, &
prolonged or improper suckling, diarrhœa or
sentery, cuteric fevers, masturbation, and vene
excesses,—have severally not infrequently ei
caused or developed phthisis, especially whe
predisposition to it was present.

234. *D. Impaired organic nervous or vital po*
or debility, whether hereditary, original, or
quired during childhood, youth or maturer
is more intimately connected with the occurre
of phthisis than is generally supposed, and is
rectly concerned with the causation of the
paired conditions of digestion, assimilation,
nutrition, which constitute a large portion of
circle of morbid actions characterising the c
mencement and early stage of tubercular c
sumption. (See Debility.)

235. *E. Morbid state of the circulating flu*
both the chyle and blood, that are so often pres
at an early stage of phthisis, or even before

has manifested itself, are the first results of
irment of the organic nervous power; and
ough comparatively rarely declared in the
of anæmia or chlorosis, yet they consist of
eater or less deficiency of the hæmato-glo-
n, and especially of the red globules, with an
ss of the colourless globules, and a weakened
is or diminished vital cohesion of the fibrin,
consequently of the coagulum.

36. VIII. Of the Operation of the Causes
Phthisis. — *Phthisis*, whether hereditary, con-
ital and proceeding from causes affecting the
nt, or produced by causes acting during early
mature age, generally arises from a concur-
e of causes, one or more of which may be
h more effective than the rest; they may
either contemporaneously or successively, or
influence produced by one or two may be
forced or determined by others acting subse-
ntly.

37. i. The causes, then, either affecting the
ents, and the offspring through them, or the
vidual only during early childhood, or sub-
uently, in the many modes of combination
succession that most necessarily arise from
r numbers, are of such natures as to impair
l power, especially as manifested by the
anic nervous system, and by the organs and
ctions endowed by this system.

38. ii. As this system actuates the vascular
em and the blood, and as it influences also the
estive, assimilating, and nutritive functions, the
retions and the excretions, so it necessarily
ows that causes which depress or exhaust, or
erwise impair the influence or power of this
tem — the organic nervous — will co-ordinately
ct the states of the assimilating functions, of
blood, and of nutrition.

39. iii. The following may thus be inferred as
successive or morbid phenomena resulting
n the action of the causes of phthisis, whether
urring singly or in various combinations, or in
cession: 1st. Depression of the organic ner-
s or vital power of the frame, or an imperfect
elopment of this power, owing to hereditary
congenital, or to more immediate or direct
ses operating in early or advancing epochs of
; 2nd, Morbid states of the circulating fluids,
ecially of the chyle and blood, commencing
h the slow or imperfect development of the
le globules, and followed by a slow or im-
red metamorphosis of these and the blood
bules, or of the former into the latter, — the
sma or *liquor sanguinis*, with its fibrine, being
icient in vital endowment; 3rd, A wasting or
inution of the red globules, and an impair-
nt of the crasis or vital endowment of the
sma by excessive secretion and excretion from
lungs, skin, and bowels; 4th, The nutrition
l vital cohesion of the tissues—the organisation
the frame ultimately suffers.

40. iv. These changes in the organic nervous
luence or vital power, in the circulating fluids,
d in the nutrition of the structures, produced
the causes of phthisis, may take place contem-
raneously and co-ordinately; but they may
re reasonably be supposed to advance in suc-
sion, however rapidly, impaired organic nervous
wer accelerating and increasing the other sub-
uent changes. That this procession of morbid
anges actually obtains may be inferred from the modes in which the causes may be presumed to operate; for those causes which primarily and chiefly affect, by depressing or impairing, or imperfectly developing, organic nervous power, as hereditary influence, the depressing emotions of mind, &c., may rationally be presumed to operate consecutively, and to no slight extent also impede and disorder digestion, assimilation, and the healthy metamorphosis of the chyle and blood globules, and ultimately the nutrition and vital cohesion of the tissues. Many other causes which more directly tend to prevent the development of the chyle and blood globules, or to promote their waste or destruction, as insufficient food, increased discharges, &c., depress organic nervous or vital power, while they impair or arrest nutrition. Certain causes, again, exert a still more extended influence; for they act directly and manifestly, both by depressing or exhausting vital power and resistance, and by accelerating or increasing the waste and destruction of the hæmato-globulin; nutrition, and the healthy conditions of both the fluids and the tissues being more or less impaired. The most influential of these last causes are premature or excessive sexual indulgences in either sex, masturbation, excessive secretions and discharges, sedentary occupations in ill-ventilated and over-crowded apartments, impure air of any kind, confinement and insufficient exercise, defect of light and sunshine, &c.

241. IX. Treatment of Tubercular Consumption. — i. Historical Sketch of the Treatment recommended by Authors. — It was remarked by Dr. Young, one of the greatest of the many names that adorn the literature and science, not only of our profession, but of our country, in his learned work on "*Consumptive Diseases*," that although we may not obtain, from the medical writings of the ancients any great variety of information immediately applicable to practical purposes, we may still feel a sufficient interest in the history of a science which deeply engages our attention, to induce us to inquire, how long the few truths which are fully established with regard to it, have been sufficiently demonstrated. "When, indeed, a fact is once well authenticated, no accumulation of authorities can be sufficient to invalidate its credibility; yet we cannot help placing a greater degree of confidence in opinions which we are, for other reasons, inclined to adopt, when we are informed that they are sanctioned by the observations of the most respectable authors of every age." It is necessary to premise that, until the commencement of the nineteenth century, the sub-acute and chronic forms of *bronchitis* were very generally described and treated as forms of *consumption*, and even as true *tubercular phthisis*; and that this want of precision in the diagnosis of these diseases led not only to a much greater diversity of opinion as to their treatment, but also to a marked difference in the reputed results of the means employed. The general misconception existing among writers respecting the precise nature and seats of bronchitis, and tubercular formations in the lungs, and their consequences, should be kept in recollection in reading the following sketch; for it will then become apparent that much of the benefit produced by many of the means recommended was actually not manifested in cases of tubercular consumption

but in those of sub-acute, or asthenic, or chronic bronchitis. (See Art. BRONCHITIS.)

242. HIPPOCRATES frequently mentions tubercular consumption by the name phthisis, phthoe, and empyema, and states that the age most liable to it is from 18 to 35. He notices many of its most prominent phenomena; as the taste and appearances of the expectoration, the pain between the back and sterum, the frequency of hæmoptysis, the quick, wheezing respiration, the cough, the condition of the hair and nails; the sweats, diarrhœa, emaciation, pleural adhesions, &c. His treatment is not always consistent with itself. He advises caustics externally, emetics, purgatives in moderation, oxymel, milk diet, especially asses', goats', and mares' milk, warm from the animal; walking exercise; avoiding the extremes of heat and cold. In addition to these, several other, and often opposite means are advised in different parts of his writings, to which it is unnecessary to refer.

243. In the works of ARISTOTLE are to be found the earliest notice of the opinion that phthisis is infectious. He states that this disease makes the breath corrupt and offensive, and those who approach the diseased person breathe air vitiated by him.—PLAUTUS mentions resin and honey as being employed by the Romans for hæmoptysis; and DIOSCORIDES, the physician of Cleopatra, and the greatest writer on the materia medica in ancient times, recommends sulphur — a substance which has been employed in various forms, even down to the present time.—ARETÆUS considers ulceration of the lungs as genuine consumption, called it phthoe, and gives a good description of the disease. Most of the chapter on the treatment is lost, but in what remains milk diet and sea-voyaging are strongly advised.

244. CELSUS states that, in genuine consumption, a long sea voyage and change of climate are most advisable, if the strength will permit, and the climate of Alexandria is preferred by him. He remarks that the worst air for any disease is that in which it has originated. Amongst various other means he recommends milk-diet, with garlic, leeks, &c., with vinegar; farinaceous articles, occasionally some mild animal food; flour boiled with mutton suet, and some light and austere wines. He advises the cautery on various parts of the chest, and the ulcers not to be healed as long as the cough continues. He mentions several other remedies, as horehound with honey; the juice of plantain; garlic in wine, raw or soft; eggs with sulphur; hyssop; turpentine boiled with butter and honey; carriage exercise; sailing on a long sea voyage. For hæmoptysis he advises bleeding, cupping, wool wet with vinegar to be placed where pain is felt; a cool apartment, and rest.—The elder PLINY enumerates many substances as specifics for consumption, especially ammoniacum, a course of milk in the mountains, the juice of plantain, a linctus of betony with honey; goats' fat in gruel, or with honey and water, and a little rue, and various other means less rational.

245. The works of GALEN furnish many prolix and digressive discussions on phthisis. The expectoration of cretaceous concretions was first noticed by him. He believes in the infectious nature of the disease. He prescribes vinegar much diluted with water for the hectic; bleeding, an emetic, purgatives, frictions, baths, exercise, a milc piate at night, and removal to *Stabiæ* for th advantages of the air and milk of that place. He remarks that the air of that place is dry, the astures healthy, the hills of moderate height, ree miles from the Bay of Naples, sloping gent to the west, and near to Vesuvius, which make the air still drier by its volcanic heat, and defe s it from the north-westerly winds. At Stabia he says, that the milk of cows is used; but he onsiders asses' and goats' milk preferable, the fo her being lightest, the latter of an intermediate na re. In order to allay the cough and improve the expectoration he prescribes frankincense, m rh, saffron, squills, liquorice, mastich, tragac th, &c., with syrup of grapes and honey. Whe the discharge is excessive, he employs opium nd castor, or aloes, mastich, and saffron; or the ice of hyoscyamus with pepper; or a lozenge of ri*bonius Largus*, containing liquorice, myrrh urpentine, and tragacanth; or sulphur, with c damoms and cinnamon. Most of GALEN's pre iptions were copied from those of the physician ho had preceded him. Various modes of prep ing the *diacodium*, consisting chiefly of syrup of oppies and honey, are given; and for dry co hs, iris with honey is recommended, and for h noptysis, roses, gum, tragacanth, bole, linseed nd polygonum; and for the consumption conse ent on it, iris with hyssop, bitter almonds, the ju of squills, with honey, southernwood, and v ous other substances.

246. CÆLIUS AURELIANUS gives a tolerabl orrect account of the disease by the name of ph isis or phthoe. The medicines he prescribe are honied water, fenugreek, iris, aristolochia, um, and horehound; also fir-cones, with hone and liquorice; and diacodium with butter and h ey. Sailing especially to a distant climate and ading aloud are also advised. He censures th use of emetics, and considers the cold bath dang ous. For hæmoptysis he directs astringent electu ies, and pomegranate with aloe, as advised by HEMISON. If the hæmorrhage continue in m ration, he prescribes bloodletting on the third day, as inflammation will then take place; but the symptoms are urgent with dyspnœa, ble ling should be practised at an earlier period.—O BASIUS gives merely an abstract of GALEN's actice, and remarks that a milk diet is of mo importance than all other remedies.—AETIUS kes a similar remark respecting asses' milk. H also recommends venison fat dissolved in soup and caustics to the chest.—ALEXANDER TRA IAN gives ripe fruit for the hectic of phthisis, esp ally grapes. When concretions are expectorat he employs a cooling diet; and for the cou the juice of lettuce with liquorice; and the diac ium for relieving thirst and excessive perspiratio He also mentions the hermodactyls and their c binations. In the writings of PAULUS ÆG ETA and ACTUARIUS, there is nothing beyond w t is contained in the works of GALEN.

247. The *Arabian* writers exhibit no vi s of the nature and treatment of phthisis differen rom those which have been given by the G eks. RHAZES, the most original of these, strong recommends a milk diet, and fumigations f n a mixture of orpiment, aristolochia, myrrh, rax, and galbanum in equal parts, with a su ient quantity of butter.—AVICENNA prescribes am-

r lozenges; in the early stages bleeding; and erally a dry air, a milk diet, and sugar of s. In all else he closely follows Galen.

48. The medical writers of the fifteenth, and of first half of the sixteenth century, follow the trines and practice of the ancients, with the eption of Paracelsus. He recommends a der for phthisis, containing crude antimony crocus martis. He considers diet to be of the test consequence; and advises a bath to be d containing a decoction of herbs with sulphur. uchsius was the first to notice digitalis, but in ry imperfect way. Fernelius, whose reputa- was high in the sixteenth century, praises s' milk, and small bleedings for hæmoptysis; ll things he principally followed Hippocrates. mius notices the infectious influence of the ectoration and breath in phthisis, and the he- tary character of the malady. The work of olas Piso is only a compilation from Galen other ancient writers. Prosper Alpinus ely states, in his work on the Diseases of Egypt, phthisis is one of the endemic maladies of the ntry. Forestus was amongst the first to give s in detail; but he professes merely to follow doctrines and practice of Galen. Among the ns which appear to have been most beneficially d by him in consumptions are asses' and goats' ; and sulphur with the white of egg. Schenk ces the use of turtle broth, and snails fattened sugar and flour for hectic; but his materials chiefly compiled from other writers. Most of remedies he mentions have been already no- d; but we find that Avenzoar prescribed olive Rubæus sulphuric acid, and J. G. Schenk balsam of sulphur, in phthisis. The volu- ous writings of Ballonius or Baillou, a sician in large practice in Paris at the end of fifteenth century, contain nothing more deserv- notice respecting phthisis than a remark as to frequent occurrence of the disease in those have nursed others affected with it.

49. Poterius, a physician to the French court, ck out novel modes of practice in this disease, kept the preparation of most of his chemical licines secret. These, as far as they are known, n to have been oxydations of tin, of mercury, ilver, of antimony, of gold, &c., with various er substances. He employed sugar of lead as frigerant; and a preparation which, under the e of the antihectic of Poterius, long enjoyed reat reputation. Dr. Young states that this icine appears to have consisted of two parts of and one of antimony, oxydated by means of e. He professes to have cured phthisis by ng five drachms of balsam of sulphur every ning with syrup, and the antihectic in the ning, sulphur lozenges and iris being held con- tly in the mouth, with a diet of wine and nal food. The balsam of sulphur he recom- ds to be made with the oil of almonds, and n in milk; other oils make it too heating. gelius states that consumptions are more com- in England than elsewhere, owing to the it of confining the chests of females by tight ss; and that in Venice, where this habit does exist, females are more healthy.

50. Sennertus, whose works were very gene- y confided in at the commencement of the nteenth century, closely follows Galen. He siders the debility, diarrhœa, &c., to depend, in phthisis, upon an acrid or morbid secretion generated in the lungs. He prescribes many medicines, especially rhubarb, with infusion of roses and goats' whey; and he cautions against too copious evacuations of any kind. He advises an issue in one or both arms, if the debility and emaciation be not extreme. He remarks that sulphur was first recommended in phthisis by Dioscorides; and he makes favourable mention of honey, roses, horehound, hyssop, &c. He quotes other authors in favour of guaiacum and ginseng. Bontius, in his Medicine of the Indies, gives a case in which he supposes that fragments of the bronchi were expectorated, but which are mere false membrane formed on the bronchial surface. For true consumption he praises his opiate extract of saffron, which he says stops bleeding, quiets the cough, and has alone cured many desperate cases. He also prescribes conserve of roses with poppy seeds and sulphur, and decoction of ginseng or of sarsaparilla. Verily there are much worse modes of treatment employed in recent times than those adopted by Sennertus and Bontius. Tulpius furnishes nothing more deserving notice than the advantage obtained in a case of the disease by eating oysters daily.—Fabricius Hildanus describes several dissections of phthisical subjects, and notices the complication of pulmonary with mesenteric lesions, and the presence of calcareous concretions in the lungs. He relates several instances of successful recourse to setons.

251. Our countryman Bennet, as Van Swieten and Dr. Young very justly remark, has much surpassed his predecessors, and most of his successors also, as a writer on consumption, which he experienced in his own person. He pays marked attention to the breathing and the sputa, to the prognosis, and to the several contingent affections in the course of the disease. For hæmoptysis, leading to phthisis, he advises bleeding, warmth to the extremities, and bleeding from the feet in females, if the catamania be scanty or suppressed. He recommends milk and milk diet, but prefers medicated whey, and reprobates the use of saccharine substances, as productive of an injurious fermentation. He considers the best expectorants to be those which contain resin and turpentine. Bennet also has recourse to frictions and fomentations, and to balsamic fumigations. These last should consist, in his opinion, of frankincense, turpentine, and styrax, with cinnamon, coltsfoot, and other articles, made into a powder or troche, and burnt on coals. He prescribes also mixtures of herbs, on which boiling water is poured, and the vapour to be enhaled by holding the head over the vessel containing them. Issues are much praised, and, according to my experience, with very great justice. He directs them in various situations, according to the symptoms, and he considers that they may be kept sweet by using peas of orris root, and when the discharge should be promoted equal parts of hermodactyls and wax. He recommends Welsh flannel to be worn next to the skin, and not to be too frequently changed. Animal food, neither very fat nor lean, is allowed, and a gentle emetic is given when the stomach is loaded, and a decoction of sarsaparilla and other woods with ginseng is recommended for drink. If we except the recent employment of cod liver oil in phthisis, in what, it may be asked, has the treatment of this disease been advanced

since the appearance of the work of Bennet, by the voluminous writings of specialists and stethoscopists in recent times?

252. The continental writers of the middle of the 17th century afford very little information as to the treatment of phthisis beyond what was previously known. Silvaticus confided chiefly in bleeding, issues, and sulphurated lozenges. Riverius notices the infection of persons who had nursed phthisical patients. Among the many substances already mentioned he particularises guiacum, Peruvian balsam, and the stomachic, and the diaphoretic gold, of Poterius. Bartholin furnishes nothing deserving notice further than that sitting apartments may be made, by suitable vapours or medicated effluvia, useful substitutes for a voyage to Egypt or other warm countries. Sylvius attributed phthisis to the existence of glandular tubercles, which, when in a state of suppuration, constitute the vomicæ. For the cure of the disease he administers opiates, demulcents, and emulsions, fumigations, decoctions of the woods, hermodactyls, &c. He praises balsam of sulphur, prepared slowly with oil of aniseed, and says that it facilitates expectoration and relieves the breathing. He considers the milk of sulphur to be much inferior to it. To promote the appetite he prescribes the elixir proprietatis, which is made of myrrh, saffron, aloes, sulphurous acid, and spirit of wine, digested together. The diet he allows comprises wheaten bread, broths, milk, yolks of eggs, biscuits, with a little generous wine.

253. Gideon Harvey gives a tolerably good description of phthisis, notices bleeding, and remarks that great caution is required in practising it. He prefers whey to milk, gives it liberally with conserve of roses, and mentions the imperatoria as being recommended to him for this disease. Willis remarks that the atmosphere of towns is not always unfavourable to consumptive patients, for he has observed many have better health and less cough in London than in the country. He prescribes sulphur in all forms, several balsams, and tar-water. After bleeding he advises narcotics, the muscus pyxidatus, warm bathing, frictions, blisters, &c. Diemerbroeck mentions the case of a person who was cured by taking goats' milk thrice daily for three months, without any other medicine. Bonetus furnishes some information as to the lesions formed in phthisical cases, but it is of a very loose and imperfect kind, chiefly furnished by former writers, many of them of little reputation.

254. Of the writings of Sydenham, which have been extravagantly praised, but which are now more justly estimated, Dr. Young justly observes, that "among the practical writers on consumption he cannot be considered, even by his warmest admirers, as holding a distinguished rank." His pathology of the disease hardly deserves notice. For a confirmed consumption, medicines are, he remarks, of little use; but bleeding, mild purgatives and pectoral remedies may be tried, with incrassants or attenuants, according to circumstances. For the fever he gives refrigerents, asses' milk, emulsions and opiates. For hæmoptysis he directs bleeding, cathartics and the avoidance of animal food. Horse-exercise is very strongly recommended by him; and he states, with the truth that many cannot fail to appreciate, that riding cures consumption as certainly as l k cures intermittents. Carriage-exercise is a o praised by him. For simple cough he prescr s abstinence from wine and meat, for a few da ; ten drops of anisated balsam of sulphur, ta n occasionally on a lump of sugar; lozenges c- taining liquorice, alecampane, anise seed, an- lica, iris and sulphur; and a linctus of oil f almonds, with syrup of capillaire and violets. f the cough be obstinate or attended by fever e orders bleeding and catharties; and, if the pat t becomes consumptive, ten drops of Peruvian l- sam, three times a day, a decoction of bitter pla s, riding being the chief remedy. G. Harvey, a r ridiculing the treatment of consumption prop d by his predecessors, concludes that there a single cheap remedy which does wonders; but is remedy he conceals. The only remark made y him deserving notice is, that hectic is gener d by the pus which enters the blood; for the dis e is partly an affection of the fluids, and not, as s sometimes been supposed, of the solids alone.

255. The *Phthisiologia* of Morton was for n e than a century the basis of practice in consu - tion, although in all most important matte it was anticipated by the writings of Bennet. T e remains, therefore, but a few topics deserving - tice. Chalybeate waters are considered by n as preferable to all other means for the preven n of the disease, especially in scrofulous cons - tions; he directs them to be taken freely, ei er cold or warm. He considers catarrh to be e most frequent cause of phthisis; and infec n sometimes to occur, for he believes that it ma e communicated to a bed-fellow. When proc - ing from this latter cause, he considers it t e most fatal. He recommends bleeding in the e y stage, but views it as fatal in the advanced sta s, and opiates for the cough with purgatives, as e aloetic tincture. After bleeding emetics are vie d by him as of great benefit, in the first stage, t they ought to be followed by opiates. He e- quently prescribes his stomachic pills, consis g of aloes, myrrh, mastich, saffran, cloves, w - wood, nutmeg, calamus, mace, rhubarb, m , cardamoms, &c. In scrofulous and scorb c consumption he recommends pills of gum am - niac, with benzoin, balsam of Peru, and sulp r. But in all forms of phthisis, especially in the n e advanced stages, he considers cinchona the g t and general febrifuge. Several forms and c - plications of consumption are particularised y him as requiring different or additional mean f cure. He says that, in asthmatic phthisis, op n is injurious, by increasing the dyspnœa; but t ammonia and the citrate of potass are most us l remedies. In the melancholic and hyster l phthisis, emetics, he avers, act like magic, d opium is particularly requisite. For phthisis c - plicated with hæmoptysis, after venesection d other remedies, he gives the bark in doses a drachm every four hours. He remarks that - culi may form in the lung, may lie there a l g time inactive, or they act as foreign bodies. C - sumption consequent on syphilis he considers o be of an asthmatic nature. Chlorosis often pa s into phthisis, he justly observes, by impercep e degrees, if not treated by chalybeates and pu - tives. When he suspects internal ulceration, e gives from 20 to 30 grains of calomel every t l or fourth morning, and the diaphoretic antim y

ight. **BRUNNER** states that he "entertained ing doubts of the propriety of **MORTON**'s prac- of giving cinchona in hæmoptysis, till he nd by experience that it succeeded, where ry thing else had failed." (**YOUNG**, p. 203.)

256. **ETTMULLER** recommends emetics early in hisis, and a diet of milk and raw new eggs. **GLIVI** furnishes us with nothing novel, except- that he supposes ipecacuan to be the best nedy for this disease, and for all hæmorrhages l discharges. **WEPFER** furnishes some of the liest information as to tubercles. In his ob- vations on diseases of the head, he gives an ount of an *endemic* consumption at Waldschut the Rhine, where there is a cavern in which l-stones are dug and wrought. The air is re always hot — even in winter, and a very dust floats in it. All the workmen employed it become consumptive, if they remain a year, even a shorter time.

257. **STAHL**'s opinions as to the treatment of hisis are not worthy of his reputation. His narks are chiefly directed to the non-efficacy most of the means which had been advised to his time, and many of his observations just. He reprobates the use of balsams, ates, expectorants, cinchona, myrrh, balsam sulphur, &c., and confides chiefly in bleed- , and nitre in moderate doses; and asses' lk, he says, is fit only for asses. The too general or inappropriate use of these and other me- ines — the universal employment of a medicine cause it has been advised, or found useful in one even a few cases, is mere empiricism. It is appropriate exhibition of a medicine to in- red pathological conditions, which constitutes ional practice. He remarks that females are re frequently consumptive than males; but y have a greater chance of escaping its fatal mination. He considers exercise on horse- ck, or in a carriage, to be the most beneficial nedy for phthisis. **FULLER** agrees with **STAHL** to riding on horseback being most salutary in s disease, when "without fever or ulcer;" but adds that "the patient must be a Tartar, and e on his horse."

258. F. **HOFFMANN**, the rival of **STAHL** in repu- ion, fully discusses the treatment of hectic fever d phthisis. He remarks that hectic attended indigestion may often be relieved by an emetic ipecacuan, followed by a dose of aloes. If nenorrhœa be a concomitant, bleeding in the t and deobstruents, are prescribed by him. mesenteric disease complicate phthisis, as often served in children, warm bathing, nitre, sul- ate of potass, and sal-ammoniac are recom- ended. In all hectics he considers milk a incipal remedy, especially woman's milk, asses' lk, goats' milk, or cows' milk, with manna or nserve of roses, or with seltzer-water. He also ntures to give the tincture or infusion of roses, scarilla, cinchona, and nitre. He gives the uriate of potass when the appetite is weak. leeding, he says, should be practised with much ution. He adverts to a patient who was kept ive thirty years by losing some blood twice a- ar, and drinking a decoction of ginseng and ssafras. The treatment which he more espe- lly advises for phthisis is somewhat similar to e foregoing. He thinks justly, that, where a edisposition to the disease exists, it may be called into action by attendance on a consumptive patient. When a milk diet occasions acidity, he substitutes whey; with which, or with milk, mineral waters, or lime-water, may also be mixed. He considers the best laxatives in phthisis to be manna, magnesia, rhubarb, or senna taken in milk; and milk or whey with parsley-seeds, or celery-seeds, to be the best diuretics. He is not favourable to the use of gum-resins or balsams, if they occasion, or if given during, febrile action. Myrrh, saffron, copaiba, opium, honey, wax, spermaceti, and oil are viewed more favourably. In the young and plethoric, small and frequent bleedings, air, exercise, and warm baths are, he believes, the best prophylactics. He considers half the cases of consumption to originate in hæmoptysis, and he advises that the bleeding should not be stopped too soon by astringents. In advanced cases, bleeding to the amount of an ounce only, often relieves the breathing. He says that emetics and strong cathartics are injurious. He makes favourable mention of issues, and of a stomachic elixir, composed of myrrh, saffron, nutmegs, and buck-bean, which is to be taken at meals, consisting chiefly of milk diet, broth, and ptisan. For the colliquative perspiration he gives nitre and opium in small doses. He often prescribes also sulphur and diaphoretic antimony; and the combination of milk with mineral waters is much praised by him. It will be seen that the treatment adopted by this great physician is, in most respects, of great excellence, and when employed appropriately to the circumstances, form, and stage of the malady, by no means inferior to any adopted at the present day.

259. **MUSGRAVE** was the first to point out the connection of phthisis in some instances with irregular gout. The treatment he advises is not materially different from that recommended by **BENNET**, **HOFFMANN**, and others. **BOERHAAVE** furnishes no information as to the treatment of phthisis in any way worthy of his great reputation; his practical judgment appears to have been overlaid by his hypothetical doctrines. The respectable synopsis of **ALLEN** furnishes one very good suggestion, namely, the propriety of the liberal use of buttermilk in consumption. He also believes in the contagious nature of the disease in certain circumstances favourable to its operation. **WHERLHOF** comes to the defence of cinchona and **MORTON** against the attacks of **STAHL**. **DOVER** in his ancient Physician's Legacy, appears in his heroic character of buccaneer in the treatment of phthisis. He advises a frequent repetition of bleeding in small quantities, horse-exercise, crude quicksilver in large quantities, a substance much in fashion at the commencement of the eighteenth century; and aniseed and crocus martis made into pills with the balsam of Locatelli, in the morning, and elixir of vitriol in the afternoon. He gives also his powder, which originally contained nitre instead of the sulphate of potash of the modern powder. He advises the antiphlogistic regimen.

260. P. **DESAULT** deserves notice for his having been the first to contend that tubercles in the lungs constitute the essence of consumption; that they are generally antecedent to hæmoptysis; and that ulceration of the lungs is merely an effect and not a cause. He adds nothing to what has already been stated as to

the treatment. Juncker, the methodiser of the doctrines of Stahl, furnishes but little information respecting phthisis, and almost none deserving notice, excepting his approval of riding, and his disapproval of warm balsams and aloes. Wainewright considers Cheyne correct in concluding, that the quantity of blood is much diminished in hectic, and thinks that pectorals and balsamics are injurious, unless they serve as stomachics and diuretics. He prescribes gentle emetics, mild stomachics, riding, pure air, frequent blisters, and a light, digestible diet. Dr. Thomson is in favour of small doses of antimonial wine in consumptions.

261. Dr. Huxham's reputation induces a desire to know his practice in phthisis. He remarks, that catarrh occasions this disease only when tubercles had previously been formed in the lungs, and that the malady may be fatal before an ulcer is formed. Instead of sweet, oily, emollient, and other substances, which often disagree with the stomach and occasion acidity and diarrhœa, he employs gentle diaphoretics, blisters between the shoulders, mild cathartics with anodynes interposed, the decoction of cinchona, with guiacum and styrax, and inhalations of drying fumigations. He advises those of a consumptive tendency to remove into the country in the spring, and to lose a little blood as a precaution. Russel's work on glandular decline is of some importance as recommending a remedy within the reach of most persons, and one of great efficacy when judiciously employed, namely, sea-water, especially when taken internally, warm or cold, according to the circumstances of the case. He employs it also externally, at different temperatures.

262. Dr. Mead insists on the intimate connection of phthisis with scrofula, and considers that the use of bark in the disease is indicated by the periodicity of the attendant fever; but he believes it to be injurious when the lungs have become ulcerated. Goats' milk and whey are recommended; and when milk disagrees with the bowels, it may be boiled with roses, pomegranates, and cinnamon, with the addition of water. The fumigations advised by Bennet, change of climate, a voyage to Naples or Lisbon, are severally noticed with approbation. Dr. Bryan Robinson praises emetics, especially those with ipecacuan, in hæmoptysis, and adduces evidence of their effects. Dr. Horsburgh gives some cases showing the benefits produced by the aluminous chalybeate spring, the Hartfell Spa near Moffat, at an advanced stage of consumption.

263. Dr. Gilchrist adduces numerous cases showing the great advantage accruing from sea voyages. He considers hæmoptysis a consequence of tubercles previously existing, and remarks that there are still tubercles to be resolved, even after ulceration has taken place, and hence the difficulty to give appropriate remedies for every stage in which tubercles may be found. But sailing and sea air appear the best calculated to fulfil all the indications. On a rocky coast, where the inhabitants live much on shell-fish, he observed consumption decidedly more rare than in the country inland. He considers that the practice in this disease should consist in a proper administration of bleeding, issues, mercurials, balsams, diet, sea voyaging, and sea air.—The practice of Dr. Marryat has been very generally adopted at least in many of its parts, until modern ti s. He strongly objects to bleeding in consumpt n, and recommends a nourishing diet, especiall of pork broth, and exercise on horse-back, t above all the "dry vomit," consisting of a g n of tartar emetic, with three of ipecacuanha, t e taken fasting twice or thrice a week, wit t drinking after it. If there be diarrhœa he dir ts a grain of sulphate of copper with four of e-cacuanha. If ulceration exist, he gives tw y drops of copaiba in sugar night and morn g. For hæmoptysis he gives his emetics in incre d doses. Bark, nitre, sulphur, chermes mine l, and alum are also severally employed accor g to circumstances. For scrofula he prescribes r-rosive sublimate, with the addition of a few d s of the hydrochloric acid, &c.

264. There are few topics connected with e treatment of phthisis more important than that e-specting the employment of opium, and to is Tralles has devoted much attention, in a pr x and discursive work, in which the general tr t-ment of the disease also is fully discussed. e considers opium to be useful in the first st e, but to be injurious afterwards. He thinks t it is not even a palliative. He, however, giv it in enemata with decoction of bark and milk, r the palliation of the colliquative diarrhœa, and -mits that it is useful in small doses when e cough is violent, for which also he gives the sy p of poppies. He recommends Plummer's , ammoniacum, soap, squills, and honey, milk , milk with lime-water, emulsions, and farinace s substances. The works of Morgagni furnish o precise information as to either the morbid a -tomy or the treatment of pulmonary consumpti , beyond what was previously known. Of e other contemporary writers on medicine ther s none who gives any information respecting e treatment of consumption deserving notice, u l we arrive at the works of Sir John Pring , Donald Monro, and others.

265. The observations of Sir John Prin e deserve the high estimation in which they h e always been held. In recent coughs he gi , after bleeding, mucilages, oils, and ammonia, the form of an emulsion; and at night laudan with oxymel of squills, or gum ammoniac. Wh the symptoms assume the form of hectic, he -peats the bleeding, recommends low diet, d the employment of setons or issues, which e justly considers still more beneficial than bleedi . If thirst or heat be great, acidulated drink, buttermilk, without animal food, are advised. check the sweats he uses sulphuric acid, or lim-water, conserve of roses, air, exercise, a milk a vegetable diet, and where there are debility a lowness of spirits, the bark is recommended. Donald Monro appears to have adopted e practice of Pringle in phthisis. He has -course to bleeding when there is pain, and to c -chona when neither pain nor difficulty of brea -ing is experienced. Setons and issues, he sa , are always of use. A gentle emetic is advis for difficulty of breathing. For diarrhœa rhuba and afterwards opiates are given.

266. Lieutaud, in his Synopsis of Medi Practice, considers bleeding injurious, n advises chiefly a milk diet, with pectoral coctions, balsams in small doses, sulphur, t

er, or MORTON's balsamic pills, the fumes of amic herbs, the waters of Bonnes or seltzer, lime-water mixed with milk, riding, issues veen the shoulders. For the consumption luced by hard study, he prescribes camphor ı HOFFMANN's anodyne, baths, frictions, change ir, horse-exercise, and generous wine. LIN- s suggests the use of the lichen pulmonarius hthisis. The Lichen Islandicus was known to ier writers, according to Dr. YOUNG, although s not mentioned by LINNÆUS. Mr. READ ls a residence in a cowhouse in cases of con- ption, and says that it is preferable to any igations. The recommendation of a medicine ed the decoction of a thousand flowers, which much used from two to three centuries ago the different forms of consumption, is more ra- al than this singular residence. This decoc- , or infusion, as sometimes prepared, was le from the recent dung of cows, whilst feed- in open pastures, warm or cold water being ed with it, and allowed to stand a considerable e, and the clear fluid being poured off for in- ıal use. The bile existing in the dung was partially extracted, and employed as a nachic.

67. The works of HEBERDEN, SAUVAGES, and HERGILL, furnish no additions to the method means of treating phthisis already known. ERCK is extravagant in his praises of hemlock his disease. VAN SWIETEN, in his commen- es on the aphorisms of BOERHAAVE, observes t persons exerting their voice in their professions more liable to hæmoptysis than others; and t MOLIÈRE died of an attack of this disease nediately after performing his "Malade Ima- aire" for the fourth time. He believes in the ımunication of phthisis by infection, and con- rs that an hereditary disposition to the disease s not necessarily imply its actual existence. approves of camphor as prescribed by AVI- NA (§§ 247.), and of the treatment adopted PRINGLE. He praises the use of milk, small frequent bleeding, horse-exercise, the cautious ployment of cinchona, and of opiates. For ef of the diarrhœa, he directs an enema of a chm of turpentine, rubbed down with yolk of , adding half an ounce of theriac, and four ıces of new milk.—The treatment recommended MACBRIDE is, in most respects, the same as t already so frequently noticed, namely, gum moniac, soap, and ammoniacal iron, early in the ease; gentle emetics to promote expectoration l relieve dyspnœa; bark, in some cases, goat's ey, asses' milk, buttermilk, seltzer, Bristol, or ılvern waters; riding, and especially sea- aging, setons, or issues, &c. For hæmop- is, he directs bleeding, opiates, and demulcents. NTERINGHAM disapproves of fumigations, as scribed by BENNET and MEAD, but thinks t the steam of hot water containing vinegar of ıills may be inhaled with advantage.

268. Dr. JAMES SIMS, the founder of the Me- al Society of London, is favourable to emetics, sulphur, and to cinchona, suitably employed. r-water is also useful, but he considers tar- ls to be preferable. The following remarks correct: — Females not uncommonly have a pite from consumption when they marry, but k under the disease after having had two or ee children. The catamenia may remain natural till the last stage, but this, I may add, occurs only occasionally, and chiefly in the more chronic and protracted cases. SCHOENHEYDER employs the decoction of Iceland moss, especially in phthisis consequent on measles, or after the removal of inflammatory symptoms. TODE very judiciously gives the bichloride of mercury in the infusion of cinchona, with Iceland moss, and a milk diet, in syphilitic consumption.—Dr. MOSES GRIFFITH is deserving of notice, chiefly for his recommendation of chalybeates in consumptions, and more particularly for his Mixtura Ferri Composita. This mixture is, however, varied by him according to the circumstances of the case; adding nitre in young subjects and recent cases, myrrh at a more advanced stage, and when there is more debility. He further advises a diet of asses' milk, or skimmed milk, puddings, rice, potatoes, and a little light animal food, once a day, and above all, snail-broth, or snails boiled in milk. LINNÉ reports favourably of the Hypericum perforatum, in hæmorrhagic and ulcerous phthisis, a handful of the tops of the plant being made into a decoction with Spanish wine, boiled down to one-third, and an eighth taken morning and evening.

269. The treatment adopted by CULLEN for phthisis was generally followed in this country until early in the present century. When expectoration of purulent matter, with hectic fever, is present, he believes that ulceration exists. He views catarrh as rarely a cause of phthisis in persons not predisposed to this disease, but it ought not to be neglected. Spasmodic asthma not unfrequently terminates in phthisis. In two cases of the expectoration of chalky concretions, the patients recovered by the aid of milk diet, &c. Consumption from hæmoptysis is less universally fatal than other forms. "Hæmoptysis is not always followed by ulceration, nor is ulceration always attended with hectic. Pregnancy retards the symptoms, but they generally recur and become fatal soon after childbirth." In the hæmorrhagic form of the disease he thinks the acetate of lead dangerous, and chalybeates and cinchona improper, as tending to increase the philogistic diathesis, and as having been found injurious in his practice. He prefers evacuations of all kinds, a low regimen, and blisters to the breast or back, followed by issues. Sea-water, and other mineral waters are wholly useless, and mercury is prejudicial. Milk is a chief remedy; and violent exercise, and the extremes of cold and heat, are to be avoided. He thinks that sea air is desirable only for its moderate temperature; that the balsams, myrrh, &c., have sometimes done harm; that bark increases the phlogistic diathesis, and even when it relieves for a time, the symptoms speedily return; that acids are useful, especially vegetable acids; that opiates are necessary for allaying the cough, but they often increase the sweats; that demulcents frequently disagree with the stomach; that the diarrhœa requires astringents and mucilages, and that all purgatives are dangerous, but ripe fruits are often both agreeable and beneficial. M. BRILLONET records cases illustrating the connection of tubercular phthisis with scrofula, and the successful treatment of the former by small doses of corrosive sublimate, and by a diet of soup, eggs, and vegetables.

270. Stoll offers some judicious observations, although others are more open to objections. For tubercular hæmoptysis he advises small and repeated bleedings; gentle emetics; acid and nitrous drinks, and afterwards lichen, polygala senega, or cinchona. For hectic diarrhœa he gives the powder of the root of arnica. He disapproves of balsams, bark and astringents, where there is any inflammatory complication.—Bergius strongly recommends the Iceland moss in phthisis. When its tonic qualities are not required he directs the bitterness to be extracted by previous maceration. — Dr. Mudge employs the inhalation of medicated vapours for consumption. He believes hæmoptysis to result from the obstruction caused by tubercles; and for this state of the disease he advises nitre in solution, a moderate bleeding, and emetics; for cough the inhalation of emollient vapours, the ammoniacum with laudanum, or half a drachm of the anisated balsam of sulphur, a very large scapulary issue, if these fail, and a milk diet and vegetables. He reprobates the use of small issues, and advises them to be large and efficient — a recommendation agreeable to my experience.

271. Dr. Simmons notices the form of consumption produced by dry-grinding, or by breathing the minute particles of sandstone and iron. He considers the practice of bleeding to have been carried too far by Dover. He prescribes nitre and camphor, myrrh with spermaceti; and oranges and ripe fruit in preference to sulphuric acid. Setons and issues, he says, are useful, opiates mischievous, and ripe fruit and antiseptics are the best remedies for diarrhœa. A little animal food, plainly dressed, may be allowed if much desired. Change of air is advised; but, he justly adds that migration to a warm climate, late in the disease, merely hastens death. Emetics of sulphate of copper, twice or thrice a week, in the early stage, preceded and followed by a draught of water, are also given with the vain hope of dispersing the tubercles.—The observations of Home, Duncan, and Reid furnish little or no information. The last named physician advised chiefly the exhibition of ipecacuan emetics, morning and evening, and considered sea-voyaging beneficial, mainly by producing nausea and vomiting. Verily his treatment seems to have been as bad as the disease. Borsieri again thinks emetics injurious, and balsamic remedies hazardous; but he approves of bark in incipient cases, of camphor, and of balsam of tolu and turpentine in advanced stages. Pouteau advises, when pain is experienced, bleeding, and cupping, and blisters.

272. Dr. Stark's posthumous observations contain the earliest correct account of the anatomy of tubercles. He is favourable to bleeding in the early stages, to oleaginous and demulcent medicines, and to vinegar of squills, &c., when cough and dyspnœa are urgent. Raulin's views as to the treatment of phthisis are in some respects heterodox. He is more correct in recommending ipecacuanha in the catarrhal complications of the disease. He considers gums to be preferable to emulsions; and the preparations of cascarilla to be appropriate for the sweats and for diarrhœa. Syrup of tolu with ptisans; and myrrh, camphor, and a little opium every night, are very generally prescribed. He praises opium in large doses for hæmoptysis; and the mineral waters of Cauterets and Bon for convalescents. Dr. Withering, in 1785 his account of the foxglove, notices the rec mendation of this medicine by Mr. Saunders consumption, and states that he found it of vantage in several cases when it was given i decided manner. Dr. Darwin, however, doubtful of its good effects; and Sir G. Ba is of opinion that its influence in phthisis is ow to the sickness it occasions.

273. Sir G. Blane considers the best clim for the consumptive to be between 30° 40° north latitude. Vogel prescribes the ve table acids with gum arabic; and, for phth after fevers, the taraxacum, bitter extracts horehound, or the cold infusion of cinch with rhubarb, if inflammatory symptoms absent. The cold infusion of bark he gives frequently with acids or nitre, or made w whey, and preferably during the remissions the hectic. He agrees with Sims as to the of oysters as an article of diet. Quarin c siders emetics unsafe in phthisis; he gives b with sulphuric acid for the sweats; spa w with milk in preference to seltzer water; and senega when the expectoration is difficult. Moseley believes that England furnishes cha sufficient for an invalid; but that a voyage Madeira early in the disease may be of advant For hæmorrhagic phthisis, and pulmonary pression he prescribes a vitriolic solution with sulphates of zinc and alumina as an emetic, stead of bleeding, followed by a sea voyage.

274. Dr. May states that, in a well-mar case of phthisis in a young person of a scrofu constitution, the patient took laudanum night morning, an ipecacuanha emetic when the stom was loaded, and cinchona; and that the consisted of soup, meat, wine, porter, brandy water, eggs, oysters, &c. with proper condime Swinging was employed twice daily, and ho exercise completed the cure. A similar case published by Dr. Kentish. I recollect mee Dr. May in 1820. He argued strongly favour of his tonic and nourishing method treating phthisis, which then appeared hetero but which is now more or less adopted. Grieve notices his employment of koumis fermented liquor made from mare's milk, in early stage of phthisis. The fermented whe cow's milk is used as a popular beverage in disease in Norway and the Shetland Isles. Crichton gives a favourable report of the Icel moss in cases of phthisis uncomplicated inflammation. Bang of Copenhagen recomme the oil of asphaltum, in doses of eight d morning and evening in rye broth. The p matic treatment, first tried by Fourcroy, more fully discussed and employed by Bedd furnishes no satisfactory results. Dr. Sen U. S. prescribes emetics of ipecacuan and phates of copper, every second or third morn without eating or drinking, and as much Griffiths's chalybeate mixture (§§ 268.) as stomach will bear in the intermediate time. children especially, the sulphate of zinc is a ferable emetic. A milk diet is also directed.

275. The second volume of the "Med Inquiries" of Dr. Rush of Philadelphia, con some of the most important observations on c sumption which appeared towards the close

last century. He was himself subject to umptive symptoms during a considerable ion of his life,—a circumstance which imparts tional weight to his advice. He recommends, 1 the first indication of the disease, or as soon ieat in the hands, weakness of the eyes on ening, dryness of the feet, inactivity, and other it febrile symptoms appear, the patient to have ourse to a more active life, with bathing, bark, steel. When the pulse is hard, with pain or dy expectoration, he directs frequent bleedi, and where bleeding cannot be employed, tics and milk diet. In the last, or typhus e, as he terms it, he considers that a temury benefit is derived from balsams, horend, vegetable tonics, bitters, cinchona, &c., diet being now stimulating and nutritious. believes damp situations injurious in all states he disease, and a high, dry, and temperate dence in the country most beneficial. He ises also flannel always to be worn next to the , the dilute vapour of tar, or the smoke of n to be inhaled, opiates to be given in small es during the day, and more largely at night, repeated blisters and small issues to be ployed. He admits of a moderate exercise of lungs in speaking, reading and singing; and adually increased exercise of the body, espely of the limbs.

76. Dr. Gregory of Edinburgh in his lectures siders mercury injurious; cinchona of little , and myrrh of less. The mineral acids he vs as palliatives only, and as inferior to the ic acid. Emetics are sometimes useful, even hout operating powerfully; sulphur is liable be too laxative, but beneficial nevertheless; purgatives hazardous as either inducing or ravating the diarrhœa.—Dr. Ferriar finds italis with change of air of service in the muis consumption (chronic bronchitis), and in cking incipient phthisis, when the patient is weak to bear evacuations. The pneumatic ans, so much and so sillily vaunted at that e, and like other means puffed, with their hors, into undeserved notice much more reitly, he justly considers quite undeserving ption.—Dr. Garnet introduced several cheal medicines into practice, about the end he last century. He prescribes the sulphuret potass, and powdered charcoal, in the florid les of consumption, and gives a drachm of h of these, four or five times a day, in warm ter, with the effect of promoting expectoration l improving the other symptoms. I question, wever, the ultimate good arising from medicines ich "promote expectoration," as I have too quently seen them promote other more unourable symptoms.

277. In the writings of Darwin, in which there a mingling of hypothesis, fancy and poetical aginings, with ill-assorted experience, I find nong on the treatment of phthisis deserving notice, at least nothing worth attention which had not en previously advised by many of his predecess.—J. Frank professes himself an advocate for tonic and nutritious treatment in phthisis prosed by Salvadori, May, and others, though th much more moderation in the degree; palting the urgent symptoms by opium, and enavouring to relieve the debility by cinchona, hen, milk, wine, exercise and nutritious food—a treatment, however, by no means admitting of general adoption. — Dr. Barton mentions the Arum triphyllum boiled in milk as a remedy in phthisis, states that has known only of one case of the disease cured by digitalis; and that he finds more benefit from emetics of sulphate of zinc, than from other means.

278. Dr. Fowler and Dr. Ferriar relate cases of consumption cured by digitalis given as decoction or infusion; but it is not improbable that more benefit was imputed to the medicine than it really deserved, as most of the cases were characterised chiefly by hæmoptysis, and as those are often attended by prolonged periods of amendment. That it is, however, followed by some degree of benefit, especially early in the hæmoptysical form of the malady, appears from the testimony of Beddoes, Mossman, Maclean, Sherwen, and others, although this position is denied by Dr. Bree. Dr. Magennis' success with digitalis may be attributed chiefly to the very large doses, and to the early period of the disease in which he prescribed it. — Busch in his researches employs chiefly aconite, hemlock, henbane, and dulcamara, combined with either ipecacuan, chermes mineral or honey of squills. He prefers the leaves of aconite to the extract, and gives two grains every two hours, increasing the dose to a drachm daily. Dr. Beddoes insists upon the propriety of confining the phthisical patient to a temperature varying only from 60° to 65°, and believes that the muriate of lime is sometimes of service.

279. Dr. Heberden considers asses' milk to be of use in allaying the fever; decoction of bark and sulphuric acid in relieving the sweats; opium in quieting the cough and favouring sleep; bleeding to the amount of five ounces only, when pain is urgent; and the application of a blister when the pain is obtuse. He advises a vegetable diet chiefly, and the purest water for drink.—Dr. Thomas recommends an emetic every second or third day, especially in the early stage, Griffith's iron and myrrh mixture, and digitalis. Dr. Trotter is favourable to cinchona and sulphur; and to digitalis with opium. Dr. Wilson considers sulphuric acid to be most efficacious in checking the sweats; and a demulcent mixture with spermaceti and a little laudanum most useful for the cough. He allows animal food in moderation; and the vapour of warm water, in which onions have been boiled, to be inhaled in order to facilitate expectoration. Dr. Bourne furnishes experiments on the use of the uva ursi in consumption, from which he infers it to be of service early in the disease, in doses of ten or twelve grains, twice or thrice daily, sometimes taken with a small dose of opium. The end of the last century, and the commencement of the present, abound with writings on the treatment of phthisis, many of them most inconclusive, some of them trifling or puerile, and nearly all of them deficient in precision of description, and in logical inference. Most of these are filled with discussions and cases proving and disproving the efficacy of digitalis, and commenting upon the operation of this medicine.

280. Dr. Badham, in 1808, was the first to distinguish between asthenic and chronic bronchitis and tubercular phthisis, the former having been generally viewed as varieties of pulmonary con-

sumption, and thus confounded with the tubercular disease. A large proportion of the recoveries of cases which had been considered tubercular, was evidently cases of bronchitis. Several writers at this period added nothing to our knowledge, or placed before us the "crambe bis coctum," or rather decies coctum, of their predecessors. Russell expresses a favourable opinion of bark, calumba, chamomile, sulphuric acid, and iron, with hemlock. But these require discrimination as to the cases in which they may be individually prescribed. He considers the virtues of hemlock to be much overrated. Both he and Thomson state the muriate of lime to be without any efficacy. In the more purely scrofulous phthisis, he considers issues to be decidedly beneficial, and sulphuric acid and salines as preferable to cinchona in the early stage. Barton and others in America employ the super-acetate of lead with ipecacuan and opium in the hæmoptysic form of phthisis.

281. The remarks of Dr. Parr are upon the whole judicious. He advises the pain in phthisis to be pursued by blisters as it changes its place; emetics to be given chiefly in hæmoptysis, and without informing the patient, ipecacuanha being preferred; and mild diaphoretics in an early period. He considers balsams of use only when expectoration is checked by debility; myrrh occasionally of service as a slight tonic and sedative; hemlock to be preferable to opium in palliating the cough without occasioning sweats; cicuta and the seeds of hyoscyamus to be often useful; and digitalis to do more harm than good. Assafœtida is recommended for flatulency and as an expectorant. In the last stage, emetics and other means are quite inefficacious, or palliatives merely. — The work of Portal, although interesting at the time when it appeared, contains very little of importance in respect of treatment. He considers the mildest food the best, and particularly new-laid eggs; and issues, setons, and moxas, of service.—Dr. Buxton furnishes additional evidence to that adduced by Beddoes in favour of a regulated temperature in phthisis, of from 60° to 65°. Dr. Shearman notices the connection of consumption with amenorrhœa, and observes that Griffith's chalybeate mixture has been more successful in females than in males, owing to this connection. There is much truth in this: early in the disease this mixture is advantageously conjoined with the compound decoction of aloes and conium, and even in more advanced stages, if it do not increase the severity of the cough.

282. M. Bayle very justly referred many of the cases of imputed recovery from phthisis, to the circumstance of chronic bronchitis, or chronic pulmonary catarrh having been mistaken for phthisis; and he described, with greater precision than heretofore, the structure of the tubercular deposits, and the pulmonary and the associated lesions. The granulated form of this writer is merely the earlier stages of the disease, excavations not having taken place. In this state he advises, according to the features of individual cases, composing and emollient medicines, occasionally bleeding, blisters, and issues; aconite, hemlock, henbane, nightshade, and opium, and, where the expectoration is very copious, balsamic and resinous medicines. In the state of ulceration, he employs medicated vapours, and external drains and revulsants of various kinds. In cases complicated with chronic bronchitis or catarrh, the lichen, with diaphoretics and balsams, is prescribed; or with bark, when there are well-marked rigors. Streaks of blood in the expectoration require lemonade or orangeade, and bleeding if the pulse be hard, blisters if soft. As prophylactics, he recommends travelling, voyaging, change of air and climate, nutritious diet, anti-scorbutics, tonics, alkalies, muriate of ammonia, &c.; for incipient cases, repeated emetics, bitter and stomachic purgatives, a sea voyage, exercise, the sulphuretted waters of Bonnes, Cauterets, Bagnères, or Mont d'Or; and later in the disease, mild tonics, as the lichen, syrup of cinchona, &c.

283. Dr. Wells contends that phthisis is much less prevalent in marshy countries and districts where agues are endemic, and advises that consumptive patients should be removed, at least for some time, to these places. He quotes several authorities and statistics, by which the subject is placed in exaggerated points of view. It is not yet satisfactorily proved that malarial situations are beneficial in either the early or the advanced stages of phthisis; at least the matter should be further investigated, as well as the assertion that places wherein ague is endemic, are free, or nearly free, from phthisis; inasmuch as the position is controverted by several more recent writers, although contended for by Marshall, Weekes, Harrison, and others towards the close of the last century and at the commencement of the present.

284. Dr. Roberts has endeavoured to discover a more effectual remedy for consumption amongst the active mineral salts and other substances, than those hitherto employed. He has, however, only to record the failures of his experiments, with the nitrate of silver, superacetate of lead and opium, sulphate of zinc, oxyde of zinc, alone or with myrrh; white oxyde of manganese 0 grains); arsenite of potass; black oxyde of cobalt (one to four grains); ammoniated copper, muriate of baryta, nitric acid, phosphoric acid, aconite, henbane, stramonium, belladonna, and toxicodendron.

285. Dr. A. Duncan gives the results of his long experience in the treatment of phthisis. He considers hæmoptysis as often a salutary occurrence early in the disease; bleeding with low living to have hastened death in many cases; emetics to be of use in promoting expectoration, but to be useless as respects the cure of the disease; and blisters to be of service in most forms of the malady. He believes that vegetable acids are more beneficial than the mineral or acetous; that digitalis is of little use, and sea voyages are counteracted by the inconveniences and risks attending them; that bark, myrrh, lichen, or these with hemlock, are sometimes of service in scrofulous cases, but that the pneumatic practice is altogether unsuccessful; that the diarrhœa may be moderated by mucilaginous fluids and broths, melted jellies, rice, catechu, opium, &c.; that the inspissated juice of the common lettuce is one of the best substitutes for opium; and that the patient should take asses' milk, wear flannel next to the skin, and have walking and riding exercise.—Dr. Southey has remarked upon the frequency and infrequency of phthisis in different countries. He is in favour of the use

s, of digitalis for hæmoptysis, of a regulated
erature, by means of a stove from 60 to 65°,
ding, sailing, and swinging, and of change of
at an early stage, to Valencia, Hières, &c.

36. Dr. Thomas Young, in his able and
ned work on Consumptive diseases, has given
nteresting account of the treatment of these
ases, and a full digest of the means employed
his purpose in this country during the first
ter of the present century; and until the dia-
tic method of Laennec and the pathological
numerical disquisitions of French writers
red the minds of practitioners to the neglect
ational therapeutical doctrines, Dr. Young
iders *bleeding* an important remedy at an
y period of the malady, for the removal of in-
matory and congestive symptoms, and for
ating the suppuration and debility consequent
hem. From six to twelve ounces of blood,
emarks, may be taken away with safety in
y incipient case, and the operation may ge-
lly be repeated with advantage three or four
s, at proper intervals; but to do more than
might justly be called an experiment which,
ever laudable in proper circumstances, is not
e recommended in the ordinary routine of
tice. Dr. Young was himself bled twice, by
direction of his uncle Dr. Brocklesby, and
in favour of small bleedings, to the extent of
e or four ounces — locally, when there is pain
ny part of the chest. He advises *purgatives*
n early stage, and considers that fears of pro-
ing the diarrhœa by them at this period should
be entertained. He justly views *sulphur* as
xcellent aperient in the disease, and especially
n complicated with hæmorrhoids. Dr. Young
recommends *emetics*, and prefers ipecacuanha,
cially in cases of hæmoptysis, combining it
acetate of lead, or other means, according to
umstances. On *sorbefacients*, especially digi-
, mercurials and alkalies, he places very slight
nce, although they may be prescribed in some
umstances of the disease with advantage.
spastics and *issues* are viewed by him much
e favourably. He considers that the ten-
cy to night sweats is not a just reason against
use of *sudorifics*, especially Dover's powder
antimonials. In *expectorants* he has little
n, although ammoniacum, squills, senega,
rh, and ipecacuanha may be employed with
efit in some cases, in conjunction with hem-
and other *palliatives*. *Demulcents* and *nar-*
s are prescribed by him in circumstances in-
ting their use, sometimes with balsams, the
zoic acid, &c. Of *astringents*, when required
oderate the secretions of the skin and of the
stines, the sulphuric acid is considered the
, especially when conjoined with aromatics
opiates; but he is also in favour of catechu,
, the extract of logwood, with chalk mixture,
he compound powder of chalk.

87. Dr. Young believes *cinchona* to be the
t important *tonic*, and both its advantages and
nveniences to have been exaggerated. He
known it decidedly beneficial at the com-
cement of the disease, and he has never ob-
ed that it increased the hectic symptoms at
period. Besides the powder, and the de-
tion, he has employed the cold infusion
Seltzer water, in his own case, as well as in
rs. He has had little experience of *chalybeates*; but he justly remarks that, when they can be taken alone, or with myrrh, as in Griffith's mixture, without increasing cough or pain, — effects which may also proceed from cinchona, — they are sometimes beneficial. The *diet* most favourably mentioned by Dr. Young consists chiefly of milk and the farinacea, especially asses' milk twice daily, cow's milk boiled with soda-water or lime-water, butter-milk, new eggs, vegetable and farinaceous articles. He has found milk boiled with mutton suet of great service. *Exercise* in the open air, riding, walking, &c., are also severally advised. *Change of climate* is recommended, and he considers that the remark of Celsus, that the worst air for the patient is the air which has given rise to the disease, is founded on good sense.

288. I have now brought down the *Historical Sketch* of the treatment of phthisis to a sufficiently recent period. Notices of some more modern writers will appear in the sequel only in so far as they may furnish anything deserving notice. Their works will, however, be mentioned in the *Bibliography* and *References*; so that the reader may be aided in satisfying himself as to the views of those who have written on this difficult subject, or on topics appertaining to it. I shall next endeavour *to state those means of prevention which seem most efficacious against this malady*, and afterwards proceed *to give the results of my experience as to the means which appear to me the most appropriate, or which have been advised for the several stages and states of this disease, conformably with the division above adopted.* (§§ 17. 76. *et seq.*)

289. ii. Of the Prevention of Phthisis.—The full exposition of the *causes* of phthisis which I have given above, and which many readers may consider tedious and unnecessary, will not be viewed in this light, when it is admitted that a knowledge of these causes, and of their modes of operation, is the most certain basis of rational means of prevention. By ascertaining the causes, and the ways in which they act, as far as they may be ascertained, we are enabled either to avoid or to counteract them. When we can neither avoid nor arrest the causes we should endeavour to arrest or to palliate their effects, by means rationally selected and employed, — guided by the lights of science, and by careful observation and induction. The great objects, therefore, of treatment are, in the first place, *to avoid and to counteract the causes of the malady*, and, secondly, when this end cannot be attained, *to arrest or palliate their effects*. The former constitutes the *prevention*, the latter the *cure*, of the disease. But in the procession of morbid conditions from the first impression of the causes, there is an intermediate state between the operation of the causes and the development of their effects in a manifest form, that requires the prompt recognition of the physician, and rational decision as to treatment. This state of incubation — of threatened or incipient phthisis — requires great acumen for its detection, and equal promptness for its arrest. For this state *measures of prevention* should be conjoined with *means of cure*, either predominating according to the circumstances of individual cases.

290. The *prevention* of phthisis is either *radical* and *efficient*, or *conditional* and *uncertain*. The avoidance or removal of the causes is required for the former; the counteraction or the arrest of their

more immediate or early effects is all that can be expected from the latter: the one is *positive*, for the causes have not existed or acted; the other is *contingent*, for the causes have been present, have probably acted and produced their more immediate effects, the means of counteraction or of arresting these effects either succeeding or failing, as numerous circumstances may determine. Prevention thus may be divided into,—first, that which consists of the avoidance of all the causes of the malady; and, second, that which attempts the counteraction, or the removal of their more direct and immediate effects, before the malady is fully developed.

291. *A. The Efficient Prevention of Phthisis* consists in the avoidance and removal of the causes which predispose to, and directly occasion, the malady. Those which affect one or both parents, or which operate during the earliest epochs of childhood, have generally produced their effects upon the constitution before professional advice is obtained. The transgressions of the parent have already injured the offspring, and the scrofulous taint has either been communicated to, or generated in, the child, before efficient measures of prevention could be instituted. The remarks which I have offered on the prevention of Scrofula (*see* §§ 148. *et seq.*) apply with equal, if not greater, force to the prevention of phthisis. Consumptive persons who marry are even more culpable in this than those who are imbued with the scrofulous diathesis, or who have been affected with external tuberculosis. The offspring of the former may be scrofulous, but the taint is more likely to be manifested in the form of tubercular consumption, whilst the offspring of the latter are more liable to external tuberculosis, although they may be attacked with phthisis, especially when the external malady has not occurred. When the *predisposition*, whether it be hereditary or occasioned by the habits or the diseases of the parents, or by the management of infancy and childhood, has been produced, the radical and complete prevention of the malady can then rarely be effected, the best efforts to this end being merely conditional or uncertain. It is only by the avoidance of those causes which I have arranged under the head of *Causes appertaining to one or both parents*, aided by the removal of *those which usually act during the early epochs of life*, that the efficient or certain prevention of this disease can be expected.

292. *B. The Conditional Prevention of Phthisis*, although uncertain, should not be neglected. Where the predisposition, arising from either the constitution or the health of the parents, already exists prevention may be hoped for, but it cannot be insured.—*a. During Infancy and Childhood* the Hygienic precautions which were offered when treating of Scrofula (§§ 148. *et seq.*) are even more urgently required when tubercular consumption has appeared in the family of either parent, or when the causes mentioned under the first class of the arrangement have injured the constitution of one or both parents. For children thus circumstanced, a dry, pure, and mild air, considerably elevated above the surface of the sea; frequent change of air; clothing suited to the temperature and season; exercise in the open air; light digestible food, with strict attention to the digestive functions; a milk, farinaceous, and vegetable diet, with a moderate proportion of wh esome animal food, as childhood advances; ut the milk of a healthy nurse, asses' milk, ., during infancy, and the other means advised in e place just referred to, strictly avoiding the ca es incidental to this period of life (§§ 49. *et seq.*), e severally of great importance, especially w n aided by such other means as the circumsta es of individual cases will suggest.

293. *b. During Puberty and Adult Age*, e causes of phthisis which have been notice as most frequently operating in these epochs of fe (§ 184. *et seq.*) should be carefully avoided, specially those which relate to schools, slee g apartments, &c. A strict surveillance ough to be instituted over youths of both sexes in ord to prevent masturbation, and as soon as this vi is detected, its enormity should be represente to the delinquent, and measures taken to pre nt the mental contamination from extending to others. The sleeping rooms should be well ntilated; but their temperature ought not t e much lower in winter than that of the si g apartments, especially for the delicate and edisposed. For these a physical and menta egimen should be enforced, aided by proper d and clothing; by change of air, preferably a warm, dry and pure air; by chalybeates in f ns suited to the peculiarities of the case; and, w re the predisposition is manifest, by travellin to and in healthy, warm, or mild and dry count s, as Egypt, Syria, Upper Egypt, South of S n, or north coast of Africa, &c.

294. These preventive measures are chiefly s ed to the rich only; and to these especially hun g, riding, farming in a dry, elevated district, d field sports are remarkably beneficial. The s ction of professions and trades for those who re hereditarily or otherwise predisposed to pht sis is attended by great difficulty. Agriculture d the out-door exercises which it involves are utary to those who can adopt them. Garde g offers some advantages, but these are inferi to those furnished by other agricultural occupat s; Poorer persons should become sailors and butc s; but the life of a soldier, even in the best circ nstances, is very unfavourable to those in any y predisposed to phthisis. To such persons especi y, and even to the most robust, several trades re most injurious. Sculptors, stonemasons, mi s, millers, flax, wool, and cotton dressers and wor s, weavers, tailors, bakers, milliners, dressma s, and other needle-women are severally mor or less liable to phthisis in consequence of thei ccupations: and so liable are "dry-grind ," knife, fork, razor, scissor, and needle-grinde to tubercular consumption and other pulmo ry diseases, that it has been said by Dr. C. Holl d that about one-fourth of those engaged in t e occupations died every five years.* (See A rs and Employments *in relation to disease.*)

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* All nuisances, all dangerous and insalubriou stablishments, especially in large towns, besides ng productive of several other maladies, are liable to elope phthisis, especially in the predisposed. The gov nment of this country has as yet paid little or no atte on to the due regulation of these, as regards the p ic health; but, in France, as Dr. Waller Lewis ha ecently shown, these establishments are divided to three classes, and before they are permitted to be rried on, certain authorisations and formalities are spensable. In the first class are placed those estat hments that must be isolated from private habitat s, but not necessarily from the outskirts of a town; i e

)5. iii. Treatment when Phthisis is threat-
).—When phthisis is imminent, the measures
prevention already noticed, conjoined with
rs of a more strictly medicinal kind, should
dopted according to the predisposition, age,
iesis, and circumstances of the patient. The
stive and assimilating functions ought to be
noted by the usual means; and especially by
ige of air, by voyaging, by travelling in
n and dry countries, more particularly in
e already mentioned (§ 293.), by suitable
ning, and by attention to the temperature and
ilation of sleeping places. The preventive
curative influences of districts where ma-
and the diseases which proceed from this
ce abound have been insisted on by Dr.
LLS and several of his contemporaries. He
s that it was common for the consumptive in
nders to remove to the marshy parts of the
ntry. In Minorca, where agues are endemic,
sumption, according to Dr. Cleghorn, is
rare. Dr. Sequeira states, that in the
shy country of Alentejo phthisis is rarely
. Volney says that consumptive patients
frequently sent from Aleppo to the sea-coast,
re intermittents prevail. Other instances are
uced by Dr. Wells in favour of his opinion; and, although it has been controverted by several writers, yet I believe, from several facts with which I am acquainted, that it is not quite devoid of truth.

296. In this, as well as in other periods of the disease, the clothing, especially that worn nearest the skin, should be warm, and the best suited to the preservation of the functions of this part of the frame. With this object flannel ought to be worn during the night and day; and the dress in females should be sufficiently high to protect the upper regions of the chest and the neck. Close cinctures of the chest, and steel supports in corsets are injurious. Due attention ought always to be paid to the digestive and excreting functions, and to the state of the uterine discharges; which are often more or less disordered in the states of the disease now being considered. In many instances cod-liver oil may be of service; in others, as well as in these, sulphuretted or chalybeate springs, or a course of the one following that of the other. For females, the mixture ferri composita, and the decoctum aloes compositum, in varying proportions, according to the state of the bowels, are often of service, especially when the pulse is languid, the catamenia scanty or difficult, and when the cough is not increased or rendered hard or dry by these medicines. In these cases flannel drawers, in addition to the other articles of flannel clothing, and woollen stockings should be worn. In other circumstances, or when the natural secretions and excretions are not suppressed, the infusion, or a weak decoction, of cinchona, with a mineral acid; or other tonic infusions, with aromatics, &c.; or the tinctura muriatis ferri, either with or without the preparations of Calumba and an increased quantity of the acid, may be prescribed, and may even be made the vehicle on the surface of which the cod-liver oil may be taken. Confined positions of the body, the labours of the desk, and close application to either study or business, ought to be avoided; and a due restraint should be placed on the instinctive desires and passions. Mental and physical occupations ought to be pursued as much as possible in open and airy places and apartments, and in a temperature never lower than 60° nor higher than 70°; and should not be such as to fatigue, but such as moderately or pleasantly engage the mind and body.

297. In this state, as well as in the preceding, and more particularly when the predisposition is marked, or the tubercular cachexia manifest, warm or tepid salt-water bathing, or sponging the surface of the body daily with a warm, tepid, or cold solution of salt — the temperature and strength of the solution varying with the state of the patient and the effects produced — is often beneficial; but this practice should always be followed by rubbing the surface smartly with a rough towel, and by the constant use of flannel nearest the skin. Various medicated fluids or lotions have been advised as washes for the chest and neck, in the circumstances now being considered, as well as in the first stage of the disease. Of these, however, the most deserving notice are, a weak solution of the nitro-muriatic acid, a weak solution of the pyroligneous acid, and tar-water, varying in strength with the circumstances of the case. This last lotion has been employed only

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nd are included those factories which do not rigo-
ly require their isolation from habitations, but which
important not to allow until assurance has been
ined that the operations proposed to be carried on
hem are executed so as not to be a nuisance to the
hbourhood, and not to cause damage. In the third
are such factories as may remain without incon-
ence near dwellings, but which should be subject to
surveillance of the police.
s regards the effects on health of various professions
occupations, it is shown by M. Lombard, that in
) deaths consumption had furnished the following
portions, viz.: — Occupations with vegetable and
eral emanations, 176; with various dusts, 145; with
ntary life, 140; with workshop life, 138; with hot
dry air, 127; with stooping posture, 122; with sud-
movements of arms, 116; with muscular exercise
active life, 89; with exercise of the voice, 75; living
he open air, 73; with animal emanations, 60; and
watery vapour, 53. In manufactures the majority of
kmen are affected with scrofula; this scourge marks
children and the youths with its scars, swellings, and
rmities, and attacks more especially the weavers.
he women furnish more maladies and diseases than
men, partly owing to the comparative paucity of
r earnings, from which it arises that the poor work-
nan is ill-fed, ill-clothed, and ill-lodged. In one
e, indeed, not money, but the want of it, may be
ounced as the root of all evil. So, in this case, "want
bad adviser, and quickly triumphs over the weak
stance of a conscience without religious light to
le it." Debauchery, followed by excesses of all kinds,
es in to consummate the work of destruction com-
ced by distress. The worst occupations are those
eedlewomen, or *couturières*, dressmakers, embroid-
es, and *modistes*, from whose ranks the public women
largely recruited.
he separation of the sexes in workshops is a measure
eriously demanded for the moralisation of the work-
classes.
s to the healthfulness of employments much depends
n whether they are carried on in the open air or in
fined air. Consumption is twice as frequent in the
as in the second case; the latter group comprising
ipations carried on in vast spaces well aërated, and in
rs which confine the workmen in close localities.
he latter phthisis is far more prevalent. The action
usts on the lungs is in the direct ratio of the volume,
ght, and consistence of their molecules. The inha-
on of coarse particles is less dangerous than that of
s finely divided, which penetrate more easily into
last ramifications of the air cells. Dusts from hard
stances cause a far greater number of consumptive
s than dust from soft bodies, or of ordinary hard-
. The specific gravity of the dusts does not affect
ny marked manner the production of phthisis. The
er of the respective fatality of dusts is as follows:
, 1. mineral; 2. animal; and 3. vegetable.—*Report*,
, by Dr. W. Lewis.

by myself, the temperature of it, as well of the others, being varied according to the feelings of the patient and the state of the air. Friction of the surface also should always follow a recourse to either of these.

298. iv. Treatment of the usual Form of Phthisis. — *Treatment of the First Stage of this Form.* The imminence of tubercular consumption may be viewed almost in the same light as the commencement of this stage; and the treatment advised for the former is altogether applicable to the latter, with various additional means adapted or modified to the circumstances of individual cases. When this stage has commenced, as indicated by the symptoms (§ 187. *et seq.*), the question is no longer, Are tubercles already formed? This must be answered in the affirmative. But their development may be delayed or prevented by judicious treatment; or their absorption may even be procured, although this is a doubtful or rare occurrence. The great principle of treatment in this stage, as well as when the disease is merely threatened (§ 295. *et seq.*), is to develope the powers of life, and increase the vital resistance to the further advance of the malady, without producing or augmenting febrile symptoms: — 1st, By diet and regimen—by Hygienic means; 2nd, By medical treatment. A selection of means belonging to each of these heads, appropriately to the peculiarities of the case, will frequently promote the assimilation of the chyle globules and of the colourless globules of the blood, by supporting or developing the powers of life.

299. *A. The Food and Regimen of the Patient* are of the utmost importance in this stage.—*a.* The *food* has always been discussed, questioned, dogmatically prescribed, and often pertinaciously persisted in, according to the doctrines of the day, and the views of prevailing authorities; and instead of accommodating it to the peculiarities of the case and to the effects produced by it, an indiscriminating mode of administering it has been too generally adopted. At different periods of medical history, and by different physicians, very opposite kinds of food have been recommended. Some have praised a milk diet; others farinaceous and vegetable food only; many a combination of both; some have allowed a large proportion of animal food; and even not a few have permitted the use of fat meats, and a rich, full, and nutritious diet. The praises of certain kinds of diet have often been accompanied by denunciations of all others. Thus the inexperienced, and those who treat a disease according to its name, and not according to the successive pathological conditions it presents, are bewildered, and an important part of the treatment is adopted and applied not more rationally than if it were drawn by lot, or were the turn-up of the die. Now, each of those kinds of diet, modified and added to, according to circumstances, is appropriate and beneficial when appropriately employed, and when aided by a regimen judiciously prescribed. The diet in this stage should always have strict reference to the regimen, which the situation and circumstances of the patient permit, and especially to the locality, temperature, and air in which he resides; and both diet and regimen ought to be directed according to his temperament and diathesis, to the states of vital power and vascular action, as indicated by the pulse and by the febrile symptoms, are to the indications of existing local lesions.

300. When the disease is not ushered in by hæmoptysis, or by indications of active congestion, and especially when it is traced to depressing or exhausting causes, then a nutritious diet, animal food in moderate proportion, the white kind of fish, boiled, with a squeeze of lemon, with little or no other kind of sauce, and shell-fish, especially oysters, may generally be adopted. The fresh livers of the cod, torsk, ling, haddock, and coal-fish, and the fresh oil of their livers, may be very beneficially used as sauce for these kinds of fish; or the oil may be taken in a more strictly medicinal form soon after a meal. In these and in similar states of the disease even richer and more nutritious kinds of food than those may be tried, and the effects carefully observed. I have often advised a frequent use of fat venison, in some cases, and the fat of lambs or of mutton boiled in milk in others, with much benefit. In cases where this stage is characterised by little or no acceleration of the pulse, by despondency, by a poor state of the blood, and by absence of sub-inflammatory or congestive symptoms, a dry and nutritious diet, or a more full and restorative diet; animal food, consisting of mutton, game, &c., and even wine or malt liquors in moderation, may be allowed, if exercise in the open air, especially horse exercise, short of fatigue, be regularly taken.

301. For persons of a fuller habit of body, or more sanguineous temperament than those just referred to, and especially when oppression, or constriction, or pain at the chest, or a dry, hard cough is complained of, the diet should consist chiefly of milk and of farinaceous and vegetable substances, ripe fruits, &c., and the antiphlogistic regimen should be adopted in every respect; but it should not be carried too far, especially in the scrofulous diathesis. In these cases, local depletions, issues, and other derivatives, as will be hereafter mentioned, should be employed according to the state of the pulse and other peculiarities of the case. For these, buttermilk, whey, and skimmed milk are excellent beverages and aids to diet. After the more inflammatory and congestive symptoms are removed, and when issues or setons have commenced to discharge, then a more liberal and nutritious diet may be allowed, and the cooling, antiphlogistic, and febrifuge medicines hitherto prescribed may be changed for those which are more restorative, and more calculated to support vital power and to promote a healthy assimilation. In these circumstances the fish diet, as advised above (§ 300.), may be first employed, and the more nutritious articles of food be afterwards given with caution.

302. *b.* In this stage, *change of air, voyages,* more particularly in latitudes from 30° to 50° or from 10° or 15° to 30° in winter, in vessels possessing comfortable accommodations; *travelling* in temperate and warm climates, with due regard to the temperature and climate and to season; residence in a warm and dry air, the elevation above the surface of the sea, and the degree of atmospheric dryness being such as the patient finds to be most beneficial; regular exercise in the open air, preferably on horseback, and short of much fatigue; are severally of manifest advantage. Exercise on horseback is, however, rarely of benefit to females, and is generally

ing, and consequently exhausting to them ; ing or driving in an open carriage being more ficial. In all cases, extremes of temperature, sudden changes or vicissitudes of temperature be avoided, even by those who are able to active exercise, as well as by those who are h less able.

03. *Travelling*, at proper seasons and hours of lay, is generally beneficial, especially when the nt is able to travel on horseback. Travelling ind by other conveyances is less serviceable ; ugh an open carriage, when the weather will it, is little inferior to riding, especially in the s of females. But, when a close carriage is , the patient should sit with his back to the s; and when he travels by railway, this seat ld always be taken, a sufficient ventilation of arriage being always preserved.

4. *Tepid* and *cold-sponging* and washing the ce of the body, or the surface of the chest ly, with variously medicated lotions, have advised in this stage; but, excepting with those dy mentioned, or with the lotions, liniments, embrocations about to be noticed, this prac- is seldom of much service when this period is dvanced, unless exercise can be regularly in the open air, and flannel be constantly nearest the skin. It is, however, beneficial employed as a preventive measure for the isposed, and for those of a tubercular ca- ia (§§ 170, 171.) ; and when adopted at the nencement of this stage, and followed by active frictions of the surface.

5. *c.* A *winter residence* is of the greatest im- nce in this stage to patients in cold or tem- te climates, for that residence should be se- d which will admit of regular and daily ex- e in the open air. But this is not the only ideration by which we ought to be guided. ation above the surface of the sea, a situation the level of or close to the ocean, or re- ed at a distance from it, and frequent or pro- ed voyaging on it, are severally topics which ire to be duly considered. As to the last of — *voyaging* — very well-founded expecta- of success from it may be formed, if it be nenced in this stage, or before the second be dvanced, more especially in cases which have attended by hæmoptysis at their commence- or early course, and if it be continued for a iently long period. Voyaging in the Medi- nean or in the Atlantic between the degrees titude named above (§ 302.), and prefer- in the Pacific Ocean, especially when pro- ed, either in naval cruisers, or by repeated ges, so as to avoid the winter and spring of and other countries unfavourable to con- tive patients, deserves to be more frequently nmended that it has hitherto been. Now the passage across the isthmus of Panama is voyages thence, in various directions in the fic Ocean, may be made, and a return to this try effected in May or June.

6. Elevation above the surface of the sea, es- lly in warm climates, and when dryness of attained by elevation, is generally beneficial. n in temperate climates, where elevation is ined with dryness, the diminished tempera- which results is not so injurious as generally ved. The cold of Canada is by no means ious to the consumptive, owing to the dryness of the air being great in proportion to the lowness of temperature. If such a residence admits of regular exercise in the open air, it may be salutary, although a warmer air, and an exemption from sudden atmospherical vicissitudes, may be preferred.

307. The only question connected with residence that remains to be considered is, whether preference should be given to a sea-coast or to an inland locality. This is a difficult question to answer; and judging from the indisputable advantages derivable from sea-voyaging, and the very frequent recommendations of places on the sea-coast by modern physicians as winter residences for the consumptive, it may be inferred that these places are actually the most healthy. But this inference is neither logical, nor practically correct as respects phthisical cases. The benefit derived from voyaging depends chiefly upon uniformity of temperature and the motions of the vessel, aided by the influence of a pure sea-air, on the digestive and assimilating functions. Residences on the sea-coast furnish only two of these elements of benefit, in an imperfect manner, but they are altogether deprived of the third and that which appears to be the most important. We must therefore refer to the results of observation for a decision ; and, as far as my experience enables me, I may state, where two localities, one inland the other on the sea-coast, possess equal advantages as to dryness of the air ; as to annual, monthly, and daily ranges of temperature ; and as to vicissitudes of weather, and facilities for out-door exercise, that the inland situation should be preferred.

308. Whatever be the locality adopted for the consumptive, or however the patient may be limited in his choice, exercise should not be neglected, in air and sunshine, whilst he is able to enjoy it; and the temperature of his sleeping apartment should not fall below 60° or rise above 70°. The advantages derived from stoves, when properly regulated, are shown by their preservation of the warmth of apartments at all hours of the night; but a due ventilation ought always to be preserved where they are the only means of keeping the temperature at a proper elevation. Having insisted upon regulation of *diet* and *regimen* appropriately to the pathological states of the case in this stage, and upon the advantages of *change of air*, of *travelling*, *voyaging*, and of *suitable residence* during the winter and spring months, the *means* which are more strictly *medicinal* are next to be considered.

309. *B. The strictly medical treatment* of the first stage of phthisis must depend entirely upon the diathesis, temperament, and habit of body of the patient, and upon the states of vascular action, of local lesion, and of vital power. The predisposing and determining causes should also be kept in view ; for these should influence or even almost change our indications and means of cure. — *a.* In cases where vascular action is excited, or the pulmonary circulation is oppressed or congested, or where pain is felt in the thorax, or where hæmoptysis occurs without being very copious, neither anæmia nor vital exhaustion being remarkable, *bleeding* ought not to be either neglected or delayed. The only consideration is, in what manner may it be most advantageously resorted to. Venesection, unless the patient be robust

or plethoric, is rarely required. Scarification and cupping are most frequently to be preferred, as the circumstances are few in which this operation may not be efficiently performed, and a due quantity of blood withdrawn in a very short period, the operation itself generally proving a salutary derivative. When the quantity of blood to be taken is small, and in certain complications, the application of leeches may be preferred.

310. The quantity of blood abstracted at one time should be small, or at most not great. In the majority of cases it may vary from four to twelve ounces; this last amount being allowed only where the habit of body and circumstances of the case appear the most to acquire depletion. Time should be allowed to observe the effects of the first bleeding; and after a due interval, if the symptoms still continue, or upon the return of the indications for having recourse to it, the operation may be repeated. The amount and the repetition of the depletions should be determined only by the peculiarities of the case and the judgment of the physician. It will often be observed that even when bleeding appears to be required, it is but ill endured, although the quantity withdrawn has been small. When this stage is developed by the suppression of an accustomed discharge, as of the catamenia, or of hæmorrhoids, then the necessity of having recourse to vascular depletion is obvious, and that method of performing it which is most likely to re-establish the interrupted discharge should be adopted. Leeches may be applied around the anus when the hæmorrhoidal discharge has been suppressed; and beneath the groins when the catamenia are interrupted, difficult, or scanty; and, for both causes of aggravation, calomel, the preparations of aloes, and warm fomentations or the hip-bath, may be prescribed. The older writers advised bleeding from the feet when immersed in hot water, in cases of catamenial obstruction, and this mode may be adopted by those who prefer it. I have sometimes prescribed it, and seen it employed, with benefit.

311. Vascular depletion has been advised in the first stage of phthisis by some authors and reprobated by others. I have now stated many of the circumstances which require it; but there are others, more especially certain complications hereafter to be noticed, which also are benefited by it. But cases are common for which, even at an early period, bleeding cannot be ventured on with safety; or, if employed at all, it can be prescribed only to a small amount, and in the immediate vicinity of parts which appear to require it. The numerous class of cases caused by the depressing and exhausting causes mentioned above (§ 192.), by want, by misery, by debilitating discharges, by confinement and etiolation in factories, close apartments, &c., and by sedentary and ill-rewarded occupations, — those cases which present anæmied, cachectic, discoloured, and debilitated appearances, or in which the pulse is either slow and beneath the healthy condition, or very quick, small, or soft, or when the blood is inferred to be thin and poor in red globules, — are severally injured even by the smallest local depletions, unless they be prescribed for the removal of the pains occasioned by pleuritic complications, for which the additional and often more successful means hereafter to be noticed should be employed.

312. The indications for and against vascular depletion in an early stage of phthisis are, however, not always to be depended upon. Whilst many are manifest, others may be doubtful. Much, therefore, should be left to the close observation, the enlightened experience, and the acumen of the physician, in the interpretation of these indications and the discovery of others. The season, climate, peculiarities of race, modes of living, and prevailing constitution and character of disease, the prevalence of a sthenic or an asthenic condition of morbid action, are severally weighed in his mind before bleeding in any way, its amount and its repetitions are decided upon, and before other important means are prescribed. The prevailing constitution of disease, so much insisted upon by Sydenham, differs most remarkably in different periods of time. The sthenic constitution so general in the first quarter of the present century, was changed to the asthenic in the second quarter, and this latter still appears to continue. The vital energies of the residents in large cities and manufacturing towns, especially in low situations, are weaker than those possessed by the inhabitants of rural districts and elevated localities; and these differences, with others manifested by individual cases, require due consideration when devising our indications and means of cure.

313. The necessity of having recourse to vascular depletions, especially to local depletions, when congestion, sub-inflammatory action, pain, the state of respiration or of cough, or other symptoms, require them, does not necessarily prevent the exhibition of nutrient and even of restorative means, more particularly when vital power appears depressed and vascular action is not much increased. Indeed, in large cities and manufacturing towns, these latter medicines, or even more tonic remedies are often required, although local depletions are equally necessary for the local lesions. For these milder tonics, conjoined with sedatives and narcotics, as the infusions of cheyreita or calumba, with hydrocyanic acid, or conium, or hyoscyamus, or the tinctura camphoræ comp., may be first prescribed, and be followed, according to the effects observed by infusions or decoctions of a more tonic kind. When, with debility, a cachectic or an anæmied appearance is present, the preparations of iron may be given, commencing with the mildest. I have generally preferred the mistura ferri composita, with the extract or tincture of conium, or the powder or extract of liquorice; and, if the bowels be sluggish, and the catamenia be deficient, with a sufficient quantity of the decoctum aloes compositum, or tinctura aloes.

314. The effects of chalybeates of every kind require to be closely observed in this as in every other stage and state of the disease. This class of medicines are contra-indicated where any inflammatory complication exists, or where a tendency to hæmoptysis is observed, unless hæmorrhage has occurred to a large amount, when the tinctura ferri hydrochlorici, with additional acid and appropriate medicines, may be given in a suitable vehicle; but on all occasions the effects of chalybeates on the respiration and the cough should be strictly watched, and, if rendered more oppressed, difficult, or hard by them, they ought to be relinquished. I have often prescribed the

e of iron, in syrup of sarzæ, or in other ps, with conium ; or some other anodyne ; but ve not considered it more beneficial than FFITH's myrrh mixture, even in cases where atamenia are deficient; and I have found it me cases to aggravate the cough and tight- of the chest more than that mixture.

15. When the above medicines are either not ated or prove inefficacious, the infusions of hona, prepared either with cold or with warm lled water, may be prescribed with hydro- nic acid, or with any of the preparations of um or hyoscyamus; and it may be taken in in which a little of the bicarbonate of potash, f soda has been dissolved. When febrile ptoms harass the patient, the liquor ammo- acetatis may be given with the infusion of hona, and the spirit of nitric ether and hydro- nic acid added to them. In some instances iquor ammoniæ acetatis may be prescribed an excess of acetic acid, especially where optysis occurs; and in others, particularly re sinking or exhaustion is present, with an ss of the carbonate of ammonia, other sub- ces which the symptoms will suggest being added.

6. In this early period of phthisis the functions igestion—of both stomach and liver, are often e or less impaired; and it is often beneficial to n, as well as to the state of circulation in the s, to commence the treatment with an *emetic.* older writers recommended this practice, and rience has shown that, when the emetic has n judiciously selected, and the treatment other- appropriate, benefit has been produced by it. Italian physicians, and after them LAENNEC his pupils, prescribed tartarised antimony as metic in this disease, having, as they believed, ved great advantage from it in the more tly inflammatory diseases of the lungs; and only did they employ it as an emetic, but as ntra-stimulant, and in doses which were sel- efficacious in reducing the febrile symptoms, which rarely failed in reducing the vital ers of the patient. I frequently saw the effects is substance whilst it was in vogue, and etimes prescribed it; but I considered it of in- r utility to ipecacuanha and to sulphate of as an emetic in phthisis, their operation being itated and increased by a draught of a weak sion, tepid, of camomile flowers. Afterwards ulcents or emollients, or stomachics, with the tion of a little hydrocyanic acid, if the retch- or vomiting be more than we desire, may be cribed, and subsequently the other internal edies which the features of the case will sug- .

7. The effect of the emetic early in this stage, the repetition of it when the functions of di- ion are disordered, will generally be beneficial, hown by the appetite and the state of the uations, especially when followed by the icines just mentioned, or by small doses of nitro-muriatic acids taken in the tonic infu- s already noticed, or in others which the state he case appears to require. If the bowels me irritable, the tinctura camphoræ comp., e pilula saponis composita, will correct the rder; the former being given in the mistura æ, or any other suitable vehicle or form of bination, the latter with small doses of ipecacuanha, and of an aromatic powder. If the biliary secretion be deficient, as not infrequently observed in this period, although the bowels are relaxed, PLUMMER's pill or blue pill may be cautiously given, with soap and extract of taraxacum, instead of the nitro-muriatic acids; or these latter may be prescribed instead of the mercurial, an occasional dose of which should only be taken. In this stage of the disease the bowels are more frequently confined than much relaxed, and the intestinal secretions and excretions are very often more or less disordered. It thus becomes an important object to improve these secretions, and to regulate the function of defæcation. The medicines just named will often aid in attaining this end; but they require to be either conjoined with others, or followed by suitable laxatives or aperients, conjoined with vegetable tonics, stomachics, &c. I have also observed great benefit result from the following, when appropriately administered or modified:—

No. 350. ℞ Pulv. Ipecacuanhæ, gr. viij. ;—Extracti Fellis Bovini, ℈ij. ; — Pilulæ Rhei comp. (vel Pil. Aloes cum Myrrhâ) ℈ijss. ;—Extr. Conii (vel. Extr. Hyoscyami), ʒss. ;— Saponis Castil. gr. xij. ; —Olei Anisi, q. s. Contunde bene et divide massam in pilulas xxxvj. quarum capiat duas horâ somni.

No. 351. ℞. Extr. Glycyrrh. ʒss. ;—Tinct. Aloes comp. ℥ss. ; —Tinct. Conii, ʒj. (vel Tinct. Hyoscyami, ʒij.) ;— Decocti Aloes comp. ℥vss. Aquæ Carui ad ℥viij. Misce. Fiat mist. cujus capiat cochl. ij. vel iij. ampla horâ somni vel primo mane.

No. 352. ℞ Pilulæ Rhei comp. ℈ij ss. ; — Pilulæ Scillæ comp. et Pilulæ Conii comp. aa. ℈j. ;— Saponis Castil. gr. x. Contunde bene et massam divide in pilulas xxiv. Sumantur binæ hôra somni.

318. These medicines are most suitable in cases devoid of any inflammatory complication, which, as occurring either in this or in subsequent stages, will be more particularly considered in the sequel. The objection of not being applicable to these and other complications cannot, however, be urged against equal proportions of magnesia and sulphur as an aperient in this stage, especially when rendered more agreeable by the addition of liquorice powder and a little ginger. Where this aperient proves too depressing, or where vital power and vascular action and assimilation are much impaired, a little powdered cascarilla may be added to the former, the whole being taken in some water.

319. *b. External Medication* is a very important part of the treatment of phthisis; and, as will be seen from the historical sketch given above (§ 242. *et seq.*), it has been considered such from a very early period of medical history. Probably external derivation by means of moxas was as early resorted to in eastern countries for this and other diseases, as by issues and setons among the Greeks and Romans; but there can be no doubt of the benefit to be derived from these and similar means in aid of judicious internal treatment and regimen. As it was in respect of internal, so it has been as regards external means, different kinds and various modes of prescribing them having been advised in successive ages, and those which had fallen into disuse having been revived from time to time, again to be neglected or forgotten. The moxas employed in far eastern countries from time immemorial came into vogue in Europe after the former were visited by voyagers and travellers from the latter; but failed in superseding issues and setons, which have always held their place, and deservedly, in

the treatment of this disease, especially with the judicious and experienced. Early in the present century moxas came again into use in some places on the continent of Europe, and pustulation by means of tartarised antimonial ointment, or of croton oil in this country; the latter means having so entirely superseded issues and setons, as to have caused the complete disuse of them. I have seen much of these modes of derivation, and have had considerable experience of their effects, both in phthisis and in other diseases. *Moxas* are of more or less use according to the amount of discharge which may be procured subsequently to their incandescence; but their operation is uncertain. Both the tartarised antimonial ointment and the croton oil liniment produce external irritation, but little discharge, their influence on the disease being seldom beneficial, while they distress the patient and even augment the constitutional disturbance in some cases.

320. *Issues*, made sufficiently large, have proved most beneficial in my practice. I have always prescribed them when I have seen the patient in the first, or even in the second stage, and several persons are now alive who had recourse to them from twenty to thirty years ago, as I advised them. I have generally recommended them to be made near the margins of the ribs, when the patient is not much emaciated; or in any other situation which may be preferred. The chief objection to them is the preliminary measure of destroying the integuments for the lodgment of the peas. Where *setons* appear preferable, as respects the state of the patient, or the situation in which they may be inserted, so as least to incommode him, care should be taken, in respect of them as well as of issues, that they should be sufficiently large to be effective, and that a free purulent discharge be uniformly procured from them. When both issues and setons are objected to, especially the formation of an issue in the usual way, then the inner bark of the mezereon, previously moistened, may be placed on a part of the surface of the extent of a crown-piece, and confined there by means of a larger piece of adhesive plaster spread on paper or leather, the bark being renewed from time to time. This latter plan, however, is not preferable to a blistered place of this extent kept open and discharging by the usual means; but neither the one nor the other is so effective as an issue or a seton, the benefit being derived chiefly from a uniformly copious discharge. When this is procured, the internal treatment and regimen of the patient should be more restorative and generous than in other circumstances of the disease; tonics, chalybeates, animal food, restorative beverages, &c., being allowed, according to the peculiarities of the case, especially as respects the vital and vascular conditions.

321. I have since 1819 never neglected to prescribe an embrocation to the chest, in phthisis and in some other diseases, which acts less as an external irritant and derivative than as a source from which a salutary agent is inhaled into the lungs in so mild a form as neither to irritate nor to stimulate, whilst it is slightly absorbed. This embrocation I have employed in many internal diseases, in various forms or modifications, as a liniment, or as an embrocation or epithem — sprinkled on folds of flannel, or on spongeopiline, and covered over by a napkin, or otherwise,—and varied as respects the constituents he principal one being always present.

No. 353. ℞ Linimenti Terebinthinæ,—Linimenti n-phoræ compositi, aa. ℥jss.;—Olei Olivæ, ℥ss. ad ℥ —Olei Cajuputi, ʒj. ad ʒjss. Misce et sit embrocatic

No. 354. ℞ Linimenti Terebinthinæ,—Linim. Sa is cum Opio, aa. ℥ij.; — Linim. Camphoræ comp. ℥ .; —Olei Cajuputi, ʒjss. Misce.

322. When it is desired that external irrit on should follow the first of these, the olive oil ma be omitted. Either of these should be renewed e ry night, the vessel being previously shaken, nd applied, by the means already mentioned, a sufficiently large surface, either of the front, of the back of the chest, or of the side, where in or uneasiness is most felt. It should be pt applied all night, or the following day, and en be renewed again in the morning, the qua ity sprinkled over the surface of the flannel or spo opiline being sufficient to moisten, or more mpletely to wet these substances, according t he effect we wish it to produce, whether by in lation of the fumes proceeding from it, or b he external derivation it may occasion, in additi to the former mode of action.

323. Blisters, mustard poultices, the caut es, urtication, and dry-cupping have severally een resorted to as derivatives in this stage. Bliste are often of much service, especially when applied ter local depletions; and when a discharge has een procured from them for some time. The other excepting the cauteries, are seldom producti of much or permanent benefit. The tartarised ntimonial ointment and liniments with croton oil ve deservedly fallen into disuse. The actua nd potential cauteries were not infrequently mployed in former times for this disease, a discharge from either having always been pron ed. They are now never resorted to in phthisis.

324. *c*. In this, as well as in more adv ced stages of the disease, the *inhalation* of medi ted vapours, and of certain fumes, effluvia, and o urs has been recommended and been adopted. I ve, however, very rarely observed much b efit derived from it, especially as commonly emp yed by means of an inhaling apparatus. The ubstances, also, generally prescribed for inha ion have been used in so concentrated a form, are so acrid or stimulating, as often to increas the existing irritation in the bronchi, or the m bid action in the substance of the lungs, and i the seats of vomicæ or of cavities. It is also ery questionable whether or no the inhalati of vapours,—whether watery, emollient or ano ne, or narcotic, or possessed of all these propertie —is actually beneficial in phthisis, more especi at an early period of the malady. The inha ion of these may be useful as palliatives at a advanced stage, especially when an irritable c gh, a sense of constriction in the chest, difficu expectoration, &c., are much complained of; ut, in other circumstances and stages of the di se, they only tend to obstruct or impair the fun ons of the lungs, by interrupting the progressive tamorphosis and oxygenation of the globules the blood, and by favouring congestion or a tial collapse of the organ. The modes of inhal on, or of having recourse to the respiration the effluvia of substances which are calculat to prove beneficial in this disease, will be cons red in the sequel.

25. *C. Treatment of the second stage of the* c *non form of phthisis.* — At the commence- m t of this period, or when the symptoms, espe- ci y the appearances of the expectoration, and th haracter of the febrile action, indicate the re nt supervention of this stage on the first, then it ill become a question how far the means w h have been, or still are, in use, may be con- ti d, and in what they may be modified or ch ged, or what additions may be made to them. In is the physician will be guided by the pecu- lia ies of each case; but, in the circumstances of ost, the same principles and means as have be discussed should be continued, modified so as meet prominent symptoms, and commencing or lly developed complications, or intercurrent af tions. The softening of the tubercles in this st is generally attended by an increase of co h and expectoration, of the hectic symptoms, ar of the morning perspirations, with occasional at ks of diarrhœa or disorder of the bowels. O or more of these usually become more pro- m nt as the disease advances; or other pheno- m a are superadded, requiring the treatment to b rected more especially to them.

6. *a.* The *cough* generally suggests palliatives, in nnection with the other means which the state of e patient demands. Thus hydrocyanic acid, or h ane, or hemlock, or the compound tincture of ca phor, may be added to mixtures containing the li r ammoniæ acetatis, and any demulcent which m appear most appropriate to the nervous and va ular conditions of the case; or they may be con- jo d with bitter or tonic infusions or decoctions, w the states of the pulse, of the fever, and of th vital powers, require them; these latter are of rendered more beneficial by the addition of th olution of the acetate of ammonia, and of the sw t spirits of nitre. Where there is much pe r of the surface, the pulse being either weak or at little accelerated, any of the anodynes al e mentioned may be added to the mistura fe composita, and the effects upon the cough an upon the hectic and other symptoms carefully ol ved.

7. *b. The perspirations* during the night or ea part of the morning are always productive of reat exhaustion, and are the most difficult to re ain or prevent. They have been very diffe- re y treated by both ancient and modern phy- sic ns, but most frequently by mineral acids, and by arious refrigerants, astringents, and tonics, as sh n in the historical sketch given above (§§ 241. *et* .). Either of these may be prescribed in co binations suited to the case, with emollients, sto achics, or tonics, and may be made the ve le, on the surface of which the recent *cod- liv oil* may be taken shortly after a meal, twice or rice daily, and in sufficient quantity; this be the substance most deserving of reliance for m rating this distressing symptom. Some of th nedicines advised with this object have often di dered the bowels, or induced an attack of di hœa, and even augmented the suffering of th patient without effectively diminishing the pe irations and their consequent exhaustion; bu hese results rarely follow from the use of this oil The mistura ferri composita is sometimes of se ce in allaying the severity of the hectic and th xcessive perspirations, especially when there is inflammatory complication present, and when t neither produces headache nor renders the cough harder or more severe. Dr. WATSON has found the tinctura ferri muriatis successful in allaying the perspirations after other means had failed. The dose he prescribes of this medicine is twenty minims thrice daily. I have likewise given this preparation, with advantage, in the infusion of calumba, with an additional quantity of the acid, and have sometimes made this combination the vehicle on the surface of which the cod-liver oil was taken.

328. *c.* When *diarrhœa* occurs it is often induced by some purgative medicine, or by errors in diet, or by means employed to moderate the perspirations. The cause of it should be ascertained, and the medicines to restrain it be suggested or selected accordingly. It is, however, frequently independent of either of these causes, and the result of indigestion — of the acidity and the accumulation of sordes in the *primæ via* consequent upon the imperfect performance of the functions of primary assimilation. In either of these circumstances antacids and absorbents, conjoined with mucilages, anodynes, or narcotics, or with mild tonics, will prove of service; as the cretaceous mixture with the compound tincture of camphor, or the tincture of hop, &c., and with the tincture of catechu, or with other vegetable astringents, if they be required. But the bowels should not be confined by these or other medicines; and when there is any risk of such an occurrence magnesia may be given with sulphur or rhubarb, or with cascarilla; or the compound decoction of aloes may be prescribed with the tincture or with other suitable medicines.

329. *d.* In this stage of the disease *emetics* and *bleeding* are seldom beneficial, unless the states of the digestive and respiratory functions require a recourse to the former, and the occurrence of pain or the appearance of an inflammatory or congestive complication demand the latter. Ipecacuanha is in most instances the best emetic, and local bleeding the most beneficial, especially when the embrocation prescribed above (§ 321.) is afterwards applied and duly persisted in. Although it may be necessary to have recourse to these means, others of a restorative or even tonic kind — both medicinal and regimenal — may be equally required; often, however, in different cases, but not infrequently in the same case, and sometimes even soon after the more antiphlogistic measures have been employed. Generally, when local depletions are required, febrifuge medicines, chiefly such as the solution of the acetate of ammonia, camphor mixture, &c., are the most appropriate; but they may be afterwards conjoined with others of a more tonic nature, such as the infusion of hop or the infusion or decoction of cinchona, and to these anodynes may be added; the selection of which should depend upon the features of the case. Hydrocyanic acid, monkshood, hemlock, henbane, meadow-saffron, and digitalis, have been individually employed in combination with these or other medicines; but they require caution in their use, and careful observation of their effects. Monkshood or *aconite* is most appropriate in the more inflammatory tendencies of this and the preceding stage, but it especially demands a most cautious observation of its effects; a remark not less applicable to colchicum and digitalis, which are suited to the same states of the disease as those for which aco-

nite may be given; these being useful chiefly as antiphlogistic means, either in aid of vascular depletion, or when the condition of the blood and of vital power contra-indicate a recourse to depletion; although the local morbid action requires to be restrained or even lowered.

330. *e.* The remarks offered above respecting *issues*, *setons*, and other derivatives (§§ 319—323), apply to this, as well as to the first stage. Instances are rare in which either the one or the other should not be resorted to. The great difficulty often is, owing to the emaciation of the patient, in which situation they may be placed, so as to produce the least amount of discomfort. When emaciation is not very remarkable, then the margins of the ribs may be selected; but in different circumstances an issue of good size may be formed over the pectoral muscle, or between the shoulder-blades. When this stage in females is characterised by suppression or marked diminution of the catamenia, the issue may be made near the groin, in the anterior aspect of the thigh. When setons are preferred, the arm, near the axilla, may be selected. If neither of these, nor moxas be adopted, *blisters*, kept open as long as possible and renewed from time to time, are generally necessary. The *embrocations* advised above (§ 321.), ought not to be overlooked, inasmuch as, in the more urgent cases, they may be applied whilst the foregoing means are also in operation, and as they are sources both of derivation and of inhalation. When the above produce a sufficient discharge, then GRIFFITH's myrrh mixture, or other chalybeates or tonics, may be prescribed, with anodynes, narcotics, &c.; and their effects upon the cough, the pulse, and the hectic should be carefully observed. If these symptoms become aggravated by them, they ought to be relinquished, and the salines, especially the solution of acetate of ammonia, or of citrate of potash, with hydrocyanic acid, conium, &c., as noticed above (§ 329.), may be substituted. If these effects do not result, then the more generous regimen recommended for the first stage (§§ 314. *et seq.*) is equally, if not even more, required for this.

331. *f. Inhalation* of dilute medicated vapours and fumes may be tried in this stage, as well as in the first. The opinion I have formed of them, and stated with reference to that period (§ 324.), is not materially different as regards this. Cases may occur in which they will be more serviceable in the second than in the first stage, and still more so in the third than in either of the foregoing: but the amount of benefit, or the want of it, will entirely depend upon the substances selected for this mode of administration, and upon the way of effecting this intention (*see* § 412.). But mild or weak *fumigations* of the patient's apartment are generally much more beneficial than inhalations, which often irritate and increase the local lesions (§ 413.).

332. *g.* In females the state of the *catamenia*, as respects both the intervals and the duration and quantity of the discharge, is of the greatest importance, especially in the first and second stages of the malady. Excessive discharge, whether as to frequency of recurrence, the duration of its continuance, or the quantity, not infrequently predisposes to, or more directly occasions, phthisis; and the same disorders of this function, if allowed to proceed, will aggravate or hasten the progress of this ma if they occur in either the first or second s The rapid or sudden disappearance of thi charge, on the other hand, is even more cer and rapidly injurious, in whatever stage thi take place. A difficult or scanty catameni charge requires attention, although it is r dangerous as either of the former states, espe the latter. Excessive states of the cata should be moderated with caution and by means as are not likely to be followed b pression. The decoction or infusion of cin with either of the mineral acids, or the su of quinine in the compound infusion of rose tincture of orange-peel may be prescribed, sulphate of quinine may be mixed in some and taken without any addition. If anæmi been produced by this discharge, the tinc the sesquichloride of iron may be given, alone, or with the preparations of calun quassia. It should not be overlooked, th disorders of the catamenia in the early st phthisis are often occasioned by mastur and when this is suspected, and when advi prudently be given and precautions taken this vice, it becomes the duty of the physi act accordingly. In these, as well as in oth cumstances of profuse catamenia, ipecac conjoined with extracts of gentian, catech a narcotic, may be given in such quantit occasion some degree of nausea to even ret

333. Scanty or difficult menstruation r means appropriate to the peculiarities of th for either of these states may be attended, patient, with an anæmied or chlorotic appe and, in another, with little or no appare ciency or poorness of blood. In the case, the compound mixture of iron, much of the compound decoction or the t of aloes as will act moderately on the bov prevent constipation, with a little of the or tincture of conium, will generally be vice. In other cases, where there is no de of blood, a few leeches may be applied be groins shortly before the expected period catamenia; and the hip-bath and pediluv sufficiently warm temperature and with dition of salt or mustard, resorted to.

334. In cases attended by suppression discharge, strenuous efforts should be m restore them. The hip-bath, pediluvi rendered stimulating by bay salt and m leeches applied around the anus, or bene groins, the preparations mentioned above (walking exercise, or riding on horseback carriage, and the several emmenagogues for suppression of the catamenia (*see* MEN TION, §§ 64—95. *et seq.*), should be presc combinations or forms suited to the state a of the pulmonary disease.

335. In this stage various complicati pear, either as temporary or intercurren tions, or as morbid associations, which c to the termination of the malady. These noticed in the sequel; but there is one is rarely absent, and which renders th ment difficult, namely, the bronchitic a This in many cases becomes the pr disorder, and requires the treatment to especially directed to it; the most gener

vi ble means being, according to the accompa ing fever and the state of the patient, the so ion of the acetate of ammonia with the spirit of itrous ether, dilute hydrocyanic acid and ca hor mixture; or in somewhat different states, wi carbonate of ammonia, compound tincture of mphor, or henbane or conium. If there be a morrhagic tendency, the acetic acid may be ac d; and in most cases the terebinthinate embr ition should be applied to the chest.

6. *h.* The *diet* and *regimen* in this stage may, in very large proportion, if not in the majority of ises, be altogether the same as I have advised fo he prevention and for the treatment of the fir stage of the disease (§§ 292—308.). In m cases a fish diet will agree well in this stage; th white kinds of fish, always boiled, but never fr, a squeeze of lemon, with little butter, but pr rably with the liver of fish, being the chief or ly sauce. The fish and their livers, which ar nost beneficially used as articles of diet, are th *Gadus brosmius*, or torsk; the *Gad. morrhua*, or od; the *Gad. molua*, or ling; the *Gad. æ finus*, or haddock; the *Gad. merlangus*; th *Gad. callarius*; the *Gad. carbonarius*, or co fish; the *skate, turbot, soles*, &c. The recent li s of all these species of the genus Gadus, bo d in such a manner as to preserve their oil, m be used either as sauce to the fish, or may be at with it, or the oil may be taken after the m, in the usual medicinal way. They are be ficial both as articles of diet and as medicine. W en quite recent they have no fishy or unpl sant flavour, and are easily digested, — the m e easily the more oil they contain.

7. As to other articles of *diet, regimen, change of r, exercise, travelling, voyaging*, and *choice of re ence*, the remarks which I have made above (§ 92—308.), and in the sequel (§§ 420, 421.), an n the article Climate (§§ 42. *et seq.*) are applica e to this stage, according as the strength of the pa nt and the prominent symptoms will admit of th adoption; and as the presence or absence of an of the more important complications will su est.

8. *D. The treatment of the third stage of the co non form of phthisis* (§§ 38. *et seq.*), is frequently bu little different from that already advised. The st of the patient may not, in some instances, be m rially different from that characterising the se nd stage, although cavities — one or more — ha already formed in one or even both lungs. T patient may not be materially worse in respect ei r of strength or degree of emaciation, or of co h and respiration, especially if the more aggr ated symptoms and complications have not as ye been experienced. More commonly, however, h much worse as regards all these; and colliq ive perspirations, attacks of diarrhœa, severe p xysms of cough and of oppressed breathing, a pains in various parts of the chest or its vici y from inflammatory congestion of portions of t ungs or from the extension of the morbid acti to the pleura, are more or less experienced, a are generally relieved with greater difficulty t in the preceding stages. The treatment dep s chiefly upon the complication, or rather comp itions, which characterise this stage.

39. *a.* In all cases there is more or less *bronchiti* hiefly, however, of the bronchi communicating w the softened tubercles and cavities; but there may be in addition *inflammatory*, or *sub-inflammatory action* in the surrounding portions of lungs, or even also in parts of the pleura in the vicinity. These may require, or at least suggest, a treatment which neither the strength nor vascular condition of the patient may well bear, especially when carried so far as to subdue the super-induced local mischief. But to leave these complications to their natural courses, when clearly manifested by symptoms, may be more injurious than the effects of judicious means prescribed for their removal; and, as far as my experience enables me to decide, the employment of such means is the safest alternative. For these states of this stage, therefore, local depletions, by leeches or by cupping, are required according to the condition of the patient and symptoms of the case, the quantity of blood taken at first being small. When the indications for having recourse to this measure are doubtful, dry-cupping, afterwards blisters, the terebinthinate embrocations already advised (§ 321.), and the febrifuge medicines recommended above, are most appropriate. Of this class of medicines, the solution of acetate of ammonia, in forms and combinations already noticed (§ 315.), is the most generally of service.

340. *b.* In this stage, especially in its advanced course, the colliquative perspirations and diarrhœa exhaust the patient and more or less waste the red globules of the blood. Whilst these symptoms should be restrained, the powers of life and the supply of duly assimilated blood-globules must be supported and promoted. The means which fulfil the one indication often also aid the other. This is more particularly demonstrated by the effects of cod-liver oil, and by medicines which improve the digestive and assimilating processes, and correct, counteract, or remove the contaminating matters which are carried into the circulation from the lesions seated in the lungs, whether softened tubercles or ulcerating cavities, and which thereby affect the cutaneous and mucous surfaces and follicles, so as to give rise to these exhausting and distressing symptoms of the malady. Numerous means, beside those already mentioned, have been proposed for these morbid conditions, especially the acetate of lead with pyroligneous acid and laudanum, the sulphate of zinc with sulphuric acid, the sulphate of copper with opium, the substances containing tannin, gallic acid, &c., and catechu, kino, krameria, hæmatolylum, nux vomica, &c.; but very few of these, even while they restrain the diarrhœa, diminish the perspirations, or in any other respect alleviate the malady. Indeed, in some cases they aggravate the disease, and only accelerate its progress to a fatal issue by preventing the elimination by those emunctories of the effete, morbid, and contaminating materials conveyed into and circulating in the blood.

341. *c.* Much more rational and efficient *indications* for the abatement of the colliquative diarrhœa and perspirations in phthisis would be the improvement of the digestive and assimilating functions by such means, or combinations of means, as would at the same time, by their partial absorption into the circulation, correct, change, or counteract the contaminating matters which are imbibed from the seat of the disease; whether these matters be purulent or tubercular, or the sanious fluid formed in or on the surface of ulcerating parts, and whether they are actually present in the blood or are more or less changed

in the course of the circulation of the blood. That they actually contaminate more or less this fluid, however small may be the quantity which passes into it, and thereby give rise to the most distressing and dangerous symptoms of phthisis, cannot be doubted, the skin and the bowels being two of the chief channels through which they, and other injurious matters they may form, are eliminated from the circulation; but the selection of the means of fulfilling these indications is much more difficult than devising them, and depends entirely upon the peculiarities of individual cases, as respects especially the progress of the disease and the states of respiration and circulation. The bicarbonate and the nitrate of potass, prescribed in tonic infusions or decoctions, with aromatic or astringent or narcotic tinctures, according to the state of the case; magnesia and sulphur, with the powder of cascarilla or of cinnamon or ginger and liquorice powder, or with other substances, as the state of the bowels will suggest; the compound iron mixture, or the aromatic mixture of iron (D. P.); the bitter or tonic infusions, with carbonate or citrate of potass or of soda and anodynes; balsams, the purified or inspissated ox-gall, with conium or with the compound soap pill and ipecacuanha, or with the purified extract of aloes, according to circumstances; and camphor, the terebinthinates, tar or tar water, conjoined with such of the foregoing medicines as the features of the case require, may severally be employed. In some instances where the colliquative state of the bowels and other symptoms indicated a contaminated state of the blood, and consecutive alteration of the mucous surface and follicles of the bowels, I have prescribed the following pills at night, or night and morning, or with the meals; the bitter vegetable tonics, with alkalies, &c., having been taken in the intervals between meals:—

No. 355. ℞ Pilulæ Ferri comp.; Pilulæ Rhei comp.; Extracti Fellis bovini; Picis liquidæ, āā. ʒss. Misce et contunde bene, dein divide massam in pilulas xxx.; quarum capiat unam ad tres pro dose.

No. 356. ℞ Extr. Fellis Bovini; Sulphuris præcipit; Picis liquidæ; Confect. aromat. in pulv., āā. ʒss.; Olei anisi, q. s. Contunde bene et divide in pilulas xxxvj. Sumat j. ad iij. pro dose.

No. 357. ℞ Magnesiæ carbon.; Sulphuris præcipit., āā. ℈ij.; Confect. aromat. in pulv. ʒss.; Creasoti ♏ viij. ad xij.; Olei anisi, et muscilag. q. s. Misce et fiant secundum artem pilulæ xxxvj. Capiat j. ad iij. bis terve in die.

342. It may be noticed that the above, both mixtures and pills, may be modified, or receive additions, so as to meet the peculiarities of the case. If irritation or pain in the bowels be experienced, small doses of the extract of opium or the soap pill with opium, may be added to either of the foregoing; and if diarrhœa, or tenesmus, or dysenteric symptoms be present, ipecacuanha in full doses may also be conjoined with these.

343. With the other distressing symptoms, to which I have directed notice, there are others for which relief is required, and although we may be unable to impart it, we should at least attempt it. The dyspnœa, difficulty of breathing, the feelings of suffocation, &c., in this stage, are sometimes distressing. In many instances the terebinthinate embrocations already mentioned (§ 321.), applied over the chest or between the shoulders, will afford some relief; and an opiate conjoined with either of the pills just prescribed, or with
expectorants and antispasmodics, or the con ound
galbanum pill, or with stimulants and other eans
indicated by the state of the case, or eady
mentioned, will often be of service. Wl the
dyspnœa is urgent or distressing, an emetic ll be
found to afford most relief. The aphthæ hich
towards the close of this stage, often app r in
the mouth, tongue, and throat, further incre the
distress of the patient, and require the tre ment
advised for this condition of the mouth and roat
in the articles Throat (§§ 40. *et seq.* and
Thrush (§§ 11. *et seq.*)

344. *d. Delirium* rarely occurs in this n o
phthisis until shortly before dissolution, ur s in
females, when this stage of the malady is ele-
rated by, or occurs in the puerperal state r in
cases where the nature of the medicines the
idiosyncrasy of the patient has given rise this
symptom. Most of the narcotics and an nes
especially henbane, conium, aconite, um
morphia, digitalis, &c., will have the ef t o
inducing delirium in the advanced progress this
stage, especially in nervous and exhausted tates
of the patient, and when either of these sub nces
are given in too large doses, or continu too
long; or when substances which are cal ated
to prevent or to correct their injurious fects
have not been conjoined with them. The de ium,
in most instances, is slight; but it is som imes
more severe or acute, and is attended wit rest-
lessness and sleeplessness, or it approach the
character of delirium tremens. For these odi-
fications of mental disorder, lowering mea only
hasten a fatal issue. If they have been occ oned
by either of the medicines just mentione they
will frequently disappear after the cause h been
removed, especially if judicious means b pre-
scribed; but, under every circumstance, th state
of vascular action, especially as respects th brain
and membranes, should be observed. If t be
increased in these, cold-sponging the head, n stard
pediluvia, &c., are required; and even wh such
increase is present, it will be more readily r eved
by restoratives, prescribed in small and m erate
doses, and their effects watched, than by c osite
means. The medicines from which mos relief
may be expected in the delirium occurring this
period, are camphor, ammonia, the solu n of
the acetate of ammonia, the carbonate of am onia,
the compound spirit of ether, the spirit o nitric
ether, the hydro-chloric ether, the prep tions
of serpentaria, of arnica, and of sumbul. hese
may be prescribed individually, or in combi tions
of two or more, or with the alkaline, sali and
restorative medicines I have mentioned a eing
useful when the blood is contaminated, t de-
lirium often arising from that condition, as ll as
from exhausted organic, nervous, or vital inf nce.

345. v. Treatment of the Latent F of
Phthisis.—This variety of the disease 77.
et seq.) generally eludes the notice of the ends
and the fears of the patient until it h ad-
vanced to a state hardly admitting of hop If,
however, the symptoms characterising it ould
alarm either friends or patient, if depres n of
spirits, impaired digestion and assimilat , or
other indication of disorder lead to the pr ring
of medical advice and the detection of the lady
in its silent and stealthy course, althou no
prominent or unmistakeable sign be prese the
treatment which will be found most benel al is

t which has been already advised for the *Pre- tion* and for the *threatened appearance* of the lady (§§ 292—298.). It is obvious, however, t the best devised means will have no beneficial ct if the causes which injured the constitution continue to act. The physician should en- vour to ascertain what these are; and if they such as may be removed, the necessity of king the attempt should be insisted upon, and patient be made acquainted with the conse- ences of the neglect of this advice, especially en the removal of these causes depends upon self. In most of the cases of this variety the ses are usually depressing and exhausting; and many, as soon as the nature of the malady is pected, the digestive and assimilating functions uire restoratives, mild tonics, change of air, derate exercise in the open air, travelling, pleasurable occupation of the mind; the re- ienal and medical treatment I have advised ve (§§ 299—324.) for the first stage of the al form of the disease being also necessary. this latent or silent course of phthisis vascular letions are not well sustained; and if they be all attempted, they should be small, and their cts watched. In the great majority of cases this form, and especially when depressing or austing causes have occasioned the malady, dicines of a decidedly restorative or tonic kind, ention to the digestive functions, cod-liver oil, the other means recommended at the place erred to, should be adopted. These may arrest disease; but if it should advance, nevertheless, become unmistakingly developed, the treat- nt must necessarily be the same as I have vised for the more common form of the malady, dified as above, according to the manifestations the advanced stages.

346. vi. Primary Acute or Rapid Phthisis. *A.* The symptoms of the *first variety* of this m (§§ 82—84.) have been described by me intermediate between those of congestive nchitis on the one hand, and of congestive nervous pneumonia on the other (§ 83.), h lungs being more or less affected. The es which I have observed have been conse- tive of measles in a scrofulous diathesis, or of ayed, suppressed, or excessive catamenia. In se bleeding seemed injurious, or was of no il. Emetics, the solution of the acetate of monia, with ether or ammonia, small doses of nphor, the terebinthinate embrocation applied er the chest or between the shoulders, and sters, were the means which appeared to be of st service. Cod-liver oil was either not re- ned, or was nauseated and not taken, or failed producing any benefit. The infusion or decoc- n of cinchona, with nitrate of potash and bi- rbonates of the alkalies, or with the solution of etate of ammonia and various ethereal prepa- ions, and small doses of camphor with aconite, ., were also prescribed in different cases, or in same cases at different periods of the disease, t with no marked advantage.

347. *B.* The *second variety*, or more strictly fe- ile form of acute phthisis described above (§§ 85, .), is often mistaken for low nervous or typhoid ver, which it closely resembles, especially in its vanced progress. In the few cases which have llen under my observation I prescribed the re- edies I have just mentioned (§ 346.); and of these, the last-mentioned, or those consisting of the preparations of cinchona with the substances stated to have been conjoined with them, the chlorate of potass, camphor, the terebinthinate embrocations, &c., appeared to be of service only in prolonging the life of the patient for a few days. The nature of these cases precludes any hope of further advantage than this from any treatment whatever.

348. vii. Consecutively Acute Phthisis (§ 87.) is merely the supervention of either of the acute varieties of the disease described above (§§ 81—86.) upon the latent form (§§ 77—80.), or the development of this latter form owing to an attack of hæmoptysis in its course, or to some determining or aggravating cause or occurrence. Although an attack of hæmoptysis often relieves the pulmonary symptoms when they have been unequivocally manifested previously, at least for a time; yet it is sometimes followed by an acute state of the disease, most frequently by the more common form, when it occurs in the course of the latent variety. In the consecutive manifestation of acute symptoms the treatment should depend upon the character of these symptoms and upon the associations they present. If hæmoptysis take place, the treatment I have advised for it (§§ 353—5.) may be adopted as far as it may be appropriate to the peculiarities of the case. If the local symptoms and signs indicate congestion or inflammatory action in one or both lungs, local vascular depletions, or even a repetition of them, emetic, antiphlogistic, and saline medicines, especially the solution of the acetate of ammonia, terebinthinate embrocations, blisters, and other means already noticed, will be of service; and if the disease assume the acute or febrile states, the medicines noticed above (§§ 346, 347.) may be prescribed, although with little or no hope of benefit from them. In some instances the malady assumes a less acute or febrile form, the treatment having temporarily mitigated the severity of the symptoms. This is probably owing to the congestive and inflammatory states of the bronchi and substance of the lungs, which had supervened upon an extensive but latent formation of tubercles in both lungs having been partially subdued by the means employed. In these cases the developement of the tubercles by the morbid action in the bronchi and substance of the lungs afterwards prevents this action in these parts to subside; and thus both these morbid conditions act and react on each other, so as to occasion an acute state of disease. The extension of these lesions in a more or less marked degree through both lungs generally terminate fatally before large cavities, or even any cavities, are formed; whereas, in the common form of the disease, the greatest part of the lungs remains free from change, although other portions are ulcerated, excavated, or otherwise disorganised. In these circumstances the principles of treatment already developed should be adapted to the peculiarities of individual cases.

349. viii. Protracted Phthisis (§§ 89—91.), especially when early recognised or manifested, and judiciously treated, furnishes many chances either of recovery or of prolonged existence. For this variety, particularly when the pulse and respiration are not much disturbed, the several Hygienic means advised for the *prevention* of the

disease and for the treatment of the first stage (§§ 292—323.) are generally of great service, more especially change of climate, voyaging, exercise and agreeable occupations in the open air, and in a dry and temperate situation, attention to the digestive and assimilating functions, aided by digestible and nutritious food; by sulphur, balsams, a farinaceous and milk diet, &c.; by tonics, stomachics, and chalybeates when the disease appears to have proceeded from depressing or exhausting causes; and by emetics and other antiphlogistic means, or by small bleedings, issues, setons, terebinthinate embrocations, blisters, &c., according as vascular excitement or congestive or inflammatory complications may occur. In the simpler states of this form, when the pulse is weak or slow, and no congestive or inflammatory complication is present, and especially if the blood be deficient or thin, the mistura ferri composita, or the tinctura ferri muriatis, will be given with benefit; and with either of these other medicines may be conjoined, especially cod-liver oil, anodynes, &c.

350. ix. PHTHISIS IN INFANTS AND CHILDREN (§§ 92 — 95.) requires more particularly the Hygienic measures I have recommended under the head SCROFULA AND TUBERCLES (§§ 148—153.); and in the sections above on the *prevention* and *early treatment* of the usual form of phthisis (§§ 292—308.). Asses' milk, a milk and farinaceous diet, moderate exercise in the open air, change of climate, strict attention to the promotion of the digestive and assimilating functions by means of diet, regimen, and suitable medicine, the cod-liver oil in as large quantity as the stomach will bear, and taken in the modes hereafter to be noticed, are the chief means in which confidence can be placed, although others should be added which the circumstances of particular cases will suggest. When the disease advances to the second or third stage in children, then the treatment advised above for these stages, in the usual form of the disease, will, with due reference to the ages and states of the patients, be equally appropriate for them.

351. x. PHTHISIS IN THE DARK RACES (§96. and *note*).—The forms and states of the disease may reasonably be considered as varying with race and climate (§§ 200—222.), and also with the habitual food and clothing, or amount of clothing, of these races (§§ 219—222., 420, 1. and CLIMATE, §§ 42. *et seq.*). From what I have seen or gathered from writers respecting the disease in these races, I conclude that for them a tonic and restorative treatment, with attention to the digestive organs and to the functions of the skin, is especially and generally required. In other respects the means of cure advised above for the several forms of the disease in the white races are also suited to these forms when they appear in the dark races. In these latter the causes are commonly depressing and exhausting. Confinement to close situations, where the air is rendered impure by frequent respiration or by numbers, removal to colder and more humid climates than those from which they have been taken, venereal excesses, and insufficient food are the most frequent causes of phthisis in these races, and hæmoptysis is a common occurrence at the accession or early stage of the disease. For these the more astringent tonics, the preparations of cinchona or of cascarilla, conjoined with laxative r aperients, or with diaphoretics, according to e states of the bowels and skin; ipecacuanha c bined with the balsams and restoratives, ch beates with stomachics, and terebinthinate em cations externally, are most frequently indica l. If febrile action be present, the warm and res ative febrifuges and diaphoretics are requi ; especially the solution of acetate of ammonia, e carbonate of ammonia, camphor, and the infu n or decoction of cinchona. If the bowels bec e disordered, ipecacuanha in large doses, with i ates, the bitter extracts, and such of the medic es already mentioned as the circumstances of e case will suggest, will be found most appropr e. Dr. ARCHIBALD SMITH states that the sev al dark races, and the crosses between these r es, on the coast of Peru especially, when attacke by the hæmoptysic form of phthisis, were most be fited by a residence for several months i he mountains at an elevation of 5000 to 10,000 et above the level of the sea.

352. xi. TREATMENT OF COMPLICATED PHTI IS.—The *Complications* which severally appear m the accession to the close of this disease re re a few remarks. These complications are not n fined to any one form or stage of the malady ut occur in all; although more frequently pe ps in some cases than in others, owing to the n stitution and predisposition of the patient, the exciting and determining causes, and to the o sures and other influences in operation durin he progress of the malady. Some of these com ca tions may appear in the character rather of ro minent or more urgent symptoms than of a ual superinduced or intercurrent affections; bu as phthisis may, and actually often does, ru its whole course without the appearance o ny of them, or of one only in some cases a of another in others, whilst two or more may cur even in the same case, although not at the me time, they may be more correctly consider as contingent symptomatic affections, complic ng, and often rendering the tubercular or or nal malady more severe and more rapidly fatal. ith a few exceptions, these affections have al dy been considered with reference to treatment en discussing the successive stages.

353. *A. Hæmoptysis* is a frequent occurre in phthisis. The treatment of it should depend on the state of the pulse, the age and habit of dy of the patient, the stage of the disease, a the amount of blood lost. I have, however, so lly treated of hæmoptysis under the head H OR-RHAGE FROM THE RESPIRATORY ORGAN (§§ 123—141.), that it is quite unnecessary en tertain this subject farther than to remark hat hæmoptysis is generally the result, at the acc ion or at an early stage of phthisis, of capillar on gestion arising from the obstruction or irri ion caused by tubercular deposits, and at an adv ced stage either of the same cause or of exu ion from an ulcerated cavity, or of discharge om an eroded vessel or vessels. The older w ers, observing the relief following a free discha of blood at an early stage of the disease, advise hat the hæmorrhage should be allowed to proce for some time. But to do this would often g tly alarm the patient, and be running the risk the blood passing into and obstructing or irr ing many of the bronchi which had remaine free

disorder. It is, therefore, safer to assist the orrhage by suitable means, such as those h I have detailed under the article Hæmor- e (§§ 123—141.), or by general or local ing, or by the internal exhibition of the spirits rpentine in doses of twenty or thirty drops half-hour or hour, and by the turpentine ocation or epithem applied over the chest. are numerous other means which may be oyed, and which are mentioned in the article eferred to; but these are most generally of ce. The bleeding should be rather repeated large, and be regulated by the circumstances dy stated. Large doses of ipecacuanha, or or two grains given every quarter or half- , are also of great service; but if the bowels onfined, half-an-ounce each of spirits of tur- ne and castor-oil may be taken in a suitable le, and the same substances in larger doses nistered in gruel as an enema. Dr. Cheyne es, especially in cases of hæmoptysis with nmatory symptoms, a quarter, or even an h of a grain of tartarised antimony with five grains of nitre every hour. The chief ad- ge from ipecacuanha and from antimony is uced by the nausea they occasion. Much, of the benefit experienced from sea voyages, ially in this form or complication of phthisis, oduced also by the nausea thereby occa- d.

4. When called to these and other forms of orrhage I have often found the practitioner uously applying cold or ice to the chest. The ntaneous shock or impression of cold some- does good; but if this effect does not im- ately follow, to persist in these applications, cially in hæmoptysis, always does mischief, creasing or perpetuating congestion of, and ular determination to, the lungs.

5. When hæmoptysis has not sufficiently ed the congestion or the inflammatory toms attending it, then bleeding, general or , should be repeated, according to the effect o the circumstances at the time or subse- tly. When, on the other hand, the quantity e discharge, the existing symptoms, the stage e disease, and state of the patient, require an ediate arrest of hæmoptysis, without having urse to vascular depletion, then the other s advised are the most efficient, the spirit of ntine or ipecacuanha acting more promptly the acetate of lead or other astringents. The e cornutum I have also found to act very ptly in hæmoptysis, five grains of it being every five, ten, fifteen, or twenty minutes, it produces the effect or causes vomiting or h nausea. The repetition of small bleedings, other means subsequently, should depend the state of the pulse, the existence of *pain* ny part, or of dyspnœa and the state and of the disease; but in most cases the tere- inate embrocations already advised should be inued to those regions of the chest where t uneasiness is felt.

56. B. *Inflammation* of portions of the *lungs* f the *bronchi*, or of the *trachea* or *larynx*, wed by more or less of the consequences of e, as stated above (§§ 109—112.), often com- ates phthisis, and requires means of an antiphlo- c kind in some respects the same as those just sed. It should, however, be recollected that the inflammatory action affecting one or more of these parts, owing to its asthenic or congestive character, to impaired constitutional power, to previous disease, and to the associated morbid conditions, admits not of the same treatment as that which is found most beneficial in idiopathic or some other states of this action. Vascular depletions, generally local, as in hæmoptysis and pleuritic attacks, are required, and sometimes should be repeated. When the state of the case admits of venesection, to however small an extent, this should be preferred to the application of leeches, to which also cupping ought to be preferred.

357. *a. Pain* in the chest, independently of hæmoptysis, is often relieved by small bleedings, by cupping or leeches, by blisters, and by the continued application of the terebinthinate embrocation. The usual cause of this pain—its connection with *partial pleuritis* (§ 112.) — should not be overlooked; and the advantage generally following a recourse to mercurial and antimonial preparations in combination, and sometimes also to anodynes, demulcents, &c., in the intervals between the exhibition of the former, ought to be kept in view.

358. *b. Cough* is often a most distressing symptom, especially in the advanced stages of phthisis, and more particularly when it is associated with *dyspnœa*. In the less urgent states of cough, compound tincture of camphor, or hydrocyanic acid, will often give relief. The preparations of aniseed have long been highly esteemed for their effects in ameliorating the cough and even the dyspnœa. To the preparations in common use Dr. Watson states that Dr. Prout preferred an infusion of three drachms or half an ounce of the bruised seeds of aniseed in half a pint of distilled water, at a temperature not exceeding 120°, allowing it to stand until it is cold. This may be made an excellent vehicle for the compound tincture of camphor, hydrocyanic acid, or conium, &c. But the severer attacks of cough, in the advanced stages, require more energetic means, especially the preparations of opium or of morphia. These, however, often are followed by unpleasant symptoms, particularly morphia, if they be not conjoined with aromatics and gentle stimulants—with small doses of camphor, of spirits, or oil of carraway, or of lavender, or of aniseed, &c. Opium may be given in the form of the confectio opii, or conjoined with a little of the confectio aromatica; or the pilula galbani composita, or the pilula saponis composita, or the pilula styracis composita may be prescribed with either of the foregoing. I have frequently preferred the following solution of the acetate of morphia, conjoined with aromatics in order to counteract the depressing effects often produced by it.

No. 358. ℞ Morphiæ acetatis, gr. vj.; Liq. Ammoniæ acetatis, ℥j.; Acidi acetici diluti ʒij.; Spirit. Anisi ℥ss.; Spirit. Carui et Spirit. Lavand. Comp., āā ʒiij.; Mist. Camphoræ (vel Syrupi Tolutani) ad ℥iij. misce. Fiat mist. cujus capiat ʒj. pro dose, vel ʒij. hora decubitus, et ʒj. primo mane, in aquæ hordei cyatho vinario.

359. C. *Laryngeal* and *Tracheal Affections* are often the most distressing of those which occur in the course of phthisis (§§ 109, 110.); and in some of the usual or more protracted forms of the disease, present more or less of the characters noticed above (§§109, 110.), or of the sub-acute or chronic states described in the article on Diseases of the

Larynx and Trachea (§§ 105. *et seq.*). Since this article was written, the diseases of these parts have been ably investigated by Dr. Horace Green. He contends that inflammatory affections of the larynx, trachea, and throat are seated in the mucous follicles. It is, however, chiefly in the sub-acute and chronic affections of these parts, that the follicles are either primarily or consecutively implicated, and especially when these affections are complications of phthisis, and are produced either by the protracted irritation of the trachea, larynx, epiglottis, and even of the pharynx and fauces, by cough, and by morbid secretions passing through them, or by the existence of tuberculous matter in their follicles or muciparous glands. At first, these sources of irritation and contamination enlarge these follicles, increase their discharge, thicken and somewhat soften the mucous and sub-mucous tissues, and ultimately occasion an ulceration of the mucous follicles, and an atrophy, with increased softening, of the mucous and sub-mucous membranes. That the affection of the muciparous glands, in the advanced course of phthisis, is occasioned not only by the morbid secretions passing over them, but also by the deposit of tuberculous matter in them, is extremely probable. Dr. H. Green insists upon this latter change, although it is denied by several eminent pathologists. In either case, the treatment cannot materially differ. Dr. H. G. found this complication of phthisis most frequent between the ages of 25 and 38 years. He also often observed this affection of the throat and larynx after influenza, eruptive fevers, and more particularly in persons habitually using tobacco. Dr. Gellerstedt considers the ulcerations so commonly found in the larynx, in phthisis, to be of tubercular origin; while those of the trachea he regards, with Louis, as of an aphthous nature, arising from the constant irritation of the cough and expectoration.

360. The *treatment* of this complication of phthisis has been by inhalation, insufflation, lotions, and the application of the solid nitrate of silver to the tonsils, uvula, and pharynx. Dr. Laycock remarks, in an able article in the *British and Foreign Medical Review* (vol. xxiv. p. 497.), that the application of the nitrate of silver to the cavity of the larynx is not, however, to be classed among these ordinary methods; and the practice of it by Dr. Green seems to have been received with so much incredulity in the United States, that he has thought it necessary to multiply evidence as to the fact that he has introduced a strong solution of nitrate of silver within that cavity "Trousseau and Belloc are supposed, by Dr. Green, to have been the first to prescribe and employ topical medication in chronic laryngeal disease. They found a solution of the nitrate of silver, in the proportion of two drachms, or sometimes four drachms, to an ounce of distilled water, to be the most efficacious and harmless application. Two methods were adopted by them: the one was to saturate a small sponge attached to a bent rod of whalebone, and to manipulate so that the solution be expressed into the larynx: the other was to use a small silver syringe, with a tube suitably adapted for effecting the same object. Dr. Green, however, several years before the appearance of Messrs. Trousseau and Belloc's book, had instituted experiments, and come to a similar conclusion." Dr. Laycock further remarks at, without wishing to disparage the labours o our Gallic or American brethren, Sir Charles LL successfully adopted the method of treatme so fully illustrated by Dr. Green; and Dr. L. ers to cases published by Sir C. Bell (*Surgica Ob-servations*, &c. Lond. 1816, p. 34.), for whic his practice was employed. Dr. Watson tes that Sir C. Bell had recourse to this local pli-cation of the strong caustic solution in a se under his care; and remarks in his Lectu as follows, on the practice:—"It is said that a tle practice will enable a person to pass his ger into a patient's throat, and to familiarise his nse of touch with the ordinary condition of the per part of the respiratory apparatus, so as to be ble to detect swelling, or irregularity, or thick ng about the chink of the glottis. And grea ad-vantage is said to have been obtained from a ly-ing remedies directly to the diseased or irr ble part. This practice was much followed b the late Mr. Vance, who had been for many ars a naval surgeon; and he called it, in naval p se, *swabbing* the affected organ."

361. Where the laryngeal complication o urs in the advanced course of phthisis, this pr ice can prove only of temporary benefit. I ve been consulted in many cases of this descri on where it had been said to have been resorte to, but apparently either with no advantage, or ith very temporary relief. However, in idiop hic or primary cases, or when the complication o urs in an early stage of phthisis, for which a ra nal and an appropriate treatment is prescribec his local medication of the laryngeal complic on may be employed, by one capable of perfor ng it, safely and satisfactorily. I do not, how er, believe that the appliances here advised ent the larynx and trachea once in twenty times; at-ever benefit results arises from the applicati to the under surface of the epiglottis and adj ng parts. I have, since the commencement o my practice, trusted much in those cases to the a-lation of the weak vapour of turpentine a ng from the application of the embrocation so en mentioned, either around the throat and nec or to the chest, or between the scapulæ.

362. *D. The Abdominal Complications* of ph sis have been already partly considered, when re k-ing upon the treatment of the diarrhœa (§ 3.) and of the impaired digestion and assimil on (§ 234.) so generally observed previousl to, and in the course of the malady. But the func ns of the liver are also not sufficiently discharg in the course of the disease; and due attention ha not hitherto been directed to them. That this orga as been long disordered in cases of phthisis is s wn by the nature of the organic lesions it gene ly presents after death (§ 118.). It has bee n-sisted upon by an able and close observer o he causes and nature of disease (Dr. McCor c, of Belfast), that phthisis is not only caused, b is also perpetuated, by an imperfect supply, a an insufficient digestion and assimilation of pur ir in and by the lungs; consequently, the ed globules of the blood are not oxygenated d assimilated to such an extent or amount to supply the requisite materials by their wast ot the elaboration of healthy bile: owing also to is cause, the carbonaceous and hydrogenous e-ments are not sufficiently combined with e

ygen of the respired air, so as to contribute to althy assimilation and nutrition ; and they consequently, under the influence of life, form morbid adventitious products, and give rise to the fatty largement of the liver so generally found after ath (§§ 118.).

363. The great importance of promoting the gestive and assimilating processes from the very mmencement of phthisis, whatever other means treatment be adopted, will appear from what s been advanced above ; and I know of no rer means of attaining this end, than by improving the secretions and excretions by suitable edicines and food, and by removing the patient a high, dry, and temperate air, where he may joy the advantages of sunshine and exercise, nd avoid those causes which reduce organic ervous or vital power. In general physicians ave been during the last half century, in which ich wonderful advances have been made in the ractical sciences, so much occupied in listening sounds which they often could neither interpret or refer to their proper sources — in splitting the iagnostic hairs floating before their troubled, if not lways dazzled vision, and in hearing what they elieved even when not believing what they heard —as to be carried along by the pathology in shion, neglecting those great views of physioloical pathology which alone furnish the true basis f rational and successful practice. Whilst a murur, a bruit, a râle, a ronchus, and every sound for hich a term could be coined, and their various rades, cadences, &c., were observed, or were igned to be observed, and were noted, and paraded nd admired, on all occasions, the conditions of the ital powers and functions, upon which both disease nd recovery from disease mainly depend, were ntirely neglected. But attention to these latter, o the states of the secretions and excretions, to he manifestations of impaired vital power, to the auses of this impairment, to the removal of hose causes, and to the true means of restoring ost energy, as regarded a malady the most fatal, he most prevalent, and the most constant in its revalence, was practically discarded ; and fussy manipulations, striking examinations, — where uch examinations and manipulations were often nnecessary— were paraded in the place of these, nd of other more profound, more physiological, nd more practical investigations.

364. *E.* Several *other complications*, of less freuent occurrence than the above, have been menioned (§§ 119—123.); but the means appropriate o each will readily suggest themselves to the phyician. *Œdema* of the lower extremities (§ 120.) ot unfrequently occurs in the advanced stages of hthisis, and is sometimes diminished by precribing small doses of biborate of soda, or of otash, with the tonic infusions or the diuretics, r with the means employed for the disease. Pressure on the course of the veins of the lower xtremities, by the sitting or other posture of the ody, sometimes favours the œdema, and even ccasions a permanent obstruction of these vessels.

365. xii. Brief Remarks on some of the Means advised for Tubercular Phthisis. — Having considered the treatment which apears the most suited to the several forms and tages of phthisis, I am next desirous to notice the medicines which have been recommended by writers for this disease, and to mention the circumstances or states of the malady in which they may be prescribed, and in which they are contra-indicated. Most of these medicines have been prescribed empirically in phthisis ; for, although the treatment of the disease had assumed a rational aspect in the works of our countrymen Bennet and Morton, there were few besides, even among the most eminent of medical writers, who presented us with a plan of cure which was even tolerably appropriate to the stages and states of the disease ; and, even amongst those who had cultivated the most the diagnosis and pathology of this malady, there were very few who recommended their favourite remedies with due reference to the states and complications of the disease, and to the pathological conditions which they had themselves described or admitted. I shall, therefore, attempt to inquire, in my brief notices of the substances recommended, into the circumstances in which either experience or the operation of these substances warrants their use.

366. *Acids.* Most of the *mineral and vegetable acids* have been employed in phthisis, but seldom with any definite object, or to fulfil a rational indication. The chief intention with which they have been prescribed in recent times is to repress or prevent hæmoptysis, or to act as a refrigerant when the febrile action is considerable, and the night-sweats exhausting. They are merely palliatives—and in this they often fail, and sometimes they even render the cough harder and more severe ; and, with the exceptions of the hydrocyanic and boracic, they are injurious to the sub-inflammatory states, and in the inflammatory complications of the disease.—The *acetic acid* has long been employed in phthisis; and when the contra-indications just mentioned do not prevent recourse to it, either simply or in the form of raspberry-vinegar, or oxymel more or less diluted, it is a grateful and cooling medicine, especially after hæmoptysis has been considerable or excessive. In states of great exhaustion, or colliquation, when it is desirable to produce an antiseptic as well as an astringent effect, the pyroligneous acetic acid may be given, or even a drop of the aromatic.

367. *Sulphuric acid*, much diluted, has been commonly prescribed in phthisis, and generally with the same object as the acetic. Bang gave it with mucilages ; Joerdens with the Phellandrium aquaticum, a medicine much employed in Germany for this disease, and Portal in states of weak dilution, as a cooling drink ; Rollo and Hufeland considered it useless ; but Collbatch, Grant, De Haen, Home, Fothergill, Simmons, Sims, and Marx, entertained a more favourable opinion of it, especially in the form of acidum sulphuricum aromaticum, or *vitriolic elixir*. Quarin very justly cautions against its use in the more inflammatory states and complications of the disease.—Weak dilutions of the *nitric* and the *hydro-chloric* acids may be prescribed, in the same states as those which admit of the use of the foregoing ; and the combination of the two—one part of the former to two of the latter—when the contra-indications mentioned above are not present ; and, when exhaustion, colliquation, and other symptoms of vital depression are urgent, these two may be added to the infusion of cinchona, or other restoratives, especially when the functions of the liver are much impaired. I have prescribed them with

benefit in such cases, and sometimes given the cod-liver oil on the surface of a mixture of these or of similar substances.

368. *Hydrocyanic acid* is one of the most useful medicines in this disease. It was introduced into practice by Magendie, Granville, and Elliotson, who took a just view of its effects both in phthisis and in dyspepsia—complaints so intimately allied in their origins and in their pathology, as already shown. Its influence in the latter benefits the former, whilst it exerts a soothing effect on the cough, without aggravating, but rather ameliorating, any complication which may appear in the course of the malady. It may, moreover, be advantageously conjoined with other acids, with the neutral salines, most of which it is incapable of decomposing, and with the great majority of other medicines usually prescribed for phthisis. Of the other acids, the most important are the *citric*, the *benzoic*, and the *boracic*. The *citric* is serviceable in the states of the disease for which the acetic is given; but, either in the pure form or as it exists in lemon juice, it is most useful as an adjunct to beverages, or in combination with the alkalies. In these latter states it aids, with other means, in preventing, counteracting, or removing the morbid conditions of the circulating fluids in the advanced stages of phthisis. *Benzoic acid* has been frequently advised in various combinations for this disease, but has rarely been confided in alone. It is chiefly in the more asthenic and colliquative conditions that it is at all of service. I have seen more benefit from the *boracic*, than from benzoic acid. Either of these acids may be given conjoined with mucilaginous, balsamic, and expectorant medicines, when these are indicated. The boracic acid and its alkaline salts — the biborate of soda and B. of potash — are not contra-indicated by the inflammatory diathesis, and may be given in those states in which the mineral acids are inappropriate. I have found the *dilute phosphoric acid* of much service in the few cases in which I have tried it. It may be prescribed in doses of 20 to 40 minims in cases of phthisis characterised by vital depression or exhaustion, especially when the disease appeared to result from depressing causes, or from masturbation. For such, it may be given in the infusion of absinthium, or of ginseng root, with or without the addition of the tincture of sumbul.

369. *Aconite* was first prescribed for phthisis by Portal, who afterwards relinquished the use of it. Busch gave the powder of the dried leaves in doses of two grains every two or three hours, and increased the dose until a drachm was taken in the twenty-four hours. I have prescribed the powder in smaller doses in a few cases; and the extract in doses of a quarter of a grain, in others, cautiously increasing the dose; but I have ventured upon it only in the more inflammatory states as a substitute for bleeding. I cannot say that it was so beneficial as Busch and Harel du Tanerel have stated it to have been. It had, however, the effect of lowering the pulse, of causing perspiration, of diminishing pain, and of affording ease; and, although I cannot view it, with the writers just mentioned, as a cure for phthisis, yet I consider it as an excellent medicine in the more inflammatory states and complications of the disease, when prudently exhibited, or when its doses are increased, or its use interrupted and resumed from time to time, as circumstances quire.

370. *Alkalies and alkaline salts* are serviceable several states of phthisis. The former, and th sub-carbonates, were much praised by Bark and Spalding. I have often prescribed the liq potassæ, and Brandish's alkaline solution in t scrofulous forms of the disease, with sarsaparil demulcents, and narcotics, and, in the protrac form, with tonics or bitters and anodynes, w temporary, and sometimes with permanent bene In certain states, and more particularly when blood is probably more or less contaminated the passage into it of morbid matters from lungs, the alkalies are often advantageous co bined with the solutions of the neutral salts, the bi-carbonate of potass, with the nitrate, the solution of the acetate with the carbonate ammonia, and with the other substances n mentioned.

371. *Ammoniacum* was frequently prescribed phthisis, and often injudiciously, especially combination with squills or other heating gu resins. It should be given only in the mi chronic states of the disease, and even in th with caution, and rarely with the medicines n mentioned. I have prescribed it with ben when an expectorant was required, and when inflammatory complication existed; but if cough became severe or hard during its use, it w always relinquished. I generally gave it as f lows: —

No. 359. ℞. Ammoniaci ʒjss. tere cum Aq. Des ℥ivss.; dein adde Vini Antimonialis ʒij.; Liq. Am niæ acetatis ℥ij.; Tinct. Conii (vel Tinct. Hyoscya ʒij.; Syrupi Althææ officinalis ad ℥viij., misce. mistura, cujus capiat cochl. j. vel ij. larga, 4tis vel horis.

No. 360. ℞. Ammoniaci ʒjss.; Tinct. Benzoini Co ℥iij.; Tinct. Camphoræ Comp. ℥ss.; Aquæ Flor. rantii, Aq. Sambuci, āā, ℥iij.; Tere bene, et adde Ti Conii ʒjss., Acidi Hydrocyanici diluti ʒss., Syrupi lutani ℥ij., Syrupi Althææ officinalis ad ℥viij. Mi Capiat cochl. j. amplum, 3tis vel 4tis horis.

No. 361. ℞. Ammoniaci, Balsami Sulphuris Ani (*vide* § 400.), āā. ʒj.; Extr. Hyoscyami (vel Co ℈ij.; Saponis Castil. ʒss.; Extr. Glycyrrh. ʒss. Mi Fiant, secundum artem, Pilulæ L. quarum capiat un vel duas, omni 4ta vel 6ta horâ.

No. 362. ℞. Ammoniaci, Galbani, Extr. Conii, Sa nis Castil. āā. ʒss.; Fol. Belladonnæ gr. xv.; Anti onii Potassio-tart. gr. v. Contunde bene, et fiant sec dum artem Pilulæ xxxvj. Sumantur binæ vel tres in die. (The Pills prescribed by Richter (*op. cit.*) tubercular phthisis).

372. *Balsams* have been long in use in chro pectoral diseases, and especially in phthisis; and though they are sometimes of service, they are often injurious, unless they be given with gr discrimination. Under this denomination the *paiba*, the *Peruvian*, and the *tolu balsam* fall m strictly; the others more correctly belong to terebinthinates and to the gum-resins, and to th likewise the older writers often extended the te The circumstances, and the combinations in wh the balsams, and even the other substances of ranked in the same category, may be prescri in phthisis, are the same as those which I h stated in respect of the exhibition of am niacum (§ 371.). When it is considered t these medicines, and those closely allied to the are appropriate only in certain states of malady, that an empirical use of them may as often injurious as beneficial, we should be surprised at finding them recommended by Haen, Godbold, Simmons, Rush, &c.; and

nced by FOTHERGILL, FRIZE, and others.
e Copaiba balsam was preferred by FULLER,
FFMANN, MONRO, and GESNER; but it is now
dom prescribed for phthisis. A substance be-
nes a remedy only by its appropriate use.—*Ba-
es, the hydrochlorate,* has been recommended in
hisis by HUFELAND, HERZ, and CRAWFORD;
, although it has been prescribed by many, yet
satisfactory result has been adduced respect-
it.

373. *Bitters and tonic infusions,* as those of ab-
thium, Gentian, Calumba, Chereita, &c., have
en advised for phthisis by CÆLIUS AURELIANUS,
IALMERS, SALVATORI, RUSH, MAY, and PEARS,
nerally also with a nourishing and digestible
t. Although too generally and empirically
escribed by these and other writers, yet these
dicines are often required in the usual and more
ronic states of the disease, especially with the
w of removing the symptoms of indigestion so
quently attending phthisis from its commence-
nt, and of supporting the vital powers. These
fusions, moreover, may be made the vehicles,
which other medicines, whether saline, anodyne,
alterative, or narcotic, may be prescribed.

374. *Camphor* was given in phthisis by BUR-
RIUS; by MARX, with nitre and hydro-chlorate
ammonia; and by KORTUM with this latter
lt. It is useful chiefly as an adjunct to other
ore appropriate medicines, or when it is given
ith the object of abating urgent symptoms. In
nall doses it is beneficial, especially when con-
ined with nitre, the spirits of nitric æther, and
lution of the acetate of ammonia, in allaying
brile action and inflammatory complications.
n larger doses, and combined with the sesqui-
rbonate of ammonia, it is of service in the
lvanced stage of phthisis, in rallying the vital
ower and in counteracting morbid conditions of
e blood, whilst it promotes expectoration; and
ith the extract of conium or of henbane, or with
preparation of opium, it allays irritation, both
cally and generally.

375. *Carbon or charcoal* was formerly much
mployed in the colliquative states of phthisis, in
ysentery, and in putro-adynamic fevers. I have
iven it at an early period of my practice in
everal cases, but generally with camphor, chalk,
ascarilla, and aromatics, in doses varying from a
cruple to a drachm; and chiefly with the inten-
on of correcting the fœtor of the excretions.
OBERNHEIM states that SCHOENLEIN gave it in
hthisis with digitalis; and GARRETT prescribed
with sulphur and the extract of the smaller
entaury. I suspect, however, that whatever
enefit resulted from these combinations cannot
e imputed to the carbon. M. JOURDAN justly
emarks, "Lorsque les théories chimiques ré-
naient en Médecine, on attribuait au Charbon
égétal puissantes vertus dans la phthisie pulmo-
aire, la dyssenterie, et surtout les maladies pu-
rides. Le temps n'a justifié aucune des espé-
ances qu'on avait conçues à cet égard."

376. *Cascarilla* was often prescribed with the
ame intention as cinchona and the medicines last
oticed. I have given it only in the form of
nfusion in the more colliquative states and non-
ebrile forms of phthisis, and have generally made
this preparation the vehicle for such other medi-
cines as the peculiarities of the case suggested.
Cascarilla has received the approbation of THILENIUS, WENDT, KRUGELSTEIN, and HECKER, in the usual and more chronic forms of the disease, indeed, in the states for which I have prescribed it. The historical sketch I have given above, will sufficiently show the diversity of opinions as to the propriety of employing the tonic and astringent barks in phthisis; and more particularly as to the use of cinchona, &c.

377. *Chalybeates* have been already mentioned in connection with the states of the disease in which they may be prescribed. They have been recommended by GRIFFITH, GÜNTHER, STANGER, SCHALLER, VELSEN, and many others. The compound mixture of iron, the ammonio-citrate of iron, the ammonio-chloride of iron, the solution of the pernitrate of iron, the potassio-tartrate of iron, the tinctures of the acetate and of the muriate of iron, and the compound pills of iron, are severally of use in certain states of phthisis; but there are few medicines which require greater discrimination and caution in their use in this disease than they. Cases which proceed from depressing and exhausting causes, in which the blood is poor in red globules, or which are free from inflammatory or hæmoptysic complications, are often benefited by chalybeates, as well as by other tonics, especially if dyspeptic symptoms are prominent; but their effects upon the cough, expectoration, breathing, pulse, and the accompanying hectic, should be carefully watched; and any aggravation of these should cause the discontinuance of the medicines and the adoption of other means. The good effects of chalybeates may be aided by other medicines, with which they may be conjoined according to the stage and complications and other peculiarities of the case.

378. *Cinchona.* Whilst DESAULT, DE MEZA, and ROMANS considered it injurious, and FOTHERGILL said that it was rarely of use, QUARIN, VOGEL, RAULIN, MARX, JAEGER, HORN, SCHMIDTMANN, and others, recommended it. HALLER, HOME, and CHAPMAN, prescribed cinchona with a milk and vegetable diet. CALLISEN gave it with a powerful stimulant, the oil of asphaltum, of which notice will be taken hereafter; THOMANN with opiates; and RYAN and MAY with animal food. STOLL advised cinchona, when inflammatory symptoms were absent, and SIMMONS when the expectoration was abundant and puriform. METTERNICH preferred the extract, and gave it in large doses. In more recent times, the *sulphate of quina* has been substituted for the preparations of cinchona, in phthisis as well as in other diseases; but I doubt the advantage of the substitution as respects this malady, for the infusion, the decoction, the extract, and the compound tincture of cinchona, furnished the physician with the means of selection according to the features of the case for which he was prescribing. However, the sulphate of quina is an excellent medicine, when it is desirable to have recourse at the same time to an acid and to an astringent; and then it may be given in the compound infusion of roses, and at the same time also, as advised by GUENTHER, AMELUNG, DROSTE, and some other German writers, with the tincture of digitalis, or with the powder of digitalis in the form of pill. I have prescribed it, with small doses of camphor and conium, with benefit in some states of the disease.

379. *Conium* has, from the days of STOERCK down to the present time, been more generally

employed in phthisis and scrofula than perhaps any other medicine. It has been praised by QUARIN, ZEVIANI, FOTHERGILL, ADAIR, BUTTER, BUSCH, HUFELAND, and many others; and yet there are few medicines whose effects in phthisis are more equivocal, and, as usually employed, are more uncertain. At the present day it is seldom confided in alone; and when given as an adjunct to other means it is often in insufficient doses, or in imperfect states of preparation, and not persisted in for the time required to evince its effects.

380. *Creasote* has been recommended for phthisis by SCHROEN, REICHENBACH, CARTONI, RAMPOLD, and others. I have employed it, since its introduction to medical practice, chiefly as an adjuvant of other means in the last stage of the disease, and for the mitigation of the disorders of the stomach and bowels, — of nausea, vomiting, diarrhœa, &c. It is also of great benefit when used to slightly impregnate the air of the apartment in which the patient chiefly resides (§ 413.). Creasote, however, should not be prescribed in the circumstances contra-indicating chalybeates and tonics,—when the cough is dry, hard, or constrictive, — when a state of erythism or of active congestion is inferred, and when an inflammatory complication or active hæmoptysis is present. It is chiefly in the colliquative or asthenic conditions of phthisis, that it is a valuable adjunct of other means, and especially when the excretions are more or less fœtid, and the circulation is contaminated by the passage of morbid matters into it from the primary seat of disease.

381. *Digitalis* has been recommended by some, and praised by others, for phthisis. Indeed there is, perhaps, no other medicine which has been more generally employed in this disease, and whose operation has been less understood, than digitalis, — has, in short, been more empirically prescribed. It has been sanctioned by BEDDOES, WITHERING, DARWIN, FERRIAR, SPENCE, FOWLER, KINGLAKE, MAGENNIS. MEYER, and THOMAS. Dr. DRAKE says that citric acid counteracts its unpleasant or cumulative effects, when given in too frequent or too large doses. Whilst the above, and many continental writers, are favourable to the use of digitalis in phthisis, BREE and BAILEY contend that it is injurious in some cases and useless in others. I have, however, seen some benefit derived from the infusion, prescribed at first in very large, and afterwards in rapidly diminished doses; especially in the hæmoptysic and febrile states, and in the congestive and inflammatory complications of the disease.—*Dulcamara* was advised for phthisis by BURSERIUS, and afterwards by STARK, RICHTER, and HUFELAND, who generally gave it in conjunction with the Iceland moss.

382. *Emetics* have been recommended for phthisis since the days of HIPPOCRATES to the present time. MORTON, BRYAN-ROBINSON, MARRYAT, SIMMONS, SIMS, KENTISH, MARET, REID, METTERNICH, SWEDIAUR, PARR, RICHTER, DUMAS, &c., advise emetics at an early stage of the disease; some, as REID, BAYLE, and others, with a frequency which appears to be excessive or even injurious; others, as YOUNG, CLARK, WITT, &c., in a more moderate and rational manner. Many physicians in Italy, early in the present century, pretended to have cured phthisis by the exhibition of a solution of tartar eme in the infusion of the flowers of the sambu nigra, or in other emollient infusions — gener three grains of the former in six ounces of latter. A quantity sufficient to produce vomit was directed night and morning, and milk water were drank freely. If diarrhœa sup vened, digitalis and ipecacuanha were prescri in small and frequent doses, with other me calculated to moderate or arrest the diarrh and the emetic tartar was relinquished.

383. Emetics are often of service, especia in the early stage of the malady, and when advi as above (§§ 306. 317.); but they should prescribed with caution, and with strict refere to the functions of the stomach and liver, and the assimilative and vital powers. I have alre mentioned those which may be preferred; even they ought not to be given so as to imp digestion and assimilation; and if these functi be weakened by them, or in cases where this appears great, mild tonics and a restorative digestible diet, aided by external derivation, sho be prescribed. In the advanced stages of phthi emetics are of more doubtful advantage, but e in these they may be of service. BLUMENB recommended them even in the third stage; either in this, or in an earlier period, they so times constitute an important part of ratio practice, especially if appropriately selected, wh the digestive mucous surface appears to be loa by sordes, when the expectoration is difficult scanty, the breathing suffocative or oppressed, the biliary secretion interrupted, or deficient the evacuations. But even in these circumstanc vital power should not be exhausted by a frequent recourse to them, and the digest functions ought to be restored soon afterwards suitable tonics and anodynes, as the infusion a tincture of calumba, or of chereita, or of ot bitter tonics, with hydrocyanic acid, conium, & or with one of the vegetable extracts, the purif oxgall, &c., in the form of pill.—*Ipecacuanh* useful in phthisis not merely as an emetic but a nauseant, expectorant, and promoter of digesti and as a corrector of morbid actions in the bow according to its dose and mode of administrati As a nauseant it was praised by PIDERIT, BARBA and others; and it certainly is a valuable medici in the more inflammatory and hæmoptysic sta of the disease; and in the form of pill with bit tonics and anodynes, or astringents when t bowels are much relaxed.

384. *The iodides*, especially the iodide of pota have been employed in phthisis, but are appropri only in the more chronic states of the disea Since the discovery of iodine, the use of its prep rations in scrofula had extended to tubercular c sumption. The earlier prescribers of this substan and of iodides generally, erred in giving them too large doses, in scrofulous and other diseas and in neglecting to conjoin them with a su cient quantity of alkalies, whereby the irritati effects of the iodine, or the decomposition of t iodide, by the acids of the stomach, might prevented. Thus, even when a very small d of the iodide of potass is prescribed in a vehi suited to the features of the case, the solution potass or the bicarbonate should be given in su cient quantity to prevent the decomposition of t iodide. Whatever form or combination of iodin

ven in phthisis, the effect upon the digestive func-ns, the pulse and the cough should be watched, d if it induce dyspeptic symptoms, or aggravate ose already present, it should either be re-nquished, or the dose of it much reduced.—*The rageen Moss*, or Fucus crispus, has been long nployed as a popular remedy in consumption, d it has been favourably noticed by M. Béral, yself, and others. It, as well as others among e fuci, may be used as a demulcent in this sease, with some benefit, probably arising in rt from the minute quantity of iodine this ass of sea-weed contains.

385. *The Lichen Islandicus* has been very com-only used in consumptive cases by Quarin, ergius, Thilenius, Marx, Régnault, Richter, chmidtman, Chrichton, and others. It is one the most generally useful medicines in this isease; its bitter, demulcent, and tonic pro-erties, divested of exciting action, rarely proving jurious, even in the more febrile cases. Wendt, yself, and others, prescribed it with milk, adding these such other medicines as the circumstances the case required. Sachtleben recommended decoction of three ounces each of the lichen, d of the polygala amara, of six drachms of quorice root, and of three drachms of dulcamara, be made with milk, as a preferable mode of rescribing the lichen in consumption. The de-oction of these substances is best made with ater to which a small quantity of the carbonate r solution of potash is added, boiled milk being dded to the strained decoction, and such ano-ynes, or other remedies, as the peculiarities of he case suggest.

386. *Lactucarium* was much employed by Dun-an, Rothammel, and François to allay the ough in phthisis and bronchitis, and was con-idered appropriate in the inflammatory state of he disease. It may be given under almost any ircumstances with this intention, and may be onjoined with ipecacuanha, digitalis, demul-ents, mild tonics or bitters, or other medicines uited to the case.

387. *Lead, the acetate of*, has been often pre-cribed in phthisis, but chiefly with the view of rresting hæmoptysis, and it has then been given ither with opium and ipecacuanha, in the form f pill, or in solution, with the addition of acetic cid. These combinations of acetate have been dvised by Kopp, Stark, Ettmuller, Amelung, Iildenbrand, Horn, and others. Weber pre-cribed the acetate with digitalis, myrrh, balsam of Peru, extract of hellenium, and mucilage, in the orm of pills. Hoffmann preferred the phos-hate of lead, in the dose of a grain, to the ace-ate, and conjoined it with the extract of henbane.

388. *Lime water* and the *muriate of lime* vere advised by Quarin, Marx, Beddoes, and Iufeland. Effervescing lime water (*Carara-vater*), is very advantageously given with milk, specially when the bowels are much relaxed. For this state of the malady not only may ca-echu, kino, and other means already recom-mended for it be employed, but the nitrate of silver, the extract of nux vomica, tar made nto pills with liquorice powder, &c., also be indi-vidually tried.

389. *Mercurials* are occasionally of service in phthisis, especially in certain states of the disease; and when judiciously combined with other medicines. Mercury with chalk, the blue pill, or Plummer's pill, will be of service, when the biliary functions are torpid, either alone or with soap and taraxacum, or with the compound rhubarb pill, or with the aloes and myrrh pill. when the digestive functions require to be assisted. In the more inflammatory states or complications of the disease calomel may be prescribed, as advised by Beddoes; although it should not be pushed so far as to produce salivation, as recommended by Rush, unless the disease be consequent upon syphilis; when the very unfavourable state of the malady may require this decided treatment. When partial pneumonitis, or pleuritis, or pneumo-pleuritis complicate phthisis, then calomel may be employed, and be beneficially conjoined with antimonials, or with ipecacuanha, or with opium, or with other narcotics. The beneficial effects of the bichloride of mercury, prescribed in the decoction, or in either of the tinctures of cinchona, in scrofulous cases, have induced me, as well as other physicians, to employ the same combination in the more manifestly scrofulous states of phthisis; and in some instances with much benefit; but, in my own cases, as other means were also employed, especially the external treatment about to be noticed, the amount of benefit derived from the former could hardly be determined. Schaeffer and Valentin have also given the bichloride with tonics and opium in phthisis, and, as they conceived, with advantage.

390. *Myrrh* and various gum-resins, especially *asafœtida*, *galbanum*, *&c.*, are most appropriate in the more chronic or protracted forms of phthisis, when they are attended by dyspnœa or difficult expectoration, and in females when the catamenia are difficult or scanty; or when the disease has been caused by depressing or exhausting causes. They are contra-indicated during inflammatory states and complications, and in the febrile forms of the malady: and are best suited to the circumstances of the disease which admit of chalybeates, tonics, balsams, cinchona, &c. In the form of Griffith's mixture (§§ 314. 377.), or when conjoined, as in the compound galbanum, or compound iron pill, or when further combined as with soap, extract of conium, or extract of henbane, they are sometimes of service.

391. *The oils*, especially *fish oils*, have only recently been employed in consumptive diseases, although they have been long previously used in other disorders. Hankel appears to have been the first to prescribe the *cod-liver-oil* in phthisis in Germany, and Professor Bennett in Edinburgh, to whom the credit of having first recommended it is clearly due. Contemporary with the earliest employment of it in this country, it was prescribed for a lady, whom I frequently saw in consultation with my friend Dr. Baird; and at that time it was not to be had in London, Mr. Morson having procured it, at our request, from the Continent. Since then I have employed it in this and several other diseases; and have always seen more or less benefit derived from it, especially in the more usual, and in the protracted, states of phthisis. It may be given in various ways; but generally with greatest benefit, from an hour to two hours after a meal, in the dose of half an ounce or even more for an adult, on the surface of any agreeable vehicle, — as of an infusion of orange peel, or of any bitter tonic or aromatic infusion, with

either a little acid or carbonate or citrate of an alkali, and any anodyne, &c.; or on the surface of milk, or of ginger or orange wine, &c. This oil may be taken twice or thrice daily, and in all stages of the disease. After continuing it for some days or weeks, it may be intermitted for a few days, and medical treatment may then be directed more especially to the digestive functions, and to the promotion of the biliary and intestinal secretions and excretions; and after such intermission, its use should be resumed and continued for a time which the state of the case and its effects will indicate.

392. All the *fish oils*, especially the oils from the livers of the *Torsk*, *Cod*, and other fish which I have enumerated above (§ 336.) are beneficial in phthisis, especially when they are recent, or fresh, and then they may be taken in larger quantity. The common use of fish oils in the most northerly countries of Europe probably is partly the cause of the infrequency of phthisis in those countries. The use of vegetable oils, especially *olive oil*, in countries near the Mediterranean, and in the north of Africa, may have the effect of diminishing the number of phthisical cases in those countries; and the adoption of the *palm oil nut*, as an article of food, in Western Africa, and of the oil for daily inunction of the surface of the body, may have a similar effect on the natives of that part of the world. It is not unlikely that other mild vegetable oils, as *linseed*, *almond*, &c., may also prove of service when taken in sufficient quantity and when judiciously conjoined with other medicines. Formerly the *oil of asphaltum* or of bitumen was often prescribed for phthisis, especially by Callisen, Bang, Thilenius, Healde, and others. Quarin said that it was only slightly palliative, whilst Frize considered it injurious. It was probably employed then, as other things have been used recently, or are praised now, merely with the object of being, with their abettors, talked of.

393. *Opium* and *Opiates*, in various forms, have been advised in phthisis by many writers, and condemned by others. There are, however, states of the disease which indicate the propriety of having recourse to them, and circumstances which contra-indicate their use. They are more frequently injurious than beneficial in the first stage of the disease, although Tralles has given a different opinion. Sometimes in the second stage, but most frequently in the third stage, opiates, or even the preparations of morphia, are of great service; but much of the benefit produced by them will depend upon the combinations in which they are prescribed. Marcus gave them with myrrh and Peruvian balsam, and, in the advanced and more chronic states of phthisis, this combination, or that with the compound galbanum pill, and the compound soap pill, will be appropriate. Peart advised opiates to be given with the carbonate of ammonia, æther, and aloes; and J. Frank laudanum, with the aromatic sulphuric acid. In the third stage of the disease, preparations containing more or less opium, especially the compound tincture of camphor, the compound styrax pill, pills of ipecacuanha and opium, &c.; and, when diarrhœa is present, the opiated cretaceous powder, the compound cretaceous powder with opium, the compound ipecacuanha powder, the compound kino powder, or the combination of opium with the extract of nux vomica, or w
the nitrate of silver, or with the sulphate of co
per, or with the sulphate of zinc, will be fou
individually of service, when judiciously pr
scribed. When there is much debility, opiat
should not be given in full doses, unless they
combined with aromatics, tonics, or stimulants,
with balsams or gum resins; and when the prep
rations of morphia are preferred to other opiat
then this recommendation should be especial
kept in recollection, because I have seen mu
distress result from its neglect.

394. *The Phillandrium aquaticum*, or wat
hemlock, especially the seeds and herb, has be
much recommended for phthisis by Stern, C
wald, Fischer, J. Frank, Ricamier, Rose
müller, Henning, Michaelis, &c., who ha
employed chiefly the powder of the seeds,
doses of ten to twenty grains, the decoction a
tincture. Its action is stimulant, narcotic, a
diuretic. Some of the authorities now adduc
have given this medicine with sulphur. Lan
prescribed it, after bleeding, in robust or pletho
cases, in goats' milk twice or thrice daily; Her
with nitrate of potass, sugar of milk, and gu
Arabic, thrice daily; and Hufeland, Mülle
Chiappa, Remer, Berkun, and Heine, in va
ous forms and combinations, — in powder, dec
tion, and tincture.

395. *The Polygala amara* has been mu
praised in phthisis by Thilenius, Plenciz, Co
lin, Baume, Frize, &c., and is certainly to
preferred to the *polygala senega*, in this disea
as it is more tonic and pectoral than this latt
It was formerly much employed in consumpti
diseases; but has now fallen into undeserv
neglect. The root is chiefly used; and eith
in powder (from fifteen to thirty grains), or in e
tract, or infusion, or decoction, in which forms
is directed in several of the Continental pharm
copœias. The *Polygala Senega* is much mo
stimulating than the P. amara, and is not a
propriate in the more inflammatory and comp
cated states of phthisis, unless it be given wi
ipecacuanha, or with antimonials, so as to occasi
nausea or vomiting. The decoction is, howev
sometimes of use, not only when prescribed wi
this intention, but also in the less febrile a
more chronic forms, or in the advanced stag
when it is desirable to promote expectoration,
to relieve dyspnœa; and in these circumstanc
it may be conjoined with orange-flower water,
with hydrocyanic acid, or conium, or the co
pound tincture of camphor, or with other an
dynes, as the peculiarities of the case will sugge

396. *Salix, &c.*— Besides the barks already me
tioned (§§ 376. 378.) others, especially the *willo*
the *cedar*, the *larch*, and *fir-barks* have also be
employed in phthisis, but they are useful chiefly
tonics and astringents; and have few other virtu
to recommend them. Gourraud and Schneid
prescribed an extract of the middle bark of t
willow in this disease; and the *cedar* and *pom*
granate barks were prescribed not merely as to
in phthisis, but also with the object of destroyi
intestinal worms, with which this disease was som
times complicated, especially in low, cold, a
damp localities.

397. *Sage* is an old and popular remedy f
coughs and colds: it was also much used
pulmonary consumption. It is by no means

l adjunct to other medicines, and may be ad- ntageously combined with the decoction of *rsh mallows,* in which form it was prescribed Quarin and others.

398. *Salts and Saline Solutions* of various kinds ve been prescribed for phthisis, with the inten- n of moderating the hectic and other symptoms, her than with hopes of curing the disease, hough several of them may be as rationally nsidered capable of effecting this latter object many other medicines which have been em- oyed with this expectation. Of this class of ostances none are more generally useful than solution of the acetate of ammonia, and of the rates of the fixed alkalies, of ammonia, and of agnesia. The solution of *acetate of ammonia* is service chiefly in the early stage of phthisis, d may be prescribed, according to the state of e case, with the nitrate of potash, sweet spirits nitre, and camphor mixture, with hydrocyanic id, or with compound camphor mixture, or with nium, henbane, &c. In more advanced or ronic states the ammonia of the acetate may be ven in excess, and other medicines substituted r some of those now mentioned. The *citrates potass*, of *soda*, and of *magnesia*, are of service, her individually, or with the nitrate of potass, d the other substances enumerated, chiefly in lvanced stages of the disease, when the blood comes contaminated by the absorption of mor- d materials. In similar states of phthisis the *rbonates of the alkalies* are also of service, espe- ally when given with the *nitrate of potash*, or ith the *chlorate of potash*, in solution or in vehi- es — bitter, tonic, or demulcent — suitable to the quirements of particular cases. The *hydrochlo- te of ammonia* was much employed by Thile- us and Marx in phthisis, as well as in all forms hectic and in some other fevers, periodic and ntinued; and was a favourite remedy in these seases among German physicians early in the esent century.

399. The *secale cornutum* has been found very ficacious in arresting the hæmorrhage, in the emoptysic states of phthisis. Dr. T——, who ad been for many years subject to attacks of emoptysis, had recourse, and generally with suc- ss, to the secale, in doses of five grains, at inter- als of a few minutes, until the discharge began cease. It was not until at an advanced period life, and when travelling on the railway, that e was disappointed in the effects of this remedy, r he always carried it on his person. I saw im on his arrival in town, and prescribed oil of rpentine. The hæmorrhage returned some time terwards, and produced suffocation. I had an pportunity of examining the lungs. The appear- nces are noticed in another place (§ 91.). The æmorrhage proceeded from ulcerated vessels.

400. *Sulphur* was formerly much employed in hthisis, and was prescribed either in combination ith myrrh and various balsams, gum resins, or owders, or in the form of a balsam or electuary, repared with an essential oil, as the oil of aniseed, r with honey or syrup, and given with such ther medicines — demulcent, emollient, anodyne, bsorbent, or narcotic — as the state of the case uggested. The anisated balsam of sulphur es- ecially, and other combinations of this sub- ance, were strongly recommended by Ettmul- er, Busch, Sims, Agricola, Rollo, and others. Hunold prescribed it with charcoal in the advanced stage of the disease. The *anisated balsam of sulphur*, the preparation most frequently used, consisted of one part of the flower of sulphur, and four parts of the oil of aniseed, which were digested in a sand-bath. If diarrhœa was present, the sulphur was given with preparations of chalk, or with astringents and tonics. Sulphur has long since fallen into disuse in phthisis; but I have seen much benefit from it in several states of the disease, when judiciously combined and prescribed.

401. *Tartar emetic* was prescribed by Schlegel in small and frequent doses, and was probably employed by him and others on account of the apparent benefit derived from it and other antimonials in the inflammatory complications of the disease. The contra-stimulant doctrine in vogue in Italy at the end of the last century, and in France at the commencement of this, carried the use of tartar emetic in diseases of excited action to an extravagant height; and, very probably, more injury than advantage was derived from it, owing to its improper use. However, in the more inflammatory, and in the more active hæmorrhagic, states of the malady, it is often of service when given either as an emetic, or in frequent small doses, as a contra-stimulant.

402. *Tussilago Farfara* has been for ages a popular remedy for chronic coughs and consumptions; and the several parts of the plant have been used in the form of infusion, decoction, electuaries, syrups, &c. for these complaints. It was recommended for phthisis by Percival, Reusner, Kramer, and others; and the mucilaginous, bitter, and mildly tonic virtues of the plant appear to warrant their recommendation.

403. *Turpentine*, in the various modes of its existence, from the essential oil through the terebinthinate balsams to the pine-tops, tar, and tar-water, have been for ages found of benefit in various states of phthisis, some in certain states, and others in other states. These substances, in their several modes of employment, are often of service, not only when exhibited internally, but also when employed externally, and when the much diluted vapour, or even the odour from them, is inhaled into the lungs. In the hæmoptysic states of phthisis, when it is proper to arrest the hæmorrhage, there is no remedy that is more certainly efficacious than turpentine, when exhibited in small and frequently repeated doses, epithems of the same substance being applied over the chest. It may be taken in doses varying from twenty minims to a drachm every hour, or two or three hours, according to the urgency of the case; or even oftener, either mixed in honey and liquorice powder, as prescribed by Gasser and myself, and as advised in a memoir on the use of this medicine, published in 1820 in the London Medical and Physical Journal; or as directed in a case lately attended by Mr. W. Barnwell and myself.

No. 363. ℞. Olei Terebinthinæ ʒiss.; Spirit. Ætheris Sulphurici Comp. ʒij.; Pulv. Tragacanth. Comp. ʒijss., Mist. Camphoræ ℥ij.; Syrupi Rosæ et Syrupi Tolutani, āā, ʒjss.; Aquæ destillatæ ad ℥vj. Misce. Fiat mistura, cujus sumatur pars quarta, quartâ quaque hora.

404. The quantity of the oil may be diminished or increased, or the frequency of the dose increased or otherwise, according to the circum-

stances of the case. There are almost no complications of phthisis which contra-indicate the use of this remedy, when judiciously prescribed, as respects the dose and mode of exhibition; and especially when employed externally also as hereafter recommended. The terebinthinate substances, in which the essential oil exists in different forms and combinations, are also beneficial when suitably prescribed. The infusion of *pine tops* was praised by **Cælius Aurelianus** for phthisis; *tar water* was recommended by Bishop **Berkeley** for this and other diseases; and *tar* was given by **Sims** for this malady. I have had recourse to these, especially to tar and tar-water. Tar, in the form of pill, with liquorice powder, is often of great service in the colliquative states of diarrhœa, and when there is reason to fear incipient ulceration of the mucous follicles of the bowels. Tar-water, when sufficiently weak, not to be unpleasant to the patient, is also of service in this state of the disease, and in its hæmorrhagic and congestive complications. Indeed there are several states of this malady, and several other diseases, in which both tar and tar-water may be very usefully employed. The injudicious or rather extravagant praises of some writers at the commencement of the last century have caused the complete disuse of an excellent remedy.

405. *Uva ursi*, in powder, decoction, and extract, was recommended for phthisis by Dr. **Bourne**, and subsequently by Drs. **Hamilton** and **Davy**. The tannic and gallic acids it contains, and its astringent and tonic qualities, would justify its use in several states of this disease, especially in the hæmoptysic, and in the colliquative sweats and diarrhœa which occur in the advanced stages. It may, moreover, be combined with other remedies, — demulcent, tonic and anodyne, — with opiates, bitters, &c., according to the peculiarities of the case.

406. *Venesection* and other modes of vascular depletion, as by cupping or leeches, or by the application of these last to the anus, as insisted on by **Plenciz** and **Läkeren**, with antiphlogistics, emollients, and demulcents, have been advised by many in the early stage of the malady. At this stage venesection, hardly amounting to more than eight or ten ounces at a time, and repeated according to circumstances and to its effects, has been recommended by **Morton**, **Mead**, **Pringle**, **Monro**, **Fothergill**, **Salvadori**, **Stoll**, **Hosack**, **Farr**, **Cheyne**, and others. I have stated above (§§ 309—313.) the circumstances in which the practice may be adopted; and that it should not always be accompanied with other antiphlogistic remedies, either in an early stage, or when prescribed for inflammatory or hæmorrhagic complications; for depletion, although manifestly indicated, may be followed, in many cases, by suitable tonics and nutrients, provided that exercise be taken with due care in the open air, and that the *external derivation* about to be noticed (§§ 415, 416.), such as issues or setons, be kept discharging. **Rush** advised, for cases requiring venesection, recourse to it in preference, in spring and autumn. But this recommendation is in conformity rather with an old custom than with correct pathological inference. **Rhodius**, **Tracy**, and **Rush** considered that an attack of hæmorrhage from the nares, rectum, or even from the lungs, beneficial, and the larger the better, and that it should not be too soon arrested, unl manifestly injurious. The opinion is certai often correct, but the numerous exceptions sho not be overlooked.

407. *Various other substances* have been p scribed for phthisis by eminent writers; a although they may be of little use, further than adjuncts to other more beneficial remedies, th may be very briefly enumerated at this pla The *arum triphyllum* was recommended by B TON, in the form of decoction with milk, *carduus benedictus*, either in decoction, infusi or extract with senega, by **Thilenius**; the *er gium campestre*, by **Hoffmann**; the *geum ur num*, by **Buckhave**, in doses of a scruple a upwards of the powder of the root, as a tonic a astringent; the tops and flowers of *hypericum*, its balsamic, bitter, and tonic qualities, by L NÆUS; the *nasturtium aquaticum*, by **Pouti** and **Brillonet**; *myrrh*, conjoined with *sulph* or various other substances, by numerous write the *rhus radicans*, by **Gibson**; the *raphanus*, horse-radish, by **Schenck** and **Osiander**; *marubium vulgare*, by **Alibert**, a popular reme in various forms of preparation, for pectoral co plaints in most European countries; the conse and other preparations of *roses*, by **Moseley** a very many other writers; the *phosphoric acid*, **Goedin**; the *sulphate of iron*, by **Stanger**; a *taraxacum*, by **Schmidtmann**. These hardly quire any remark. They may be employed un circumstances which prevent the use of ot more beneficial remedies; or in conjunction w such means as have already been advised, with the Iceland moss, digitalis, conium, or with bitters, as absinthium, calumba, cas rilla, arnica, &c., when a restorative diet is quired, or when indigestion, flatulence, or sink are experienced. In certain states or compli tions, as in those just named, the preparations ammonia, as the carbonate, &c., or the æth may be conjoined with other means with bene Of the etherial preparations, the compound sp of sulphuric æther, the spirits of nitric æther, a the hydrochloric æther are the most useful. cases where I have prescribed the hydrochlo or nitro-hydrochloric acids, with or without hydrocyanic acid, I have often added the hyd chloric or other æthers when the state of the c required such an addition.

408. xiii. **Mineral waters** have been reco mended by several authors; but they require mu caution and consideration before entering upon use of any of them, when the disease has fu declared itself. In the scrofulous diathesis, a when the disease is threatened, or when its p vention should be attempted, these mineral wat are often of great benefit, when taken in pro quantity, and in suitable dilution in certain cas The quantity of these waters usually reco mended is often not duly regulated, or suited the nature of the case and to the effects p duced; and hence they are either inefficacious injurious. There are three kinds of mine waters, which, when used in proper quantity a combination, and their effects watched, are so times beneficial both in the prevention and in treatment of the early stages of phthisis; th are the *chalybeate*, the *sulphureous*, and *alkaline;* each, however, being suited only certain states or forms of the disease. It sho

however, be overlooked, that all these waters in various proportions of different saline dients,—the oxides or salts of iron, or sul- etted hydrogen, or alkaline carbonates, being nt in certain of these waters also in various ortions.

9. *a.* The *chalybeate mineral waters* are chiefly ated in those states of the disease for which ompound iron mixture has been recommended e (§ 378.), more especially in lymphatic phlegmatic temperaments, and when the pulse eak, small, or slow, and the blood poor in globules. Generally the weaker chalybeates, ie stronger more or less diluted, are most ficial, and should be preferred for cases where use is of doubtful propriety. The mineral rs of *Aix-la-Chapelle*, especially the sulphur- chalybeate, have been recommended for class of cases: but the mineral waters of this try, of a similar composition, are equally opriate with those; especially the chalybeate saline spring at *Harrowgate*, which may be alternately with the sulphureous waters at place. The mineral waters of *Kissingen* lso of service early in the disease, or when isis is threatened, especially when the several gs are employed under judicious medical tion.

0. *b. Sulphureous mineral waters* are often ficial in phthisis, especially if the composition he several springs containing sulphuretted ogen gas be such as may be appropriately loyed for individual cases. The several gs at *Harrowgate* supply a sufficient variety mposition to suit the various states of different s. The waters of *Moffat* and *Strathpeffer* are ger in sulphur than those of Harrowgate, but present a less variety of composition. The rs of *Enghien* and *Barèges* may also be tried, they offer even fewer advantages than those dy mentioned.

1. *c.* The mineral springs abounding in the *onates of the alkalies*, as well as holding va- s other substances in solution, have likewise recommended for threatened and incipient isis. The chief of these are the waters of , *Seltzer*, and *Vichi*. These are usually most ficial when taken with milk or with whey. Ems waters are much praised by BRUCHMAN others; and the Seltzer by BANG and MER, in this disease, especially when diluted milk or whey. The waters of *Cauterets* have been recommended by many; and those *onnes* and *St. Sauveur* of the Pyrenees, have ed most beneficial in several instances which come before me. Whatever mineral wa- be adopted, other means, medicinal, regi- al, and dietetic, are generally also required. e advantage, moreover, is derived by con- ptive invalids from change of scene and of es of living, and from dryness of the air and ation above the level of the sea, when they some of the inland or continental watering es. Increased exercise in the open air and in n day and sunshine is also not devoid of some efit.

12. xiv. INHALATION of various fumes and va- rs, chiefly medicated in various ways, and by rse means, has been advised by many.—*a.* I have several modes of inhalation employed, and have scribed certain of them, but without any very manifest benefit. The great disadvantage of most of these means is occasioned either by the amount of aqueous vapour thus passed into the lungs, or by the irritating or other effects produced in the air-passages by the ingredients employed. I have already noticed the subject of inhalation above (§ 324.), and when treating of *bronchitis* (see art. BRONCHI § 98. *et seq.*); and the opinion I have stated under this latter head a further experience has fully confirmed. I may mention, however, that the inhalation of sulphuric æther, with the vapour from preparations of conium, was advised by Dr. PEARSON; of vapour containing the fumes of Burgundy pitch, by HOME; of aqueous exhalations from henbane, myrrh, and "naphtha vitrioli" (sulphuric æther), by JOERDENS; of the fumes from pine-tops, and various balsams, by a number of writers; and of tar-vapour, by CRICHTON and PAGENSTECKER. But the usual modes of inhalation, especially those in which inhalers are employed, are most objectionable and much more injurious than beneficial.

413. *b. Weak fumigations* diffused through the apartment occupied by the patient are much more beneficial than any mode of inhalation; and the vapour, or the weak fumes, or rather the odours, exhaled from the substances employed for the purpose of impregnating the air of the apartment, are sufficiently strong to be respired by the patient in most cases. The greatly diluted fumes or vapours proceeding from creasote, from tar, from turpentine or the several terebinthinates, from pine-tops, from various balsams, from the æthers, especially pyroligneous æther or pyroxilic spirit, from cedar, and from resins, gums, &c., independently of any combination with aqueous or narcotic vapours, are generally much more beneficial and pleasant to the patient than the inhalations commonly employed. The embrocations so frequently recommended for this (§§ 321, 322, 403.) and several other diseases act beneficially, chiefly in consequence of the inhalation by the patient of the ingredients as they are evaporated, or as their dilute fumes are exhaled and diffused in the air surrounding him. A young man, who had repeatedly come under my observation in an advanced stage of phthisis, completely recovered his health after he had been for a considerable period employed in the manufacture of creosote. When cough is distressing, the fumes of æther, arising from the sprinkling of one or other of these, especially of the spiritus ætheris sulph. comp., the pyroligneous æther, or pyroxilic spirit, or the hydrochloric æther, or of chloroform, on the bed-clothes of the patient or on any article more or less removed from him, will often have a very palliative effect.

414. xv. THE EXTERNAL MEANS of treating phthisis have been already partly noticed (§§ 319, 323.). —*A.* Amongst these *medicated* and *mineral baths* have been advised by several writers, more especially the warm mineral springs of the continent. Sulphuretted chalybeate baths were recommended by LENTIN; the baths of *Baden* were praised by SCHENCK; and those of *Weisbaden* by RITTER, especially for the early stages of phthisis; but they are more likely to be of service for the prevention of the disease, aided by more beneficial means; for very little dependence can be placed upon thermal springs or baths, either in the prevention or cure of this malady. Whatever

benefit is derived in some cases is to be imputed as much to change of air, exercise, and regimen, as to the effects of the baths.

415. *B. External derivatives*, and *exutories* have been advised for phthisis from the earliest periods of medical history. I have stated above (§§ 319 — 323.) the modes in which these may be employed and the general results of my experience of them. I shall only notice the opinions of a few writers respecting them: the views of many eminent authorities on this important department of medical practice may be gathered from the historical sketch I have given above (§§ 242 — 287.). During the course of my medical experience I have not observed this practice employed in the manner in which it is most efficacious. Tartar-emetic ointments, croton oil liniments, &c., have been frequently resorted to in recent times; but issues and setons have been rarely employed; although the experience of numerous writers, as well as my own experience in several cases, has demonstrated their great utility. The selection of a situation in which an issue may be made or a seton inserted is often the chief difficulty in the way of either. BARTHOLIN directed an issue to be made in the back, below the scapulæ; DUPLAN and RIVERIUS between the scapulæ; GEBEL, DREYSIG and BILLARD, in the upper arm; SIMMONS recommended a seton to be inserted in the nape of the neck; MONRO, PORTAL, and HILDENBRAND in the arm; ZACUTUS LUSITANUS at the edge of the pectoral muscle, near the axilla; WHYTT and RUSH preferred the same situation for a seton, or near the sternum for an issue, LENTIN also selecting these places in preference to others. Whilst these and many other authors have thus resorted to these means in phthisis, they have not considered them suitable to all states or stages of the malady. QUARIN, WINTRINGHAM and SOUVILLE, who have been less in favour of these means than the writers just referred to, consider them worse than useless in the far advanced course of the disease and when there is much exhaustion. Having often employed them with advantage — in some instances in the families of medical men of my acquaintance — I am enabled to state, that I have generally preferred issues, kept discharging by means of a number of peas, to setons; that, when the patient is not much emaciated, some part of the breast, or over the margins of the false ribs, has been preferred; that this practice is of service chiefly in early stages, before cavities are formed, and in the more usual and chronic forms, of the disease; that it is more especially beneficial in the hæmoptysic and congestive complications; and that it should not be resorted to in the more febrile, debilitated, and emaciated cases, and when the signs of cavities are manifest. It ought to be further recollected that time is a necessary element in the development of the effects of this treatment; that the other means of cure, the diet and the regimen adopted, should be restorative and nutritive, without being heating or stimulating, especially as the discharge from the issue or seton becomes copious; and that air and exercise in the open day, avoiding injurious exposure, should not be neglected.

416. *C. Blisters, rubefacients*, and *embrocations* (§§ 319—323.) have been sufficiently noticed. The first of these, when kept discharging for some time or frequently renewed, is often of se ce, and may be substituted for issues or setons en these latter will not be adopted by the pa nt. The *embrocations* which I have so often en- tioned are of service, both as irritants or be- facients, and as furnishing the best means in- halation. *Cauteries*, actual or potential, for rly employed, and recommended by HIPPOCR ES, GALEN, and others of the ancients, an by PORTAL, AULAGNIER, GARDOUIN, &c., a ong the moderns, are rarely prescribed; and ven *moxas*, although much praised by LARRE and other recent writers, are seldom resorted to. *Urtication*, which was recommended by LAN , is also superseded by other means. That pu lar eruptions and purulent discharges artificiall ro- duced have more or less influence in delay or arresting the progress of phthisis, when the d ase is not far advanced, are amongst the mo important facts in medical practice; but much ore is required than an empirical recourse to uch means. A knowledge of the cases, state and stages of the malady in which they are lik to be of service, or at least not to be detrim tal, and of the other means, constitutional, loca external, and regimenal, which may be brou t to their aid, is essential to success in the emplo ent of them. That the production of a purulen discharge or the formation of a purulent erupti has sometimes cured phthisis, appears to have een known from the earliest periods of m cal history. After the appearance of small-p , it was observed that a copious eruption in hat malady often cured pulmonary consumpt in an early stage, and as often accelerated th pro- gress of this latter disease in an advanced ge. This was remarked by MUYNIK, BRACHE and others; and it has been stated by writer hat phthisis is rarely observed in persons much n ked with small-pox (§ 231.), — a statement ich has appeared to be confirmed by my ow ob- servation.

417. xvi. STATES OF THE AIR were much dis ssed by writers from the middle of the last centur ntil early in this, in respect of consumption, a all sorts of air were considered with reference the cure of this disease. The air of cow- uses was advocated by some, of marshes by ot s (§ 295.). Even the mephitic air produc by bilge-water (arising chiefly from the act of salt water upon the ship's timbers) was cons red by BEDDOES and HARRISON as the cause the benefit derived from voyaging. The use o xed air, soon after its discovery, in the treatm t of phthisis, was most unprofitably discusse by writers from 1780 to the commencement this century; and although the influence of th car- buretted and sulphuretted hydrogen, and her gases given off from bilge-water, may be on- sidered by some as disposed of, yet it i still viewed as not without some favourable inf nce by those who believe in the good effects of m shy exhalations in threatened phthisis.

418. That fixed air contained in fluid s a useful palliative in this disease, and for th ys- peptic symptoms which accompany it, can be doubted; and that the sulphuretted hydroge on- tained in some mineral waters is often benefi , as most preparations of sulphur are also more less so, in tubercular states of the lungs, must ad- mitted, as far as medical observation and expe nce

want the belief. But this refers only to the ga impregnating fluids taken into the stomach.

9. Of much greater importance is the determi tion of the questions, whether or no the air in ve elevated situations, or in low places, and wheth that near the sea, or at a distance from it, is th most beneficial to phthisical cases? Or, in other wo s — 1st, What is the state or states of the air w h the phthisical patient may breathe with gr est benefit? 2nd, Should the states of the air, fo d beneficial in certain seasons, be continued in ot seasons? and 3rd, If change of such an ai e found requisite, how should it be most appr riately and beneficially changed with the proce on of the seasons?

0. 1st. *Sea voyages* were praised by CELSUS, A TÆUS, and others amongst the ancients; and by G NT, SAVARY (*Lettres sur l'Egypte*, t. iii. p. 8.), ar many among the moderns. But it is very doubtfu hat share of the benefit observed proceeds fr the sea air itself, or from the motions and ot circumstances connected with the voyage. It not improbable that the sea air may contain ce in elements beneficial to morbid states of the lu s, and sufficient to counteract any injurious in ence which humidity alone might produce. B persons living on the sea-coast are not much me exempt from phthisis than those living inla, where equally humid states of air, within th same ranges of temperature, usually exist. A eater exemption may be experienced, but the a unt has not yet been ascertained, or even an a roximation to it. The ancients inferred benefit fr sea air, because the voyages for the cure of p nonary diseases were generally made to Egypt, a very probably the relief manifested soon after th arrival of patients in that country was partly a east attributed to the voyage. Although Dr. S TH is not in favour of sea air for consumptive c s, yet I know that voyaging in the Mediterr an and in the Atlantic has been most benefi l in several cases in which I have advised it. E I agree with CÆLIUS AURELIANUS, GILCHRIST, I NE, REID, and many others, in saying that in o r to be of service it should be adopted early i he disease; if it be resorted to at a far adv ced period, and if a very warm latitude be e red into, the disease will most probably be a elerated to a fatal issue. The doubt exp sed by me above (§ 307.) of the superiority o he sea-coast to inland situations, other circums ces being equal, appears to be confirmed by t observations of Dr. RICHARDSON respecting t climate of Nubia, of Dr. BARCLAY on the c ate of Egypt, and of Dr. ARCHIBALD SMITH o the influence of high elevation in warm clin es on consumption. In *Nubia*, *Egypt*, the S th of *Spain*, and at a considerable elevation on t *Andes*, cases of this disease, whether attended b hæmoptysis or not, were remarkably benefited s n after their arrival; and a removal from the l -named place to the sea-coast was often foll ed by a return of the malady. From the test ony and experience of these eminent writers, a from what other sources of information have f nished, I infer that dry states of the atmosphere, i moderate grades and ranges of temperature, a at considerable or even moderate elevations a ve the sea-level, are most favourable to cons nptive patients; that the places just named, a Malaga, and various other places in Syria and the East, are most to be preferred; and that, before the commencement of the hot season, Nubia, Egypt, and other places, where the temperature rises very high, should be relinquished for others which are more temperate.

421. The *second* and *third* questions are partly answered by what I have now stated; for although a continued residence in these climates may not be injurious to many consumptive patients, yet it may give rise to diseases of a different nature, or may occasion complications of phthisis which otherwise might not have occurred; or it may prove too exhausting, or otherwise injurious to the patient: in many cases, if not in the majority, a change to a more temperate climate is therefore beneficial before the hot season commences; and if the change can be made to a climate both dry and temperate, it will generally prove of the greatest advantage. Patients who are subject to hæmoptysis, or other states of the more usual or the chronic forms of phthisis, will derive very great benefit from a voyage to Alexandria, and a journey thence to Cairo and Upper Egypt, and, having resided there or in Nubia some time, proceeding thence to Syria, they may return by Malaga, Granada, or other places in Andalusia, in April or May, to England; or, if it be preferred, a voyage may be made across the Atlantic early in September, with great benefit; and having crossed the isthmus of Panama, the Pacific may be traversed; and having visited Lima, a residence in the mountains of Peru may be tried at the elevation and in the season found most beneficial for phthisical patients. After a satisfactory residence in this locality, the patient may return to Europe by the same route as that by which he went out, or by one more direct, taking care, however, to return to England about May or June.* If this plan be

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* There are many places in the south of Spain that may be chosen for winter residences by persons either threatened by, or in the first stage of tubercular consumption, especially in Andalusia; and if the vicinity of Malaga, or of Granada, or of Seville be not selected, other places in the above extensive province may be tried. During the warmer months, the more elevated situations on the southern side, or the southern ridges of the Sierra Morena, furnish many situations which cannot fail of possessing most of the advantages required by phthisical invalids.

Dr. MITCHELL (*Brit. and For. Medico Chirurg. Rev.* No. xxxiii. p. 226.) states that "the climate of Algiers, during winter and spring, vies with that of Madeira, — being as warm and steady in temperature, but drier and more bracing."

It has been a generally-received opinion among medical and scientific men that very high elevations above the level of the sea are injurious to tubercular consumption, especially when it is either ushered in, or attended by, or even threatened with hæmoptysis. DR. ARCHIBALD SMITH's very interesting account of the very remarkable benefit he saw, in numerous cases (see above, §§ 420.), derived from residing at an elevation above the sea-level of 5000 to 10,000 feet, completely upsets this opinion. This very able and experienced physician has further remarked on this subject, in a communications he has kindly favoured me with since the earlier pages of this article was published; and he has stated, respecting a diminished or increased frequency of phthisis in the the aborigines of a country by change to a colder or to a warmer climate, or to a higher or lower elevation, "that, as regards Lima and the coast of Peru, generally, the change to the maritime climates of Chili and Ecuador—the first colder, the second warmer—has a decidedly bad effect on the Peruvian phthisical invalid; but the higher elevation on his own mountains of 5000 to 10,000 feet has a decidedly curative influence. In these regions the climate is moderately dry and temperate, favourable to exercise in the open air, and the patient is also removed from a luxurious and sensuous society, as well as from a warm, humid and relaxing atmosphere. Very possibly the decided benefit received by the natives of Peru from the change from followed out for two, or three, or four seasons, at an early stage, with due precautions against injurious exposure, the disease will either be arr ed for some years, or altogether overcome, in a at

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coast to mountain may not be equally shared in by strangers. I hope, however, that this may be a fair trial, and, as you recommend navigating by Panama to the Pacific, that you will find room to recommend, on fair trial, to Europeans, the migration to elevated spots on the Andes, from time immemorial known of paramount importance to the native races affected with pulmonary consumption." Dr. **Archibald Smith's** very long and extensive experience of the diseases in this part of the new world renders his opinion of the greatest value on this subject. He further remarks, "I observe at § 218. what you say with respect to the effect of migration on the Chinese; and I can say that, among the thousands of this race lately introduced into Lima, I never met with an instance of phthisis. It is likely, however, that this disease will show itself in their offspring born in Peru of Indian or dark women. When the Chinese crop their hair, and take on the Peruvian dress, it is not easy to distinguish them from native Peruvian Indians." Is not this last remark in favour of the opinion that the Indian races are offshoots from the Mongolian, or Chinese.

Dr. **Richardson**, in his account of his travels in Egypt and Nubia, published more than thirty years ago, has strongly recommended these countries, and especially the latter, as winter and spring residences for phthisical invalids. The more recent evidence of my eminent friend, the Rev. Dr. **Barclay**, fully confirms this recommendation. The very interesting account given by Dr. **Barclay** of the climate of *Middle and Upper Egypt, Malaga*, &c., is so very important to our profession, and to phthisical patients, coming, as it does, from one whose great talents and acquirements I have long known and admired, that I quote it at this place without abridgment, of which indeed it does not admit:—

"The object of this communication is to draw attention to those characteristics of the Egyptian climate by which an opinion may be formed of its curative influence in cases for which a removal to a milder and warmer atmosphere is usually recommended. The result of my own observation and experience, during five months spent in that country, is a thorough conviction that there is no accessible part of the world so well adapted for the relief of most of that formidable class of diseases to which the respiratory organs are subject. In venturing to express this opinion, however, I am far from affirming that all Egypt, or any part of Egypt at all seasons, fulfils the conditions required in a climate suitable for such cases. On the contrary, it will be readily perceived, that no part of the Delta is at any season adapted to patients who are subject to these affections, nor, it may be added, to those who are either dyspeptic or rheumatic; and from the beginning of May to the end of September the heat in every part of Egypt is too great for a European constitution weakened by disease. But in Middle and Upper Egypt, from the beginning of October to the end of April, the invalid may breathe, under a bright and cloudless sky, an atmosphere at once of a warm and equable temperature, of perfect purity, and free from all excess of humidity. The climate of other regions may be equally distinguished by one or more of these properties (though even that is doubtful); but assuredly there is no other habitable part of the globe in which they are all combined in so great perfection.

"The malady for which I sought relief in a southern climate was chronic bronchitis in its most aggravated form. All the usual remedies, both external and internal, had been resorted to, and steadily persevered in, under the ablest medical advice, but with little temporary and no permanent benefit. I had tried with the same unfavourable result those places on the south coast of England which are usually recommended to invalids. The symptoms obstinately resisted every remedial measure. The chronic character of the disease was frequently exchanged for attacks of a subacute form. These always commenced with inflammation of the pharynx, creeping insidiously down the glottis and trachea to the bronchial tubes, which became gorged with mucus throughout their whole extent; and on every spot on which the stethoscope could be planted over the lungs the mucous *râle* was to be heard. Dyspnœa, accompanied with loud wheezing, was at all times distressing; but its nocturnal exacerbations, which invariably occurred after a short sleep, like fits of spasmodic asthma, were often so fearfully violent as to threaten suffocation. The digestive organs were deranged, I had no appetite for food, my frame was emaciated, and my strength prostrated.

"I was so enfeebled as to be unable to encounter the voyage till the month of November; and thus I lost two months of the season suitable for the residence of an invalid in that country. Yet the benefit which, by the blessing of Providence, I reaped from that deliciou cli mate, was most signal; and far exceeded all tha my most sanguine hopes had ventured to anticipate.

"On the passage outward I stopped five days at I ta, but found the heat so oppressive in the day-time, a the chills in the evening so severe, that I was glad to ke my escape. The extreme humidity of the atmosph in that island, notwithstanding its high temperature, ust always render it, I apprehend, an unfit resort for a on chitic patient; and the greatness of the diurnal ra of the thermometer, at least in winter, makes it que on able how far it is an eligible residence for consun ive patients. It is believed that an inquiry into *resul* will not tend to give a favourable idea of its sanative lu ence on that class of complaints. Of the clim of Alexandria also I have reason, as I shall show er wards, to speak unfavourably. In Cairo, howe a very different climate was found; and I had no een many days there when I began to experience its ects in allaying the irritability of the respiratory m ous membrane. The coldest season there is the latte art of December and the early part of January; and t gh the temperature even then is equal to that of o best summer weather, yet the evenings are somewhat ill The following observations, made with the re ter thermometer and Dollond's hygrometer, show the m perature and the dryness of the atmosphere at ire during the coldest fortnight of the year:—

Date.	Lowest temperature by night.	Highest temperature by day.	Diurnal range.	Degrees dry.	Degrees damp.	State of weathe
	°	°	°	°	°	
Dec. 25.	59	64	5	7	..	Bright sunshine.
„ 26.	58	63	5	7	..	Ditto.
„ 27.	58	62	4	5	..	Ditto.
„ 28.	57	60	3	..	5	Rain and blowin
„ 29.	57	60	3	1	..	Showery.
„ 30.	58	60	2	..	4	Wind and rain.
„ 31.	59	64	5	5	..	Bright sunshine.
Jan. 1.	60	64	4	8	..	Ditto.
„ 2.	57	62	5	4	..	Cloudy.
„ 3.	58	63	5	0	0*	Ditto and blowin
„ 4.	58	64	6	5	..	Bright sunshine.
„ 5.	57	64	7	4	..	Cloudy.
„ 6.	58	61	3	..	4	Drizzling.
„ 7.	57	60	3	..	1	Cloudy and wind

"From these observations it will appear that, wa and equable as the winter temperature is at Cairo, th ea ther at that season is not free from frequent and den changes. It is in Upper Egypt that the invalid ust seek entire exemption from these; and there he w not be disappointed.

"While I was there my register was kept on th ile, and consequently it shows a lower temperature, ast in the night-time, than would be denoted at a litt distance from the river; while the dryness indicated the hygrometer in the latter case was many degrees ter than that registered on the river.

"The following table contains the result of the ob vations noted between Thebes and Asouan, the upp ost town in Egypt, and from these an idea may be for of the winter climate in that region:—

Date.	Lowest temperature by night.	Highest temperature by day.	Diurnal range.	Degrees dry.	Degrees damp.	State of weathe
	°	°	°	°	°	
Jan. 17.	64	70	6	7	..	Cloudless sky bright suns every day; firmament bla with stars e night; no eve chills.
„ 18.	65	68	5	7	..	
„ 19.	66	70	4	5	..	
„ 20.	64	69	5	12	..	
„ 21.	64	71	7	7	..	
„ 22.	69	72	3	6	..	
„ 23.	68	72	4	10	..	

"The benefit I derived from breathing the gen ai of the Thebaid was very decided. The periodica gh ma cases — indeed in most, if it be not delayed to oo far advanced stage.

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* The zero of the hygrometer corresponds to summer dr t in Britain.

2. THE DIET in phthisis has been already discus d in general terms, and chiefly with respect to own experience (§§ 299—301.), but a few au rities and particulars may be further adduced at place.—*a.* HIPPOCRATES advised, for phthisis, an l food to be taken in small quantity, and oft when fever is absent; and the opinion has be followed by SALVADORI, MAY, RUSH, VOGEL, R o, and KINGLAKE. Animal fats, marrow, an at meats were recommended by LANGE and BE IN. The circumstances in which these ma be adopted have been stated above (§§ 299 —1.).

A *fish diet* is often of service, especially in the more chronic and hæmorrhagic states, or when the biliary organs are congested; but on all occasions the white kinds of fish should be selected, and always be boiled. Oysters were praised by TULPIUS and SIMS, but they ought to be taken immediately upon being opened, and a small number only at one time.

c. Vegetable food has been advised by many writers in preference to any other, whilst as many recommend a due proportion of animal and vegetable diet. Of the more unusual articles, at least in this climate, new figs, dates,

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att s, though still occurring, were less violent and of sho r duration; my breathing was greatly relieved; an y strength was so far recruited, that I was able, wit t fatigue, to make daily excursions, sometimes of ma miles, to the monuments with which this part of the lley of the Nile is studded.

" Thebes, which for several reasons should be made hea uarters in Upper Egypt, the day temperature, from the iddle of January to the middle of February, ranges fro 68° to 78°, and after the latter date the heat beco rather too great to be borne with comfort. The inv l should then commence his downward voyage, an y the time he reaches the latitude of Cairo he wil ind the climate there nearly as delightful as that wh he left at Thebes. My register during the first we of March at Cairo was as follows :—

Date.	Lowest temperature by night.	Highest temperature by day.	Diurnal range.	Degrees dry.	Degrees damp.	State of weather.
	°	°	°	°	°	
rch 1.	66	72	6	9	..	Gentle breeze, sunny.
,, 2.	69	74	5	4	..	Ditto, ditto.
,, 3.	68	75	7	0	0	Fog.
,, 4.	68	76	8	6	..	Calm and sunny.
,, 5.	71	74	3	..	2	Haze.
,, 6.	69	72	3	6	..	Cloudy and sunny.
,, 7.	65	69	4	6	..	Drops of rain.

" a city like Cairo, with a dense population of more tha two hundred thousand people, and with narrow str walled in by lofty houses, and constantly watered to the dust, the air can neither be so pure nor so dry as he desert. Accordingly the medical gentlemen of Ca are in the habit of sending almost all their convales t patients to reside for some time in the adjoining des , to enjoy the benefit of its invigorating air. In it the is no water, either running or stagnant, to produce hu ity by evaporation, nor is there any decaying ma r, either vegetable or animal, to taint the air with no is exhalations. It is in the desert, therefore, that the alities of warmth, equability, dryness, and purity, wh are characteristic of the Egyptian climate in ge l, are to be found in the most perfect union. The sou ng influence of the desert air on delicate organs of res ation, and its invigorating influence on a debilitated fra can be appreciated by those only who, like myself, ha experienced its marvellous effects. It is at once bal and bracing; and the invalid, while breathing it, fee s if he were drinking in health at every pore. I qui d Cairo for the desert of Ghezeeh on the 12th of Ma , and took up my abode in the neighbourhood of the yramids; and there a sudden change came over me s if by magic. The second night I passed in the des was marked by sound and uninterrupted sleep, an e absence of the periodical fit of dyspnœa; the firs ccasion on which I had enjoyed the one, or had bee exempted from the other, for more than two years. My petite soon became *excessive;* both the flesh and the rength I had lost during my illness were restored; eve symptom of my complaint disappeared; and at the en f a month I returned to Cairo in perfect health. Th ollowing table contains the meteorological register kep y me while I lived in the desert:—

Date.	Lowest temperature by night.	Highest temperature by day.	Diurnal range.	Degrees dry.	Degrees damp.	State of weather.
	°	°	°	°	°	
March 13.	63	69	6	10	..	High wind.
,, 14.	63	70	7	12	..	Bright sunshine.
,, 15.	63	68	5	12	..	Ditto.
,, 16.	63	68	5	13	..	Ditto.
,, 17.	63	67	4	13	..	Ditto.
,, 18.	63	70	7	12	..	Ditto.
,, 19.	63	73	10	14	..	Ditto.
,, 20.	67	72	5	17	..	Ditto.
,, 21.	63	70	7	18	..	Ditto.
,, 22.	63	71	8	18	..	Ditto.
,, 23.	66	76	10	19	..	Ditto.
,, 24.	71	76	5	16	..	Cloudy.
,, 25.	67	71	4	10	..	Ditto.
,, 26.	63	71	8	13	..	Bright sunshine.
,, 27.	63	71	8	12	..	Ditto
,, 28.	64	73	9	11	..	Ditto.
,, 29.	63	74	11	15	..	Ditto.
,, 30.	63	71	8	12	..	Ditto.
,, 31.	66	71	5	12	..	Cloudy.
April 1.	67	81	14	23	..	Khamséen.
,, 2.	67	72	5	10	..	Cloudy and blowing.
,, 3.	65	72	7	11	..	Bright sunshine.
,, 4.	68	71	3	12	..	Ditto.
,, 5.	65	71	6	16	..	Ditto.
,, 6.	65	75	10	18	..	Ditto.
,, 7.	64	70	6	5	..	Rain.
,, 8.	65	71	6	10	..	Bright sunshine.

" The only other place in Egypt whose meteorology it seems necessary to notice is Alexandria. When it is borne in mind that this city is surrounded on three sides by the Mediterranean Sea, and that on the land side it is enveloped by the Lake Mareotis, a moist atmosphere may be expected; and accordingly the degree of humidity indicated in the following extract from my register is excessive. In this respect the state of the atmosphere in Alexandria, during the early part of May, will be found to contrast remarkably with that of Cairo and its vicinity during the latter part of April; while the greater equability of temperature in the former city, both from day to day, and during the twenty-four hours, is no less observable:—

Place and Date.	Lowest temperature by night.	Highest temperature by day.	Diurnal range.	Degrees dry.	Degrees damp.	State of weather.
Cairo.	°	°	°	°	°	
April 19.	68	70	2	6	..	A gentle breath of wind and bright sunshine by day. Always calm towards evening and during the night.
,, 20.	67	70	3	5	..	
,, 21.	66	72	6	5	..	
,, 22.	67	72	5	4	..	
,, 23.	69	74	5	9	..	
,, 24.	70	77	7	9	..	
,, 25.	75	79	4	5	..	
,, 26.	72	75	3	4	..	
Alexandria.						
April 28.	70	73	3	..	10	Sunshine and calm.
,, 29.	70	73	3	..	13	Ditto ditto.
,, 30.	71	73	2	..	12	Ditto ditto.
May 1.	72	74	2	..	15	Ditto ditto.
,, 2.	72	74	2	..	14	Ditto ditto.
,, 3.	73	75	2	..	15	Ditto ditto.
,, 4.	72	74	2	..	14	Ditto ditto.
,, 5.	73	76	3	..	15	Ditto ditto.

the nuts yielding the palm oil, olives, &c., are the most likely to be of service. Grapes, both recent and dried, were praised by **Riverius**; pickled red-cabbage by **Lange**, and cucumbers with vinegar and sugar, by **Schmalz, Frize, Quarin, Marx**; but these last should be thus dressed without having had their outer rinds removed. Of oranges, lemons, limes, &c., the utility is manifest.

423. *d. Milk* has always received great commendation in phthisis, but writers have differed respecting that which is most beneficial. Thus **Zacutus Lusitanus** and **Blegny** prefer human milk; **Aretæus, Burserius**, and **Stoll**, asses' milk; **Diemerbroeck** and **Velschius**, goats' milk; **Schenck**, either asses' or goats' milk; **Hippocrates**, either mares' or asses' milk; and **Heister**, the whey of cows' milk. **Stoll** considered that asses' and human milk should be diluted, and that they are injurious in the inflammatory complications and in the last stage of the malady. Whatever may be the diet and regimen adopted, milk of various kinds, in suitable forms and states of dilution, constitutes an important part of the treatment of phthisis.

424. *e. The beverages* allowed the patient ul depend on the form and stage of phthisis. ar early stage whey is one of the best that can be ken At a far advanced stage, or if diarrhœa be pr ent it is apt to run off by the bowels. Ferm ted whey, or serum of milk, or the whey of b ter milk, or recent butter-milk, may be given a rd ing to circumstances. In northern or S di navian countries, and also among the Tarta the fermented serum of milk is very commonl employed, and it has been recommended by Si ER and others. Spruce-beer is one of the best ve rages that can be used; weak tar-water is also me times beneficial. Seltzer-water, with milk and lime-water or Carara-water, with milk, whe th bowels are much relaxed, are also of servic

425. *f.* In recommendation of *exercise* i th open day, according to the strength and state th patient, it is unnecessary to add anything to ha has already been stated. Of all kinds of ex ise walking and horse-exercise are the best. Alt ug the latter was considered of little use by Qu IN yet by **Sydenham, Haller, Marx, Darwi** and others mentioned in the historical sketch (14 *et seq.*), it was strongly recommended. **Sto** ad

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" How far Alexandria, during the months of March and April, may be a more suitable residence than Madeira or Italy for those whose complaints require a climate at once warm, equable, *and moist* I leave it to gentlemen of the medical profession to judge; but I do think myself fully warranted to denounce it as a most unsuitable place for a bronchitic patient. During all the time I was there I felt as if inhaling steam; my breathing was excessively affected, and my whole system was languid and relaxed. These effects, however, by the time I had been twenty-four hours at sea, were completely dispelled, leaving no doubt whatever as to their cause.

" I may add, that dyspepsia is very prevalent among the European residents in Alexandria; and I was informed that cases of pulmonary consumption, though not common, do occasionally occur among the natives of the whole northern seaboard of Egypt; but the inhabitants of Middle and Upper Egypt, as far as I could learn, are entirely exempted from that fatal disease. The prevailing maladies throughout all Egypt are dysentery and ophthalmia; both induced, it is believed, by exposure of the heated frame to currents of cold air.

" These observations on the subject of Egyptian climate would be very incomplete if I failed to notice its influence in arresting hæmoptysis. Several instances of its efficacy in that respect were mentioned to me, and one very decided case fell under my own observation. A. B., a middle-aged gentleman, of a clear and florid complexion, had been for years afflicted with this complaint to an alarming extent. He had spent a winter in Italy without experiencing the smallest mitigation of his ailment. He had next been sent to Madeira, and there the malady was very greatly aggravated. He was at Malta when I went to Egypt; but, finding no relief there, he came to Cairo in the end of December, and took up his abode at the hotel at which I lodged. The effect of the change of climate was immediate. The spitting of blood ceased at once, nor did it ever recur during his stay at Cairo, which was prolonged till the end of April. He then went to the south of Spain, and remained there till the month of June, when he returned to England, apparently in perfect health, and fully resolved to spend the whole of the following winter in Egypt with the view of confirming his cure.

" The transition from the climate of Egypt to that of Britain is too violent to be hazarded by one whose respiratory organs are in a delicate or dubious condition, especially as the season at which it is necessary to quit the one country is far from being genial in the other. I therefore stopped in Spain on my homeward passage, and spent the latter part of May and the greater part of June in that country and in Portugal. Having heard that the air of Malaga was remarkable for its mildness, I repaired thither, and was both delighted and surprised to find in Europe a climate scarcely inferior in any respect to that of the latitude of Cairo. The register I kept while there, and from which I subjoin an extract, shows a temperature which was probably only a few degrees lower than that of Cairo at the same date, while its equability was greater than I had noted anywhere except at Alexandria; and what is still more remarkable, the dryness of its atmosphere exceeds that of Cairo, and contrast surprisingly with the humidity with which the air of lexandria is loaded.

" The atmospheric conditions indicated by the fol ving table are doubtless to be referred, partly to th geological structure and the physical conformation the country around Malaga, and partly to the latit i which it is situated. I am persuaded that, in a era peutic point of view, the climate in this part of dalusia is deserving of more attention than it see hitherto to have received. Those who take it for g ted that the climate of Italy must be the mildest and w hes in Europe, seem to forget that Malaga is 248 iles farther south than Naples, 318 miles farther sout han Rome, and 518 miles farther south than Venic and those who have not adverted to the fact will prob y b surprised to find that it is 5 miles farther sout han Algiers. Both Gibraltar and Cadiz are somewhat uth of Malaga, but both have a great diurnal range o em perature, and are nearly equal to Alexandria in th humidity of their atmosphere; the one standing a almost insulated rock in the Mediterranean Sea, a the other on a narrow spur of land projecting into t Atlantic Ocean.

Date.	Lowest temperature by night.	Highest temperature by day.	Diurnal range.	Degrees dry.	Degrees damp.	State of weathe
	°	°	°	°	°	
May 20.	70	72	2	9	..	Bright sunshine.
„ 21.	70	73	3	12	..	Ditto.
„ 22.	71	73	2	12	..	Ditto.
„ 23.	69	72	3	11	..	Rain.
„ 24.	67	70	3	10	..	Ditto.
„ 25.	66	69	3	10	..	Ditto.
„ 26.	68	70	2	14	..	Bright sunshine.
„ 27.	69	72	3	16	..	Ditto.
„ 28.	69	73	4	15	..	Ditto.
„ 29.	69	73	4	15	..	Ditto.
„ 30.	69	72	3	16	..	Ditto.

" In the beginning of June I moved northward t ls-bon; but on its climate and that of delightful C ra no information is needed. In the end of June, I I returned to Scotland; and though I was threa ed soon after I reached home with a recurrence of n-chitic symptoms, these *now* yielded readily to m al treatment. I am most thankful to be able to add at during the last twelvemonth I have enjoyed exc nt health, nor have I been affected, during that tim by any of the changes of weather to which our va ile climate is subject." — *The Climate of Egypt*, by the v. **Thomas Barclay, D.D.** 8vo. Edinburgh, 1854.

t in the non-inflammatory states, and when lominal viscera were torpid or congested. In flammatory complications, active exercise, on horseback or otherwise, can rarely be

. In concluding the above imperfect view of atment of phthisis, it will be manifest that plan of cure, class of medicines, kind of or regimen, — no single method, whether nal or regimenal, or both, is appropriate to es, or even to the great majority of cases, of is. The rational physician, after having voured to ascertain the existing morbid con-, will merely select and combine, from the above indicated, such means as he believes most energetic in arresting, counteracting, or ing these conditions, as far as circumstances warrant the attempt or may promise suc-

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TYMPANITES.—(From *τυμπανον*, a drum). *υμπανιτης, τυμπανιας*, Hippocrates, Celsus, alen;—*Tympanites, Tympanitis*, Auct. Latin;— *ympanites*, Sauvages, Vogel, Sayar, Cullen, c.;—*Affectio Tympanitica*, Hoffmann;—*Tympan- a*, Sennert;—*Meteorismus*, Sagar, et auct. var.; -*Emphysema Tympanites*, Parr;—*Tympania*, loucquet;—*Emph. Tympaniticum*, Young;— *mph. Abdominis*, Good;—*Hydrops siccus*, Auct.; -*Windsucht, Trommelsucht*, Germ.;—*Tympanite*, r.;—*Tympanitide*, Ital.;—*Tympany, wind ropsy, dry dropsy, inflation of the abdomen.*

1. Classif.—4. *Class*, 6. *Order* (Cullen);— 6th *Class*, 2nd *Order* (Good).—I. Class; I. Order. (*Author in Preface.*)

2. Definit.—*An inordinate generation and ac- umulation of a gaseous fluid within the digestive anal, generally with retention of it, occurring hiefly symptomatically, either terminating acute lisease, or complicating chronic affections, and oc- asioning great abdominal distension, and a drum- ike sound on percussion.*

3. I. Pathology. *Tympany* is generally the re- ult of greatly impaired vital power, as manifested hiefly through the organic or ganglial nervous sys- em upon the digestive canal, whereby not only is he tonicity of the coats of the canal remarkably npaired, but also gaseous fluids are exhaled from he digestive mucous surface. That the air is gene- ally contained in the canal, where it is retained ither by spasm in parts of the canal near to ts outlets, or by the inability of the muscular tructure of the canal to expel it, cannot be loubted. It has been supposed by some writers hat the air may be on some occasions exhaled nto the peritoneal cavity. If this occurrence ake place at all, it must result from the decom- position of matters effused into the cavity, as in cases of chronic peritonitis, or of puerperal peritonitis, or of perforation of the intestines, when some of the intestinal contents have passed into this cavity. The occurrence of tympany from these changes are however rare; but less rare when the intestines are perforated by any of the causes of this lesion of the intestines. (See *Art.* Intestines, § 29.).

4. Several varieties of tympany have been enumerated by writers of the seventeenth and eighteenth centuries, according as the gaseous accumulation has occurred in the advanced course of acute maladies, or has complicated chronic diseases, the primary affections, with which tympany is associated, furnishing the basis of arrangement. Of these it is quite unnecessary to take any notice, as such occurrences of tympany are merely contingencies of advanced and dangerous diseases, and are merely symptoms of these, or of hysterical or uterine disorders; often, however, assuming very prominent and distressing characters, especially in the last stages of peritonitis, of puerperal and malignant fevers, &c. That the air which accumulates in the digestive tube in these and various other circumstances of disease cannot arise, to any great amount, from the decomposition or retention of alimentary materials, or of morbid secretions accumulated or retained in the canal, is demonstrated by the absence of these sources of the gaseous collection in the more extreme cases. We are compelled, therefore, to view the accumulation of air as the result of a morbidly increased exhalation of it from the digestive mucous surface, resulting from depressed vital or organic nervous power, in connection with lost or impaired tone of the muscular coats of the canal; this last condition, equally with the augmented exhalation, proceeding from the loss of vital power. According to this view *tympany* is merely an extreme state of *flatulence* (*see that article*), the gaseous exhalation having accumulated in the former, so as to produce extreme distension, but being discharged in the latter at intervals or absorbed.

5. That this exhalation must necessarily proceed from the blood, in great measure, or in as far as it does not arise from the decomposition of alimentary matters, or of the secretions, must necessarily be inferred, particularly in the more extreme and sudden accumulation of the gaseous fluid. John Hunter and Cullen believed that the fluid was thus generated, and Majendie and Gerardin endeavoured to prove the occurrence by experiment. They included a portion of intestine between ligatures, returned it into the abdomen, yet air, nevertheless, was found in it, although it contained no materials for the generation of air. That the air was exhaled from the digestive mucous surface had long been believed in, and supported by observation and analogy. Fabricius Hildanus, Hoffmann, Portal, Vidal, Gaspard, Nysten, Merat, and many others have contended for this doctrine, and have adduced facts in support of it. Bichat has shown that friction with sulphur communicates the odour of sulphuretted hydrogen to the gas which collects in the bowels. The swimming-bladders of fishes are known to be supplied with air from the blood only; and Blainville, Dumas, Majendie, and others have shown that a division of the pneumo-gastric nerves is followed by gaseous distension of the stomach.

6. Tympanitic distension of the abdomen may therefore be referred — firstly and chiefly, to the extrication of air from the digestive mucous surface, owing to the states of organic nervous endowment, or to the irritation or morbid action of matters received into the alimentary canal, as in various kinds of poisoning, or to changes in the blood itself; secondly, in a small degree from the deglutition of air with the food or with the saliva; and thirdly, and in a very variable degree, from the decomposition or fermentation of alimentary matters, or of secretions and excretions. In cases of weak digestion, or when the organic nervous influence is much depressed, the quantity of air which may be formed, as shown by Dr. Hales, from the fermentation of fruit or raw vegetables in the stomach is often very great.

7. According as either of these sources of gaseous collections in the digestive canal predomi-

nates, or is increased, so may the nature of the gaseous fluid be supposed to vary. The states of the blood, the nature of the ingesta, whether alimentary, medicinal, or poisonous, the seat of the collection, will severally modify the composition of the gaseous fluid. MM. JURINE and CHEVREUL have shown that generally the proportions of oxygen and carbonic acid decrease, while that of nitrogen increases, in descending from the stomach to the rectum.* Although there does not appear to have been any analysis of the air collected in tympany, yet there is every reason to infer that it does not materially differ from that usually formed in the digestive canal, unless under the influence of acute or malignant diseases, when, with an admixture of carbonic and nitrogenous gases, and a little hydrogen, sulphuretted, carburetted, and even phosphoretted hydrogen, may severally exist in varying proportions.

8. II. THE CAUSES OF TYMPANY.—*whether predisposing, exciting, concurring or determining*—are in some respects the same as those which are noticed under the head FLATULENCY; but they exist in the former, or are rather associated, with one or more of the following pathological states:—1st, with mechanical or other obstruction to the discharge of the gaseous exhalation from the alimentary canal; 2nd, with impaired or lost contractile power of the muscular coats of the canal; 3rd, with alterations of the blood from absorbed matters or from vital changes, affecting the absorption of gases from the air, or the generation or extrication of them from the blood; 4th, with changes in the circulation in the lungs, and in the respiratory functions. Where one or more of these conditions are present, and in proportion as they are increased by depression or exhaustion of the vital manifestations or endowments of the digestive canal, in so far will the tympany become remarkable or extreme, and the possibility of its removal be diminished.

9. The *causes* of tympanites, or rather the *circumstances*, in which flatulent distension of the abdomen chiefly occur, are pathological, or consist of antecedent disorders or most dangerous organic changes. Whilst such disorders are productive of the less severe and dangerous states, or those which more nearly approach the conditions described under the head Flatulence, the most dangerous organic changes and malignant maladies give rise to the extreme instances of meteorismus or tympany. The *slighter* cases of flatulent distension are produced by the nature of the food especially by saccharine and ascescent matters and vegetables, by indigestible and otherwise injurious articles of food, by constipation or the retension, by mechanical or vital obstruction, of the intestinal excretions, as in cases of colic and ileus, and by hysteria or uterine and spinal irritation.

10. The *extreme* instances of tympany occur chiefly after poisonous ingesta, more particularly after poisonous meats, poisonous fish and shell-fish, and indeed during the last and most dangerous stage of poisoning by other deleterious agents (see art. POISONS generally, and especially §§ 427—528.); in the advanced stages of puerperal fevers, and puerperal peritonitis; in gastritis and interitis particularly when perforation of the intestina canal has taken place, and then air may escape into, or be developed in, the peritoneal cavity in misplaced gout of the stomach or bowels and in the last stage of adynamic and typhoi fevers, and of malignant continued and eruptive fevers. They also occur as terminations o fatal ileus, of hernia, of intersusceptions and strictures of the bowels, of lead colic, &c. Even a moderate degree of tympanitis in adynamic o typhoid fevers should be viewed with alarm, inasmuch as it is an indication of ulceration o PEYER's glands.

11. III. The SIGNS and SYMPTOMS of gaseous distension of the abdomen are very manifest, and even the seat of distension may be correctly inferred, especially when it is not extreme. *A.* Palpation and percussion, in some cases even simple inspection of the abdomen, are sufficient to show the sea and nature of the morbid condition. When th distension is chiefly of the stomach, the region o this organ is elevated above the margin of th false ribs, and the ensiform cartilage is protruded the lower abdominal regions being less prominent. A similar elevation of the upper region of the abdomen exists when the colon is the chie seat of distension; but the course of the colon from the distended cæcum to the termination o the bowel, may be observed on inspection; and it is further evinced by the hollow sound on percussion, especially when the cause of obstructio to the escape of flatus exists in or near to th sigmoid flexure or rectum. In the extreme instances of tympany, arising from any of th causes stated above (§§ 8—10.), the inflation i generally greatest in the small intestines, althoug it may be more or less in other portions of th digestive tube. In cases of hysteria, the distension is more limited, varies in its seat, and in th sympathetic sensations and pain it occasions and, owing to the spasm and contractions, successively affecting different portions of the tube occasions borborygmi, and the propulsion o flatus into the stomach and œsophagus. Th mechanical effects of abdominal inflation a chiefly the pressure of the diaphragm on th heart, lungs, and large veins, and the arrest of th peristaltic motions of the intestine and of the propulsive efforts by which the intestinal content are excreted. To these various subordinate effec others may be added, consisting of disturbanc and arrest of the several secreting excreting functions, of congestion of the lungs and large vessel and of imperfect oxygenation of the blood, &c.

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* *In the Stomach.*	Oxygen		11·	
	Carbonic acid		14·	
	Hydrogen		3·55	
	Nitrogen		71·45	
			100·	
In Small Intestines.	Carbonic acid	24·39	40·6	25·0
	Hydrogen	55·53	51·15	8·4
	Nitrogen	20·08	8·85	66·6
	In three cases.			*In one.*
In Large Intestines.	Carbonic acid		43·5	70·0
	Carburetted hydrogen with trace of sulphuretted hydrogen		5·47	11·6
	Nitrogen		51·03	18·4
In the Cæcum.	Carbonic acid		12·5	
	Hydrogen		7·5	
	Carburetted hydrogen		12·5	
	Nitrogen		67·5	
			100·	
In the Rectum.	Carbonic acid		42·86	
	Carburetted hydrogen		11·18	
	Nitrogen		45·96	
			100·	

12. *B.* The *source* and *nature* of the abdominal iflation are to be inferred chiefly from the history the case ; from the antecedent disorder ; from ie seat, nature, and duration of pain ; from the idications furnished by percussion of the several bdominal regions, and from the states of the ecretions and of the pulse and tongue, with the arious constitutional symptoms.

13. The flatulent distension is generally that of ie intestinal canal, and not of the peritoneal cavity, lthough I would not say that this latter may not rare cases be its seat, especially if the fluids ffused into this cavity undergo more or less of ecomposition previously to dissolution ; but it is ot improbable that the instances of gas thus volved in this cavity, as observed by Heister, usseau, Lieutand, Morgagni, Portal, and thers, are merely those in which the gas had scaped into the cavity owing to a perforation of ie digestive canal. Tympanites has been occaonally observed in most of the organic lesions ffecting the biliary organs, the digestive tube, and ie abdominal and pelvic viscera. It is often an ttendant on Gout of the stomach or intestines.

14. *C.* The *appearances* observed in fatal cases re a very large proportion of those lesions which ave been very fully described under the heads igestive Canal and Intestines. In some cases ie distension of the tube has been remarkably reat throughout the greater part ; and in others has been more limited ; as to the Cæcum and olon (*see those articles*). It has rarely been uch as to rupture the bowel ; sphacelation of the iore distended portions being more common. he small intestines, especially the ileum, are lways remarkably distended by flatus, and the lands, more particularly Peyer's, are often more r less ulcerated, &c.

15. IV. The treatment *of Tympany* is generally ifficult, often hopeless, and always dependent upon ie pathological conditions of which it is merely symptom or contingent effect. In many cases t is productive of so much and so urgent distress hat it becomes requisite to attempt the removal, r the amelioration of it, before the morbid states, rom which it results, should occupy our attention vith the view of directing the means of cure to hem more especially. The *indications* are thereore: — 1st, to remove the tympanitic distension y such means as we possess, when it is distressıg and most urgent ; and 2nd, to subdue the athological states upon which the distension deends, by appropriate treatment, either when this rgency is removed or does not yet exist.

16. i. *The removal of the flatulent distension* of he intestines by mechanical means was first recomıended by Dr. Darwin to be attempted by the ntroduction of an enema-pipe into the rectum, in rder to remove the resistance of the sphincter ni to the passage of flatus. Trnka proposed that he gas should be removed by the air-pump ; and r. Osborne of Dublin adopted this means, in the ıode most likely to render the recommendation uccessful. After other means had failed, he inroduced a gum-elastic tube of nearly three feet n length, with a button and hole at its extremity, nd, having applied to it a stomach-pump, he roceeded to withdraw the gas, and "was enbled to do so with few interruptions, which were peedily overcome either by shifting the place of he tube in the intestine, or by injecting warm water to clear the holes by accidental stoppage. In about an hour the abdomen was reduced to nearly the natural size." (*Lond. Med. Gaz.* vol. vii. p. 825.) Dr. Graves employed similar means with success in two cases. (*Lond. Med. and Surg. Journ.* vol. ii. p. 781.) I had recourse to it in one case, with temporary benefit, and have advised it in consultation in two or three instances, but in neither with permanent advantage. It should not, however, be neglected, as more or less relief is produced by it. In many of the more severe cases I have prescribed enemata containing the extract or confection of *rue*, or *asafœtida*, or both rue and asafœtida, and enemata with *oleum olivæ* and *oleum terebinthinæ*, or the other carminative injections recommended for the removal of obstinate constipation.

17. Whilst the operation of these and similar means is expected, *frictions* over the abdomen with either of the *liniments* referred to in the Appendix (F. 311.) may be resorted to, and medicines may be exhibited by the mouth. When the tympany is not attended or caused by mechanical obstruction, and is to be imputed rather to a paralysed state of the muscular coats of the canal than to either constriction or strangulation, then the extract of nux vomica in small doses, or the usual carminatives, especially rue, asafœtida, capsicum, turpentine, &c., are often of service. Turpentine, either as a confection, or as a draught, with the oleum olivæ, or ol. ricini, on the surface of an aromatic water, or of common gin, in cases of hysterical tympany, or of spirit-drinkers, if prescribed with discrimination, is the most efficacious, especially if enemata or liniments with this substance be employed also.

18. When the tympanitic distension has arisen from obstruction in the vicinity of the cæcum or in the large bowels, then the injections into the latter should consist chiefly of warm, oleaginous, and saponaceous substances. Olive oil in large quantity may be thus employed, and this oil may be taken in small and frequent doses, oleaginous frictions being also resorted to. In several instances where tympany was caused by the obstruction arising from hysterical pica — by chewing paper in two cases, by sealing wax in one case, and by bleached wax and spermaceti in another, the obstruction was removed, in all, by these means, the causes of the disorder having been made apparent, by the numerous balls of these substances, agglutinated by the mucous of the bowels, and moulded in the cells of the colon, which were voided.

19. ii. Having removed the more urgent symptoms, the *Pathological conditions* producing the tympany requires close attention and appropriate treatment. These conditions are so numerous and so different that it is impossible to state all that may be required to fulfil this intention. This is, however, the less necessary as the circumstances under which tympanites occurs, and the pathological causes producing it, are duly considered, with the treatment required for each, in the articles on *Adynamic Fevers*, inflammations of the *intestines* and of other portions of the intestinal tube, *hysterical affections*, *colic*, *ileus*, and on other disorders upon which tympania is often contingent. The diverse sources of this affection, and the very opposite pathological states which may occasion it, sufficiently explain the success which has sometimes followed very dif-

ferent or even opposite indications and means of cure. Thus, when depending upon inflammatory action, the antiphlogistic treatment and regimen, as advised by J. P. **Frank** and others, are then required; but when depending upon a paralysed state of the intestines, consequent upon either organic lesion in some part of the digestive tube, or upon a morbid condition of the blood, as in the advanced stage of low or malignant fevers, then stimulants, tonics, carminatives, and restoratives, as turpentine, camphor, musk, ammoniacum, asafœtida, galbanum, capsicum, myrrh, rue &c., are equally necessary. In these latter circumstances, and especially when the bowels are loaded by offensive sordes, or morbid excretions, then powdered *charcoal*, as advised by **Frank**, and employed by myself in such cases, in conjunction with antiseptics or other means, or with one or more of those just named, may be employed. The carbon may be administered in doses of half a drachm to a drachm, twice or thrice daily, in the state of powder, in any suitable vehicle. In the case of a very celebrated general, attended some years ago by Dr. F. **Hawkins** and myself, this substance was administered in that quantity and even in more frequent doses, and was conjoined with active medicines; it having been adopted chiefly for the removal of the fœtor, characterising the evacuations and tympania in the advanced stage of low fever. For inflation of the bowels in the last stage of fevers, in dysentery, in chronic diarrhœa, in misplaced gout, &c., the treatment already advised (§ 17.) is often beneficial; and in many of these, especially in aged subjects, carbon is often of use, and seldom fails of removing the fœtor characterising these cases.

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URINARY BLADDER. — Synon. — *Ves*
Urinaria ; Ves. urinalis ; κύστις, Cystis ; U
cystis ; — Vesica ;—Vessie, Fr. ;—*Harnbla*
Germ.

1. *The Urinary Bladder* is a musculo-me
braneous reservoir for the reception of the uri
until the accumulation of a certain quantity s
licits the discharge of this secretion. This rese
voir is situated in the hypogastric region, betwe
the pubes and rectum in man, and between t
pubes and vagina in the female. Its several co
nections with the urinary and sexual passages,
both sexes, and its other anatomical relatio
need not be noticed at this place. It is suffi
ent that we bear in recollection that, in additi
to the disorders and lesions which are seated in
solely or chiefly, it is liable, in consequence
these connections, and of the nervous and vasc
lar communications existing between it and oth
parts, to several sympathetic affections, the mo
important of which are those depending up
lesions of the kidneys and ureters, and upon tho
of the prostate gland and urethra. In all case
therefore, when the urinary bladder appears
be the seat of disease, our attention should
directed also to the states of these organs a
passages; and not be limited to these, but be e
tended even further, and more especially to t
composition and condition of the urine and of i
deposits, with the several relations of digesti
and assimilation.

2. I. Irritability of the Bladder.—Class
—II. Class; III. Order. (*See Preface.*)

3. Definit. — *A frequent and urgent desire*
micturate, independently of febrile symptoms a
of inflammation, and of organic lesion of the u
nary bladder and prostate gland.

4. i. Symptoms. — A person otherwise
good health feels an urgent desire to void h
urine after very short intervals, and if the desi
be not gratified, either he is incapable of retaini
it, or he retains it with great difficulty, and wi
more or less pain. The effort at micturition
sometimes attended by pain in the glans or und
the frænum, and by straining; and although t
calls are frequent, the quantity passed at eac
call is very small. These latter symptoms a
most frequent in old or aged persons, and in tho
who have been addicted to masturbation or sexu
excesses, in whom the prostate is more or le
tumid or enlarged. Hysterical persons are ofte
liable to this disorder; but in these the urine
more copious and pale, and contains less than t
usual proportion of solid ingredients, the natu
of which are not altered. When irritability
the bladder has continued long — the organ ha
ing for a long period ceased to be distended by t
accumulation of urine — the capacity of it be
comes permanently accommodated to the paucit
of its contents, and incapable of containing mo
than two or three ounces.

5. Mr. **Coulson**, in his admirable work o
Diseases of the Bladder and Prostate Gland, re
marks that, notwithstanding this contracted stat
if there be no stricture or disease of the prostat
the parietes of the bladder are often thinner tha
natural; and that it would seem that protracte
irritation produces absorption of part of the sub
stance of the organ. Opportunities of examinin
after death the bladder of persons who laboure
under this affection in its idiopathic form ar

ry rare. Mr. COULSON examined the body of zentleman of a very nervous temperament, long sufferer from this disorder, who was carried off disease of the lungs; but he could not detect e least alteration in the appearance or structure the bladder, or of any of the urinary organs.

6. ii. THE CAUSES of this disorder require cognition in each case which comes under treatent. Old persons, or the aged, and next the ry young, are more liable to irritability of the adder than youths or the middle-aged; but the uses producing it in the aged are generally very fferent from those occasioning it in children. ne nervous temperament, weak, irritable and xious dispositions, and gouty and rheumatic rsons are most predisposed to it. Those subject chronic dyspepsia, to nervous giddiness, treors, or to scaly eruptions, are often also afflicted th this complaint.

When it occurs in females it is sometimes ferable to injury from pressure, either during egnancy or in parturition, or to disorders or sions of the uterus, ovaria, or vagina. It may occasioned in both sexes by hæmorrhoids irritation of the rectum by ascarides, or by ronic states of dysentery. It may occur, in slight form, even independently of hysteria, in ales as well as in females, from self-pollution, or om irritation of the spinal nerves increasing the ganic sensibility of the bladder.

7. *a.* The most frequent causes are probably ose which are referable to the *states of the urine*, ising either from the nature of the ingesta, or om the changes consequent upon primary or sendary assimilation. It has been well remarked Dr. PROUT, in his celebrated work, that cases irritable bladder, depending on functional dengement of the kidneys, usually result from the natural properties of the urine. All deviations om the normal condition of the urine, whether in ficiency, or in excess or in kind, are recognised the containing organs, and may prove a source irritation in the bladder. "Hence, whenever e urine is very dilute or very concentrated, or preternaturally acid or alkaline, or contains any natural ingredient, the urinary organs in genel, and the bladder in particular, though perctly healthy, are liable to become excited and itable, and the individual has no peace until e unnatural secretion is discharged. In such ses the fault lies, not in the bladder, but reotely in the kidneys and assimilating organs." *)p. cit.* p. 366.)

8. The use of various fruits, ripe or unripe, pecially by children, and even by adults, and sorders of digestion and of assimilation, occaoned by these or by other causes; the eliminan from the blood of unwholesome substances, nveyed into it from the organs of digestion, hether subsequently altered or unaltered by the dneys; the excessive use of alkalis, or of these mbined with the vegetable acids, and alkaline ates of the urine from these or other causes; and e prolonged use of acids, or of the nitrate of otass, or of the oxide of potassium, or of other uretics,—may severally occasion this complaint.

9. *b.* The irritation of ascarides in the rectum, d morbid states of the urine, caused either by wholesome food, by unripe fruit, or by imired assimilation, or by spinal affections, or by ckets, are the most common causes of this affection *in children*. Mr. COULSON met with cases in children which were caused by so great a contraction of the orifice of the prepuce as hardly to admit the point of a probe; circumcision cured the complaint. When irritability of the bladder occurs in this class of patients about the periods of dentition, it may generally be imputed to disorder of the digestive organs, and to consecutive alterations of the urine. The connection of irritability with paralysis of the bladder is not infrequently met with in children (§ 36).

10. *c. Symptomatic irritability* of the bladder is much more common than the idiopathic disease. Granular and other organic lesions of the kidneys are generally attended, especially during the night, with frequent and urgent desire to evacuate urine; this excretion being always more or less morbid even from an early period. Diseases of the prostate gland and of its vicinity, organic, inflammatory, or malignant very generally, and strictures of the urethra not infrequently, are accompanied with this complaint. Indeed, strictly speaking, irritability of the bladder is merely symptomatic, either of disease of some adjoining or some closely related organ, or of morbid conditions of the urine; and this may be the case even in those considered purely nervous, or most devoid of manifest structural change.

11. iii. THE DIAGNOSIS of this complaint is often of importance; and nothing tends more to determine this than a careful examination of the urine. Irritability of the bladder will not be mistaken for *diabetes*, if the quantity and quality of the urine be ascertained. Although irritability is a symptom of inflammation of this viscus, yet it is necessary to ascertain its independence of inflammatory action; and this is to be inferred chiefly from the absence of those local and constitutional symptoms characterising cystitis, either in an acute or chronic form. The absence of pain in the region of the bladder, and of frequency of pulse or of other febrile symptoms, especially towards evening, will indicate the independence of the recent state of the complaint of acute inflammation; whilst the more chronic state of irritability will not be imputed to chronic inflammation of the bladder, if the constitutional powers of the patient be not very sensibly impaired by it. The dependence of the complaint upon disease of the prostate gland may readily be ascertained by an examination *per rectum*. Not only, however, may there be irritability, but also pain of the bladder, without any manifest disease of this viscus; the mischief being confined to the kidneys, chiefly in the form of calculi of these organs. Instances of this kind are adduced by MORGAGNI, PROUT, COULSON, H. J. JOHNSON, and others, and have come under my own observation. Dr. PROUT remarks that, in certain renal affections in particular habits, even where the urine is not very unnatural, the pain is confined chiefly to the neck of the bladder; but where the urine is actually diseased, and especially when it is alkaline, we may be certain that the kidney is functionally, and if the patient be of a scrofulous habit, and the case of long standing, very probably organically affected.

12. iv. TREATMENT. — *a.* In recent cases, the states of the general health and of the urine will frequently indicate a successful treatment. When the urine is very acid, or scanty, or furnishes a

red sandy deposit, and when the complaint appears in connection with either gout or rheumatism, then bicarbonate of potash may be given, with or without the nitrate of potash, in tonic or bitter infusions or decoctions; the carbonates of soda and of ammonia being inappropriate, the former owing to its favouring the formation of urate of soda, the latter to its influence in generating urea and uric acid. Mr. COULSON states that great relief will sometimes be obtained from cupping on the perineum. This will be more especially the case if any congestion of, or vascular determination to, the prostate gland be present. Liquor potassæ, prescribed in bitter infusions, with henbane or conium, or with small doses of colchicum, in the gouty or rheumatic diathesis, is also of great service. Where the potash, in either of the states now mentioned, is not productive of relief, magnesia may be given so as to preserve the bowels in an open state, an occasional dose of equal parts of the compound infusions of gentian and senna being also taken.

13. *b.* In cases which manifest a nervous character, or which seem to be results of abuse of the sexual organs, tonics are especially required, either in combinations already mentioned, or with the mineral acids; as the infusion or decoction of cinchona with the nitro-muriatic acids, and with henbane or conium, or with a few drops of tincture of opium, or with the compound tincture of camphor. The mineral acids may also be given with the decoction of pareira brava, or of uva ursi, or with the infusion of buchu, and with the additions just mentioned. I have prescribed the tincture of the muriate of iron in calumba or quassia, and anodynes, with benefit, for cases of this kind. Mr. COULSON remarks, that the decoction of uva ursi and the infusion of wild carrot seeds will occasionally give great relief; but that no medicine is so generally successful in irritability of the bladder as the infusion of diosma; and he adds that, from time immemorial the buchu leaves have been held in great esteem by the natives of the Cape of Good Hope as a remedy for irritative and inflammatory affections of the urethra, bladder, prostate gland, and rectum, and also for rheumatism, indigestion and gravel. The natives of the Cape and the Dutch are partial to the spirit of buchu, made by distilling the leaves in the dregs of wine, and call this spirit buchu brandy; and they use it for all chronic diseases of the stomach and bladder, especially colic, spasms, &c. A tincture of buchu is ordered by the Edinburgh and Dublin Colleges; and half a drachm to a drachm of it may be given for a dose. In these and similar cases of irritability an opiate suppository, or a starch enema containing from one to two drachms of syrup of poppies, or about thirty drops of tincture of opium, may be administered at night; or a pill with opium, or henbane, and extract of colchicum, shortly before bed-time.

14. *c.* When this complaint is *symptomatic* of granular or other organic disease of the KIDNEYS, or of enlargement or other lesions of the PROSTATE GLAND (see those articles), then the treatment must be based on the primary and chief malady. When it is connected with the gouty or rheumatic diathesis, or with either of the scaly eruptions, then the bicarbonate of potash, or the solution of potash, and small doses of the iodide of potassium, in equal parts of the compound tincture of chona, and of the fluid extract of sarsapar with one of the narcotics already mentioned, often beneficial. If the urine becomes alkal or if the iodide appear to perpetuate the irr bility, the alkali and the iodide should be linquished. In this state of the disease, colchic may be conjoined with the above, or even a sr quantity of opium may be added to them. most cases, especially when the nightly rest the patient is much disturbed, an opiate in s suitable form should be given in the evening o bed-time.

15. *d.* When the complaint occurs in *hyster females*, or in connection with the accession, or v disorder of the catamenia, the preparations of ir or of valerian, or of asafœtida, or of aloes, bowels being acted upon by preparations of latter, are generally beneficial. In these c also, the tincture of sumbul, in doses of twe to forty drops, with five or six of the tinctur opium, is often of service.

16. *e.* The incontinence of urine often afflic *children*, and generally during sleep, seems proceed from an association of irritability w partial paralysis of the bladder, or at least w impaired tonicity of the sphincter vesicæ. most of these cases the general health, the gestive functions, and the state of the urine more or less disordered; and to these especi medical treatment ought to be prescribed. many instances, while due means are emplo for these, stimulating liniments rubbed along spine, or sponging the back and sacrum wit strong solution of salt night and morning, prove of service. (*See also* § 39.)

17. *f.* In all cases of irritable bladder the and *regimen* of the patient should be duly re lated, and with especial regard to the state the digestive functions, of the urine, and of organs most intimately related to the offices of bladder. Fruit and vegetables are often injuri Much animal food is even more hurtful, especi in the gouty, rheumatic, and uric acid diath Malt liquors and spirits are still more injuri and wine is very rarely of service. Sex excesses ought also to be avoided, and sex intercourse seldom indulged in. The call micturate should be deferred as long as possi and the mind be diverted from it; for a cons response to each early call ultimately gives to a habit which increases and becomes confir from the want of opposition to it.

18. II. SPASM OF THE BLADDER.—CLASSI II. CLASS; III. ORDER. (*See Preface.*)

19. DEFINIT.—*A sudden and violent attac pain in the region of the bladder, extending a the urethra to the glans, with either involun expulsion or retention of the urine.*

20. *A.* This disorder is most commonly s*ptomatic*, either of stone in the bladder, o gonorrhœa, especially when this latter is tre by injections; or of organic disease of the kidn or of parts adjoining the bladder. Dr. PR remarks that it may be caused by acid urine abscess of the kidney, by ulceration or o disease of the prostate gland, bladder, &c., o retention of urine, or by gout, or by vene excesses. Irritating diuretics, cantharides ta internally, the application of blisters, hyst masturbation, the irritation of ascarides in

ctum, dysentery, or tenesmus may severally cite an attack. When it is connected with norrhœa or the treatment of it, then the sphincter sicæ is thereby either irritated or inflamed, and asm supervenes as soon as urine passes into the adder.

21. *B.* The sudden and violent attack of pain in s viscus, *characterising* this complaint, is at-nded by a constant desire to void urine, without e ability to do so, and the agony felt during ese attacks is excessive. The contraction of e bladder excites the muscular coats of the ctum, and occasions also a desire to evacuate e bowels, or more or less tenesmus. Mr. OULSON remarks that the closure of the ureters their vesical extremities has given rise to latation of these ducts and of the pelices of the dneys, and to serious changes in the kidneys; d that, after an attack of spasm, from which e patient has apparently recovered, it some-nes happens that a new train of symptoms pears, indicating the injury which the tubular d secreting structure of the kidneys has re-ived. Frequent attacks of spasm also sometimes jure the tone and contractility of the bladder much as ultimately to induce a partial or more mplete paralysis of the organ (§ 27.).

22. *C.* The *diagnosis* of spasm of the bladder not difficult; it may, however, be confounded ith inflammation; but in this latter the pain is nstant, commences with uneasiness, and gradu-ly becomes more and more severe. Spasm curs suddenly; the pain is violent and con-ictive; whereas in inflammation the pain, when eatest, is either lancinating or throbbing, and is tended by more or less febrile action, of which e former is generally exempt. In both the ine is usually retained, or passed in the latter in ry small quantities, and after remarkably short tervals. Spasm may, however, be associated ith inflammation of the mucous coat of the adder, as spasm of the coats of the colon is sociated with inflammation of the mucous coat the intestine. In such cases the spasm is only symptom aggravating the character of the in-mmation, febrile symptoms more or less mani-stly attending this latter.

23. *D. The treatment* of spasm of the bladder ill appear from the above to depend chiefly on the pathological state occasioning it. If it consequent upon inflammatory action, either of e sphincter vesicæ, upon suppressed gonorrhœal scharge, upon the use of irritating injections, or on inflammation of the bladder, *bleeding*, ac-rding to the grade of morbid action and habit of dy of the patient, should be prescribed, either venesection, cupping, or by leeches, and be peated if required. The warm bath, fomenta-ns, cooling aperients, and diaphoretics should llow vascular depletion; and demulcents with odynes, emollient enemata with anodynes or rcotics, &c., should also be prescribed. If the mplaint supervene on gonorrhœa or the use of jections, the above treatment is appropriate; cal bleeding, however, generally proving suf-ient.

24. If spasm of the bladder occur in the gouty athesis, or upon the suppression of a paroxysm of out, or as misplaced gout, the regular form of the sease should be solicited by means of mustard diluvia, and mustard poultices to the feet, whilst the soothing and anodyne remedies above mentioned are exhibited. In cases of this kind, as well as in many others, magnesia and sulphur may be taken, with small doses of colchicum, of camphor, and of opium; and if the former be given in decided doses so as to act upon the bowels, a more rapid effect will be produced upon the spasm than by any other means. If the state of the urine occasion or aggravate the spasm, appropriate means should be used to correct this state.

25. When the disease is symptomatic of a calculus in the bladder, or in the kidney, or passing the ureter, the warm bath, fomentations, demulcents, emollients, and narcotics, or anodynes, taken by the mouth and administered in enemata, are generally of service; but when the calculus is in the bladder these means are only of temporary benefit,—permanent relief must be looked for only from the surgeon. Cases of spasm affecting chiefly the sphincter vesicæ, and causing retention of urine, are generally symptomatic of irritation or of disease of adjoining parts, and are relieved by the tinctura ferri sesquichloridi taken in doses of ten to twenty drops in water every quarter of an hour, or by a suppository containing the extract of belladonna, or by a belladonna plaster applied over the perineum, whilst the emollients and anodynes already advised are taken internally. Mr. COULSON recommends a poultice containing powdered camphor to be applied over the perineum, or a liniment composed of camphor and opium; and states that emollient clysters containing some of the watery extract of opium often afford instant relief.

26. III. PARALYSIS OF THE BLADDER.—CLASSIF.—I. CLASS; II. ORDER. (*See Preface.*)

27. DEFINIT. — *Partial or complete loss of the contractible power, and of the organic sensibility, of the bladder; often also with loss of power of the abdominal muscles, whereby the urine is partially or completely retained.*

28. i. HISTORY. — Paralysis of the bladder, whether partial or complete, whether temporary or permanent, depends on loss of power, either originating in the organ itself, or affecting it consecutively upon injury or disease of the spinal chord, or of the brain, or of their membranes —*a.* A *partial* form of paralysis sometimes occurs as a symptom of extreme debility or exhaustion in the course of acute or chronic maladies, as of typhoid or adynamic fevers, of hectic, and of the last stage or organic diseases. In these circumstances, the contractility and organic sensibility of the bladder is more or less impaired, and the power of the abdominal muscles to aid by their contraction the expulsive efforts of the detrusor urinæ, is equally lost.

29. *b.* In some cases the loss of power in both is *general* and *complete*, and this state of the disease, especially in its advanced or protracted form, may be attended by a constant dribbling of the urine, owing to the over-distension of the bladder having overcome the resistance of the neck or sphincter vesicæ. Thus incontinence of urine is superadded to retention, and the latter is sometimes mistaken for the former. In such cases examination of the abdomen and region of the bladder, or the introduction of a catheter, will disclose the state of matters; and strict attention should be paid to the excreting functions of the urinary organs in all fevers and constitutional maladies.

30. *c.* Paralysis of the bladder, giving rise to retention, may come on gradually, especially in advanced age; either in consequence of disease of the kidneys, or of the prostate or urethra, or after a prolonged neglect of evacuating the bladder or the suppression of the desire to evacuate. In these circumstances, however, the paralysis and the retention may be at once complete. Although this form of the affection is most frequent in aged persons suffering from disease of some other parts of the urinary apparatus, yet it may also affect the middle-aged, especially when the desire of evacuation has been long suppressed; the consequent over-distension having overcome the power of contraction, the abdominal muscles either failing to expel the urine, or expelling it only partially. In these and similar circumstances a frequent desire to micturate occurs, and after expulsive efforts made by the abdominal muscles a very small quantity only is expelled; and this state may be mistaken for a form of irritability of the bladder; but, upon a strict examination of the abdomen, or upon the introduction of a catheter, a large accumulation of urine is found in the viscus.

31. In some persons, even of middle age, a more or less manifest state of paralysis is consequent upon impaired health caused by anxiety, fatigue, excessive application to business and neglect of calls to micturate, or by venereal excesses or masturbation. When these latter causes have existed, a state of complete or incomplete *tabes dorsalis* supervenes, with manifest weakness of the loins and lower limbs; and if relief be not obtained, paraplegia, with complete paralysis of the bladder, ultimately results. In both this and the immediately preceding cases, as well as in some others, the over-distension of the bladder, or the distension of it to a certain extent, occasions a frequent desire or effort to evacuate the urine, and a small quantity only is passed, the power of contracting further being lost, or the contractions of the abdominal muscles being sufficient only to expel that small quantity. In such cases the catheter is often required.

32. *d. Injuries* and *diseases* of the *spinal chord* and *brain*, and their *membranes*, occasion the most complete and severe instances of paralysis of the bladder; more especially lesions seated in the spinal chord or its membranes, and whether in the cervical, dorsal, or lumbar regions. In this class of cases the effects produced upon the bladder and upon the state of the urine are different, or vary more or less with the amount of injury or disease, or with the rapidity of progress of the latter in the nervous centres; but they are generally remarkable according to the severity or danger of either. At first, or immediately after the occurrence of these, the urine may be more or less acid and free from mucus; but especially after injury of the spinal chord it soon becomes alkaline, turbid, and ammoniacal, evincing this state at its discharge; and when it cools it deposits much adhesive mucus. After a short time phosphate of lime is found in the mucus, which afterwards is sometimes blended with blood. The urine collected in the bladder is altered, either during the process of secretion, or during its retention in the bladder; and is generally changed in the following manner. The urea is converted into carbonate of ammonia, which irritates the mucous surface of the bladder and causes the exudation of much viscid mucus. The neu triple phosphate of magnesia and ammonia c tained in the secretion form prismatic crystals, present different degrees of transparency. T inflammation of the bladder consequent u paralysis of the bladder, caused either by inju or disease of the nervous centres, extends from mucous to the other coats of the organ, if patient live for some time; and the parietes come thickened and incapable of contracti the urine requiring to be drawn off, and alw presenting a fœtid and alkaline character. T question in these cases is whether the change the urine is owing to the altered nervous po of the kidneys, or is it the result of retention the bladder? From some attention which I h paid to this question I conclude that the cha in the urine takes place primarily and chiefly the kidneys, owing to the loss of that portion nervous power which the spinal nerves convey the renal ganglia; and that it is increased dur the retention of the urine in the bladder, the pa lysed state rendering this viscus more prone to flammation, and to the more rapid supervent and progress of the changes consequent upon flammation.

33. As this state of disease proceeds, the p or uneasiness of the neck of the bladder and gl penis at first experienced subside and ultimat disappear, although distension may continue encrease. The desire to pass urine is not pressed; and whilst the local symptoms subs the constitutional become aggravated. The p is much accelerated, thirst is increased, and r lessness and anxiety of mind are augmented. fur on the tongue is thicker, deeper, and dar coloured. Delirium supervenes, with a urin odour of the perspiration, and stupor or profo coma supervenes, and the patient dies in this sta the complaint being, perhaps, mistaken for typ fever, if due attention have not been directed the states of the urinary functions and blad Patients, especially those advanced in life, w attacked by fever, owing to the congested st of the nervous centres, may experience sim changes in the urine, and a similar paralysis of bladder; and if this unfavourable complicatio fever be overlooked, it rarely fails of being chief cause of a fatal issue.

34. Paralysis of the bladder occurs chi in the aged; and although in them, as well as some younger persons, it may be favoured caused by the states of the spinal chord or of membranes, it is most frequently consequent u disease of the prostate gland or neck of the bl der, or of the urethra, causing over-distension the organ. When this complaint affects fema especially from puberty to the decline of life, i generally connected with *hysteria*, or with advanced stage of spinal congestion (hysteri paraplegia) caused by uterine irritation. I h seen several cases of hysterical paraplegia, wh a surgeon was required to draw off the urine, complaint having been imputed to masturbati When it occurs in married females it may either a symptom of pregnancy, or of injury perienced during labour or delivery. In fourth month of pregnancy, or about that ti or near the period of confinement, retention urine may occur, and if it be neglected a paraly state of the bladder may supervene from distensi

r results may follow retroversion or ante- n, or prolapsus of the uterus. Imperforate ı, and obstructed catamenia from this cause ven occasioned this complaint.

e. Hysterical paralysis of the bladder is be- by Sir B. C. Brodie, and very justly in cases, to be owing to defective efforts of n. He remarks that, in the first instance, ot that the nerves are rendered incapable of ying the stimulus of volition, but that the of volition is itself wanting; and this corre- s with what is observed in other affections cted with hysteria. "As the distension in- s the patient begins to be uneasy, and at last actual pain; and as soon as this happens n is exercised as usual, and the bladder begins pel its contents." If not relieved by means theter, the hysterical retention of urine is f short duration; but if the catheter be had se to, the natural cure is prevented, and the may be indefinitely prolonged. "The l rule," Sir B. Brodie adds, "in the ent of these cases, is to interfere but little;" is rule is not without exceptions; for, in a ses where the bladder has been very much led, it loses its power of contraction, and hough the patient endeavours to micturate, ter flows. Under these circumstances, ar- aid should be obtained.

f. The affection which sometimes occurs in *n*, especially in delicate boys, and which is terised by the discharge of urine during has been variously explained: by some it en imputed to irritability of the bladder, by to a morbid state of the urine, causing on of this viscus, and by some to paralysis neck of the bladder, occurring during That this last condition may obtain is not ly, as the affection is not infrequently asso- with prolapsus of the rectum after a mo- nd with deficient tonic contraction of the ter ani. It may, however, depend, in dif- cases, upon the association of all these conditions in different degrees, the share morbid state of the urine may have in its tion being ascertained by the examination excretion.

ii. The Treatment of paralysis of the r, is 1st, *constitutional*, and 2nd, *local*; but, ny cases, the latter should precede the , especially as respects the urgent neces- obtaining immediate relief. As to the best of attaining this end, I must refer to surgi- iters, and especially to the able and precise tions of Mr. Coulson, in his work on the *ases of the Bladder*," &c.—*A*. The *constitu- treatment* must chiefly depend upon the of individual cases, upon the pathologi- onditions occasioning this disease; but in ases, and particularly in old cases, medical ent is of little avail; surgical appliances, lly frequent introductions of the catheter, required during the life of the patient. however, may be made of strychnine, gra increasing the dose, and carefully ob- its effects on the nervous and muscular s. I have generally preferred the extract vomica, in doses of a quarter of grain, lly increased to one grain, given twice or daily, and combined with the aloes and pill, and purified extract of ox-gall, or with the compound galbanum pill. I have also prescribed terebinthinate embrocations, or epithems, to be applied over the loins and sacrum. In the great majority of cases, and especially in aged persons, serious lesions supervene in the kidneys and in the pelvis of these organs, and thus complicate and further aggravate the disease, and render recovery altogether hopeless.

38. *B. Hysterical paralysis* of the bladder is not infrequently caused by masturbation, and a moral discipline is required, although it may not prudently be either suggested or enforced, unless with the utmost discretion. Indulgence and sympathy, on the part either of friends or of the physician, should be withheld, and the most nauseous anti hysterical medicines should be exhibited, especially asafœtida, turpentine, &c., both by the mouth and in enemata. In a case where this affection was rather simulated or feigned, than actually present, I recommended, in the hearing of the patient, the actual cautery to be applied to the sacrum; but the complaint vanished soon after mention was made of the remedy, and directions given as to its employment.

39. *C.* The *paralysed* or *relaxed state* of the neck of the bladder in children, noticed above (§ 36. generally disappears as the constitutional powers of the patient improve. I have found tonics, stomachic aperients, chalybeates, and stimulating embrocations applied over the loins, the spine and sacrum being sponged every morning with a strong solution of salt, of great service. The patient should sleep on a hair mattrass, covered with a waterproof cloth. Change of air, sea-bathing, or sponging with sea or salt water, where the plunge bath causes alarm, and exercise in the open air, are also beneficial indeed are almost essential in these cases.

IV. Inflammation of the Urinary Bladder.

— Synon. — *Cystitis*, (from *Cystis*, a cyst or bladder), Sauvages, Vogel, Cullen, &c.; — *Inflammatio vesicæ*, Sennert, Hoffmann; — *Cauma Cystitis*, Young; — *Empresma Cystitis*, Good; — *Uro-cystitis*, *Cystiphlogosis*; — *Inflammation de la Vessie*, Fr.; — *Entzündung der harnblase, blasenentzündung*, Germ.

Classif. — 1. *Class*, 2. *Order* (Cullen); — 3. *Class*, 2. *Order* (Good); — III. Class, I. Order (*Author, in Preface*).

Definit. — *A sense of pain in the region of the urinary bladder, increased on pressure, with a frequent desire to micturate, generally preceded by chills or rigors, and attended by inflammatory fever.*

40. i. Structures and parts primarily or chiefly affected. — Inflammation of the bladder most frequently commences in the mucous coat, to which it may be limited, or it may extend to the external coats. When it thus commences it may be circumscribed, or it may affect all this coat. When the former obtains, the part covering the neck of the bladder and the cystic triangle is most commonly affected; but inflammation, whether limited to the mucous surface or affecting the other coats also, or even the whole parietes of the organ, generally commences in this situation, owing to the irritation of sabulous matter, of calculi, &c. The imperfect emptying of the bladder, especially in connection with engorgement of the prostate, the contiguity of this

part to the prostate and urethra, the liability of the extension of inflammation to it from these parts, and the participation in irritation of the rectum and vagina, also account for the more frequent commencement of cystitis in this part. From the extension of disease, cystitis may be consecutive upon inflammation of the rectum or vagina, upon metritis, and upon hæmorrhoids; and it is often consequent upon and complicated with inflammation of the prostate. In addition to these modes of commencement, cystitis may primarily attack the peritoneal covering of the fundus. This is comparatively a rare occurrence. The fundus of the organ is much less frequently the seat of the disease, particularly at an early stage, than the neck of the bladder and the parts situated posteriorly between the sphincter and entrance of the ducts. When inflammation commences in the peritoneal coat of the organ it usually arises from the extension of the morbid action from adjoining parts, as the rectum, cæcum, colon, or omentum. Uro-cystitis has thus been observed in the course of colonitis or inflammatory dysentery, of peritonitis, and of inflammation of the generative organs in females; and the connection of these maladies has often been rendered manifest by examinations after death. Inflammation may also attack all the coats of the bladder either primarily or consecutively. The former is of rare occurrence, the latter is much more frequent, owing to its extension from the mucous or serous surface of the organ, and to injuries and operations.

41. Uro-cystitis, with reference to its *seat*, may be viewed,— 1st. As to its limitation to the mucous surface of the organ; 2nd. As to its extension to the coats forming the parietes; 3rd. As to the part of the viscus most frequently affected either primarily or secondarily; 4th. As to the nature of the morbid action; 5th. As to its consequences; and, 6th. As to its complications. Each of these heads will be considered in detail.

ii. Inflammation of the Mucous Surface of the Bladder. — Synon. — *Blennorrhagia vesicalis*, Swediaur; — *Dysuria mucosa*, Cullen; — *Catarrhus vesicæ*, Lieutaud; — *Rheuma vesicæ*, Stoll; — *Pyuria mucosa*, Sauvages; — *Catarrhe de la vessie*, Fr.; — *Muco-cystitis* (*Author*).

42. Inflammation of the mucous coat of the bladder generally proceeds from the common causes of inflammation, and from those which are usually productive of cystitis (§§ 84 *et seq*), especially the extension of inflammation of the urethra to the neck and internal surface of the organ, the use of irritating injections, of irritating diuretics and aphrodisiacs, the irritation of calculi, &c. This form of cystitis is of frequent occurrence, and presents every degree of activity from the most acute to the most chronic, owing to the diathesis and habit of body, age, and mode of living of the patient, and to its causes.

43. *A. The acute form* of the disease is characterised by severe pain, increased by pressure, sense of heat or tension in the hypogastric region, and uneasiness in the perineum, and by frequent urgent calls to discharge the urine, attended by difficulty and increased pain. These symptoms are often preceded by chills, horripilations, or rigors, and are followed and attended by febrile reaction and its usual concomitants. Sometimes
neither chills nor horripilations are felt, espe
when the disease has extended from the pr
gland or the urethra, the pain in the region
bladder, and the frequent desire to urinate
the invading symptoms. The urine is
often and in small quantities, with much sm
heat and repeated efforts. It is generally a
a deep lemon or orange colour ; at first cle
in a day or two numerous small shreds of
or mucus are seen floating in it. Sometim
urine is reddened and turbid, and deposits
sediment, consisting chiefly of a muco-pu
matter. In a few days the irritation and
disturbance are diminished ; the severity
pain in the region of the bladder is abate
often, even when this abatement is well m
the quantity of mucus or of muco-purifor
ter in the urine is increased. The loc
symptomatic irritation, and the frequency
difficulty of urinating, generally more
subside about the same time.

44. *B. The consequences and terminat*
acute muco-cystitis vary with the severi
causes, and the nature of the attack, and t
stitution and other circumstances of the
If the inflammation proceed no further t
mucous surface of the neck of the bladder
the parts in the immediate vicinity, the
symptoms diminish gradually, and the
terminates in resolution. But very differe
sequences occasionally ensue. If the inf
tion be very acute, it may rapidly extend
the tissues of the organ, and even parti
others in the vicinity, the disease becom
tremely dangerous or even fatal. In this
passes into a state of uro-cystitis, to be
hereafter. More frequently, however, t
inflammatory symptoms gradually subsid
cially the febrile action, but the local
subsists for some time, or continues with
obstinacy, the disease becoming chronic.

45. *C. Chronic inflammation of the muc*
face of the bladder sometimes supervenes
acute, as just stated ; but it often occurs i
mary form.—*a*. In this latter case its in
slow, and it is not accompanied with any
febrile disturbance, unless the inflamma
sume an intermediate grade between the a
chronic. Sometimes the febrile action
slight or remittent, and the local sympt
chiefly remarkable, especially irritabilit
bladder, pains in its region, or at the extr
the urethra, previous to and at the time o
the urine. This excretion furnishes, espe
it cools, a mucous or muco-fibrinous de
various shades of colour in different ca
often an ammoniacal odour. A sense o
in the perineum, or of heat in the blac
along the urethra, frequent calls to mictu
shooting pains to the anus are also oft
rienced. The discharge of mucus in th
more or less considerable,— hence the
tarrhus vesicæ,— but varies much in
cases and at different times.

46. *a*. Sometimes the disease is slight
old cachectic subjects, and when complic
disease of the kidneys or of the prostate
both, it is often dangerous, or even pro
In this latter state, or when the disease
on to ulceration, the heat in the bladder
thra amounts to scalding, the desire to

becomes more frequent and urgent, and the s more violent or straining. The expulsion last portion of urine is more or less pain- nd retention of urine is not infrequent, owing obstruction caused by clots of mucus or ous exudation lodged in the passage. Pain at the extremity of the penis, in the peri- and anus, sometimes in the loins and thighs. are thirst, costiveness, or irregularity of the s, uneasiness or restlessness, wasting of flesh, ss of strength.

4 b. The *mucus* discharged in the urine varies in quantity and appearance. It is sometimes at other times or cases it is so great as to it to pounds in the twenty-four hours. In quantity the urine is rendered turbid or by it, and it settles to the bottom of the ves- It is occasionally stringy, ropy, or of a or viscid consistence. The urine is gener- id early in the disease, but it becomes neu- alkaline as the mucous secretion is increased. acute muco-cystitis passes into the chronic antity of mucus is often considerable; in ases extremely great, forming glairy or ropy in the urine, which are afterwards depo- When the disease has not been of long on the mucus in the urine is generally -grey or yellowish-grey, tenacious or y, inodorous, and presenting no distinct ap- ce of pus. But in the more chronic or te cases a purulent matter is evidently pre- ixed with, and often more or less predomi- over the mucus. In these cases the mor- atter is less abundant, less tenacious, of a ish colour, more readily miscible with the and is sometimes streaked with thin bloody nts. It is also sometimes fœtid, is not so deposited at the bottom of the vessel as cous secretion, nor is it so tenacious. It ot form albuminous flocculi when boiling is poured upon it, nor does it coagulate, or perfectly, when boiled. When these ap- ces are seen in cases of considerable dura- lceration of the mucous surface, affecting the follicles, and the extension of inflam- to the connecting cellular tissue may be d. This inference will be still more fully out if there be slight fever assuming a re- or intermittent or hectic form, constant the organ, emaciation, restlessness at night, e undoubted presence of pus in the urine, ore or less alkalescence.

4 c. *Pus* may be distinguished from mucus ly by the above appearances, but by its niscible with the urine, which it renders . If the urine contain pus as well as , the former is deposited upon the latter, yellower in tint, and opaque, the mucus ranslucent. The microscope aids the dia- in these cases, by showing the presence of bules of the diameter of $\frac{1}{2500}$ of an inch. urine be acid the nucleus of the pus-globule seen without the aid of re agents; but, as ore frequently alkaline, the addition of a f acetic acid will bring the nucleus into y rendering the corpuscle more trans- A copious sediment resembling pus is nes produced by a large quantity of triple ate in the urine. But the nature of this is by its solution in nitric acid, and by the f the crystals under the microscope. When the urine containing pus presents an acid reaction, pyelitis may generally be inferred; when it is alkaline cystitis may be considered to exist. Purulent urine becomes clear on standing; a more or less abundant sediment is formed; the supernatant fluid is often of a greenish-yellow tint, and contains albumen.

49. Dr. PROUT states, that in the advanced stage of the disease the mucus in the urine is diminished, it becomes opalescent and of a greenish tint, and can in part be easily diffused through the urine, rendering it glairy or opaque, or milky like pus, the morbid matter being in fact muco-puriform. The urine is now generally deep coloured, or serous, or alkalescent, having an ammoniacal odour and effervescing with an acid. In this latter case there is an excess of carbonate of potash or of soda in the urine, derived from the serum of the blood. "When these symptoms have continued for a longer or shorter period, the urine becomes scanty, still more high coloured, and occasionally even acid; the mucus and even the pus gradually diminish, and almost disappear; and after a short period of comparative ease the patient expires."

50. *d. Intermediate grades* of muco-cystitis, between the acute and chronic states of the disease, are occasionally met with in practice. These have often been termed *sub-acute*. They are to be distinguished by more or less of the symptoms already adduced; generally all of them, but in different degrees of severity, and attended by remittent or hectic febrile action. They may occur primarily or follow the acute, which may subside into the sub-acute and ultimately into the chronic state, terminating at last in ulceration and thickening of the organ, or some other structural lesion. The chronic form of the disease may even pass into the acute, although not so often as the converse, either having presented an intermediate grade of morbid action, or having, owing to some exciting cause, suddenly assumed the acute form. In this latter case the extension of inflammation still further should be dreaded and guarded against.

51. *e.* The *duration* of muco-cystitis is extremely various: it may be from one month—it being seldom much less in the acute—to two or three months in the sub acute, to several months to two or three years in the chronic. It depends entirely on the cause, the age, and constitution of the patient, on the degree to which the inflammation may have extended to the other coats of the viscus and to adjoining parts, and on the complications the disease may have presented. The same circumstances also influence the prognosis and treatment (§§ 83. 89.).

iii. INFLAMMATION OF ALL THE COATS OF THE BLADDER. — *Cystite profonde*, CLOQUET;— *Cystitis vera — true Cystitis.*

52. This form of cystitis is not often met with as a primary disease. It much more frequently supervenes on one or other of the forms of muco-cystitis, and it occasionally occurs from the extension of inflammation from contiguous viscera; as from inflammation of the uterus and ovaria or Fallopian tubes, or of the rectum, colon, cæcum, peritoneum, omentum, &c.; from extensive hæmorrhoids, and from disease of the prostate. It will be seen that true cystitis, in some of these consecutive states of occurrence, commences in

the peritoneal surface of the fundus, and that it extends to all the coats. It is indeed extremely rare for true crystitis to commence in this part of the structure of the bladder, unless when it supervenes in the manner now alluded to.

53. *True Cystitis* is thus more frequently secondary or consecutive, and but rarely primary. But, whether originating in the one way or in the other, it is a severe and dangerous disease; and, owing to its consequences, is often speedily followed by the most serious effects. While the mucous coat only is the seat of inflammation the functions of the muscular coat is seldom affected in such a manner as to allow inordinate accumulations of urine within the viscus, unless the disease is attended by an obstruction to the discharge of the urine by associated disease of the prostate or urethra, or by the impaction of a calculus or fibrinous clot in the neck of the bladder. When, however, these obstructions occur, the inflammation of the mucous coat soon extends to the other coats; the previous irritability of the muscular coat is overcome by the distension consequent on obstruction; and rapidly passes into almost total paralysis or incapability of contraction, one of the most dangerous states of the organ in cystitis.

54. When true cystitis follows muco-cystitis or catarrhus vesicæ, the abundant mucous or muco-purulent secretion which characterised the latter is either much diminished or ceases altogether. This arises from the transfer of the inflammatory action chiefly to the more external coats of the bladder, and the diminution of it in the surface, which was formerly its only seat. The occurrence of this change has led Dr. PROUT to think that the inflammation of all the coats of the viscus is of a different kind from that of the mucous coat; but I infer that the difference consists merely in the different functions of the parts affected in both these forms of cystitis.

55. *True Cystitis* presents various grades of activity, from the most acute to the chronic. The pathological states through which the disease passes, and the consequences to which they lead are also diverse, and not always referable to the violence of the attack; but are dependent upon a number of circumstances connected with the causes, complication, and other peculiarities of the case. Thickening of the coats of the bladder, owing to an infiltration of an albuminous serum into the connecting cellular tissue, is very frequent, especially when the inflammation is sub-acute or chronic, or has extended from the mucous coat and is dependent upon obstruction to the discharge of urine or the presence of calculi. In these cases the distension of the bladder is a frequent occurrence; and even when this form of the disease is primary, and is not accompanied with obstruction to the discharge of urine, a loss of the power of the muscular coat, and consequent retention of urine, is a frequent attendant upon it. Although true cystitis affects all the coats of the bladder, a part of the organ may be more particularly affected by it than the rest, especially the parts near the neck, and extending thence to the ureters. This is especially the case when the disease has followed inflammation or other morbid states of the prostate gland, urethra, rectum; or has proceeded from hæmorrhoids, or from injuries caused by the use of the catheter, by lithotomy, lithotrity, or other operations.

56. *A. Acute Cystitis.*—*a.* The *symptoms* th state of the disease are, generally after cl s o rigors, severe pain, at first behind, afte ard above the pubes, a sense of uneasiness in th per neum, heat and tenesmus, and heat and sm ting in the course of the urethra. The patie he frequent calls to pass urine, which are way attended by more or less difficulty, often a unt ing to dysuria. The urine at last escapes y b drops, with more or less scalding and pai and ultimately with unavailing efforts to disch ge i When the symptoms arrive at this pitch suc anxiety and tension of the abdomen are per enced. The distended bladder rises ab th pubes, and the hypogastric region is very nde The frequent calls to pass the urine and t dys uria may mislead the physician, a large q ntit of water accumulating and causing injuric dis tension of the bladder before the circumst ce suspected. This accumulation may be ex ine by the irritable state of the sphincter vesic, th tumefaction of the inflamed parts having mi ished the outlet of the bladder, and by the nt due action in the muscular coat, owing to e in flammation in which it and the other coats e in volved. Hence it is thrown into freque an inefficient action, a portion of urine is often sse but, as soon as it reaches the irritable d in flamed parts immediately below the sp cte spasm of these parts, and of the sphincte tse takes place, which the contractions of the ndu are unable to overcome. The secretion c urin proceeding, distension so great as to des y th powers of reaction results, and complete p lys of the muscular coat supervenes. If in th sta a portion of the urine pass off, it is owing pa tial relaxation of the sphincter for a mome an to the position admitting of the discharge gra vitation. This difficulty of voiding th urin and the consequent accumulation are no wi to the muscular coat of the bladder only, or i many cases the parts near the neck of th blad der are chiefly affected; the tumefaction the being so great as nearly to obliterate th and and mechanically to obstruct the flow urin and the introduction of the catheter. In mpli cations of the disease, with enlarged or i ame prostate, this is obviously the case; a cum stance tending materially to influence t pro gnosis. Independently of this complicatic the is every reason to infer, from the nature f th morbid secretion and structure of the pa th this swelling contributes its share with th oth lesions to the production of this very un vou able symptom. In cases of cystitis produ d b injuries of the spine the paralytic state th muscular parts of the bladder is the caus f th accumulation of urine and of the consecu e in flammation; but in other cases the inflan atio is the cause of the retention and of the ss muscular power, as above stated.

57. When the disease has reached thi tage and the accumulation in the bladder is n iles the symptoms soon run on to a dangerous eigh if relief be not soon afforded by medical sur gical treatment. The patient is anxio dis tressed, and fevered; the pulse is very quen and hard; the tongue white and loaded; t ppe tite is lost; thirst is great; costiveness w fre quent calls to stool, painful tenesmus, a diffi culty of passing a motion, especially w th

is seated chiefly about the neck of the r, or is complicated with disease of the r, as frequently is the case, especially in n, are also experienced. In these cases, n others proceeding from some irritation in a special manner on the bladder, as the cystitis has arisen from the improper use tharides, the presence of calculi, &c., the which is passed is often sanguineous, or con- considerable quantity of blood.

The disease, having reached the state now ped, will often evince signs of diminution, idly present those of a still more dangerous ter. If accumulation of urine and over-ion of the bladder have been prevented, e treatment otherwise judicious, the former enerally be the result. But when the bladll continues over-distended, great prostraf strength, with extreme restlessness, takes; the pulse becomes small, frequent, intert, constricted, and at last weak and scarcely ptible; the skin is hot and dry, afterwards ned with a urinous or fœtid perspiration; ngue is dry, the thirst extreme; and to these imes supervene cardialgia, vomiting, hiccup, or low delirium, cold extremities, some- convulsions, coma, and death.

b. Cases of true cystitis occasionally occur in little or no urine accumulates in the er, owing to the inflammation and conse- tumefaction of that part of the viscus surling or in the vicinity of the opening of the s into it, or to the effusion of coagulable h having entirely shut up their outlets. In cases inordinate distension of the ducts and s of the kidneys must occur, and, in addition e above symptoms, those of dangerous dis-of the kidneys and suppression of urine su ne; especially fulness, pain, and tenderness e loins, numbness of the limbs, vomiting, ant hiccup, cold or urinous perspirations, , subsultus tendinum, coma, &c.

c. When cystitis has followed the healing of ruptions or ulcers, or the sudden stoppage of stomed discharges, as the hæmorrhoids, the nenia, or fluor albus, or if it have arisen from misplacement or metastasis of rheumatism or or if it have attacked persons of these dias, the several tissues of the bladder are liable affected nearly at the same time; but the toms are generally less severe than in the ly primary and phlogistic form of the disease, more frequently assume a sub-acute form, or grade intermediate between this and the nic form next to be described.

. *d.* The *duration* of the disease in persons of hlogistic diathesis, and at an early age, often tremely short. True cystitis may reach its t as early as the third or fourth day, and its ination in the course of the first or second . But in more delicate or less inflammatory titutions, or in those weakened by previous se, if it assume the acute form, it is more ned to lapse into a sub-acute or chronic state, to continue an indefinite time. It may, eover, assume from the commencement a sube or intermediate character between the acute chronic. But in all cases of this form of cys very much depends upon the nature of the ting and concurring causes, the complications ch certain cases present, and the attention paid to the unloading the bladder of its contents, and to other indications and means of cure.

62. *c. Terminations of Acute Cystitis.*— True cystitis terminates—1st. In resolution, with a gradual amelioration of all the symptoms; 2nd. In the chronic state, with relief of the most urgent symptoms, and continuance of a dull pain, uneasiness, and tenderness in the region of the bladder, dysuria, &c. (§ 65 *et seq,*); 3rd. In suppuration, when the disease is very acute, this issue generally occurring within twenty-four hours after the disease has reached its acme; 4th., and very rarely, in gangrene; 5th., and still more rarely, in rupture of the viscus.

63. (*a*) *Suppuration* is preceded and attended by pain and throbbing in the region of the bladder or behind and above the pubes, and occasionally referred to the seat of the rectum; by horripilations, chills, or rigors, followed by flushes of heat, and sometimes by perspiration. There are often also painful tenesmus, costiveness, and fever. The urine afterwards has a turbid purulent appearance, or contains a whitish-yellow matter, sometimes streaked with blood, and has the odour characteristic of pus. In many of these cases the purulent secretion proceeds from the internal surface of the bladder; but small abscesses formed in the parietes of the viscus have opened internally and furnished this secretion. This latter is more frequently the case when the parts near the neck of the organ are more especially affected. Chopart has recorded several instances of this occurrence, as well as of another, more unfavourable, when the abscess is formed more exteriorly, and makes its way externally to the bladder, into the loose adipose cellular tissue at the bottom of the pelvis. If, in such cases, the patient survives, the abscess ultimately points in the perineum, or near the margin of the anus Abscess of the bladder is seldom so situated as to break into the peritoneal cavity. In all cases of abscess of this viscus the danger is great, particularly in the latter cases.

64. (*b*) *Gangrene* may supervene in the most acute cases, or in cachectic constitutions; but it is a very rare occurrence, and is never met with unless the disease be attended by retention of urine of two or three days' duration. In these circumstances an eschar or small sphacelated spot is formed at one or more situations in the organ. This advances, and at last the bladder bursts and the urine is effused, generally into the abdominal cavity. M. Cloquet thinks that the *rupture* may occur without the previous sphacelation, from the distension, the greater tenuity of the bladder, and the deficient support of its parietes at this situation. Admitting that ruptures of the bladder are generally in the fundus, yet they are less to be imputed to want of support in this situation and to greater tenacity, than to previous ulceration and deficiency of vital cohesion characterising the advanced stages of acute inflammation, although these circumstances may contribute to the event. But very few of the cases of rupture that occur depend upon previous sphacelation, which is an extremely rare occurrence in this disease.

65. *B. Chronic Cystitis.*—When the acute form of true cystitis has not terminated completely in resolution, it frequently passes into a chronic state of the disease. But this form may exist from the

commencement, and, appearing in a mild state, it is often neglected, and hence becomes an enduring disease. As in other inflammations, cystitis is observed of every intermediate grade of severity and of duration, from the most acute to the most chronic, according to the nature of the exciting and concurring causes and the peculiarities of the individual. The consequences resulting from the subacute or chronic forms of cystitis also vary with the severity of the attack. When the chronic is merely a continuation of the acute in a less severe degree, the nature of the disease is manifested by the persistance of the local symptoms especially, which are of a nature readily to be recognised and understood ; and are chiefly those already adduced, but in a milder form.

66. When chronic cystitis occurs primarily its accession is sometimes slow, and scarcely so severe at first as to excite the anxiety of the patient. In other cases it is of a much more marked character, and more nearly approaches a subacute or an acute form. But in general it is characterised by permanent pain referred to some part of the viscus, by frequent calls to void the urine, attended by difficulty, as if occasioned by stricture of the urethra ; by the presence of mucus or purulent matter in the urine ; by tenesmus at stool and costiveness ; by slight fever, especially in the evening, and sometimes by fever of a remittent or intermittent form ; by a loaded tongue ; by inability to retain much urine at a time ; and by an exacerbation of some or of all the symptoms after fatigue, exposure to cold, or errors of regimen, especially after drinking spirituous, vinous, or malt liquors. These symptoms vary in degree, and one, more, or even all of them are more severe the more nearly the disease approaches a subacute or acute form.

67. The *duration* of this form of cystitis varies, according to the severity of the symptoms, from two or three months to as many years, or even longer. An acute or subacute state may supervene upon the chronic and shorten its duration ; or the same result may follow the extension of disease to adjoining parts and the presence of serious complications. When it arises from calculi in the bladder, or from disease of the prostate or urethra, thickening of the walls of the viscus are common consequences. It may, when it approaches the acute or subacute forms, terminate in abscess, in ulcerations or perforation ; or give rise to other lesions by extension of the inflammation to adjoining parts, as noticed in respect of the acute disease (§ 63.)

68. *C. Ulceration of the urinary bladder* may result from any one of the forms of inflammation of the mucous coat of the organ already noticed, but most frequently from the subacute, chronic, and most protracted states. It may, however, also follow the acute form and the more chronic states of true cystitis. It is often difficult to decide as to the existence of ulceration ; but, when disease of the bladder has been of long duration, the pain severe and continued, with a frequently recurring desire to micturate, and an increasing difficulty and pain in passing the urine, then the existence of this lesion should be suspected, and, if the urine presents the appearances stated above (§ 48.), especially if it contains pus streaked with blood, it need not be doubted. *Ulceration* of the bladder may take place differently : it may commence in the mucous f especially in the more chronic cases ; or follow the acute form, lymph being first from the inflamed surface and subsequen tached, leaving this surface tender and susc of irritation from the urine, and liable t rience ulceration from the continuance irritating cause. In acute cases, the surface may thus be nearly all destroyed softening and ulcerating processes produc perpetuated by the urine on the inflamed the walls of the viscus becoming thickene although the muscular coat may be laid parts.

69. When the ulceration is seated o mences in the follicles, *perforation* of the may result, the disease having assumed m quently a chronic form. When ulceration struction of the mucous coat follows acute all the coats forming the parietes of the organ become implicated, and the disease soon ter fatally. The more limited states of ulc especially when commencing in the follicl perforate the coats of the viscus, and, reached the peritoneal surface, occasion the tion of lymph, by which the bladder b united to adjoining parts ; thereby preven escape of urine or forming a fistulous into some other viscus. In this manner a f communication may be formed between t dus of the bladder, the sigmoid flexure colon, or the cæcum, or the ileum, &c. a fistulous opening is thus formed betw bladder and any portion of the bowels, fæ pass into the bladder, unless the oper formed between the under surface of the and the rectum, and then the urine is voided with the fæces. Fistulous commun between the bladder and the rectum ar frequent, especially in females, than betw former and other portions of the intestinal When communications are formed in this si either by ulceration commencing in the bla in the rectum, an abscess below the reflected of the peritoneum often forms, owing to the mation of the connecting cellular tissue ca the urine or by the fæces. Mr. COULSON (p. 140.) has recorded some interesting case tulous openings between the bladder and in to which I may refer the reader. Ulcerat perforation are always attended by hype or thickening of the coats of the bladder, they be consequent upon muco-cystitis or t chronic or subacute states of true cystitis. the ulcer is seated in the posterior and part of the bladder, it may penetrate the c that the urine will pass into the cellula between the bladder and rectum, produc most destructive effects.

70. iv. COMPLICATIONS OF CYSTITIS.— other of the forms of cystitis may be ass with some other disease or structural lesion. diseases may be the causes of the inflamm the mucous coat of the bladder, as well complication. This is especially the ca gonorrhœa, gleet, stricture of the urethra, s calculus in the bladder, rheumatism, go *Gonorrhœa* often induces a severe and o form of muco-cystitis, the discharge fr urethra being diminished as that from the becomes more copious and the other sy

ne distressing. On the other hand, the chronic os of muco-cystitis, especially when they go on to ceration, perforation, &c., induce disease of th kidneys, most frequently of the left kidney (Iyer, Richter, P. Frank, Coulson, &c.). In hese latter cases a dull pain is felt in the lo, is increased by pressure, and is ushered in by cl s, rigors, sickness at stomach, and an albumino urine, which also contains large quantities of iform matter, often tinged with blood.

1. With ulceration of the mucous coat, hypertr hy of the muscular coat, contraction and th ening of the parietes of the organ generally re lt. The bladder, owing to its irritability, is cc tantly contracting upon the urine poured into it and spasm of the sphincter often causes a re rgitation into, or an obstruction of the ureters; w h thus become distended and tortuous, and st further changes are thereby induced. "The m ous membrane, extending upwards along the u ers to the pelvis and the infundibula of the ki eys, becomes inflamed and rough, and pours o a quantity of pus. The glandular structure of e kidney undergoes from pressure slow absc tion. The capsule adheres with preternatural fi ness to the exterior of the gland. Upon m ing a section of a kidney so diseased, we find th, although apparently of large size, it consists in reat part of dilated tubes, and that the true v ular or secreting part is in smaller proportion th usual." (*Op. cit.* p. 144.)

2. The complications either of muco-cystitis o ue cystitis are chiefly with diseases of adjoinin parts, and arise from the extension of inflamm ory action, either to these parts from the b lder, or from the latter to the former. Inflamm ion of the urethra, prostate gland, strictures of th urethra, calculus vesicæ, hæmorrhoids, cok tis or inflammatory dysentery, inflammations o he rectum and of the uterine organs, and k eys, &c., may severally extend to, or excite in mmation of the bladder. On the other hand, th latter may involve the adjoining parts: it may e nd from the fundus to the omentum, or to s e of the convolutions of the intestines, or it m occasion peritonitis. This is not a frequent o urrence; but firm adhesions of one or other of t e parts to the fundus of the bladder have been f nd on rare occasions, where, from the history of t cases, the bladder was the original seat of d ase.

3. Inflammation may extend from the r cous coat of the bladder to the ureters, and a g their course even to the kidneys; but this v y frequent and important complication of uroc titis is most probably not often produced in t manner, but much more frequently by the c lusion of the ureters where they pass through t coats of the bladder, owing to the tumefied s e of the inflamed parts at this situation. In t case the urine is secreted for awhile, but c not pass into the bladder, owing to this condit of parts. Inordinate distension of the ureters, vis, and tubular structures is the consequence, a serious disease and disorganisation, not only of t se parts, but also of the constitution, result.

74. The extension of inflammation of the dder to the uterine organs is not infrequent; casioning not merely adhesions between the ous surfaces, but also, particularly when cyss is consequent upon, or is attended by retention of urine, retroversion or obliquities of the uterus, leucorrhœa, &c. The most frequent complication of cystitis is stone in the bladder, the inflammation being consequent upon, and generally occasioned by the solid concretion. The frequent connection also of the several forms of uro-cystitis with gout and rheumatism, either as consequences of the misplacement or metastasis of these, or as occurring from other causes, owing to the predisposition to urinary disease occasioned by them, should not be overlooked, when ascertaining the causes and the relations of cystitis, or when determining the indications and means of cure.

75. v. Appearances after Death.—These vary much in different cases, and are more generally the consequences than the states forming the early, or even the advanced, states of the disease.—*A. After acute Muco-cystitis*, the inner surface of the bladder is thick, rough, of a reddish-pink hue, from capillary distension, with small ecchymoses, owing to exudation from the congested capillaries. The inflammation in most fatal cases is found to extend over the whole inner surface, although greatest in some parts, especially near the neck of the organ. Coagulable lymph is sometimes found covering or attached to the mucous coat. This tunic, in the most acute cases, may be detached from the muscular in parts, or even throughout, forming a greyish layer resembling a false membrane. In many instances the mucous coat has been destroyed by ulceration; "sometimes, however, round ulcerated spots, the size of a sixpence, are found in different parts, with elevated edges and a red surface." Ulceration generally commences at or near to the neck of the bladder, and extends more or less to the fundus; but it sometimes begins in the latter, and advances to the former. In the most severe cases the muscular coat is involved in the inflammation, presenting gangrenous or disorganised spots. One or other of the kidneys is also generally diseased, the pelvis being dilated or ulcerated, containing pus, and the ureters also being dilated and ulcerated at their vesical extremities.

76. *B.* In the slighter or early states of *chronic muco cystitis* the mucous coat is found, in cases of death from other diseases consequent on the former, injected, discoloured, thickened and softened, and its follicles enlarged and inflamed. It separates readily from the adjacent coat, is abraded in parts, and is even detached in spots by extravasations underneath. The parietes of the viscus are thickened and contracted, the muscular coat is greatly hypertrophied, and ulceration of the mucous coat penetrates to the muscular, or even further (§§ 68. 69.). When the ulceration is extensive, the hypertrophied muscular fibres appear, and resemble the columnæ carneæ of the heart, presenting a purplish-red colour; the mucous coat between the columns thus formed being pale, soft, and swollen. Pouches, or sacs, generally coexist, with dilated ureters, between these muscular columns, and are formed by the contractions of the bladder and of the abdominal muscles, in expelling the urine, forcing the mucous coat in places between the muscular fibres. These pouches are lined with a diseased mucous coat, which secretes an alkaline mucus, and are "sometimes the receptacles of a mortar-like matter, and finally of calculi, consisting generally

of phosphate of lime." As the disease proceeds in the mucous coat it extends to the ureters, to the pelvis, and to the tubular structure of the kidneys; and pyelitis supervenes. Ultimately the ureter leading to the kidney affected becomes dilated, tortuous, its lining membrane inflamed, granulated, or ulcerated, or sometimes covered with lymph. The pelvis and infundibula are much dilated, whilst the secreting structure of the kidney is reduced to a thin layer.

77. *C.* In the *more chronic states* and other cases of *muco-cystitis*, patches of a red colour, more or less deep, or from a bright red to a violet shade, are found in the mucous coat; and small ulcerated specks or points, apparently affecting the mucous follicles, are seen in these patches. In the more chronic cases the ulcers are of considerable size. When numerous they are generally small. Sometimes an albumino-puriform matter, adhering at points of the mucous surface, gives it an ulcerated aspect on a superficial view; and occasionally this surface appears elevated at numerous points, owing to an albuminous exudation in the subjacent cellular tissue. The whole internal surface is but rarely affected, although the greater part generally is, in the form of large irregular patches. In protracted cases the mucous surface is thickened, and this change often extends to the connecting cellular tissue; whilst the blood-vessels are more numerous and more engorged than natural. With these appearances the bladder is generally contracted, and the mucous coat forms a number of large wrinkles or folds, is often softened, and is occasionally encrusted, or covered in parts with a calcareous deposit. The prostate gland is often enlarged in these cases, is somewhat diminished in consistence, and readily admits of being divided.

78. *D. In true cystitis*, especially when chronic, in addition to increased vascularity, more marked in some places than in others, the parietes of the bladder is much thickened, and more or less contracted; but the extent of these changes varies greatly, being generally greatest in cases of chronic cystitis arising from the presence of stone. In some cases the thickening is moderate, yet attended by a varicose state of some of the veins of the viscus. Adhesions to adjoining parts of the fundus of the bladder, ulcerations, &c., are also seen in the circumstances and complications of the disease described above (§§ 63—69.).

79. vi. Diagnosis. — *A. Muco-cystitis*, when *acute*, may be mistaken for inflammation of all the coats of the bladder: but in the latter the desire to void the urine is much less frequent than in the former, and sometimes is not experienced until a large accumulation has taken place, and then it occurs in most severe paroxysms. The sense of scalding along the urethra felt in muco-cystitis is either slight, or absent when all the coats are inflamed. Occasionally the power to pass the urine is lost in this latter form of the disease, even when the desire is most urgent, and the act can be accomplished only after repeated efforts, or by surgical aid.

80. Many of the symptoms of acute muco-cystitis are experienced when *stone* is present in the bladder. But in cases of stone the pain is chiefly felt after the bladder has been emptied; whereas in acute muco-cystitis the pain is most intense when the bladder contains urine, and it subsides when the viscus is empty: in ca s of stone, also, larger quantities of blood are sed than in muco-cystitis, and the urethra is s oin so irritable. (Coulson.)

81. *B. Irritability* of the bladder is to b dis-tinguished from muco-cystitis, and true c titis by the symptoms noticed above (§ 11.), a by the severity of the local affection, and of th on-stitutional disturbance. When, however, th rri-tability depends upon organic disease of th kid-ney, the diagnosis is more difficult. Mr. Co son remarks, that the intense pain which atten in-flammation and ulceration of the mucous c of the bladder soon exhausts the patient, wh in irritable bladder from diseased kidney th is sometimes, but not always, pain in voidir the urine; that the frequency of micturition is th ost distressing symptom; and that, even when ain exists, it is never so severe as to wear the p en out, but may be, and often is, endured for ye s.

82. *C. The chronic states* of muco-cystit are readily recognised. When mucus is passed the urine in small or moderate quantity it m be mistaken for the involuntary discharge of s en or of the prostatic fluid, which accompanie the evacuation of the fæces or of the urine in me persons; but semen differs from mucus in i co-lour, in its property of liquefying on cooling, its insolubility in water when recent and thick nd its solubility when liquid, and in the rad ng crystals which it produces after evaporation. he prostatic fluid may be distinguished by its re rk-able transparency, by its stringy and slimy ro-perties, and by its retention of these cond ns until it is dried. The prostatic secretion is ten mistaken for the seminal in cases where it is is-charged, both being passed immediately afte he bowels and the bladder are evacuated; bu he prostatic fluid is passed much more frequently an the seminal, which is thus voided much re rarely than is often believed to be the se. Chylous urine is different from the urine void in muco-cystitis, in being of a uniformly wh sh hue, and the sediment formed by standing re ily mixes with the urine on shaking; wherea he urine in this form of cystitis is at first turbid, nd on standing the sediment becomes viscid, y flocculent, or muco-puriform, or even puru nt and it has the appearances already noticed. § 47—49.)

83. vii. The Prognosis depends much upo he age, constitution, diathesis, and habits of th a tient, and on the exact seat, severity, and dur o of the disease. It may even still more de upon the consecutive lesions already produced n upon the presence or absence of complicat s If the disease be primary and uncomplicated, the patient young or middle-aged, and of a sc constitution, or has not previously been sub to disease of the urinary organs, the prognos *favourable*; but, on the contrary, if he be a cachectic, has been subject to previous diseas the urinary organs, to stricture, or to any of complications mentioned above (§ 70, *et se* especially to disease of the kidneys, and still m particularly to this latter, occurring consecuti upon chronic muco-cystitis, the prognosis is *favourable.* In the more acute cases, as wel in the subacute and chronic, if the pain c tinue, notwithstanding a judicious practice; if micturition be still frequent; if the urine

led with a muco-puriform matter, epithelium, l a little blood ; if a dull, heavy, and continued n be felt extending from above the pubes to sacrum or sacro-iliac symphyses, and espe- lly if it be experienced in the loins and extend he thighs ; if emaciation and hectic be marked ; l if vital exhaustion be rapid or extreme,— ul- ation of the bladder, and consequent disorganisa- i of the kidney may be inferred, and a fatal issue expected. If the states of true cystitis be owed by retention of urine, or if either form followed by suppression, renal symptoms su- vening, and no urine being found in the dder, the danger is generally extreme. When- r any of the severe symptoms mentioned above 56. *et seq.*) occur, whatever may be the ge, form, or progress of the disease, a most itious prognosis should be formed.

4. viii. CAUSES OF CYSTITIS.—*A.* The several ms of cystitis are most frequently met with in sons advanced in age, and in adults—particu- ly in the former. MM. LESAIVE and BOISSEAU e, however, seen them in children between or three years of age, and I have met with m as early as four and five years ; but instances this age are very rare, unless when accompa- d with calculus in the bladder, or after injuries l operations. Cystitis frequently occurs in d and humid climates, especially that form of which is limited to the mucous coat : and it is nmon in persons addicted to fermented or spi- ious liquors. Sedentary habits and occupa- as also *predispose* to it, especially in aged persons o are either confined to a sitting posture or to l. An habitual neglect of immediately attending the first desire of voiding the urine is a usual disposing as well as exciting cause ; the reten- n of this excretion occasioning irritation of the icous surface and over-distension and diminu- n of contractility of the muscular coat. Fe- les are less subject than males to muco-cystitis ; t they appear quite as liable to the acute form true cystitis, while they are less frequently ected with its chronic state, and to the compli- ion of the disease with calculus and with ease of the kidneys. This partial immunity is ing to calculous concretions being less frequent l more easily removed in females ; whilst dis- es of the prostate and of the urethra are very quent causes of the forms of cystitis in the le sex.

85. There are, perhaps, few causes which re frequently predispose to inflammations of the dder than long-neglected disorder of the di- tive organs, and especially to those states of stitis which are complicated with calculous mations. There also seems to be a predisposi- n constitutionally inherent in some persons to eases of the urinary organs, and consequently the bladder, and especially in those of a gouty thesis. Indeed, both the gouty and calculous theses often originate in the same sources, mely, in deficient vital energy, and long-con- ued disorder of the digestive functions connected h an excessive use of animal food relatively to amount of exercise in the open air. The nnection of the former state of the system with ease of the bladder is very evident, and the imate relation which both diatheses hold to h other in respect both of their common sources l of their exciting causes, are satisfactory proofs of predisposition independently of the evidence furnished by experience of the frequency of cystitis in gouty habits. Persons of a scrofulous diathesis, or who have been addicted to venereal excesses or to the habitual use of highly seasoned dishes, to much animal food, and to sedentary occupations, are generally disposed to cystitis.

86. *B.* The most frequent *exciting causes* are, too long retention of the urine, exposure to cold and moisture, sitting on damp couches, sofas, or seats, or on cold stones, or on the ground ; damp clothes on the lower extremities ; damp feet ; cold drinks whilst the body is perspiring ; the abuse of diuretic and lithotriptic medicines ; the excessive use of common gin ; the incautious exhibition of emmenagogues ; the internal use of cantharides or turpentine in too large or too frequent doses ; the abuse of aphrodisiacs ; the introduction of a catheter or sound, especially by unskilled hands ; irritating or improper injections thrown into the bladder ; the irritation caused by calculi or by morbid states of the urine ; external injuries, or blows on the hypogastrium, especially when the bladder is full ; coitus when the viscus is distended with urine ; horseback exercise, with inattention to the evacuation of the urine ; the pressure of the fœtus upon the unemptied bladder during labours ; protracted labours and the use of instruments to facilitate the process ; operations performed on the bladder ; the suppression of accustomed discharges, as of fluor albus, hæmorrhoids, catamenia, and the sudor pedum, to which some persons are subject ; the incautious suppression, without suitable internal treatment, of cutaneous eruptions, or healing of external sores or ulcers ; the retropulsion or misplacement of gout and rheumatism ; inflammations of adjoining parts ; obstructions to the discharge of urine from strictures of the urethra, or from enlargement or abscess of the prostate gland ; repelled gonorrhœa, and the use of injections for its cure.

87. AMBROSE PARÉ, CABROL, and CHOPART have recorded some cases in which large quantities of cantharides had been taken as a cure for agues, and had occasioned cystitis of uncommon severity and fatal issue. The same result has followed the use of this substance as an aphrodisiac. Cystitis may also be the extension of inflammation from the pelvis of the kidneys to the bladder, or it may arise from the irritation of a calculus in that part of the ureter which passes between the coats of the bladder. It may also supervene in the progress of fevers, particularly of those characterised by stupor, coma, or delirium, or by congestion of the spinal chord, owing to the accumulation of urine of a highly irritating property ; the local affection failing to excite the sensibility of the patient in these states, or the attention of the physician. The frequency and importance of this complication in fevers and in diseases of the brain and spinal chord should attract attention to it on every occasion, and on every visit.

88. Injuries and diseases of the spinal chord, its membranes, &c. ; compression of, or hæmorrhage on, the chord ; concussions of the brain or spinal chord, &c., are frequent causes of retention of urine, and thereby of cystitis. Even sudden jerks, as missing steps on descending stairs, coming with a jerk upon the feet when the body is erect, falling from a height on the

feet, especially when much water is in the bladder and a predisposition to inflammation of it exists, are occasionally causes of the disease. It may be remarked, that a single cause will in some persons more certainly produce its effects than the concurrent operation of several causes where little or no predisposition to the disease exists.

89. ix. Treatment. — *A. Of Acute Muco-Cystitis.*— The antiphlogistic regimen and treatment are required in all their details in this form of the disease. General and local *bleeding* should be prescribed, and even repeated, according to the age, habit of body, and constitution of the patient. Cupping over the sacrum, or leeches applied above the pubes or on the perineum, and repeated when circumstances indicate the propriety of the measure, are requisite; and in the milder cases, and in the less robust subjects, the local may supersede general bleeding. In some cases, especially when the symptoms indicate congestion or torpor of the abdominal viscera, or accumulations of sordes in the *prima via*, an *emetic* will be given with benefit. After its operation has been freely promoted the bowels should be sufficiently moved by means of *cooling aperients*, as the infusion of senna with magnesia, the neutral salts, or the carbonate of magnesia and sulphur, &c Bleeding ought not to be carried too far, especially in the inhabitants of large towns, and in the aged, cachectic, or delicate. Nor should those purgatives which are liable to irritate the rectum or colon be employed; but the bowels ought to be kept regularly open. A warm general *bath*, or hip bath, is always of service, and should be resorted to as early in the disease as possible after the above means have been employed, and should be repeated as often as the state of the patient will indicate. When the bowels have been evacuated, *opiates*, and *demulcents* or *emollients* are required, both to support the patient, and to allay the local irritation. These may be variously combined and exhibited, and may be conjoined with the alkaline carbonates. Morphia, or the preparations of opium, may be used, according to the medicines intended to be given along with either of them or at the same time. I have generally preferred the soap and opium pill, conjoined with an equal quantity of Castile soap. If these fail or lose their effect, emollient enemata should be administered, with either the syrup of poppies or compound tincture of camphor added to them. When these also prove insufficient to allay the local irritation, opiate suppositories may be resorted to, and a belladonna plaster be applied above the pubes, or over the perinæum, or a suppository containing some extract of belladonna may be tried. The state of the urine must be daily tested, and, as long as it continues acid, the carbonates of the fixed alkalis may be given, in demulcent vehicles, with such other medicines as the peculiarities of the case may suggest. As the disease lapses into a subacute or chronic state, the warm, or hip-bath, opiates with soap or alkalis, the infusion of pareira or of diosma, the preparations of cubebs, small doses of copaiba or of the other balsams, and the infusion or tincture of hops, may be severally prescribed.

90. The acute form of muco-cystitis will be protracted or pass into the subacute, and ultimately into the chronic form, if the *regimen* and *diet* of the patent be not duly regulated. All spirituous, vinous, and malt liquors shoul e relinquished, as well as acidulated or sweet ed drinks or fluids. The food ought to be farinace s, demulcent, and vegetable, and prepared i as bland a form as possible. The drink should nsist entirely of linseed-tea, barley-water, or t twater, gum-water, or marsh-mallow tea, take in moderate quantities.

91. In severe or obstinate cases some pr titioners have recommended the injection of oil d opium into the bladder by means of a gum-el ic catheter. As to this treatment, Mr Coulson as very justly remarked, that the pain and irrit on caused by the introduction of any instrument a g the urethra are so severe, as to deter him m resorting to this treatment; for, unless ther be retention of urine, the use of the catheter, so ls, and bougies should be avoided.

92. *B. Treatment of Chronic Muco-Cystiti*— This form of the disease is often complicated th stricture of the urethra, or with disease of he prostate or kidneys; and it often also is c equent upon the acute form of the disease, o ng either to neglect or to the constitution of the pa nt. In all cases, the treatment of this form of m ocystitis is difficult, and more especially when is complicated, and in the aged and cachectic. V en the disease is simple, or consists chiefly o an abundant secretion of mucus (cystorrhœa), e decoction of pareira, or the infusion of buchu, th opium or morphia, or with the dilute phosph c, or nitric, or nitro-muriatic acids, and the deco n or extract of uva ursi, are generally of ser e; but, where there are also much irritability and in of the bladder, opiates given by the mouth, an enemata are most requisite, and should be njoined with every other method of cure. S A. Cooper recommends the balsam of copaib in doses of eight or ten drops thrice daily, with ucilage, sweet spirits of nitre, and camphor mix e. Mr. Coulson advises small doses of copaib or of the essential oil of cubebs with hyoscya s, either to be given alone, or with the infusio of buchu, or with the decoction of pareira. le adds, however, that both copaiba and cu s should be given with care; for, after the olonged use of these remedies, an aggravatio of the disease may result. He frequently, there e, gives the compound tincture of benzoin, in e dose of a tea-spoonful, three times daily; l, when the urine is alkaline, and contains m h mucus with the phosphates, an infusion of e dried *Alchemilla arvensis* (one ounce to a pi of boiling water), the dose being two ounces of e infusion three times in the day. The muri d tincture of iron, the ammoniated tincture of i n, the balsams, Chio turpentine, and other kind f turpentine, uva ursi, with camphor and nitre, e sulphates of iron and of zinc, have also l n severally employed in this state of the disease, d are generally of service when aided by opi s, and when the digestive organs and the bowels e duly regulated. Dupuytren relied much u n turpentine when the mucous secretion was gr ; and I have had occasion to observe its goo fects; but it should not be long continued, though it may be given at intervals, or alterna y with other means.

93. Persons of a scrofulous diathesis, or th e addicted to venereal excesses, or who have fered from syphilitic affections, or who are sub t

to emorrhoids or to gout, are liable, when they ar ttacked, to an obstinate form of this disease. F these the treatment should have more or less re ence to the state of constitution, whilst the lo affection also obtains sufficient attention. T aged and cachectic also require to have their c titutional powers supported whilst the urinary d ase receives requisite care. But in these latter p ons palliation alone can be hoped for; and t prolongation of life, by means of a restorative o onic treatment, opiates, and a regulated diet, is ten the whole amount of benefit that can be e ected.

4. When chronic muco-cystitis is associated w stricture of the urethra, or is produced by it, t treatment is extremely difficult. Mr. Coulson r arks that "the pain and irritation along the u hra are often so great as to render the use of c eters and bougies impracticable; and, unless t state of the urethra improve, no material b efit can be expected from internal remedies." U ler these circumstances, having calmed the p and irritation by means of sedatives, he pro- c ds to dilate the urethra with bougies or the g -elastic catheter; and, if the stricture be of l g standing and very narrow, he commences w armed bougies, introducing them once in t e or four days.

5. The frequency of this, as well as other f ns of cystitis in the gouty, and even also in t rheumatic diathesis; and of the occurrence the disease in connection with, or upon the ppearance of gout, suggests the propriety of difying the treatment conformably with this nection. In these cases I have found the um and soap pill, with the extract of colchicum, en at bedtime, and a sufficient dose of mag- ia and sulphur, or magnesia and rhubarb, ly in the morning, to prove of great service. e or other of the other means already men- ned, avoiding the acids, may also be given in course of the day, as circumstances may icate.

96. Other means, which more especially be- g to the province of the surgeon, have been vised in the more severe and protracted cases muco-cystitis. Sir B. Brodie states that en "the symptoms are at their greatest height mildest *injections* (into the bladder), even se of tepid water, will do harm rather than od. They are especially to be avoided when mucus deposited by the urine is highly tinged th blood. When, however, the symptoms are ated, the injection of tepid water, or decoction poppies is, in many instances, productive of cellent effects." The fluid should be allowed remain in the bladder about thirty or forty onds, and not more than two ounces should injected each time. Distension of the bladder the injection so as to cause pain is injurious, d should be avoided. The operation may be peated once or twice in the twenty-four hours. hen the symptoms have abated and assumed a ll more chronic form, and the mucus is free m blood, then one minim of the strong, or ten inims of the diluted, nitric acid, to two ounces distilled water, may be used as an injection; e proportion of the acid being afterwards creased. Mr. Coulson remarks, that the nacious mucus produced in this state of the sease deposits phosphate of lime; and when phosphate of lime from this source co-exists, as it often does, with the triple phosphate in the urine, a compound salt is formed; and that in such cases a weak solution of nitric acid (beginning with one minim of strong acid, increasing the quantity to two, to two ounces of distilled water) injected into the bladder acts as a salutary stimulant. As to Lallemand's cauterisation of the mucous membrane of the bladder with solid nitrate of silver, in cases of chronic catarrh, and as to Devergie's injections with balsam of copaiba and narcotics, I must refer the reader to the work of the author just mentioned, and to other surgical works.

97. It should not be overlooked that excessive mucous secretion from the surface of the bladder, if neglected, or treated too long with some of the more heating substances, which have been advised, may be followed by a chronic inflammation of all the coats of the bladder, and ultimately by a subacute or an acute form of the disease, which may destroy the patient. This result is most likely to occur when the *diet* and *regimen* so requisite to the success of treatment have been neglected. In the milder form of the disease, animal food, in very moderate quantity, may be taken. The diet should be chiefly farinaceous, but the white kinds of fish, boiled, may be allowed. In the severer states animal food should be still more sparingly taken. If, in these, the vital powers be much depressed, sufficient light nourishment may be given, and tonics with the alkaline carbonates, opiates, &c., may be prescribed. Spirituous, vinous, and malt liquors should be strictly prohibited; and all irregularity of diet and regimen carefully avoided. When there is great debility dry sherry may be allowed, especially if acidity of the *primæ viæ* be not experienced. In all cases the functions of the skin as well as of the bowels should be duly promoted.

98. C. *Treatment of Acute Cystitis—of Acute inflammation of all the Coats of the Bladder* (§ 56.).—It has been above (§ 55.) stated that the inflammation may affect one of the tissues of the bladder more than the others, or may implicate them all, chiefly through the medium of the connecting cellular tissue, and that a portion of the bladder may be thus affected, or the whole of the organ; that when the inflammation is seated in the neck of the bladder, the urine is retained by the tumefaction occasioned by it; and that when the parts through which the ureters pass into the bladder are chiefly affected, the swelling which results more or less obstructs the passage of the urine, and occasions dilatation of the pelvis, ureters, &c., by its accumulation in these parts and suppression of this excretion. The consequences of the *retention* on the one hand, and of the *suppression* on the other, are always most serious and should be prevented by a most active treatment as soon as these important and always dangerous states are present. The former may be removed by surgical aid; the latter by prompt and judicious medical treatment. But in most cases the treatment should have reference to the cause of the disease and the diathesis of the patient. When the malady is produced by cold in any form, then the phlogistic form may be inferred, and suppuration may take place, especially in the phlogistic temperament and full habit

of body. When it is occasioned by spirituous liquors, aphrodisiacs, or the suppression of the gonorrhœal discharge, although all the coats may be implicated, the mucous will generally be chiefly affected, and retention or suppression of urine less frequently result. If the disease occur in the gouty or rheumatic diathesis, or follow upon suppression or metastasis of either gout or rheumatism, all the coats may be affected, and neither the fundus nor its peritoneal covering escape.

99. In all these circumstances the treatment should be prompt and decisive, and the quantity of urine retained in the bladder carefully watched, by examining the hypogastrium and the quantity excreted. If the patient be young, or robust, or plethoric, although advanced in life, venesection should be prescribed and even repeated; and be followed by the local depletions, which may be sufficient for the delicate or weak, by cupping on the perineum, or by leeches applied to the part or to the pubes. Hot baths; warm fomentations above the pubes or on the perineum; the removal of the urine by means of the catheter whenever it may be required; emollient, laxative, and anodyne injections; cooling saline aperients, preceded by calomel and opium when the febrile symptoms are severe and the biliary functions are impaired; and demulcents with diaphoretics—are the means of cure which may be safely resorted to in all the circumstances of the malady just noticed. If the disease be consequent upon gonorrhœa, oleaginous or mucilaginous demulcents, with small doses of camphor, nitrate of potash and henbane, in addition to appropriate depletions, diaphoretics, aperients, &c., will generally remove the more urgent symptoms. If it be connected with gout or rheumatism, magnesia and sulphur in equal parts, either alone, or with demulcents, and small doses of colchicum, will be found very beneficial, by moderately promoting the abdominal secretions and the functions of the skin; this latter being too generally overlooked, especially in gouty affections. Under the above treatment the symptoms generally subside gradually; but if retention of urine be long neglected; or if the urine be suppressed, owing either to delay in adopting the above means, or the constitution of the patient and violence of the attack, delirium, coma, and death will generally result. It may be asked, what should be done in cases where the urine has become suppressed? I would answer, after the above means have been judiciously employed, that warm flannels, or stupes, moistened with spirits of turpentine, should be applied over the hypogastric region and perineum, and that emollient enemata, containing equal parts of this substance and castor oil, and one or more ounces of olive oil, be administered and repeated as they may be required, whilst diaphoretics should be assiduously continued.

100. When the inflammation of the fundus of the bladder implicates the peritoneal coat, or is *associated* with inflammation of the uterine organs or peritoneum, the treatment is not then materially different from that recommended above. Cupping over the sacrum, leeches to the hypogastrium, &c., the warm terebinthinate embrocations, or stupes, in these situations, calomel and opium, followed by the enemata and diaphoretics already advised, are the means most generally appropriate. If cystitis be complicated with hæmorrhoids or inflammation of the rectum or colon, or with f ula calomel should be withheld, as it genera increases these affections and thereby preven the resolution of the uro-cystitis, but the other ans ought to be employed.

101. *D. Treatment of Chronic Uro-Cy titis.* — Chronic uro-cystitis is often consequent pon the acute, but it is oftener a consequen of stricture of the urethra, of enlargement the prostate, of stone in the bladder, of pr atic calculi, of the abuse of spirituous liquors, pecially of common gin; of the use of cantha es, or of cubebs or copaiba; or protracted gou and rheumatism, especially the former; and of t retention of the urine in the bladder after t desire to pass it. The nature of the cause influ ces more or less the treatment to be adopted. In strong, young, or plethoric subjects, and espe lly when considerable pain is experienced, loc depletion, followed by warm baths, the se cupium, fomentations, &c., is always required. In many cases the removal of the primary d ase should be the first indication, especially i the case of stricture of the urethra; and with this indication the employment of means whic act more or less directly on the bladder should lso be adopted. In most instances the selectic of these means should be guided by the state o he urine. If this be acid or scanty, the bicarbo tes of the fixed alkalis with nitrate of potash and s eet spirits of nitre, in demulcent or emollient veh es, will be generally of great service; and anod es, such as the syrup of poppies, tincture of hen e, compound tincture of camphor, tincture of p, opiate suppositories, &c., will also be presc ed in many cases with advantage. The p arations of pareira brava, or of the diosm or of uva ursi, may, in the more obstinat or chronic cases, be given with the above or the decoctions or infusions of these latter y be the vehicles for the exhibition of the for r. When the disease occurs in the gouty or r umatic diathesis, or appears after the suppressi of either of these diseases, then the extract, tinc e, or wine of colchicum. in small doses, ma e prescribed with the alkalis, and a small dos of opium or of morphia; and when the pulse esents much strength or hardness, the tinctu of aconite, in the dose of one, two, or three dr s, may be resorted to, although this latter is re appropriate in the more acute cases, and w n the peritoneal covering of the viscus is implic d in the disease. The infusion of parsley-ro is sometimes of service in chronic uro-cystitis, specially when made the vehicle for some of medicines mentioned above. Mr. Coulson st s that he has tried the infusion of wild carrot-s s in this form of the disease with advantage, t that it should not be given if there be any tation of the mucous membrane; and he s that, as in these cases the bladder is, by its n efforts, seldom completely emptied, a cath r should be introduced from time to time, and e patient be instructed to do this for himself. less this direction be strictly attended to, patient will become worse, and serious co quences ensue.

102. *E. When inflammation is extended to peritoneal coat of the bladder,* either from the ternal coats, or from parts in the vicinity of, o contact with the peritoneal, the symptoms n

be very acute, and become chronic from ect or injudicious treatment. This form of isease is most frequent in females, especially parturition or in some period of the puer- state, and is generally contingent upon the rrences which sometimes take place during state. In some cases it is strictly a partial onitis, confined chiefly to the pelvic perito- ; the symptoms, local and general, being ctive of its nature and seat. (See *Art.* ITONEUM, *inflammation of*, § 76.) The seat ain, tenderness, and tension, the rapidity of pulse, the position of the patient, the expres- of the countenance, &c., indicate the nature e disease, which may be limited to the pelvic oneum, especially when coagulable lymph is wn out, which forms adhesions between the site surfaces, and prevents the extension of malady. In unhealthy constitutions, and in les in the puerperal states, the inflammation, ad of being thus limited, generally extends the peritoneum; in place of coagulable ph, a serous fluid, of varied appearances, is wn out, and the morbid action, commencing he hypogastric region, extends through the omen, which becomes tender and tympanitic. pulse is so rapid as hardly to be counted; up supervenes, and the disease presents the rse and termination described in the article ITONEUM (§§ 19—36.) In these cases the tment is the same as I have advised in that cle (§§ 137—159. *et seq.*).

03. In rare instances an abscess forms below peritoneum, between the bladder and the sym- sis pubis, or some other adjoining part, as in a related by Dr. ELLIOTSON. Sometimes also seudo-abscess is seated within the pouch of peritoneum, between the posterior wall of the dder and the rectum. Lymph, in these cases, lutinates some folds of the intestines, or the noid flexure of the colon and the fundus of bladder, and pus collects in the pouch formed these parts. The contents of this pseudo- cess may be absorbed, if in small quantity, adhesions alone remaining; or they may find ir way into the peritoneal cavity, and occasion eral peritonitis and death. Cases of this ure are mentioned by Mr. COULSON, and they ve been seen by myself, but only in females l as consequences of pelvic peritonitis after turition (see *Art.* PERITONEUM, § 76. *et seq.*) l PUERPERAL DISEASES (§ 221. *et seq.*).

104. V. MALIGNANT AND OTHER FORMATIONS sometimes found in or attached to the pari- s of the urinary bladder. *A.—Tubercle* is occa- nally deposited in the parietes of this viscus, nerally either under the peritoneal coat, at the ndus, and in the mucous membrane, near the ethra. In this latter situation the small gran- ar deposits pass rapidly to ulceration. Tubercle the vesical mucous membrane is, according to OKITANSKY, rare, and is not always formed in nnection with tubercular affections of the uri- ry and sexual organs. Tubercle on the ex- ior of the bladder is generally seen associated th the same formations in the vicinity, especially the female sexual organs. Mr. COULSON re- arks, that the morbid deposit may be so great as glue together the different organs, and thus in- rfere with the free action of the detrusor uri- e; but this can only occur when the tubercular cachexia is inordinately developed. The most frequent appearance of tubercle in connection with the bladder is, in cases of tubercular peritoneum, that part of the membrane covering the bladder partaking in the general alteration, the deposit being commonly in small distinct masses, the membrane being spotted, dark-coloured, or rugous, or otherwise altered. (See PERITONEUM, § 111 *et seq.*)

105. *B. A polypous excrescence* from the internal surface of the bladder is very rarely observed. Dr. BAILLIE saw only one example of it, and that filled up the greater part of the cavity of the viscus. An instance of it occurred to Mr. CROSSE, of Norwich, in a child. Other cases of polypus vesicæ have been recorded by Mr. WARNER and others, but they require no particular notice. The very interesting and instructive case published by the late Mr. CROSSE will be found in Mr. COULSON's work.

106. *C. Malignant formations* in the bladder are not very rare. The worst form is that described by Mr. TRAVERS and others as the malignant medullary fungus, which arises from the sub-mucous tissue, and projects into the cavity of the viscus as a soft, vascular, and cauliflower-like mass, which bleeds upon the slightest touch. Mr. TRAVERS states that it springs from "the mucous coat of the bladder, and resembles that of the nares and uterus, breaking, bleeding, and reproduced as quickly as it is displaced. It is of very extensive attachment, and gradually reduces the cavity to very small dimensions. Portions of fungus and coagula of blood become plugged in the urethra, and form firm pellets, so as to produce retention of urine. It is a very painful disease. It keeps the patient in constant anxiety to void urine, which is more or less tinged with blood, and frequently he passes blood alone. He dies hectic and wasted." Mr. COULSON states that this malignant fungus is generally first developed near the neck of the bladder, the trigon, or the posterior surface; and that cases occur in which the vegetations fill a diverticulum or sacculus, where they form a tumour which may cause retention of urine by its pressure. These tumours vary in size, some being, when solitary, as large as a goose's egg; others are small, especially when they are numerous. Another form of medullary cancer has been described by ROKITANSKY as occurring in small masses between the muscular and mucous coats of the bladder. It may make its way through the mucous coat and form a deep carcinomatous ulcer, or may protrude externally through the muscular and peritoneal coats. Fibrous or scirrhous cancer, although sometimes affecting the uterus and ovaries, very rarely attacks the urinary bladder. These malignant formations cannot be assigned to any local cause of irritation, or to any other cause beyond the cancerous diathesis, hereditary or acquired. (See *Art.* CANCER, § 23. *et seq.*)

107. *a. The symptoms* of malignant tumours of the bladder frequently resemble those of stone. WARREN states that the first sign of this disease is a discharge of blood with the urine. The quantity is at first so small as scarcely to tinge the urine; but it gradually increases until it becomes an exhausting symptom. The amount of pain attending it varies in different cases, being slight or moderate in some, and severe in others. Constant desire

to pass urine is one of the most common symptoms, accompanied with sympathetic irritation of the rectum and inclination to stool. When blood passes from the bladder, after the introduction of a sound or catheter, or after the flow of urine has terminated or very nearly terminated, there is much reason to infer that it proceeds from the coats of the bladder; and when this occurs, in connection with the other signs, and especially with the sense of the existence of a body or substance in the bladder, felt either by the patient or the operator when a sound is introduced, the existence of a malignant tumour, fungus, or polypus may be inferred. Ultimately, in these cases, consecutive disease and disorganisation of the kidneys, with more or less marked disorder of the stomach and bowels, and exhaustion of the powers of life, is followed by a fatal issue. I may refer the reader to Mr. COULSON's work for some instructive cases and *post mortem* appearances of this disease.

108. Disease of a disorganising nature may extend to the bladder from malignant disease of the rectum in men, or of the womb in females; and by means of ulceration a communication may be established between the rectum and the bladder, or between the bladder and vagina. Mr. TRAVERS, however, doubts whether the ulceration of the bladder in these cases be truly cancerous. In this doubt Mr. COULSON appears to partake. I have seen a few cases of extension of malignant disease from the neck of the uterus to the bladder, but in most of them have had reason to infer that the disease in the latter partook of the same character as that of the former.

109. *b. The treatment* of malignant disease of the urinary bladder is chiefly palliative, by means of narcotics, sedatives, &c., administered by the mouth or in enemata or in suppositories, as advised when treating of CANCER, and of diseases of the UTERUS, &c. In many of these cases the hæmorrhage from the bladder is so excessive that means are required to arrest the discharge and to sustain the powers of life. For these the tincture of the sesquichloride of iron, the decoction of pareira brava, with nitric, or hydrochloric, or sulphuric acid, if the urine be alkaline; the uva ursi, with the alkalis, if the urine be acid; the secale cornutum, spirits of turpentine, and other anti-hæmorrhagics and astringents, the recumbent posture, &c., are the means chiefly to be confided in, conjoined with opiates, &c.

110. VI. ABNORMITIES OF THE BLADDER are sometimes observed, either alone or in connection with malformation of other parts of the urinary or sexual organs. They are generally congenital, and proceed from irregularities of fœtal development. Numerous cases and various forms of irregularity of formation are on record, but as respects any treatment which may be adopted for them they concern the surgeon more than the physician, and sufficient reference may be made to them in the subjoined *Bibliography*.

111. *Foreign bodies* are often found in the bladder, having been introduced at some previous period, or having passed into it from the rectum or some part of the intestinal canal, through a perforating ulcer or sinus formed between the bowel and bladder. In many instances, when a foreign body has been found in this viscus, it had become incrusted by the urinary deposits to a
greater or less extent. This subject will be f
more appropriately discussed in surgical w
where also *rupture of the bladder, hernia o*
bladder, and *wounds and injuries of the bla*
are most ably treated of by their respec
authors.

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NE AND ITS DEPOSITS.—Classif.:— ENERAL AND SPECIAL PATHOLOGY, AND IERAPEUTICS.

The urine is one of the chief depurating
tions in the animal œconomy, and one which
interrupted or arrested rapidly terminates
ence. This secretion in some form or other
rs in all animals, either by a distinct appara-
or by a vicarious or associated function, in
h latter form it also takes place even in the
table creation; and in all it is characterised
e excretory function of nitrogenous elements
compounds, variously associated with other
tances. In the human subject and in the
perfect animals the conditions of the urine
nd upon the states of the frame generally,
the states of the urinary organs, and upon
food and drink of the individual. Hence
e conditions are of the greatest importance to
pathologist, by enabling him to recognise,
those states of the system with which they
severally connected; 2nd, those lesions,
tional and structural, of the kidneys, of which
are often the symptoms and effects; and
the influences produced by the food and
ks of the individual upon his system and
ary organs.

. *The urine is derived from the blood*—is a
urating secretion performed by the kidneys
n the blood as long as these organs are actu
by the organic nervous influence distributed
hem, aided by whatever share of influence
be transmitted to them or their ganglia by
spinal nerves. The urine being derived from
blood, and being one of the chief depurating
etions by which the blood is preserved in due
ealthy quantity and quality, it must be mani-
that the phenomena connected with the urine
its secretion become important indications,
merely of the states of the blood itself, but also
he several sources by which the blood is altered
contaminated.

. It was stated in the first part of this work,
then explained (in 1832), that the kidneys
veyed from the blood the fluids carried into
blood, and with these fluids the effœte mate-
s, the ultimate results of animalization, and
ious other elements and substances resulting from indigestion and mal-assimilation, or otherwise absorbed into the circulating mass. As long as the kidneys discharge their functions, an excess of the fluid elements of the blood, and of various saline and nitrogenous materials, are prevented from accumulating in the blood; these functions being strictly depurating, as respects the purity or quality of the blood, and eliminating, or excretory, or excrementitious, as respects not only the quality but also the quantity of the circulating mass.

4. It is thus obvious that the urine consists chiefly of the fluids and of the fluid parts of the aliments taken into the stomach, and carried into the blood; and that it contains not only saline and other ingredients derived from the ingesta, and from the changes which the ingesta undergo, in the digestive canal, and in their passage into the blood, but also the effœte nitrogenous materials resulting from the waste and absorption of the tissues, which are first conveyed into the blood by the absorbents and veins, and afterwards eliminated from the blood, with the fluids in excess, by the action of the kidneys.

5. *Such being the source of the urine*, it may be inferred that the quantity and condition of this excretion will depend upon a variety of circumstances which require the recognition of the pathologist in his investigations of disease,—upon the states of the digestive and assimilating functions; upon the states of the circulating organs and of the blood; upon the states of the urinary apparatus; and upon the states of the other depurating and eliminating functions—upon those of the skin, lungs, liver, and intestines. In recent times, and in recent writings, the conditions of the urine have received a due, if not an excessive, share attention, especially from the chemical pathologists; yet these conditions have been insufficiently investigated in their relations to the other depurating functions, and especially to that of the skin, this particular function being either altogether overlooked, or very imperfectly inquired into. When treating of the Blood (see §§ 115—160) and when giving a succinct view of pathology under the head Disease (see §§ 94—104. and 163. *et seq.*), I there stated the same doctrines as those now enunciated, but more explicitly and fully than I have now done; and since then (published in 1832) the same views have received the approval of, because they have been altogether adopted by, more recent writers, although without acknowledgment of their long previous existence in the pages of this work. I may request those who may be curious in this matter to read what I have stated in the articles and in the sections just referred to, and to peruse the fundamental doctrines in Dr. Golding Bird's work on "*Urinary Deposits*," where the subject of urinary pathology has been very ably discussed, and where not only the views, but even the terms, first adopted by me have been followed and employed. I should not have referred to these principles of urinary pathology if it had not been necessary, by asserting my own priority in respect of them, to defend myself from the contingent imputation of adopting the ideas of others.

6. *b.* The doctrines insisted upon in the early parts of this work respecting the depurating functions of the kidneys and of other organs, have been much more recently carried out by Dr. G.

Bird, as regards those of the kidneys, and in many places so conformably with these doctrines —although with too manifest a leaning to chemical pathology and neglect of a controlling vital influence—as to induce me to refer to his evidence on several topics, where I believe it to be accurate, or to support my own views. The fundamental principle he has laid down, is correct as far as it extends; but it is too limited, inasmuch as it is confined to the functions of the kidneys. He states that "it is, indeed, a general law, that any substance which has entered the circulating mass, and not been required for the nutrition of the body, nor forming a normal element of healthy blood, always escapes from the system by the kidneys, providing it exists in a state of complete solution. Hence these most important emunctories have the duty of removing any imperfectly assimilated elements of the food which had been absorbed while traversing the small intestines, and entered the circulating mass; as well as excreting the often noxious results of unhealthy digestion. To affect these most important conditions, it is essential that the substance to be removed should be soluble, or at least capable of being readily metamorphosed into a body soluble in the water of the urine, as nothing can be excreted from the kidneys, without breach of surface, unless in a state of solution. The third function performed by the kidneys, is their serving as outlets to evolve from the animal organism those elements of the disorganisation of tissues which cannot perform any ulterior process, nor be got rid of by the lungs or skin. The disorganisation of tissues here alluded to is a necessary result of the conditions for the growth and reparation of the body."—"The old and effete atoms of the animal structure are not excreted in the form of dead tissue; but, becoming liquified, they re-enter the circulation, their elements being re-arranged. One series of combinations thus produced, rich in nitrogen, is excreted by the kidneys, whilst those products which contain a preponderance of the inflammable elements, carbon, hydrogen, and sulphur, are called upon to perform, chiefly through the medium of the liver, an important office previous to their final elimination from the system. Thus the blood is not only the source of the elements derived from the food which serve for the nutrition of the body; but it also serves, like a sewer, to receive the matter arising from the waste and liquefaction of the old and exhausted tissues." (p. 256.)

7. Now, all the ideas contained in this quotation will be found fully and explicitly stated, as referred to above (§§ 3—5.) and in other places, but more correctly and more conformably with pathological conditions, than in the above passage in the *first volume of this work*, published many years before the appearance of "*Urinary Deposits*." Besides, Dr. G. Bird has overlooked the functions of the skin in relation to those of the kidneys, and has not taken a correct view of those of the liver in connection with the functions of the lungs, whilst those of the follicular apparatus of the intestinal canal and of the skin, have been altogether neglected. Yet all these functions, as I have elsewhere shown (see *the Articles* Blood, Crises, Disease, and Excretions and Excreting Functions, &c.), are more or less intimately related to each other and to the depurating functions of the kidneys, and often evince, even in health, a vicarious increase when one or more of the others are peded or diminished, and a marked dimin when they are augmented. It should also b collected, when estimating the source and n of the functions of the kidneys and of other e nating organs, that it is not only the mat mentioned in the above quotation, which are minated from the circulation by the kidneys also a portion of those resulting from the was the red-globules and fibrin of the blood, and the kidneys are not the only depurating or the functions of the skin, liver, bowels, &c. generally more or less impaired or otherwise ordered in those diseases which evince the remarkable alterations in the state of the u these functions, especially that of the skin, too generally neglected by modern physician favour of the popular attractions furnished b functions of the kidneys.

8. It is obvious, from what I have stated and in earlier parts of this work respecting sources of the urine, that this depurating secr will vary in quantity and sensible appeara and physical properties, and even be remark altered, by a variety of causes—1st, by the q tity and nature of the ingesta, alimentary liquid; 2nd, by the imperfect and disord products of indigestion and mal-assimilatio sulting from impaired vital power or simpl complicated ailments; 3rd, by the meta phosis and waste of the several tissues and o blood — the removal of effœte materials int from the blood — during the healthy proc going on throughout the frame; 4th, by waste and metamorphosis of the structures ar the blood, when accelerated by local or cons tional diseases; 5th, by the absorption of m secretions, and deposits or formations carried the blood and partially, chiefly, or altogethe minated by the kidneys and other emuncto 6th, by the varying states of the other depur functions—by the increase and diminution of or more of these, diminishing, increasing, or a ing more or less the functions of the kidneys.

9. Dr. Prout considered that the elem of the albuminous tissues of the frame are s ranged, during the processes of metamorphosi waste, as to be converted into uric acid, or u of ammonia, and that the atoms or elements composing these bodies form certain ill-def principles. The ulterior changes which the latinous tissues undergo during destructive as lation this very celebrated physician suppose be intimately connected with their conversion urea, and some saccharine principle, or its c ally the lactic acid. Baron Liebig followe the path pointed out and first trodden by Prout, and has been in several matters suppo by the researches of Mulder, Taylor, B. Jo and others. According to Liebig's theory, elements of muscular tissue are carried into circulation, combined with water and oxyg the latter, by its union with the carbon of effete tissue, supports the temperature of body. On reaching the structure of the liver atoms of carbon, 1 of nitrogen, 45 of hydro and 10 of oxygen, with an unascertained but siderable proportion of sulphur, are filtered from the portal blood in the form of bile. more highly nitrogenised elements of the m morphosed or wasted tissues are separated by

s from the blood, chiefly in the form of nd uric acid, whilst the carbonic acid, by the slow combustion of the carbon of ginal atoms of muscle in the capillaries, is l from the surfaces of the skin, and bron- d air-cells.

It is manifest that the atoms or elements of which have become worn out, or which ven place to new deposits in the course of n, are carried into the circulating mass, they undergo progressive changes under uence of vitality, and are ultimately elimi- rom the blood by the depurating organs. been supposed that the states in which the materials are found on their elimination ch as may be altogether imputed to the of the excreting organs: but it is more le that the atoms or elements composing terials removed from the structures, as well e composing the blood, more especially the n, fibrin, red globules, and even the saline ents, undergo a succession of changes or ations during their circulation through the ntil the great or ultimate change is pro- by the organs which discharge them from nomy. It is not, however, conformable to s of the human frame that each organ perform so simple and definite a function chemical pathologists believe. The skin y exhales carbonic acid; but it also dis- other materials by means of its follicular us; whilst the bowels, chiefly by the same milar apparatus, also excrete effete mate- m the circulation; and, although the com- ns which are found during their elimination viewed as chemical, they are the results action in health, are more or less modified se, and are such as rapidly undergo fur- anges after their discharge, or after death, changes are more decidedly chemical, and their individual elements chemically dis- m to assume.

11. IN HEALTH, the urine presents certain con- a., especially as respects *specific gravity*, rent periods and in different circumstances. have been distinguished into, *first*, the which is excreted shortly after drinking f fluids, the nature of the fluids modifying earances and odour of the secretion. This *ina potus*) is generally pale, and of a spe- avity varying from 1·003 to 1·010. *Second*, e secreted shortly after the digestion of a al (*urina chyli*), varying in physical cha- with the nature of the food, and other cir- nces, and presenting considerable density, ific gravity varying from 1·020 to 1·030. he urine passed after a night's rest (*urina is*): this is of intermediate density, and rom 1·015 to 1·025. In order to ascertain cific gravity of the urine, in health or in , the portions passed before retiring to rest, rising in the morning, should be separately y the urinometer, and the average density wo will be a near approach to accuracy. OUT assigned 1·020 as the average gravity thy urine. M. BECQUEREL stated that it 39 in men, and 1·0151 in women, the mean sexes being 1·017; and Dr. ROUTH that rage of 18 healthy cases gave a specific of 1·021.

12. The specific gravity of the urine at different periods of the day varies in disease, as well as in health, although in a less marked degree, and in some diseases more than in others; but this part of the subject has not been sufficiently investigated, and it is moreover liable to many sources of fallacy, as emotions of the mind, articles of diet, the beverages or drinks employed, the medicines taken, &c., all combine to render the results of observation uncertain. The nature, the stages, states, and course of disease, as of hysteria and other nervous disorders, febrile diseases, &c., also remarkably increase the difficulty.

13. *b.* The *quantity* of urine passed in the 24 hours, as well as its density and ingredients, varies much in health, but still more remarkably in disease. The quantity and quality are modified by temperature, by exercise, by the functions of the skin, &c., by modes of living, clothing, &c. Dr. PROUT estimated the quantity at 30 to 40 ounces in the 24 hours. Dr. ROUTH found the average of 18 cases to be 35 ounces. M. BECQUEREL considered the quantity to be 43 ounces in men and 47 in women, the general use of soups and weak subacid wines in France being productive of the increased discharge; but among the beer-drinkers of this country, the amount given by Drs. PROUT and ROUTH would be found much below the average.

14. *c.* The quantity of the urine is, however, no measure of the depurating actions of the kidneys; for 20 ozs. of urine in the 24 hours may carry off as much *solid materials* as 40 ozs. at a different time or in a different person; for a density of the former amounting to 1·030 will furnish an equal quantity of those materials to those afforded by the latter at 1·015. Dr. DAY has shown that the formulæ for calculating the solids contained in the urine, given by Dr. CHRISTISON is the most correct; and the following table calculated from it by Dr. G. BIRD will show at a glance the quantity of fluid and of solids existing in 1000 grains of urine of different densities. The gravimeter having shown the specific gravity, the proportion of solid matter is at once indicated by this TABLE:—

TABLE I.

Specific Gravity.	Solids.	Water.	Specific Gravity.	Solids.	Water.
1001	2·33	997·67	1·021	48·93	95107
1002	4·66	995·34	1·022	51·26	94874
1003	6·99	993·01	1·023	53·59	94641
1004	9·32	990·68	1·024	55·92	94418
1005	11·65	988·35	1·025	58·25	94175
1006	13·98	986·02	1·026	60·58	93942
1007	16·31	983·69	1·027	62·91	93709
1008	18 64	981·36	1·028	65·24	93476
1009	20·97	979·03	1·029	67·57	93243
1010	23·30	976·70	1·030	69·90	93010
1011	25·63	974·37	1·031	72·23	92777
1012	27·96	972·04	1·032	74·56	92544
1013	30·29	969·71	1·033	76·89	92311
1014	32·62	967·38	1·034	79·22	92078
1015	34·95	965·05	1·035	81 55	91845
1016	37·23	962·72	1·036	83·88	91612
1017	39·61	960·39	1·037	86·21	91379
1018	41·94	958·06	1·038	88·54	91146
1019	44·27	955·73	1·039	91·87	90913
1020	46·60	953·40	1·040	93·20	90680

15. By measuring the quantity of urine passed in a given time, the weight of solids excreted by the kidneys may readily be calculated by means of the foregoing and the following tables, a pint of distilled water weighing 8750 grains. The following table is given by Dr. G. BIRD:—

TABLE II.

Specific Gravity.	Weight of one Pint.	Specific Gravity.	Weight of one Pint.
	grains.		*grains.*
1010	8,837	1023	8,951
1011	8,816	1024	8,960
1012	8,855	1025	8,968
1013	8,863	1026	8,977
1014	8,872	1027	8,986
1015	8,881	1028	8,995
1016	8,890	1029	9,003
1017	8,898	1030	9,012
1018	8,907	1031	9,021
1019	8,916	1032	9,030
1020	8,925	1033	9,038
1021	8,933	1034	9,017
1022	8,942	1035	9,056

16. It may readily be calculated from these *tables*, that if 1000 grains of urine, of the specific gravity of 1·020, hold 46·6 grains of solid matter in solution (*Table* I.), a pint of the same specific gravity, weighing 89·25 grains (*Table* II.) will hold 415·9 grains solid matter; and that, if two pints and a half of urine be passed, 1039·72 grains will be discharged in the 24 hours. Dr. GOLDING BIRD has calculated from Dr. CHRISTISON's formula a very useful table for showing the number of grains of solids in, and the weight of, a fluid ounce of urine, of every density, from 1·010 to 1·040.

TABLE III.

Specific Gravity.	Weight of one fluid Ounce.	Solids in f. ℥j.	Specific Gravity.	Weight of one fluid Ounce.	Solids in f. ℥j.
		grains.			*grains.*
1010	441·8	10·283	1025	448·4	26·119
1011	442·3	11·336	1026	418·8	27·188
1012	442·7	12·377	1027	449·3	28·265
1013	443·1	13·421	1028	449·7	29.338
1014	443·6	14·470	1029	450·1	30·413
1015	414·0	15·517	1030	450·6	31·496
1016	414·5	16·570	1031	451·0	32·575
1017	444·9	17·622	1032	451·5	33·663
1018	445·3	18·671	1033	451·9	35·146
1019	445·8	19·735	1034	452·3	36·831
1020	446·2	20·792	1035	452·8	37·323
1021	446·6	21·852	1036	453·2	38·014
1022	447·1	22·918	1037	453·6	39·101
1023	447·5	23·981	1038	454·1	40·206
1024	448·0	24·951	1039	454·5	41·300

17. By multiplying the number of ounces of urine passed in the 24 hours by the two last figures of the specific gravity, the quantity of solids excreted will be obtained. Thus if three pints, or 60 ounces be discharged in the 24 hours, and the density of the several specimens give an average of 1020, the 60 ounces multiplied by 20·79 would give a product of 1247 grains, the quantity of solids excreted in the 24 hours. Dr. G. BIRD estimates the average amount of solids excreted by the kidneys of the healthy adult to be from 600 to 700 grains in the 24 hours; numerous circumstances connected with occupation, exercise, diet, regimen, &c., modifying the results.

18. *d.* The *tints* presented by the urine in different diseases are of great importance in respect both of diagnosis and of treatment. These tints vary with the degree of dilution and the nature of the ingredients from nearly colourless, to the usual pale amber colour, to deep brown. When very watery, urine presents a faint greenish tint, as in early infancy, and in hysteria and chlorosis. If bile or blood be present in the urine, a variety of colours, from red to brown, blackish-green, or apple-green are produced, the latter hue being sometimes indicative of *cystine.* A *reddish* tint may be caused by *purpurine* or by *blood;* if by the former, congestion of the portal circulation, or disease of the liver or spleen, may be inferred; if by
the latter, hæmorrhage in some part of the
passages has occurred. In the former c
specific gravity is moderate, and heat proc
change; in the latter, heat and nitric ac
sion turbidity, and blood-discs are seen u
microscope. A *brownish* tint is caused b
centrated or dense state of the urine, as i
the specific gravity being high; or by obs
to the discharge of bile in some part of th
apparatus, and the presence of some or
elements of bile in the circulation; or by
istence of blood in a less degree or alter
and shown by the tests just mentioned.
and bile may occasion a greenish-brown
former when the urine is alkaline, the latt
the urine is very acid. A grass-green h
urine indicates excess of sulphur and the
of cystine. It is unchanged by heat
acid. It should not, however, be overlo
numerous articles of diet and of medici
the appearance of the urine. Chimaphyl
toxylum, indigo, rhubarb, senna, &c.,
this change in a marked degree.

19. *e.* The *fluidity* of the urine some
ries. It is more or less viscid, owing to the
of mucus or pus, or both, especially when
and in the layer formed at the bottom of th
and in a slight degree in diabetes mellit
the frothiness caused by agitation conti
some time. Although fluid whilst war
comes in rare cases jellatinous on coolin
to the presence of self-coagulating alb
fibrin. This state indicates severe org
ease of the kidneys. I have, however, m
at advanced stages of pregnancy.

20. II. The CHEMICAL COMPOSITION
URINE has engaged the attention of che
physiologists for many years; and even
elements contained in this fluid, althoug
if not altogether, ascertained, are still topic
troversy, as respects either the origin o
of them, or the successive changes of w
may be the ultimate products. As to th
principle, that the urine is an excretion
the blood is depurated from the effete
carried into the circulation from the
phosis and waste of the tissues, &c.,
above (§§ 3—10) and in the commenceme
work (*see* BLOOD, §§ 115—160), no doubt
exist; but the successive changes which t
ments or materials undergo during thei
tion and passage from their origins and
during their circulation, and during their
discharge,— from their origins to their eli
from the body,— have been long topics of
and discussion, especially by the chemic
ologists and pathologists of recent times,
been more disposed to view them as a
chemical, than as vital and as modified,
more or less altered, by the states of vit
and vascular action. To the specialist
cine the chemical doctrine presents its
most favourable aspect, as placing uri
thology in an isolated yet scientific posit
the general or legitimate physician, the c
of the urine, in all their phases, and in th
sive changes from their origins to their
results, are viewed as ever varying effe
influence of vitality throughout the frame,
fested by the functions of digestion, assi
nutrition, metamorphosis, waste, and de

h are not only under the complete and t dominion of life, but are also the ne- agencies of the continuance of life; this ient of pathology being inseparable, in its hic as well as in its practical relations, others which comprise the whole range le of morbid actions.

21. he *urine in health* contains:—1st, certain *products*, namely, urea, uric acid, creatine, ne, colouring and odorous elements; these pecially result from the metamorphosis te of the tissues and of the blood, and are d from the latter by the kidneys: also gredients, more particularly lactic and acid, developed during the process of tion, and accidental matters carried into the circulation;—2nd, *inorganic products*, being saline combinations, derived from the food, especially sulphates, phosphates, chloride of sodium, and soluble salts taken with the ingesta, and often decomposed in their transit into and from the blood; also saline substances generated chiefly from the processes of destructive metamorphosis and waste, and of depuration, as sulphates and phosphates;—3rd, *matters derived from the urinary passages*, being chiefly mucus, debris of epithelium, and a minute quantity of phosphate of lime present in mucus. M. Becquerel gives the following as the average composition of urine in males and females, and the quantity discharged in the 24 hours:—

	Urine in Men.		Urine of Women.		Mean of Both.	
	In 24 Hours	In 1000 Grs.	In 24 Hours.	In 1000 Grs.	In 24 Hours.	In 1000 Grs.
f urine - - - - -	19516.		21124		20320	
gravity - - - - -	1·0189		1·0151		1·0170	
- - - - - -	610·	31·1	526·8	24·95	568·	28·
Constituents of Solids.						
- - - - - -	270·	12·8	240·	10·366	255·	12·
l - - - - - -	7·6	0·391	8·6	0·406	8·1	0·398
ts - - - - - -	150·	7·63	126·	6·14	138·	6·9
matters and volatile saline combinations -	176·	9·26	145·	8·	160·5	8·6

22. *Urea.*—This important excretion, composed of $C\ 2,\ N\ 2,\ H\ 4,\ O\ 2,\ = 60$, is the which a large quantity of nitrogen is ed from the body; 270 grains of urea discharged by a healthy man in the 24 This substance is the product of the de- metamorphosis or waste of organised (§ 9, 10); but it is so rapidly carried out of od by the kidneys as to admit of only quantities of it escaping by the skin, unless e functions of the kidneys are interrupted, it is discharged both by the skin and by stines in greater quantities. The *food* has kable influence upon the quantity of urea rine. Dr. Lehmann found the quantity excreted by his kidneys whilst living on animal food, and whilst restricted to vegetable diet, as follows:—

	Animal Food.	Vegetable Food.	Mixed Diet.	Non nitrogenised Diet.
he urine in 24 hours -	819·2	346·5	500·5	237·1

23. According to Lecanu the quantity of d of *uric acid* excreted in the 24 hours is ch influenced by age. The following are lts of his experiments, as to the amounts substances excreted in the 24 hours:—

	Urea.	*Uric Acid.*
ien - -	431·9 grs.	13·09 grs.
vomen - -	294·2 „	10·01 „
d men (84 to ars) - -	124·8 „	6·77 „
n (under 8 years)	138·2 „	3·98 „

24. *Uric Acid.*—Uric or lithic acid, composed , $N\ 4,\ H\ 4,\ O\ 6,\ = 168$, is excreted by the kidneys to the amount of 8·1 grains in the 24 hours. Dr. Prout's opinion, confirmed by Dr. B. Jones and Dr. G. Bird, is that the greatest portion of the uric acid always exists in the blood in combination with ammonia; for this acid requires 10,000 parts of water at 60°, for solution, whilst there does not exist quite 2500 times its weight. Urate of ammonia is soluble in 480 times its weight of water; and as it occurs in urinary deposits, it requires for solution 2789 parts of urine according to the researches of Dr. B. Jones, who has shown that the presence of a moderate quantity of saline matter increases its solubility. Dr. G. Bird states the following as the mode in which uric acid exists in healthy urine. "Uric acid, at the moment of its separation from the blood, comes in contact with the double phosphate of soda and ammonia, derived from the food, forms urate of ammonia, evolving phosphoric acid, which thus produces the natural acid reaction of urine. If the whole bulk of the urine be to the urate of ammonia formed, not less than about 2701 to 1, the secretion will, at the temperature of the air, remain clear, but if the bulk of fluid be less, an amorphous deposit of the urate will occur. On the other hand, if an excess of uric acid be separated by the kidneys, it will act on the phosphate of soda of the double salt, and hence, on cooling, the urine will deposit a crystalline sediment of acid sand, very probably mixed with amorphous urate of ammonia, the latter usually forming a layer above the crystals, which always sink to the bottom of the vessel." (*Op. Cit.* 84.)

25. Without referring to Liebig's views as to the physiological origin of uric acid, which are contradicted by the experiments of Lehmann, and merely stating that these views are not corroborated by any subsequent researches, I may give the results of the researches of this latter physician:—

Diet.	Quantity excreted in 24 Hours of		Proportion of Uric Acid to Urea.
	Uric Acid.	Urea.	
Exclusively animal	22·64 grs.	819·2 grs.	1 : 36·1 grs.
Mixed animal and vegetable - -	18·17 „	505·0 „	1 : 27·5 „
Exclusively vegetable - - -	15·7 „	346·5 „	1 : 22· „
Food free from nitrogen - -	11·24 „	237·1 „	1 : 21· „

Dr. Bence Jones, who has investigated this and other subjects connected with the chemico-pathology of the urine, with great scientific acumen, has shown the *immediate* influence of food on the quantity of uric acid contained in the urine, to be as follows: —

	Specific Gravity.	Grains. Uric Acid.
In 1000 *Grains of Urine:* —		
After animal food - -	1027	1·022
Before „ - -	1024	0·049
After vegetable food -	1025	1·010
Before „ -	1024	0·049

From these and other researches and considerations, it may be inferred that uric acid is derived from the nitrogenised elements of the effete molecules of the tissues, and from the elements of food abounding in nitrogen, which are not assimilated into the healthy constituents of blood; and probably from the latter source, in larger proportion; and thus these nitrogenised elements are excreted from the blood in the states of uric acid, of uric acid combined with ammonia, and of urea; the causes of the preponderance of either of these being not satisfactorily explained.

26. *c. Lactic acid and lactate of ammonia* were said by Berzelius to exist in the urine, but were denied by Liebig. That lactic acid exists in the blood, and is excreted by the skin in health, and more largely in some diseases, is admitted. It is, however, found in the urine of herbivorous animals; and it probably undergoes some change before it is excreted by the kidneys in the human subject. Dr. G. Bird considers that what was mistaken for lactic acid in urine, is really a mixture of *creatine* and *creatinine*, these substances being forms in which the nitrogenised elements of worn out structures, especially muscular tissues, are removed from the system. Dr. Prout believed that several of the constituents of urine were derived from the destructive metamorphosis of distinct and separate tissues, and these substances appear to support his views.

27. *d. Hippuric, or urobenzoic acid*, exists chiefly in the urine of herbivorous animals, and occasionally in that of man. Its quantity in health is not constant, probably owing to the nature of the food. It is, next to *bile* and *purpurine*, the richest in carbon of any of the products of vital chemistry; and hence its abundance in urine may depend upon the states of biliary secretion and of the respiratory functions, impairment of these increasing its excretion by the kidneys.

28. *e. Butyric acid* is sometimes found in the urine, and may be either referred to the butter used in food, or to the imperfect assimilation of saccharine matter. It is seen also in the creamy deposit formed in diabetic urine. This acid may also be derived from protein compounds.

29. *f. The colouring matter of urine* has been differently accounted for by Simon, Pro ler, G. Bird, and Scherer. The las physician attributed it to the destructiv morphosis or waste of red-blood corpuscl G. Bird investigated its nature and com gave it the name of *purpurine*, and view a principle of urine chiefly in disease; result of impaired excretion of carbon lungs and liver, this element being, wher in excess in the blood, partly eliminate kidneys in this form (§§ 27, 28.).

30. *g. Sulphur extractive* exists in urin derived from the metamorphic destructi buminous and fibrinous tissues, which sulphur and traces of phosphorus. "W greater quantities of their protein elem converted into creatine and its allies and small proportion containing the sulpl phosphorus is eliminated by the kidney form of this peculiar extractive matter. taurine, a constituent of bile, may also b the sources of the sulphur extractive of t The nature of the food may also c materially to the quantity of this constitu

31. *h. Ammonia* exists in urine "combi uric acid, and probably with phosphoric soda, forming the triple compound k microcosmic salt."

32. *i. The fixed salts of urine* are tho are left after the other ingredients are by a red heat. They amount to nearly 1 in the 24 hours, and consist of combin chlorine, sulphuric and phosphoric aci soda, lime, magnesia, and potass. Of combinations of chlorine and phosphoric probably derived from the food. Dr. considers that the phosphoric acid and the urine exist in the state of the commc bic phosphate unless it be combined phosphate of ammonia. The soluble ph far exceed in quantity the insoluble are derived directly from the food as from the albumen and other elements blood. The insoluble phosphates, formin the structure of the body, and derived blood during the process of nutrition, are back to the blood during the metamorpl waste of the structures, and are eliminate kidneys. "Some portion of the phosph of the urine is in all probability genera the action of oxygen on many of the s of the body, into the composition of whi phorus largely enters, as the brain and system generally. But the greatest pa phosphoric acid is derived ready form without; the phosphates of lime and abounding in milk and most varieties of v food; whilst the basic alkaline phospha in flesh, in wheaten flour, leguminous beans, peas," &c. The interesting resea Dr. B. Jones have shown that the qu phosphates, in a given quantity of urin some relation to the periods of taking f to the nature and composition of the fo found the quantity of phosphatic salts to greater after a diet restricted to vegetable animal food. The quantity of phosp lime and magnesia in the urine are cons increased after the ingestion of soluble these two earths. The alkaline phosph most abundant shortly after a meal c

of bread, and are not materially affected ircumstances which influence the excretion earthy salts. “ A part only of the earthy ates contained in the food is absorbed into culation, the greatest proportion escaping intestines.” Berzelius found in three of human fæces six grains of earthy ates. The insolubility of the salts in water ts for their presence in the fæces. A uantity of phosphorus also exists in the n a non-oxidised form. The excess of oric acid often found arises from the oxi- of the phosphorus of the urine.

33 . The quantity of *sulphuric acid* in the s too great to be accounted for by its e in the food as saline combinations; and ic acid has been found in the urine whilst uite free from sulphates has alone been According to G. Bird and Mulder the of this acid is to be referred to the oxi- of the sulphur which exists with phos- in those tissues which contain albumen and During the metamorphosis or waste of oxidation of the sulphur occurs, and ex- the presence of at least a portion of the ic acid met with in the urine. The ex- of more than twenty per cent. of sulphur ine — one of the products of the meta- sis of bile — accounts for a portion of the ic acid, by referring it to the oxidation of iary sulphur during the recrementitious of bile in the economy. As a portion of r is excreted from the body in a non-oxi- rm, a part only of the sulphur not required purposes of the animal economy undergoes on. Professor Ronalds found, in five ens of urine of healthy persons, the pro- s of sulphuric acid, and of the non-oxidised r, existing in 1000 grains, to be as follows: ; 0·17.—1·46; 0·18.—1·42; 0·18.—2·44; —1·32; 0·165.

3 Dr. Bence Jones has shown, by his in- g researches connected with the subject, e salts of this acid are increased in the y any kind of vegetable or animal food; ercise does not appear to increase them, administration of sulphuric acid, unless in uantities; and that the ingestion of sulphur, he sulphates of soda or magnesia, always augments the quantity of the sulphuric the urine.

3 l. The *chloride of sodium* of the urine is sly derived from the common salt taken e food. Some of the saline constituents of ine may be readily recognised by the crys- forms they present when the urine is eva- l on a glass plate. MM. Regnault, Rei- d Burral have shown that the chloride of increased the excretion of nitrogen, as d by the augmentation of urea and the enised compounds in the urine. It may be d that common salt produces salutary : — 1st, by furnishing hydrochloric acid to mach; 2nd, by furnishing soda to the bile; y aiding the metamorphoses of the blood es and of the tissues; and, 4th, by pro- g the depuration of the blood. The ab- or diminution of chloride of sodium in the of patients labouring under pneumonia d by Redtenbacher was attributed to the tion of diet during this disease. But Dr. Lionel Beale has established the following propositions, which show the insufficiency of this explanation: — 1st. Chloride of sodium is totally absent from the urine of pneumonic patients at the period of complete hepatisation of the lung. 2nd. The chloride reappears after the resolution of the inflammation. 3rd. The chloride exists in the blood in the largest quantity when most abundant in the urine, and *vice versâ*. 4th. The chloride exists in very large quantity in the sputa of pneumonic patients. 5th. There is reason to believe that the chloride in pneumonia is determined towards the inflamed lung, and is reabsorbed and removed on the resolution of the inflammation. (*Transactions of Medical and Chirurgical Society*, vol. xxxv. p. 374. &c.) I may, however, remark that the quantity of chloride in the expectoration is increased beyond that existing in healthy pulmonary mucus, and is diminished in the urine, in acute bronchitis, in pleurisy, and in phthisis, although not so remarkably as in pneumonia.

36. III. THE FORMATION OF URINARY DEPOSITS.*

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* CLINICAL EXAMINATION OF THE URINE.—DR. GOLDING BIRD has given the following recommendations for ascertaining the state of the urine in disease, provided that it be an average specimen of that passed in the preceding twenty-four hours, or that resulting from the first micturition after a night's rest, unless the urine secreted at other times be required.

A. Urine without deposit, or poured from the sediment. — After ascertaining the acid, alkaline, or neutral states of the urine by means of test-papers; a little of the urine should be heated in a metallic spoon over a lighted candle, or in a test-tube over a spirit-lamp; and if a deposit occurs, albumen or an excess of the earthy phosphates is present; the former, if a drop of nitric acid does not re-dissolve the deposit, the latter if it does. “ If the urine be very highly coloured, and be not rendered opaque by boiling, the colouring matters of bile, or purpurine, are present. To determine this, pour a thin layer of urine on the back of a white plate, and allow a few drops of nitric acid to fall in the centre, an immediate and rapid play of colours, from bluish green to red, will be observed, if bile; but no such change will be observed, if purpurine alone exists. Should the high-coloured urine alter in colour or transparency by heat, the presence of blood should be suspected. If the addition of nitric acid to deep-red urine, unaffected by heat, produces a brown deposit, an excess of uric acid exists. If a specimen of urine be pale, immerse the gravimeter, and if the specific gravity be below 1012, there is a considerable excess of water; but if above 1025, the presence of sugar, or a superabundance of urea, is indicated. To determine the existence of either of these conditions, place a few drops of the urine in a watch-glass, add an equal quantity of nitric acid, and allow the glass to float in some cold water; crystals of nitrate of urea will appear on two or three minutes, if the latter exists in excess. Should this change not occur, the urine must be examined specially for sugar, which, it must be remembered, may exist in small quantities, without raising the specific gravity of the fluid.” For this purpose, boil a small portion with an equal bulk of liquor potassæ, in a test-tube, and the developement of a brown colour will show the almost certain existence of sugar. An excess of colouring matter, rich in carbon, should always be sought after on account of its pathological importance. “ This is readily done, by boiling some urine in a tube, and, whilst hot, adding a few drops of hydrochloric acid. If an average proportion of the pigment exist, a faint red or lilac colour will be produced; but if an excess is present, it will be indicated by the dark-red or even purple tint assumed by the mixture. Should the urine be alkaline, add a drop of nitric acid; if a white deposit occurs, albumen is present; if brisk effervescence follows the addition of the acid, the urea has been converted into carbonate of ammonia.” (pp. 16, 17.)

B. Examination of the sediment deposited. “ If the deposit is flocculent, easily diffused on agitation, and scanty, not disappearing on the addition of nitric acid, it is chiefly made up of healthy mucus, epithelial debris, or occasionally, in women, of secretions from the vagina, leucorrhœal discharge, &c. If the deposit is ropy, and apparently viscid, add a drop of nitric acid; if it wholly or partly dissolves, it is composed of phosphates; if but slightly affected, of mucus. If the deposit falls

Et seq. — When the several constituents of the urine are in due relation to each other, the urine is clear, and of a pale amber colour. Its transparency is but slightly affected on cooling by the gradual subsidence of a slight mucous cloud sometimes entangling a few microscopic crystals of uric acid; but when one or more of these constituents "exist in real or comparative excess, or a new substance is superadded, the urine does not generally remain clear, but either immediately upon being voided, or at least on cooling, becomes more or less turbid." When the urine, on cooling, becomes covered with a thin membrane-like scum, a *pellicle* is said to exist. When the substance causing opacity floats between the surface and the lower portions of the fluid, it is said to form a *cloud*. And when this falls towards the bottom of the containing vessel, the appearance was termed *encorema*. When a positive deposit collects at the bottom of the vessel, the term *sediment*, the hypostasis of the ancients, is commonly applied. The terms pellicle, cloud, and deposit, or sediment, are those commonly used in describing the states of the urine. These appearances are generally not fully developed until the urine is cooled down to the temperature of the air. This is especially the case with those deposits which are soluble in warm water; as the urates, particularly the urate of ammonia, which constitutes the chief part of reddish and fawn-coloured amorphous sediments.

37. *Urinary deposits*, including all substances which disturb the transparency of urine by their presence, whether they subside to the bottom of the vessel or not, have been divided b
Bird into:—1st. "Deposits composed e
of ingredients derived, directly or indirec
the metamorphosis of tissues—(to which
add, from the metamorphosis and wast
the red globules, fibrine, and other co
of the blood) — or from the organic el
food; namely, uric acid and urates, u
oxalate of lime, oxalurate of lime, and
2nd. Deposits composed of ingredients
most part of inorganic origin, includi
phate of lime, ammonio-phosphate of
carbonate of lime, silicic acid. 3rd.
coloured deposits (black or blue) of
origin; viz., cyanourine, melanourine
Prussian blue. 4th. Deposits consisting
crystalline organic products, including
ised: blood, pus, mucus, organic globule
lium, spermatozoa, confervoid bodies, v
non-organised: milk, fatty matter, stearo

38. i. Deposits of Uric Acid an
Combinations.—Uric acid, uncombine
base, forming a deposit, is invariably in c
forms. But the crystals are seldom so
to admit of their figures being recognise
the aid of the microscope. Uric acid p
yellow or amber colour, unless when mi
urate of ammonia, which is frequently
and then it is of a much paler hue. T
posits present every shade of colour, f
palest fawn to the deepest amber or or
The deeper the colour of the urine th
are the deposits.

39. *A. Diagnosis of uric acid deposits.*
heated in the urine, the uric acid dep
dissolved; the crystals merely become
When mixed with urate of ammonia,
Bird recommends the urine to be wa
watch glass; the acid then becomes visib
bottom of the glass as soon as the urate
Heated with liquor potassæ, the uric aci
dissolves, forming urate of potash of rea
bility in the alkaline fluid. "Hydrochl
acetic acids are without any action; b
acid readily dissolves it, and by carefu
ration a residue of a beautiful pink col
coming of a rich purple on being held
vapour of ammonia, is left. This colo
sidue is the murexid of Liebig, the pur
ammonia of Prout. Exposed to he
platinum spoon, the uric acid deposits
burn, evolving an odour of bitter almo
finally leave a small quantity of a w
which contains phosphate of soda, or
both."

40. *When urine contains an excess*
acid it generally forms crystals on cooli
acid being seldom deposited before e
Sometimes, especially in the urine of go
sons, many hours elapse before any is de
although a large quantity is present. O
ally the acid is not deposited, but remain
surface as a crystalline pellicle, presen
iridescent play of colours in a brigh
Urine of a deeper amber colour than nat
of a reddish-brown colour, usually depo
largest amount of this acid; but ver
coloured urine seldom deposits uric ac
after the addition of a stronger acid; an
does not deposit all its uric acid until de
sition has commenced. Urine depositing

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like a creamy layer to the bottom of the vessel, the supernatant urine being coagulable by heat, it consists of pus. Urine sometimes appears opaque from the presence of a light flocculent matter diffused through it, presenting neither the tenacity of mucus, nor the dense opacity of pus. Although scarcely sufficient in quantity to interfere with the perfect fluidity of the urine, if a little be placed in a test-tube, and agitated with an equal bulk of liquor potassæ, the mixture will often become a stiff, transparent jelly. This peculiar appearance is demonstrative of the presence of the exudation, or large organic globules formed under the influence of irritation, providing the urine does not coagulate by heat; for should it do so, the existence of minute quantities of pus may be suspected."

"If the deposit is *white*, it may consist of urate of ammonia, phosphates, or cystine: the first disappears on heating the urine; the second, on the addition of a drop of diluted nitric acid; whilst the third dissolves in ammonia, and the urine generally evolves an aromatic odour, like the sweet-briar — less frequently being fœtid. If the deposit be *coloured*, it may consist of red particles of blood, uric acid, or urate of ammonia stained with purpurine. If the first, the urine becomes opaque by heat; if the second, the deposit is in visible crystals; if the third, the deposit is amorphous, and dissolves on heating the fluid. Oxalate, and more rarely oxal rate (?) of lime are often present, diffused through the urine, without forming a visible deposit; if this be suspected, a drop of the urine, examined microscopically, will detect the character of the crystals. If the urine be opaque, like milk, allowing by repose a cream-like layer to form on the surface, an emulsion of fat with albumen is probably present. Agitate some of the urine, with half its bulk of ether, in a test-tube; and after resting a few minutes, a yellow etherial solution of fat will float on the surface of the urine, a tremulous coagulum of albumen generally forming beneath it."

Dr. G. Bird adds that much of the little time required for the investigation thus sketched may be saved, by remembering the following facts: "*If the deposit be white, and the urine acid, it in the great majority of cases consists of urate of ammonia; but, should it not disappear by heat, it is phosphatic. If a deposit be of any colour inclining to yellow, drab, pink, or red, it is almost sure to be urate of ammonia, unless visibly crystalline, in which case it consists of uric acid.*" (pp. 18—21.)

reddens litmus paper, and often contains ess of urea, so as to crystallise when with nitric acid. Its specific gravity is lly above 1·020, excepting in infants, in deposits of uric acid are common, although ine may be pale and of a much lower . These deposits "appear as a yellow line sand, whilst the supernatant urine is of ecific gravity, often 1006, as pale as water, ntains very little urea." This circumstance of explanation from the small proportion aline phosphates, the presumed solvent for id in the urine of infants. For the various copic characters of uric acid deposits which ly be satisfactorily shown by engravings, I efer the reader to Dr. G. Bird's interesting

4 *B. Diagnosis of deposits of urate of ammo-* These vary in colour, from white, through tint, to a pale fawn (the oftenest met with), ed, pink, or purple. All these deposits ertain characters in common. They never ace until the urine has cooled, and quickly ear on the application of heat. The darker ed deposits require a higher temperature for n than the paler; and when the urine is and concentrated, as in acute rheumatism, dition of a little water may be required they quite disappear. The addition of ammoniæ, or liquor potassæ, quickly dis- deposits of urate of ammonia, rendering ine a little turbid from the precipitate of phosphates. Deposits of urate of ammo- ways contain small quantities of the urates e and soda, and often of magnesia and .

Urine depositing urate of ammonia pre- several modifications: — 1st, a pale urine of pecific gravity (1012) with a nearly white it, which, instead of entirely falling, forms s in the fluid, and appears as a mucous pus. pplication of heat shows at once its real by causing its disappearance. 2nd. A pale -coloured urine, of a specific gravity about , which, on cooling, deposits a copious fawn- red substance resembling powdered bath- mixed in the water, but very readily dis- ring on applying a gentle heat. This de- occurs often, readily disappears, and fre- ly attends a cold, obstructed perspiration, or indigestion. 3rd. A deeper-coloured urine, higher specific gravity (from 1022 to 1026), eposits, on cooling, a reddish-brown sediment well-known brick-dust or lateritious sedi- . This variety generally is present during e excitement, and becomes turbid on the ion of a drop of nitric acid, "not from the ulation of the albumen, but from the precipi- of uric acid in very minute microscopic boidal crystals." 4th. Urine of a very deep r, approaching to a copper, or purplish tint, purplish hue. This colour Dr. G. Bird utes to the presence of *purpurine*. He adds whenever a deposit of urate of ammonia rs in such urine, either spontaneously or by ersing it in a freezing mixture, it combines the pink pigment, forming a kind of *lake*, which is often so abundant as not to entirely pear by heat, until the urine is diluted with r. This state of the urine is often observed cute rheumatism, gout, in diseases of the liver and spleen, &c., and has been attributed to obstructed elimination of carbon.

43. ii. Pathological Relations of Uric Acid, and Urate of Ammonia. — Independently of changes in the quantities of these substances in the urine, caused by the quantity and nature of the food, very important alterations of the proportions of these substances accompany and characterise various pathological conditions of the frame. Uric acid and its combinations have been attributed to two sources, viz., the waste or disintegration of the tissues, and nitrogenised food. But it appears to me that too large a share of these sources has been imputed to the former (which is more correctly the nutritive metamorphosis, and waste of the tissues), whilst the metamorphosis and waste of the globules, fibrine, and albumen of the blood, as contributing to the formation of these substances in the urine, have been overlooked. In disease, especially in acute diseases, as long as the kidneys are enabled to discharge their functions, an increase of uric acid and its compounds appear in the urine; and this increase is to be imputed chiefly to the waste of the tissues, and of the hæmato-globuline, for little or no nitrogenised food is generally taken in these cases, but emaciation, and with this more or less of anæmia, supervene. The anæmia, which is often remarkable, especially in the advanced progress of these diseases, is often overlooked. In acute rheumatism, gout, fevers, diseases of the liver, spleen, &c., the elements and sources of uric acid and its compounds are abundantly supplied by the states of the blood to the kidneys; and uric acid, both pure and combined, is greatly in excess in the urine. MM. Becquerel and L'Heretier found, in eleven cases of inflammatory fever, and twelve of continued fever, the uric acid more than double that in health.

	Acute Inflammations.	*Fever.*	*Health.*
Specific Gravity of the Urine - - -	1·0216	1·0229	1·017
Uric Acid in the Urine	1·041	1·312	0·391

44. That uric acid and its combinations may be formed to some extent in the blood, at least in some diseases, especially gout, rheumatism, erysipelas, &c., and eliminated by the kidneys, is rendered probable by the circumstance of urate of soda having been detected in the blood by Dr. Garrod. But the presence of this combination in the blood does not preclude the elaboration of a portion of the uric acid and its compounds, or the modification and metamorphosis of one or more of them, or their elements, by the kidneys.

45. In diseases of debility, especially in those characterised by depressed or exhausted organic nervous power, and by a poor or anæmied state of the circulation in hysteria, chlorosis, disorders of irritation, &c., uric acid and its compounds are greatly reduced in the urine, unless the quantity of urine passed be remarkably diminished, and no deposits are formed.

46. The state of the perspiratory function is too often overlooked by those who attend especially to the urine. Whenever the functions of the skin are impeded or interrupted, those of the kidneys are augmented; and the results are reversed when the perspiratory actions are increased. But the increase or diminution of either does not

consist merely in the watery element, but also in the nitrogenised and other materials held in solution. This reciprocative or vicarious function, and more especially the frequent want or imperfection of compensation existing between these functions, are most intimately connected with the origin of many diseases, and are not the less productive of most dangerous results in the progress of others. I have always insisted, in my lectures (delivered from 1826 until 1842), upon the influence of an insufficiently depurated blood—of effete materials circulating in the blood—owing to impaired function of either the kidneys, the skin, or the intestinal mucous surface and follicles, or of two or all of these; or to an imperfect compensation of function of the others, when one is impaired or interrupted, in causing diseases not only of a serious and acute character, but also of a chronic and obstinate, although not dangerous kind. Most of the diseases of the skin, especially those which are most disposed to become chronic, are induced, or perpetuated, or both, not only by impaired depurating function of the skin and its follicles, but more especially and remarkably, also, by imperfect action of the kidneys, and of the intestinal mucous surface and follicles; the effete and nitrogenised elements and materials, and their combinations, retained and accumulating in the blood, irritating the cutaneous capillaries, and the capillaries of predisposed and sensitive surfaces and tissues. The crises of fevers and inflammatory diseases are merely the returning functions of depurating organs, and the free discharge by these emunctories of effete nitrogenous elements and materials and their compounds, chiefly by the kidneys, bowels, and skin. This doctrine has been fully elucidated in the Articles BLOOD, CRISES, and DISEASE (published in 1832 and 1833), and has been applied to the illustration of the causes and phenomena of CRISES (See §§ 15—20.). Long after the publication of my views, Professor LIEBIG referred the products of elimination from the blood by the emunctories, and especially those discharged by the kidneys to chemical changes; but his explanations are opposed to clinical observation; whilst the researches of M. BECQUEREL (*Séméiotique des Urines, &c.* 8vo., Paris, 1841.) tend to confirm the opinion contained in the articles now referred to.

47. (*a*). Excess of uric acid, or of its combinations with bases in the urine, the quantity of this fluid being natural, occurs in fevers, acute rheumatism, gout, erysipelas, inflammatory diseases, hepatic and cutaneous complaints, &c., chiefly from the waste and absorption of the tissues, and the metamorphosis of the elements and materials derived from these sources, and from the blood aided by oxygen conveyed into the circulation by the red globules. (*b*) A similar excess may also arise from an excessive indulgence in animal food, especially in highly nitrogenised flesh-meats, or from an indulgence in this kind of food beyond what is required for the nutrition of the several structures, or from a more moderate use of this food, due exercise, especially in the open air, being neglected. (*c*). Excess of these substances may occur in the urine, although the supply of nitrogenised food is very moderate, owing to impaired digestive, assimilative, and nutritive function. (*d*). Excess may also occur in consequence of impaired or arrested action of the skin and bowels; the kidneys discharging a ore or less compensating function, and elimina g a portion or the whole of those elements and eir combinations usually discharged by these her emunctories.

48. (*b.*) *Calculous Deposits of Uric Aci nd Urates.* — An abundance of uric acid and the urates in the urine may occur without prod ing much disturbance to the urinary or other nctions. This is especially the case with ur of ammonia, which can hardly be ascribed t lisorder, but rather to the healthy discharge the depurating function of the kidneys. But, a Dr. G. BIRD has justly remarked, "Uric ac or urates may be deposited in an insoluble fo in the kidneys or bladder, and aggregating f a mass on which, by a kind of imperfect cryst zation, great quantities of the acid or its salt may be deposited, giving rise to the formation of calculus. Uric acid is of more serious impo nce than most other elements of calculous form ng, not only from its constituting a large prop ion of all urinary calculi, but even when th are chiefly composed of other ingredients, the cle on which they are deposited are, in the eat majority of cases, composed of uric acid. O 374 calculi contained in the Museum of Guy's ospital, at the time I examined them, the nuc are in 269 composed of uric acid or urate of a monia. On account of its solubility, urate o ammonia is not a frequent component of ary calculi, although it often enters with other redients into their composition. Indeed, c uli wholly composed of this compound are ost peculiar to childhood; in GUY'S Museum ere are but eight concretions entirely consisti of this substance, although it constitutes the n eus in eighteen. It is hence very probable t if ever by medical treatment we can succe in overcoming a calculous diathesis, or dissolv a stone in the act of growth, it will be by ans directed to the solution of the uric acid, its combinations." (*Op. cit.* p. 154.)

49. iii. TREATMENT OF DEPOSITS OF URIC ID AND URATES.—From the foregoing, it is app nt that excess of these materials in the urine, ar he deposit of them, either in some part of the u ry apparatus, or after the urine is discharge are contingent upon a variety of antecedent dis ers or pathological conditions, which, in indiv ual cases, require due recognition and appro ate means; and not upon those alone, but al in different cases, or in different circumstances, on an excessive or improper diet and regime or upon insufficient exercise. One of the mos mportant and most generally prevalent of se conditions, more especially when these mat als are deposited in large or unusual quantities nd still more particularly when they are deposit in any of the urinary organs, is depressed o xhausted organic nervous power, occasioning mpaired digestion, assimilation, and nutrition. his condition suggests the employment of such n ns as experience has shown to be most efficaci in restoring the organic nervous power to its fc er energy, throughout the organs devoted to dige n, assimilation, and nutrition. This *indication* o re should be fulfilled,— 1st by medicinal treatn t; 2nd, by suitable diet and regimen; and thir y exercise in the open air, and residence in a he y locality.

'. *a. Medicinal treatment* comprises the seve means of cure already recommended under th separate heads of INDIGESTION, GOUT, PYnc s, &c.; but there are substances to which sp ial reference may be made for removing ar dissolving the deposits above noticed, and fo counteracting the disposition to their formati The medicines which may be employed in ese cases are either restoratives andtonics, or re solvents of uric acid; and others may be o combined as to operate in this double ca city. The first of these consist chiefly of the to vegetable infusions and decoctions; the sec l of alkalies and alkaline salts; the former be g generally made the vehicles for the exhibiti of the latter—more especially of the following, vi the liquor potassæ, Brandish's alkaline soluti the carbonate of potass and soda; the citrates, ac ates, and tartrates of potass and soda; magnesi and the citrate and carbonate of magnesia; the bi rates of potash and of soda; the phosphates of sc and of ammonia, and the benzoic and citric ac s. Certain mineral substances are likewise of u especially the alkaline preparations of iron, tl nitrate and oxide of silver or bismuth, and the su hate and oxide of zinc, which may be given in v ous states of combination, and in the form of p It may be remarked respecting certain of tl foregoing, that the preparations, especially the c bonate of the fixed alkalies and the liquor pot æ are often most beneficially conjoined with tl iodide of potassium, and prescribed in a tonic b er mixture; that the phosphate of soda may be t n freely in gruel, so as to act gently on the b els; that magnesia will be most beneficial w n given with sulphur, and so as to act upon tl bowels, kidneys, and skin, which it will gener y do when taken at night; and that the bibor s may be prescribed in stomachic infusions w 1 salts of the vegetable acids. Benzoic acid w recommended by Mr. A. URE, to prevent the f nation of uric acid. It may be given in doses o ive to ten grains, thrice a day, with carbonate o phosphate of soda, or with the carbonate of a nonia, dissolved in boiling water. Citric acid v strongly recommended by Dr. OWEN REES f diseases, especially gout and rheumatism, in v ch uric acid and urates are abundantly formed; a whether it be given as an addition to the p ient's drink, or in combination with the alka , it is often of great service. With magnesia, e er in the form of citrate, or as recent lemonj e or lemonade taken immediately after the gnesia, it is equally beneficial.

51. Most of the diseases, or slight states of o rder in which uric acid and the urates are o posited, are characterised by deficiency of the aneous excretion, and insufficient attention is ected to this function in many cases. The toration of this excretion by means of the warm h, or the vapour bath, followed by frictions of surface, by walking, or other active exercises the open air, is a most important indication of e where these deposits appear in the urine, both preventing and in permanently removing the nplaints in which they are the general concoants.

52. *b.* The *mineral waters* which contain the al lies, or sulphur, as those of Vichy, of Ems, or of arrowgate, will also be resorted to with benefit. t whatever be the treatment, the quantity of flesh-meats used as food should be abridged, and farinaceous and vegetable substances, or the white kinds of fish, boiled, be partly substituted, more especially when active exercise in the open air is not enjoyed, and when the functions of the skin are imperfectly performed.

53. *c. Uric Oxide—Xanthic Oxide—Xanthine, Pathological Relations of.* — This substance is a very rare ingredient of calculous deposits or concretions; and it has been observed only in single instances by MARCET, LANGIER, LANGENBECK, DULK, BERZELIUS, and MORIN. The chemical constitution and the diagnosis of uric oxide are given by Dr. G. BIRD, to whose work I may refer the reader. The *character* of urine depositing this substance is not known. The microscopic examination of a fragment of calculus consisting of uric oxide did not furnish any information, as respects a crystalline arrangement. The only recorded cases of the formation of this deposit occurred in children, and the calculi formed by it did not exceed a few grains in weight.

54. iv. PURPURINE, ITS PATHOLOGICAL RELATIONS.—Deposits of urate of ammonia coloured by this substance (§§ 39—42.) present tints varying from pale flesh-colour to the deepest carmine. "The presence of purpurine interferes with the ready solubility of the deposit with which it is combined on the application of heat, and free dilution with water is often required to aid its solution." Dr. G. BIRD states that he has never seen purpurine colouring any other deposits except those of urate of ammonia, and hippuric acid when precipitated from concentrated urine by hydrochloric acid. Uric acid scarcely appears to have any affinity for it. It cannot be mistaken for blood, on microscopic examination, owing to the absence of blood-discs. The chemical composition of purpurine occurring in disease is not exactly known. SCHERER states that that generated by the action of hydrochloric acid on urine consists of 62·51 of carbon, 5·79 of hydrogen, and 31·70 of nitrogen and oxygen. Urinary calculi sometimes present layers of urate of ammonia stained with purpurine. Dr. G. BIRD remarks that all the deposits with which it is combined were, as far as he had observed, amorphous.

55. *A. The Characters of the Urine containing Purpurine.*—When an excess of urate of ammonia is present, it falls to the bottom of the vessel as the urine cools, carrying with it a great part of the purpurine. "If this excess be not present, the urine simply presents a pink or purple colour, and on dissolving white and pure urate of ammonia in it by heat, it is precipitated on cooling, deeply coloured by the purpurine. The presence of the yellow extractive which yields purpurine can be readily discovered by the action of hydrochloric acid. On evaporating urine containing purpurine to the consistence of an extract, and digesting it in alcohol, a fine purple tincture is obtained — the intensity of the tint being rather heightened by acids and diminished by alkalies." The specific gravity of this high-coloured urine, when the colour is as deep as that of brandy, varies from 1·022 to 1·030.

56. *B. The pathological Indications of an Excess of Purpurine* are important. Dr. G. BIRD remarks that the existence of purpurine in urine appears to be "invariably dependent upon some imperfection in the excretion of carbon by these

organs, whose special function it is to eliminate this element from the blood, as the liver and lungs, but especially the former. It is hence almost always connected with some functional or structural mischief of the liver or spleen, or some other organ connected with the portal circulation." I have for many years ascribed the presence of this colouring substance in the urine to an increased waste of the red globules of the blood, or of the hæmato-globulin by the kidneys, and that the diseases in which it most remarkably occurs, as fevers, gout, acute rheumatisms, phthisis, &c., are characterised not only by a rapid waste of the tissues, but also of the globules of the blood, giving rise in most cases to marked anæmia. There can be no doubt of biliary disorder, torpor, &c., of the liver,—enlargements of the spleen, &c., being often associated with these and other diseases in which purpurine exists in the urine; but, in these, the waste of the blood-globules is not the less remarkable, this substance disappearing from the urine when the waste is diminished to the natural amount by restoration of vital power, by due oxygenation of the blood, and by improved digestion and assimilation.

57. v. Cystine, its pathological Relations.—This substance does not exist in healthy urine, and rarely occurs in morbid urine. It is probably derived from the sulphur extractive of urine (§ 30.). In its chemical composition it contains no less than 26 per cent. of sulphur. Cystine, Dr. G. Bird states, has been found in urinary sediments by very few observers, and it was not recognised in this form until a long period after its discovery in calculi by Dr. Wollaston. In the rare cases in which it has been observed, it formed a nearly white or pale fawn-coloured pulverulent deposit, resembling pale urate of ammonia. The greatest proportion of cystine may be inferred to be merely diffused in the urine whilst in the bladder, as at the moment of discharge the urine is turbid, and immediately deposits a copious sediment. Dr. G. Bird states that, on applying heat to the urine, the deposit undergoes no change, and very slowly dissolves on the subsequent addition of hydrochloric or nitric acid. "Pure cystine is soluble in the mineral, and insoluble in the vegetable acids; with the former, it forms imperfect saline combinations, which leave by evaporation gummy masses or acicular crystals. It is readily soluble in ammonia and the fixed alkalies and their carbonates, but insoluble in carbonate of ammonia. Heated on platina foil it burns, evolving a peculiar disagreeable odour." Cystine may be distinguished from a deposit of urate of ammonia by not disappearing on heating the urine, and from the earthy phosphates by being soluble in very dilute hydrochloric or strong acetic acid. "The best character of cystine is its ready solubility in ammonia, mere agitation of some of the deposit with liquor ammoniæ being sufficient to dissolve it; and a few drops of the fluid, when allowed to evaporate spontaneously on a slip of glass, leaves six-sided tables of cystine. The ammoniacal solution, when kept for some time in a white glass bottle, stains it black, from the combination of the sulphur of the cystine with the lead in the glass."

58. *a. The Character of Urine depositing Cystine* is that of a pale yellow, or more of a honey-yellow than of an amber tint, presenting an appearance like diabetic urine. It is below the average s cific gravity, is passed in larger quantity th usual, and is often neutral, seldom acid to litm paper, and soon becomes alkaline. The odour this urine is peculiar, and resembles that of swe briar. It is more rarely fœtid, and when it is, t colour is generally greenish, or greenish yello "A certain portion of cystine exists in solution the urine, as the addition of acetic acid alwa precipitates a small quantity." Even when t deposit has vanished, for some days togeth crystals of cystine are then precipitated by ace acid. Urea and uric acid are present in very sm quantities, and in some instances the latter nearly absent.

59. *b. Calculi* composed of cystine are genera pale yellow or fawn-coloured; but by lo keeping they become greenish-grey, or a f greenish-blue, probably owing to the action light. The *microscopic characters* of cystine very obvious. When it occurs as a deposit, it always crystallised, never being amorphous. Amo the crystals, a few regular six-sided laminæ often seen, but the great mass is composed o large number of superposed plates, so that compound crystals thus produced appeared mu angular; but I must refer the reader to Dr. Bird's work, where this topic is well illustra by wood-cuts.

60. *c. The pathological Origin of Cystine* is further known than that it is inferred to proc from the waste of the tissues, and probably of the hæmato-globulin, or rather of some rangement of the normal course of this wa connected more especially with an excessive mination of sulphur; every ounce of cystine c taining more than two drachms of this eleme Cystine may thus be formed from those eleme of the tissues normally producing urea and acid with an excess of sulphur, owing proba to a deficiency of the process of oxidation in c nection with impaired vital energy. That th latter states obtain is evinced by the occurrence cystine, or cystin-uria, in scrofulous, chloro and anæmied subjects. The hereditary nature this condition of the urine has been noticed Dr. G. Bird, who states that in one family alo several members were affected with cystin-uria; that one instance exists, in which it can be trac with tolerable certainty, through three gene tions. In one case under the care of Mr. Lu extensive disorganisation of the kidneys co-exis with a cystine calculus. Dr. Prout has s fatty matter mixed with the urine in cystin-u and suggests the probability of its connection w fatty liver. Dr. G. Bird thinks it not unlik that the excretion of cystine may be a mea under certain circumstances, of compensating deficient action of the liver *quoad* the excret of sulphur. The existence of cystine in the u of chlorotic and debilitated females has been with in several cases by Dr. Shearman of theram.

61. *d. Indications of Cure.*—Dr. Prout adv the prolonged use of nitro-hydrochloric acid, found it of benefit in some cases. Having vie the existence of cystine in the urine as a resul debility in connection with imperfect oxidatio the blood-globules, I have in one case prescri the chlorate of potash with tonic infusions. T view of the pathology of cystine is suggest

of the employment of the tincture of the
oride of iron, of the iodide of iron, of chaly-
te mineral waters, and of other tonics, for its
oval, aided by a generous diet, by active ex-
ise in the open air, and by due attention to the
ctions of the skin and bowels. (See, also, the
atment *of* DEBILITY, of CHLOROSIS, and of
OFULA.)

2. vi. HIPPURIC ACID — HIPPURIA. — This
l is constantly present in the urine of the
se, and generally, also, in that of herbivorous
mals. *a.* LEHMANN found it in diabetic urine,
l LIEBIG detected it in healthy urine, although in
ute quantity. As this substance never appears
sediment until after the addition of a stronger
d, the *diagnosis* of it entirely depends upon the
racters of the urine containing it. The urine
taining an excess of hippuric acid is either
y slightly acid, or neutral. It may be even
aline. When this state of urine is caused by
ingestion of benzoic acid, it is then very acid.
odour is commonly that of whey, and its spe-
c gravity is below the healthy state, varying
m 1·006 to 1·008. Deposits of the triple phos-
te of magnesia are not infrequent in it. For
modes of detecting this acid, and for its micro-
pic characters, I must refer the reader to Dr.
BIRD's work.

3. *b. The pathological states* causing this state
urine are not always obvious. In the lower
mals it proceeds from vegetable food, it being
stant in such as are not exercised, and replaced
benzoic acid in those that are worked. When
excess in human urine, it is ascribable to diet;
s it has been found after a prolonged milk
t, after an excessive use of apples, and in the
ne of infants. This acid does not necessarily
erfere with the production of uric acid, but
erally it is attended by a deficiency of urea.
has been found in urine containing albumen.
G. BIRD ascribes it to a diet deficient in ni-
gen, or to the mal-assimilation of the carbon in
food, and infers "that hippuric acid may be
of the agents by which the kidneys perform a
arious function for the liver, in removing an
ess of carbon from the system." In this re-
ct, it may be viewed as an analogous result to
production of purpurine and bile-pigment,
h removing 63·93, 62·0, and 68·18 per cent.
carbon, respectively, from the system. It
uld be looked for in the urine when the func-
s of the liver, lungs, and skin are defective,
en the food is deficient in nitrogen, and when
urine is copious, is slightly acid or neutral,
l of low specific gravity.

4. vii. OXALATE OF LIME—OXALURIA.—Ox-
te of lime often exists in the urine, and is
quently a constituent of calculous concretions.
chemical and pathological relations have been
y investigated by Dr. G. BIRD, who contends
its frequent appearance as a crystalline deposit
the urine, in fine and well-defined octahedral
stals, and for "the connection between the
urrence of this substance and the existence of
ertain series of ailments generally characterised
nervous irritability." He considers that the
ressing influences, always present in densely
ulated cities, are more productive of this
n of earthy phosphatic deposits; and that
ces of oxalate of lime, in the minutest micro-
pic crystals, may be detected in the urine of persons free from any apparent disease. Hence he regards it as one of the common results of metamorphosis of tissue. But this is very different from its presence in large crystals and in considerable quantities, these constituting a truly pathological condition.

65. *a.* For the *Detection* of oxalate of lime in the urine, I must refer to the work already quoted for the full details: generally, however, the existence of this substance may be ascertained by pouring off the upper six-sevenths of the water passed a few hours after a meal, having given it time to repose in a glass vessel. A portion of the remaining seventh may be warmed in a watch-glass to dissolve the urate of ammonia. Having removed the greater part of the fluid, and replaced it by distilled water, a white glistering powder like diamond dust now becomes visible; and this under the microscope will be found to consist of crystals of oxalate of lime in transparent octahedra, with sharply defined edges and angles. Dr. G. BIRD states that, out of a great number of specimens of urine containing the oxalate, it has scarcely ever appeared in the form of a distinct deposit, but has remained diffused in the urine, even when present in so large a quantity that each drop, when placed under the microscope, was loaded with its crystals. But if any substance capable of being a nucleus were present, the oxalate would be deposited around it, although scarcely in cohering masses, and invariably colourless and beautifully transparent. The oxalate of lime, although absolutely insoluble in water, must be soluble in urine; for its lustrous crystalline form sufficiently indicates its previous solution, and it is not until after the urine has been voided several hours that the crystals of oxalate can be detected.

66. Occasionally some remarkable crystals of the oxalate resembling *dumb-bells*, or two kidneys with their concavities opposed, are met with, their surfaces being finely striated. But it is doubtful whether or no these are an oxalate of lime. Dr. G. BIRD considers them an oxalurate of lime, a salt which differs from the oxalate in ultimate composition only in the presence of the elements of urea and absence of the constituents of water. Dr. BACON has investigated these crystals minutely, and has concluded that the dumb-bell crystals consist of a "salt of lime containing either oxalic, oxaluric, or, perhaps, some other organic acid easily converted into oxalic acid; but the exact nature of the acid remains to be determined by future examination."

67. *b. The Characters of urine* containing the oxalate of lime are those of a fine amber hue, sometimes darker than in health, in a few cases paler than natural, and of a lower specific gravity, the odour being generally natural or rarely aromatic like mignonette. Frequently a deposit of urate of ammonia, sometimes tinted pink by purpurine, falls during cooling. The specific gravity of oxalic urine varies extremely. Of 85 different specimens, Dr. G. BIRD found 9 in which it ranged from 1·009 to 1·015; — in 27 from 1·016 to 1·020; — in 23 from 1·021 to 1·025; — and in 26 from 1·025 to 1·030. Generally the heaviest specimens contained most of the oxalate. The quantity passed seldom exceeded the average; instances of positive diuresis being rare. Irritability of bladder was sometimes complained of,

Acidity of the urine was well marked; even more so than in health, and always present. An increase in the quantity of urea was frequently found. Mr. **Stallard** discovered in oxalic urine a great increase of the indeterminate organic matters (§ 21.), often as much as double the average proportion in twenty-four hours.

68. *c. The Complications of oxalate of lime with other deposits* are of some importance. Dr. G. **Bird** found the oxalate of lime unmixed with any other saline deposits in more than one half of the specimens of oxalic urine. "In a very few, crystals of uric acid were found from the first, mixed with the octahedra of oxalate of lime; and in nearly all the successful cases, this acid appeared in the course of treatment, and ultimately replaced the oxalate altogether," at a period generally contemporary with convalescence. "Much more rarely, prisms and stellæ of the ammoniaco-magnesian phosphate were found mixed with the oxalate, and occasionally replacing it in the course of treatment; and still less frequently, the phosphate was observed in the urine some time before the appearance of the oxalate." Very few well-marked instances of a complication of the oxalic-acid urine with granular degeneration of the kidneys were observed. Of the 85 cases referred to above (§ 67.), 43 were unmixed cases of oxalate; 15 were cases of oxalate mixed with urate of ammonia; 15 were mixed with uric acid; 4 were mixed with triple phosphate; and 8 with phosphate deposited by heat. Dr. G. **Bird** constantly found a very large quantity of epithelial cells and scales in oxalic urine, indeed so constantly, that a white deposit of epithelium led to the suspicion of the presence of oxalate of lime.

69. *d. The Pathological Source of oxalate of lime* in the urine is of great interest. It is well known that a physiological connection exists between sugar and oxalic acid; that the former substance is a common constituent of our aliments; and that most of the farinacea are partially converted into this substance during digestion. Under certain circumstances the sugar thus formed is carried into the blood, and is eliminated by the kidneys. In certain morbid states, a large proportion of the food may be converted into sugar in the stomach, which passes rapidly into the circulation, and is excreted by the kidneys as diabetic urine. Recollecting the facility with which sugar and its chemical allies are, under the influence of oxidising agents, converted into oxalic acid, it might be inferred that the existence of oxaluria is due to the presence of sugar in the blood. Dr. G. **Bird**, however, argues against any connection or relation subsisting between oxaluria and diabetic urine, inasmuch as sugar very rarely exists in the former; and as the latter rarely contains, in a given quantity, an excess of urea, uric acid, or urates, and is remarkably free from saline deposits, the high specific gravity depending upon the large proportion of sugar. In oxaluria, on the other hand, a large excess of urea, of uric acid, and urates is present, and is as characteristic of this state of urine as the oxalate of lime itself. Hence he infers that there is no relation between oxalic acid and saccharine urine. From the symptoms present in cases where oxaluria is observed there can be no doubt that the primary cause of this state of urine must, as Dr. **Prout**
has shown, be imputed to an unhealthy condit
of the digestive and assimilating functions. T
the oxalic acid is formed from its elements, eit
in the digestive canal or in its course to and
the blood, must be inferred, since Dr. **Garr**
detected, beyond any doubt, octahedral crystals
oxalate of lime in the serum of blood from
patient affected with albuminuria. "It is diffic
to explain the presence of so insoluble a salt
solution in the blood; but it is probable that
opinion of Dr. **Schmidt**, of Dorpat, may
correct. He has assumed that there exists in
animal economy a tendency to the formation
a soluble triple compound of oxalic acid, li
and albumen, which, by its decomposition all
oxalate of lime to crystallise." Probably suc
compound exists in the blood in disease; and wl
the acetic acid is added as in Dr. **Garrod**'s proc
the albumen is separated and the oxalate set fr

70. The chemical relation existing betw
uric acid, urea, and oxalic acid, and the readin
with which the former of these substances is c
vertible into the latter, suggest the idea that o
luria may be regarded as a form of what
been termed by Dr. **Willis** *azoturia*, of wh
an excess of urea is the prevalent indication, p
of the urea, or of its elements, having been c
verted into oxalic acid. It may be inquir
Whence are the elements which form oxalic ac
Are they derived from the metamorphic chan
of the structures, like healthy urea and uric ac
Dr. G. **Bird** infers that they are. "Hence oxal
of lime must be regarded as one of the comn
results of metamorphosis of tissue" (*Op.*
210.). I am more disposed to agree with
opinion he has subsequently stated, viz. tl
although it is probable that such may be
origin of oxaluria (in the waste of the tissue
yet, the quantity of oxalate of lime being grea
after a full meal, and often absent in the ur
passed in the morning, frequently disappear
when the diet is regulated, and reappearing
the use of unwholesome food, it is equally p
bable that this salt is derived from the mal-a
milated elements of food. It is sufficiently
vious, from the nature of the complaints in wh
oxaluria occurs, that it is always the result
imperfect assimilation of the aliments, owing
impaired organic nervous power, the mal-assi
lated or rather the non-assimilated eleme
forming the product in question, aided by c
dation, which product is rather eliminated, tl
formed, by the kidneys. However minute
laborious may be the researches of organic c
mists in endeavouring to show the element
combinations and the atomic affinities of th
elements, in the production of urinary depos
the vital endowment, and the states of funct
depending upon this endowment, more especia
demand attention; the chemical constitution
the urine being generally only a sign, but
important one, of the state of this endowme
particularly as manifested by the organic nerv
system.

71. *e. The Symptoms accompanying the excret*
of oxalate of lime have been minutely descril
by professors of the urinary speciality;
conformably with the importance they attach
an urinary deposit, they view it as the act
disease, or at least as a diathesis, instead of be
merely a sign, or at most a result, of pre-exist

order or disease, to which, more especially,
ional medication should be directed. Oxaluria
not a sign of one or even of two disorders
rely, but of several, the chief morbid mani-
tations being depressed vital endowment of
digestive and assimilating organs, with lowness
spirits, irritability or nervousness, hypochon-
acal feelings, impaired nutrition, anæmia, and
en loss of sexual power. Pains in the loins,
itability of bladder, and high specific gravity
the urine — generally from 1·025 to 1·030, —
th various symptoms of impaired health, are
o commonly experienced. The urine is in-
iably acid, often excessively so; and there is
marked tendency to eruptions of boils. Dr.
Bird remarks that he has seldom met with
thisis in cases with oxalate of lime deposit,
d that in very few instances has he seen oxaluria
minate in the formation of a calculus. He
ain states that the source of this deposit is to be
puted to metamorphosis of the tissues, and
it this is the only way that the attending
aciation can be satisfactorily accounted
r. I have already stated my belief that this
posit as well as the emaciation are the results
impaired or morbid assimilation of the food,
d the consequent imperfect nutrition of the
sues (§ 70.).

72. *f. Causes.*— This state of the urine is fre-
ent in those who are subject to mental anxiety
d to laborious mental occupations, more especi-
y in men on the stock-exchange, in medical men,
barristers and solicitors, and in those who are
gaged in occupations attended by much mental
xiety, and are excessively devoted to business
study. The *exciting causes* are chiefly neglect
health, chronic dyspepsia, hypochondriasis,
haustion from disease, from syphilis or mercurial
urses; venereal excesses, masturbation, invo-
ntary seminal emissions, excessive discharges,
d prolonged lactation, previous acute diseases,
juries affecting the spine, &c.

73. *g. The Treatment of oxalate of lime deposits*
generally successful, if the diet and the regimen
both mind and body be duly regulated. The
od should be digestible, properly cooked, and
e animal and vegetables in due proportion.
alt liquor ought to be avoided; and either a
iall quantity of brandy in much water, or a
ass of dry sherry in two of water, may be taken
ith dinner. The medicines most appropriate
e the nitric or nitro-hydrochloric acid (one
rt of the nitric to two of the hydrochloric) given
tonic infusions or decoctions. If anæmia or
lorosis exist, the tincture of the muriate of
on, with preparations of calumba or quassia;
the mistura ferri composita, or the ammonio-
trate or ammonio-tartrate of iron, should be
escribed. If the bowels be costive, the extract
taraxacum may be given with the former
edicines; or the decoction of aloes be conjoined
ith the mistura ferri composita; or the mistura
ntiana composita may be given alone, or with
ncture of serpentaria, &c. The sulphate of
on, or of quinine, or of zinc may be prescribed,
here the foregoing fail, combined with small
ses of camphor and henbane, or of conium.
r. G. Bird recommends recourse to colchicum
r oxaluria, and states that, under the influence
f this drug, copious deposits of oxalate of lime
ave become replaced by uric acid and the urate of ammonia, thus inducing a condition of urine much more amenable to treatment.

74. viii. Chemical Pathology of Earthy Salts in the Urine.—*Phosphuria.—Phosphate of Lime, Ammonio-phosphate of Magnesia, and Carbonate of Lime.*—Phosphoric acid is excreted in considerable quantity from the blood by the kidneys, combined with soda, ammonia, lime, and magnesia; forming, most probably, ammonio-phosphate of soda, phosphate of magnesia, phosphate of lime. The first of these is soluble in water, and Dr. G. Bird considers it to be the solvent of uric acid, and indirectly the source of the acidity of urine. The other two salts are insoluble, but the presence of a minute portion an acid, even the carbonic, enables water to dissolve a considerable quantity. They are also soluble to some extent in hydrochlorate of ammonia. "In healthy urine, the earthy phosphates are held in solution by the acid of the super-phosphates, produced by the action of uric (or hippuric) acid on the tri-basic alkaline salts; and these salts are also, according to Enderlin, capable of dissolving a certain quantity of phosphate of lime." The earthy phosphates are always abundant after a meal, the reverse applying to the alkaline salts. Phosphoric acid may be excreted in large excess without forming a deposit, owing to its combination with an alkaline base; and hence, when the excretion of an excess of this acid is looked for, it is not indicated by the amount of earthy salts deposited, for there "is always three or four times more phosphoric acid in a given specimen of urine, in the form of a soluble alkaline salt, than is precipitated as an insoluble earthy compound. The presence of an excess of lime and magnesia has more to do with determining a deposition of insoluble phosphate, than an excess of phosphoric acid." The circumstances under which the earthy phosphates are deposited often are of so great importance as to require a recognition of their existence, as well as of the quantities of these phosphatic deposits.

75. *A. The Diagnosis of Earthy Phosphates.* — *a.* Deposits of these phosphates are white, unless coloured with blood, are soluble in dilute hydrochloric acid, and insoluble in liquor potassæ and in ammonia. On heating the urine, the deposit merely agglomerates into little masses. A small quantity of a solution of sesqui-carbonate of ammonia added to a large quantity of healthy urine causes turbidity, from a deposit of the triple phosphate mixed with some phosphate of lime. "On placing a drop of this turbid urine under the microscope, myriads of minute prisms of the triple salt, mixed with amorphous granules of the phosphate of lime, will be seen floating in the fluid; these disappear on adding a drop of any acid. As these earthy salts are insoluble in water, they must be held in solution in the urine by the free acid which generally exists. If from any cause the quantity of solvent acid falls below the necessary proportion, the earthy phosphates appear diffused through the urine, disturbing its transparency, and subside, forming a deposit. Hence, whenever the urine is alkaline, phosphatic deposits are necessary consequences. If urine be secreted with so small a proportion of acid as barely to redden litmus paper, a deposit of triple phosphate often occurs within a few hours after emission;" probably owing to the presence of

mucous matter, which induces the decomposition of urea and the formation of carbonate of ammonia, which, by neutralising the solvent acid, precipitates the phosphates. The triple phosphate, which occurs spontaneously in prismatic crystals, is a neutral salt, "and may *coexist as a deposit with very sensible acidity* of the supernatant urine. It by no means follows that the existence of a deposit of this salt involves the necessarily alkaline state of the urine." Another triple phosphate, differing from the former in containing an excess of base, is of frequent occurrence in the urine when in an alkaline or putrescent state. It cannot be present in urine having the slightest acid reaction on litmus paper. Its crystals are invariably stellar or foliaceous. This salt is termed the basic phosphate. "When the triple or calcareous phosphates are separately exposed to the heat of a blow-pipe flame, they fuse with great difficulty, and not until the heat has been urged to the utmost. If, however, the phosphate of lime is mixed with a triple phosphate in about equal proportions, they readily melt into a white enamel. These mixed salts constitute what is hence termed the fusible calculus, and they can readily be detected by this property in concretions; a character very available in the examination of gravel and calculi, as the two phosphates generally occur together."

76. *b.* The *Physical Appearance* of deposits of the earthy phosphates varies remarkably. Sometimes they appear as a white crystalline gravel, especially when tne triple salt is the chief part of the deposit. But if a small quantity be present, it may readily escape detection by remaining a long time diffused in the urine. After a repose of a few hours, some of the crystals collect on the surface, forming an iridescent pellicle, "reflecting coloured bands like a soap-bubble or a thin layer of oil. If then the lower layers of the urine be placed on a watch-glass, and held obliquely over the flame of a candle or any strong light, a series of glittering points will become visible from the reflection of light from the facets of the minute prisms of the salt." (*Op. cit.* p. 269.)

77. The phosphates often subside to the bottom of the vessel like a dense cloud of mucus, for which they may be mistaken. Sometimes they form, in very alkaline urine, dense masses, hanging in ropes, like the thickest puriform mucus, from which it is impossible to distinguish them by the unaided eye. Their disappearance on the addition of hydrochloric acid shows at once their nature. The examination of a few drops of the urine between two plates of glass, by the microscope, will detect the characteristic crystals of the phosphates. Occasionally they are mixed in a deposit with the urate of ammonia, this latter being pale or nearly white. As phosphatic urine is usually very pale, it follows that any urate of ammonia deposited from it will be nearly white from the absence of colouring matter.

78. *c. States of Phosphatic Urine.* — Although it may appear necessary for the urine to be alkaline for a deposit of phosphates to exist, yet generally urine which deposits the triple phosphate is acid at the time of its excretion. Some neutral salts redden litmus paper, and yet contain no free acid; and this fact may in some cases explain the occasional acid reaction where deposits of phosphates exist. Dr. O. REES has shown that hydrochlorate of ammonia may some cases be the solvent of the earthy ph phates when in excess. Occasionally urine d not contain any visible deposit, and yet on application of heat appears to coagulate from deposition of earthy phosphates. The additi of a drop of nitric acid immediately dissolves t deposit, and distinguishes it from albumen. T precipitation of the earthy phosphates by h has been ascribed by Dr. H. BRETT to the istence of carbonic acid in the urine in a f state. Dr. B. JONES has, however, shown th if to any urine rich in phosphates, as that pass shortly after a meal, a minute portion of an alk be added to neutralise any great excess of ac the subsequent application of heat precipitates earthy phosphates.

79. Generally where phosphatic depos magnesian, calcareous, or both, exist for a c siderable time, the urine is pale, often whey-li passed in large quantities, and of low speci gravity—from 1·005 to 1·014. "This is especia the case where organic lesion of the kidn exists." On the other hand, when the depos recur and disappear in the course of a few da the urine is generally of a deep amber colo is of high specific gravity (from 1·020 to 1·03 often contains an excess of urea, and presents iridescent pellicle on its surface by repose. T form of phosphatic urine is often met with connection with irritative or inflammatory d pepsia and with mal-assimilation. Sometin prisms of triple phosphate are seen entangled the meshes of a mucous cloud for a day or tv and then disappear. Phosphatic urine oc sionally varies from a whey-like hue to deep brown or greenish brown, is very fœt generally alkaline, "and loaded with a de ropy mucus often tinged with blood, and in whi large crystals of the triple phosphate and am phous masses of phosphate of lime are entangl This variety is almost always met with, eit under the irritation of a calculus, or even of catheter worn in tne bladder," or where act disease of the mucous coat of this organ exists.

80. *d.* For the *microscopic characters* of eart phosphates, I must refer to Dr. G. BIRD's wo where they are fully illustrated. I can only me tion — 1st, *the prisms of neutral triple phosphat* these are well defined, the triangular prism bei the form most frequently met with, but it prese every variety in its terminations; — 2nd, *sim stellæ of the neutral salt*, the radii being more less distinct or crowded;—3rd, *penniform cryst of neutral salt;* this variety presents the appe ance of striated feather-like crystals, two bei generally connected resembling a pair of wing — 4th, *stellar and foliaceous crystals of basic sa* this variety is chiefly formed after the urine is d charged, and, when rapidly formed, it general appears as six-rayed stars, each ray being serrat —*Phosphate of lime* generally presents no appe ance of crystalline structure; it either resembli an amorphous powder, or being collected rounded particles, often adhering to prisms triple phosphate.

81. *B. Pathological Relations of the Phosphat* — I have many years ago contended, and mo recently, in various parts of this work, alluded the fact, that *the secretions* are endowed, to certain extent, with an emanation of vitalit

wch, for a time, resists the changes which they a disposed to enter into either when organic nvous influence is much depressed or when ty are removed from the body. "Indeed, t vital influence modifies their physical condons, in a more or less marked manner, as lg as they continue subjected to its operation. Im this source, also, they are imbued with a vl emanation, the presence of which is indicated bthe continuance, for a time, of the specific charters of each. This emanation, being no longer ruired when they are removed from the body, is sn dissipated. The secretions, while within the sere of the animal system, and for a short time arwards, possess this emanation of the vital infnce, to an amount sufficient to give them cert characters, and to preserve them from the cmical changes to which their constituents are nurally prone; but when this influence becomes dressed, or ultimately ceases, they then undergo dsolution as unequivocal as that evinced by the ttures of the body. In confirmation of this view, Ieed only refer to the comparative conditions of t more perfectly elaborated secretions immedtely after their formation and excretion, and ar periods of various duration have elapsed fn the time of their discharge from the body." (hysiol. *Notes by the Author*, p. 636.).

82. The above doctrine was published by me i1824; and both then and subsequently I have isted upon its importance, and upon the obvious ductions which follow from it. Whilst vital ergy is perfect, or at least not materially impred, the secreted fluids, especially whilst they main undischarged from the body, are preserved b this emanation of vital influence from those cnges to which their constituents are chemically cposed. But if these fluids are retained for an usually lengthened period, or if vital energy, to wich they owe their original natural character, b much impaired, those changes which their cstituents are chemically disposed to undergo, te place more rapidly after their discharge from t body, and in many instances even whilst they sl remain in those receptacles or cavities which a provided for their reception and temporary rention. But with the various manifestations of cpressed vital power, changes in the secretions a not only such as take place after these secretns are produced, but also those which occur cing their production, and which depend upon t existing state of vitality throughout the body, a upon the manifestations and modifications of vlity in the organs especially destined to the fmation of these secretions. When vital energy impaired, or, in other words, when debility is mnifest, whether constituting the only or chief phological condition or associated with others, a with nervous susceptibility or irritability, or wh febrile action, or with organic change, or wh other alterations farther impeding or disturbi the functions of a secreting organ or organs, rults will be furnished by the secretions varying wh the manner in which the general impairment cvital power affects the functions of digestion, aimilation, nutrition, and waste—the successive cnditions of nutritive supply, of vital cohesion ad resistence, of molecular dissolution, of vascar depuration, and of ultimate discharge.

83. This doctrine, which, as I have shown, s been published and taught by me with reference especially to the several secretions and excretions — recrementitious, excrementitious, or depurating — is altogether applicable to the urinary excretion, and to the deposits which form in it, both after and previous to its discharge from the body, and in a more particular manner to the urine which furnishes the phosphates in great or unusual excess. The deposit of earthy phosphates may be viewed as resulting more especially from depression or exhaustion of vital power, as manifested chiefly by the nervous system, and is hence most frequently met with in the aged, and in those who labour under disease of the cerebro-spinal nervous system, or have experienced injury of the spine, or have suffered much from tear and wear of mind and body. The pathological conditions giving rise to the deposits of phosphate of lime, are similar to those producing the triple salt. Indeed, they often occur simultaneously, especially when the urine is alkaline. Dr. G. Bird considers that, when the deposit has consisted chiefly of the calcareous salt, the patients have presented more marked evidence of exhaustion, and of the previous existence of some drain on the nervous system, than when the triple salt alone existed, unless its source is strictly local.

84. When the triple phosphate occurs in small quantities, nearly or quite free from the phosphate of lime, the urine being acid or neutral at the time of emission, the cases are then the slightest of this class of disorders. Nevertheless, severe dyspepsia, irritability, restlessness, impaired assimilation and emaciation are constantly present. When there is an excessive discharge of urea, the symptoms are more severe, and the exhaustion and nervous depression greater. The urine is then of a rich amber colour, generally depositing phosphates on the application of heat, and of a specific gravity varying from 1·025 to 1·030. In mild cases of dyspepsia, especially in the gouty diathesis, an iridescent pellicle of triple salt, the urine being rich in urea and either acid or neutral, is often observed. This state of the urine is not infrequent in dyspeptic females at or about the climacteric period. Crystals of the triple salt occur in very old persons, especially in the ill-fed; in persons recovering from acute diseases, especially from rheumatic fever.

85. Early in continued fever the urine is high-coloured, and loaded with uric acid and urates. It is then generally acid; but after the end of the second week, or earlier, in the lower types of fever, the acidity often vanishes, and the urine becomes *alkaline* and deposits the phosphates. This is, however, more frequently seen in some types and states of fever than in others, especially in the typhoid and putro-adynamic, and when comatose symptoms appear. The treatment, particularly the use of alkaline medicines, or of the salts of the vegetable acids, has some influence in favouring the change to an alkaline state of the urine. In these cases, as well as in other diseases where the nervous energy is remarkably depressed or exhausted, more especially in the low forms of insanity, in cases of debility from venereal excess, masturbation, &c., after injuries of the spine, as remarked by Prout, Brodie, and others, the elements of urea become re-arranged, or obedient to ordinary chemical affinities, and form carbonate of ammonia.

86. When the deposit of phosphates is copious,

the two phosphates are generally mixed, either falling to the bottom of the vessel, or remaining suspended in the urine like mucus; the urine is then generally alkaline, and the odour ammoniacal or fœtid. This kind of urine is most remarkable in organic disease of the urinary organs, or serious affections of the spinal chord followed by such disease. Conformably with the doctrine above insisted upon (§§ 81—5.), the impaired vitality of these organs depending upon depressed vitality of the frame generally, as in typhoid and putro-adynamic fevers, or of the urinary organs especially, as after injuries or diseases of the spine, its chord, &c., so affects the urinary secretion, both during the performance of this function, and whilst the secretion is retained, as to favour the occurrence of those changes, even before it is discharged, which its ordinary chemical affinities dispose it to assume. The change thus produced in the urine, may be followed by the formation of calculi in any part of the urinary apparatus, but most frequently by irritation of the urinary mucous surfaces and by the secretion of a quantity of viscid mucus, which may become puriform or changed, by the carbonate of ammonia formed in the urine, into a viscid and almost gelatinous or tenacious ropy fluid, sometimes preventing the discharge of the urine, and increasing the sufferings of the patient. Mr. Curling's view of this subject is different from that now stated. He believes that the result of the spinal lesion is the loss of the natural sensibility of the bladder. The effect of this is the secretion of unhealthy alcalescent mucus, which acts chemically upon the urine, renders it alkaline, and leads to the deposition of the earthy phosphates. He thinks that the urine may subsequently be secreted in an alkaline state by the extension of the irritation from the bladder to the kidneys, or by the latter sympathising with the former. It should not, however, be overlooked, that injury of the spine not only deprives the urinary apparatus of that share of nervous power reinforcing the organic or ganglial nervous influence which endows this apparatus, but thereby also modifies the secreting function of the kidneys. Whether the result be impairment only, or a modifying action also, there can be no doubt that the chief result of these injuries is paralysis of the bladder, especially as respects its contractile powers, causing retention of the urine, which, whether it be secreted in an altered or morbid condition, or rendered such after its secretion, owing to impaired vital influence, more readily irritates the urinary mucus surface, than in its healthy state, and gives rise to mucous discharge and the consecutive lesions of the urinary organs.

87. The urine may be alkaline and loaded with phosphates owing to disease of the *Urinary Bladder* (see that article), more especially of its mucous surface. This state of the urine thus arises from three important pathological conditions: — 1st, from vital depression, as manifested chiefly by nervous debility and irritability;—2nd, from injuries and diseases implicating the spinal chord or its membranes; — 3rd, from disease of the urinary organs. But it should not be overlooked that the second condition affects the urine by first disordering the functions and subsequently the structure of these organs. It is important to be able to distinguish between these sources of alkalinity of the urine, especially between the presence of a general morbid condition, and a strictly l disease. Dr. Bence Jones has established, urine is alkaline from ammonia when the caus local, and from a fixed alkali when the ailme general. Hence urine may be alkaline, and ammoniacal, although when the latter it is ne sarily the former. The urine is sometimes alka after breakfast, owing to the presence of a fi alkaline carbonate. The urine, in such ca turns red litmus paper blue, whatever may be alkali present; but, if it be a fixed alkali, paper remains blue after being dried before fire; but if it be the volatile alkali, the pa resumes its red tint when thus exposed. W the urine is alkaline from ammonia, Dr. B. Jo has further shown, abundant crystals of tr phosphate are always found, whilst, when ammo is absent, these crystals are rarely present, are replaced by a copious and dense deposi phosphate of lime. He has arrived at the foll ing conclusions as to the relation borne by p phatic salts to certain pathological states:—

88. 1st. No determination of an exces secretion of phosphatic acid can be furnished the deposit of earthy salts, unless the quantity lime and magnesia in the food be taken account; — 2nd. No *real increase* of phosph salts occurs in spinal diseases, notwithstanding existence of deposits;—3rd. In fever and in n acute inflammations, the phosphatic salts are increased; — 4th. In old cases of mania, mel cholia, paralysis of the insane, or in chronic eases in which nervous tissues are uninfluen no conclusions can be drawn; — 5th. In fractu of the skull, the phosphatic salts increase o when any inflammatory action occurs in the br and in acute phrenitis an excessive increase ta place;—6th. In delirium tremens there is a mar deficiency of phosphates, unless they are introdu with the ingesta; an excess is, however, met in some functional affections of the brain.

89. In some instances the urine is copic pale, and freely deposits the phosphates, the pati being emaciated, and the urinary organs free fr disease. In these the formation of a calculus n be dreaded. But when this does not exist, it often be found that tabes dorsalis from mastur tion is the cause both of the constitutional and the urinary disorder. Dr. Golding Bird sta that the deposits of phosphates, where no orga disease exists, are often absent, not only for ho but for days together; and this fact will often dicate a favourable termination of the case; he comes to the following conclusion: — "th where the presence of a deposit of phosphates independent of the irritation of a calculus, or organic disease, it is most abundant in the ur passed in the evening, and absent or replaced uric acid, or urates, in the morning, the urine be always of a tolerably natural colour, never bel and often above the mean density. Where presence of phosphatic salts depends upon irritation of a calculus, or upon organic mischief the urinary passages, the urine is pale and wh like, of a density below the average, often c siderably so, and the earthy deposit is nea equally abundant in the night and morning urin (*Op. cit.* p. 293.)

90. *C. Therapeutical Indications.* — *a.* Wh phosphatic deposits depend upon *irritative d pepsia,* or upon *nervous or febrile disorder,*

lently of affection of the spine or of the y organs, the treatment should be directed to the constitutional, digestive, and assimi- disorders, than to the state of the urine, ought to be viewed only as a symptom. In cases, depression of spirits, hypochondriasis, rious dyspeptic symptoms are present; and ine has a high specific gravity, contains an of urea, and deposits crystalline or amor- phosphates. In these the urinary deposits be viewed as the results of defective vital tritive powers, and as exhausting the ner- energy; and the treatment ought to be d to the functions of the stomach and , and to the improvement of the general , by means of stomachic or tonic aperients, light, digestible, and generous diet, and by infusions or decoctions. To remove the painful symptoms, the oxide of bismuth or e may be given with the extract of ox-gall, e extract of henbane or the pil. saponis sita. In these cases, the means advised in ticles Debility, Hypochondriasis, Indi- n, &c., will generally be appropriate.

9 *b.* When the *phosphatic deposits* depend *xhaustion or injury of the spinal chord*—upon lorsalis, &c., then the medical means require cation. In these, great emaciation, copious atic deposit, the phosphate of lime predo- ng remarkably, pain and weight in the r region, copious pale urine and low spe- ravity, and dryness of the skin, require not he restoratives and tonics already advised, lso a recourse to opiates conjoined with tics, diaphoretics, &c. When these cases d from a blow or other injury of the spine, ench of the back, then the terebinthinate nts or embrocations along the spine (see 296, 311.), the cold salt-water douche loins, followed by frictions or liniments, nplastrum roborans, &c., will be of great e. In many of these (especially when l by masturbation) the preparations of iron, tro-muriatic acid in tonic infusions, the re of sumbul or of musk, or of serpentaria, incture of opium, are severally productive e or less benefit. In mild and prolonged of this kind, a calculus is not infrequently usly formed in the pelvis of the kidney. ese, the mineral acids have been recom- d, as they hold the phosphatic salts in solu- of these nitric or nitro-muriatic acid may eferred; but it has been doubted whether each the kidneys, or act upon the deposit. ver, when given judiciously or conjoined itter tonics, they improve the general health, ereby either prevent or arrest the increase deposit.

9 *c.* When *phosphatic deposits proceed from of the urinary organs*, their connection with a d secretion from the mucous membrane of ladder is well known. The disposition of osphates to adhere to this surface generally ses the difficulty of treatment. For this state osphatic cystitis, weak acid injections into inary bladder have been advised, in order to away the phosphatic formation. A few of the hydrochloric acid, with as many of num opii in tepid barley-water, may be in- daily. Dr. G. Bird advises, in almost case where phosphatic alkaline urine exists, to wash out the bladder by injections of warm water. (See also the treatment of *muco-cystitis* in art. Urinary Bladder, §§ 89—97.).

93. ix. Deposits of Carbonate of Lime. — Carbonate of lime sometimes occurs in small proportions in deposits of earthy phosphates, when the urine is decidedly alkaline, owing to the decomposition of phosphate of lime by the carbonate of ammonia which replaces the urea. Its appearance is that of an amorphous powder; and its presence may be recognised by the addition of any dilute acid, which dissolves it with effervescence; but the deposit should be previously washed to deprive it of any adherent carbonate of ammonia.

94. x. Deposits of Blue or Black Matters. — Certain colouring matters, communicating to the urine a blue or black tint, the products of diseased action, are met with on rare occasions. Three blue pigments, viz., cyanourine, indigo, and percyanide of iron; and two black, melanourine and melanic acid, have been distinguished. These colours as well as green have been mentioned by many of the older writers noticed in the *bibliography;* and have doubtless been owing to the presence of blood or bile altered by the urine. — (*a*) *Cyanourine* was discovered by Braconnet, and noticed by several more recent observers. Urine containing it is of a deep blue colour, the colouring matter being deposited by rest, and readily separated by the filter. The origin of this substance, as well as its pathological indications, if any, are obscure, and merely furnish a subject of conjectural discussions to chemical pathologists.

95. (*b.*) *Indigo* is sometimes prescribed empirically in some diseases, as epilepsy; and it may thus pass into the urine, and form a blue deposit. Prout and Simon have shown that it may be generated in the œconomy, the urine acquiring a dark blue colour, and depositing a substance of the same hue, which, when collected on a filter, presents all the characters of indigo. The origin and pathological indications of this substance, when not taken internally, are unknown.

96. (*c.*) *Prussian blue, or sesqui-ferro-cyanide of iron*, has been found in the urine after taking the ferro-cyanide of potassium upon preparations of iron. It furnishes no pathological inferences.

97. (*d.*) *Melanourine and melanic acid* are black pigments which have been rarely met with in the urine. It is probable that they are merely the colouring matters of the blood altered by the state of the urine. Many years ago a clergyman in London, with whom I was well acquainted, experienced a dangerous immersion in the river, and was saved with difficulty. He soon afterwards began to pass black urine, for which I was requested to visit him. He complained only of a slight weight in the region of the kidneys. The urine was quite black, was passed in about the usual quantity, and was retained nearly the usual time. The lower extremities were not affected. A portion of the colouring matter was deposited, but the supernatant urine was not materially altered from its black colour. I attributed the colour to the escape of red globules of blood with the urine, owing to congestion of the kidneys, and their alteration by the state of the urine. Conformably with this view, I directed blood to be taken from the loins by cupping. The urine soon

afterwards resumed its healthy appearance, and no further complaint was made.

98 xi. Organic Deposits in Urine.—The deposits in the urine which have been noticed above are recognisable by their forms and chemical properties; those which remain to be mentioned, either possess, or have possessed, organisation, and can be distinguished only by an examination by means of the microscope, or of tests.

99. *A.* Blood and its Elements are often seen in the urine, and suggest important pathological and therapeutical indications. The urine may contain only the serum of the blood, or liquor sanguinis; or with this a considerable proportion of red globules; or it may contain a very large proportion of blood, hardly or not at all changed from its normal characters.

100. (*a.*) *Serous or albuminous urine* is readily indicated by heat, and by adding a drop of nitric acid, which coagulate the albumen contained in it. Urine containing much albumen is either free from, or contains but a very small amount of, colouring matter. The reddish urine in granular disease of the kidneys furnishes less albumen by heat than the straw-coloured. Nitric acid and a mixture of one part of nitric and three of hydrochloric acid, are more delicate tests of the presence of albumen than heat. Several sources of fallacy have been pointed out by writers which should not be overlooked when resorting to these tests;—1st. Heat will produce a white precipitate in urine containing an excess of earthy phosphates; but this will disappear on adding a drop of nitric acid, and distinguish it from albumen.—2nd. Nitric acid will produce white deposits in patients taking copaiba, cubebs, or other resinous substances; but heat has no such effect.—3rd. Nitric acid will, in some instances, produce a buff-coloured amorphous deposit in the high-coloured urine in fever, but heat does not cause this change.—4th. Albumen combined with alkalies does not coagulate by heat; therefore nitric acid should be used if the urine be alkaline.—5th. Albumen in an incipient state may not be detected by heat, but readily by means of the acids.

101. Albumen is sometimes found in the urine in a coagulated state, presenting a tubular vermicular appearance, being casts of the uriniferous tubules of the kidneys, often with portions of epithelium adhering to them; and, according to Dr. G. Johnson, loaded with fatty globules. These casts, when recently passed, appear like large hairs; but form after a time a dirty-white sediment, which a solution of potash gelatinises, and distinguishes from mucus. This deposit is pathognomonic of the changes which terminates in granular disorganisation of the kidneys.

102. *Blood* passed in considerable quantity in the urine, may either be more or less intimately mixed in the urine or it may have coagulated in blackish masses like pieces of black-currant jelly, linear masses like leeches being passed through the urethra with great suffering. In the former case the blood generally is poured out in the kidneys or their pelves; in the latter it is most frequently effused in the bladder. In either case the urine is always more or less coloured, often so deeply as to present a port-wine colour; the microscope showing some entire blood-globules, and others with their investing membrane broken down, and their coloured contents diffused in the urine. If the quantity of urine be sma the urine may appear like the washings of meat r of a dirty or dingy hue, the red-globules beir still recognisable by the microscope. The coag tion of the urine by repose seldom occurs: it is ving to the presence of fibrin, which, however, very rarely effused without an admixture of od-globules, giving the coagulum a reddish our, or, of a fatty matter, imparting to it a whi or opaline hue.

103. *Hæmatosine*, or the colouring tter contained within the sacs of the blood-gl les, imparts to the urine a deepness of tint in p portion to the quantity of the colouring matter hich has escaped from the sacs of the blood-gl les, or rather to the number of these globules hich are ruptured. Generally, however, the ine when recently voided, contains some g ules that remain entire; and, with the colourin matter, more or less albumen, which is affec , as shown above, by heat and nitric acid, exc ting that the coagula are more or less brown ov g to the presence of hæmatosine. When, ho ver, the urine is much loaded with *purpurine*, uric *acid*, or with *bile*, these may be mistak for hæmatosine. The *first* of these will not affected in colour or transparency by a ling heat; the *second* is not affected by heat, d is at once distinguished by the characters of deposit; the *third* may be detected by pou g a thin layer of the urine on a white plate o heet of writing paper, and let a drop or two of tric acid to fall upon it, when a change of colo , in which green and pink predominate, will b produced. *Hæmatoxylon, pareira, chimaphil* and *senna*, the former especially, will impart a dish or brownish hue to the urine; but these be distinguished from hæmatosine by the kno dge of their having been taken, by the black p ipitate produced by sulphate of iron when t first of these has produced the redness; and the absence of albumen and hæmatosine as ards all of them.

104. The presence of blood-globules in th rine is best determined by the microscope. the blood be recently effused, they will eit be found adhering in rouleaux, or unaltered in re. But if it have been effused for some time r if the effusion has been slow, or the exudatio an asthenic character, the linear arrangement the globules is lost, the investing membrane, ing ruptured, is collapsed around their corpusc or nuclei, and ultimately the globules appear i gular in their margins.

105. (*b.*) *The pathological indications* of th presence of the elements of blood, or of blood any form, in the urine, has always been of impor ce, but it has become of even greater importa to the physician since the enlightened investi ion by Dr. Bright of the diseases of the ki ys. When pure blood, or even the admixture its globules in large quantity, is observed i the urine, it may be presumed that active or p ive hæmorrhage from some part of the urinary assages has occurred; the more pure the bloo nd the less intimately mixed with the urine, the ore probable is the effusion to have taken place he lower passages of the apparatus. If the qu ity of hæmatosine be so small as only to ti he urine, it is to be presumed that both it ar he albumen also present result from the con ed

of the kidneys connected with the cachectic mation of these organs, which terminate in ganic changes which render them incapable minating the nitrogenised elements of urine f depurating the blood, although the secret- ower is so far preserved as to separate the en and water, this latter element being ulti- y very incompletely removed. (See Art. EYS, § 83 *et seq.*)

. When the presence of Albumen in the was first shown to be a proof of granular e of the kidneys, I contended (see Art. SY, § 36 *et seq.*), that this state of urine d in several other diseases, especially in rile and exanthematous maladies of chil- and, when congestion of the kidneys is oned by other affections or circumstances, gh not always or continuously observed, et it was a contingent and occasional or rary occurrence. Since this statement was from a varied observation, the truth of it een confirmed by many subsequent ob- s. When blood is voided in large quantity, en coagula are passed with the urine, breach face or lesion of a bloodvessel may be in- ; but the particular cause of lesion, whether stion, rupture of a vessel, or injury, or irri- of a calculus, or malignant or fungoid dis- and the seat of either of these morbid ions can be ascertained only from a careful nation of existing symptoms, in connection he changes in the urine just mentioned (§§ 106.), and with the circumstances attending tention and calls to void this excretion.

7. (*c*) *Therapeutical Intentions.* These are l, or even opposite, according to the conclu- at which the physician will arrive, after due nation and consideration of the peculiarities ch case, respecting the seat, cause, and vital ions of Hæmaturia, as fully set forth under ead in the Article HÆMORRHAGE. (See *rrhage from the Urinary Organs*, §§ 204— 22

8. *B.* PURULENT MATTER IN THE URINE.— s seen in the urine consequent upon suppura- n the kidneys, or in any part or the urinary s, or in parts communicating with the urinary atus. It is also contended that, in cases of ss of internal viscera, the purulent collection netimes absorbed and discharged with the But it is more probable that pus-globules, absorbed, are metamorphosed either during passage into, or during their circulation in, lood, and that they cannot be eliminated by ing organs, unless thus metamorphosed or ed to simpler elements.

9. *a. The appearances of purulent urine* vary the seat of the disease. This urine is gene- acid or neutral. The pus falls to the bottom vessel by repose, and forms a dense homo- ous deposit, of a pale greenish or cream- r. It never hangs in a stringy form in the like mucus—unless the urine be alkaline,— t becomes uniformly diffused in the urine by ion. If the deposited pus be agitated with ual quantity of liquor potassæ, a dense trans- t gelatinous mass, of a thick mucous appear- , is formed. When the pus is agitated with , fat is dissolved and left in the form of r-like globules, when the ether is allowed to orate. The urine decanted from the purulent deposit yields albumen on the application of heat or nitric acid. When purulent urine is alkaline, the deposit is viscid, and is not readily diffused by agitation through the fluid, resembling some mucous deposits. The presence of albumen in the purulent urine, "and the conversion of the deposit into a white granular mass, destitute of its previous viscidity by the addition of acetic acid," indicate the nature of the deposit. In females, the urine may contain a purulent matter derived from the vagina, in cases of leucorrhœa—a circumstance requiring consideration.

110. *b. Microscopic characters.*—Pus consists of round globules somewhat larger than blood-globules, floating in an albuminous fluid, or *liquor puris*, which differ from the *liquor sanguinis*, chiefly in the absence of fibrin, and consequently in the inability of coagulating spontaneously. Under the microscope, the globules appear "white, roughly granular exteriorly, and are much more opaque than blood-globules. On the addition of a drop of acetic acid, the interior of the globule becomes visible, and is found to be filled with several transparent bodies or nuclei." Hence the pus-globule is a regularly organised body, consisting of a granular membrane enveloping transparent nuclei, being, in other words, a nucleated cell. (*See* DISEASE, §§ 131, 132, *and the Microscopic Characters more fully in the Art.* PUS, and in URINARY BLADDER, § 48.)

111. *C.* MUCUS is present in healthy urine in very small quantity. When irritation exists in any part of the urinary apparatus the mucus is greatly increased, and generally in proportion to the amount and extent of it; this secretion varying from a flocculent cloud in the urine to the production of a fluid so viscid as to form a copious ropy deposit. This condition of the urine is generally alkaline, and undergoes a putrefactive change soon after it is passed, or even before being voided if it be long retained. Although it be acid when passed, it rapidly becomes ammoniacal. Mucus contains no albumen admitting of coagulation by heat or nitric acid (§ 100.), and hence mucous urine simply "can never be albuminous like pus, unless the albumen be derived from some other source. Agitated with ether, mucus gives merely traces of fat, and in this respect also differs from pus." (For the *pathological* and *therapeutical* relations of Mucous Urine, see the Art. URINARY BLADDER (§ 47 *et pluries.*)

112. *D.* EPITHELIUM.—Exfoliation of the epithelial covering of the genito-urinary mucous surface is constantly taking place, but with very different rates of rapidity. This covering is sometimes partially detached, so as to appear like patches of membrane-like mucus; some of the epithelial cells being irregularly lacerated, others entire, and readily recognised by the aid of the microscope. When distended by fluid they are oval cells which become irregularly angular and flattened when partially empty. When quite empty they present in each a central nucleus projecting above the surrounding surface. These cells are said sometimes to contain fat globules, especially in the Morbus Brightii. When the exfoliation of epithelium is copious, a deposit is thereby formed in the urine, resembling mucus, but differing from it in the absence of viscidity. With liquor potassæ this deposit gelatinises nearly as perfectly as when pus is present. When an

abundance of epithelium is found in the urine, oxalate of lime often also is present; the irritation of the mucous surface of the urinary passages, especially in the kidneys, very probably at the same time that it detaches the epithelium, converts the uric acid and urates into the oxalate.

113. *E.* Spermatozoa, or what has been called spermatic animalcules, are sometimes found in urinary deposits, when the urine of the male adult has been allowed to repose for a time.—*a.* The only means of distinctly determining the presence of semen in the urine is by ascertaining the existence of spermatozoa by the aid of the microscope. "These minute bodies never occur living in urine, unless protected by the presence of a deposit of pus, in which they retain their power of moving a long time after emission." In the microscope "the spermatozoa will be observed as minute ovate bodies, provided with a delicate bristle-like tail, which becomes more distinct on allowing a drop of urine to dry on the glass. Mixed with these are generally found round granular bodies, rather larger than the body of a spermatozoon, and nearly opaque from the numerous asperities on the surface of the investing membrane. These appear to be identical with the seminal granules described by Wagner and others." (*Op. cit.*, p. 359.)

114. *b.* The presence of spermatozoa in the urine furnishes certain *Pathological Indications* of much importance. They may be present owing to the discharge of urine immediately or soon after seminal emission, the urine washing away the portion of semen which may remain in the urethra; or owing to a costive motion having pressed upon the spermatic receptacles, so as to press out a portion of their contents. However the presence of these bodies in the urine may be accounted for, the fact that they are commonly observed in persons who have weakened their sexual organs, either by excessive female intercourse, or by the unnatural vice of masturbation, is indisputable; and in such persons chiefly or only spermatozoa, and the much discussed affection of spermatorrhœa, is observed. The pathological and therapeutical indications furnished by this condition of the urine are considered under the head of Impotence, and more fully under that of Pollution, *voluntary and involuntary.*

115. *F.* Fatty or Oily Matter has not infrequently been found in the urine, generally, however, in minute traces only, and very rarely in any considerable quantity. It is most probable that some of the instances, in which oil has been said to have existed in the urine, have been those in which the oil-like pellicles of the earthy phosphates have formed on the surface of the urine. The genuine states of fatty urine have generally resembled milk in colour and opacity, and have gelatinised on cooling. The term chylous urine has been applied to these states by Dr. Prout. Dr. Eichholz and Dr. G. Johnson contended that oil or fat existed in the urine in granular disease of the kidneys, owing to the superabundance of fat in the epithelial cells of the tubular structure of the kidneys, and to the escape of these cells from the tubuli and admixture with the urine. But the quantity of fatty matter thus mingled with the urine is rarely such as to give rise to appearances indicative of its existence, unless the deposit be examined under the microscope, when the cells containing oil, som mes presenting casts of the tubes, from whic hey have been detached, may be observed.

116. In most cases of chylous urine, albu n is present in very varying quantity, and form with the fat an intimate admixture or emulsion. The fat may be obtained by agitating the urin with an equal quantity of ether in a tube. Th presence of fat in albuminous urine may be wed as a strong indication of organic disease of t kidneys; but the combination rarely exists in h a manner as to give rise to the chylous appe nce of the urine. It should not be overlooke hat instances sometimes occur, in which hys ical females, to create interest in their cases, to obtain other ends, have imparted a mor appearance to their urine, by adding to it m or small quantities of blood, or other matte by which the medical attendant has been de ed. Such instances have come before me and ther physicians with whom I am acquainted. ave rarely seen cases of chylous urine. Th most remarkable instance of it which I have ob ved was in a mulatto young man from the West ies. Dr. G. Bird states that, in the chylous u he has examined, he has failed in detecting der the microscope the slightest appearance oil-globules, blood-discs, or pus-granules; the city appearing to depend upon the presence of rticles so minute as to present no defined form M. L'Heritier has, however, remarked that oi globules can always be detected in fatty urine and Dr. Simon, of Berlin, has made the san remark, and has stated that he has met wit ree varieties of fatty urine; one in which the is merely diffused through it, and collects its surface by repose, as in cases recorded b Dr. Elliotson; the other in which the fat is mbined with albumen; and a third, in whic the fatty matter existed with casein as an em ion forming the true milky or chylous urine. Dr. Bence Jones has investigated this state the urine, and has arrived at the following concl ons respecting it:—

1st. The fat on which the milky aspect the urine depends appears after the absorpti of chyle, but the albumen, fibrin, blood, and kaline salts, may be found even when no foo has been taken, and consequently no chyle fo ed. 2nd. During absolute rest, albumen disa ars from the urine, and does not reappear in ny quantity, even after taking food, unless ve exercise is employed. A short time before ng early, the urine gelatinises by repose, but i ree from fat. 3rd. This state of urine does not d nd upon the presence of an excess of fat in the od as proved by actual analysis. 4th. The s of this disease is probably some slight alterat in the structure of the kidneys, by which, whe he circulation through these organs is most a e, one or more of the constituents of the blood de from the capillaries and escape into the urine

Dr. G. R. Bouyun, of Demerara (D G. Bird states), has observed cases of chylous ne so frequent in creoles and negroes as to be en epidemic in that country. This state of the ne appears to be attended by irritative fever nd emaciation as in diabetes. He attributes th sease to lesion of the assimilative functions; nd he treats it by the free administration of a d coction of the mangrove bark (*Rhizophera race*)

Th medicine acts freely on the skin, increases the sec tion and alters the character of the urine, and im oves the general health.

7. *G.* Confervoid Growths.—*Torula Cere-* *ris*—*Fungoid Growths* — *Vibriones, &c.*, have be described as existing in the urine, in certain sta of the frame, chiefly characterised by remark- ab depression of vital power. The existence of the may be imputed to the presence of albumi- no fibrinous, saccharine, or other matters in the rine, and to changes which have taken place in ese after the urine has been discharged, al- thc h they may possibly be formed in the blad- de when the urine is long retained in these mor- bic tates in this viscus, especially when the vital en ies are very much depressed, and the other cir mstances favourable to these productions al- rea adverted to (§ 82.) are present.

3. *H.* Hydatids have been passed in the urine; bu ases in which they thus have been observed are xtremely rare. Instances have, however, bee recorded in the Philosophical Transactions (N 273) and in the Medical Observations and In ries by Mr. Russel (vol. iii.). A case ca before me many years age, in which a num- be varying in size from a small pea, to that of a lar bean, were passed, in the course of two or thr days. Soon afterwards the case passed from un my observation, without being able to as- cer n its issue.

9. xii. Foreign Bodies.—*Worms, &c.*, have be often found in the urine, in some cases in co quence of having been introduced into the bla ler, in others from having been put into the uri with the intention of deception; and, in mc instances owing to their passage by ulcera- tio penetration, or otherwise, through the pa- rie of some portion of the digestive canal, or ab minal parietes. Whoever may be desirous of rusing cases of this description will find a nu ber of them related in the Ephemerides of N ral Curiosities, and in the Memoirs of the Fr ch Academies, and various other works enu- me ted by Ploucquet and Reuss.

0. IV. Gravel.—*Urinary deposits,* such as ar bove described, are formed on the cooling of ur , and are, as described, either loose and pul- ve ent, or more concrete, crystalline, or sand- lik These deposits, although associated with, or sy ptomatic of, various diseases, may occasion, as spects their effects upon the urinary organs, bu ittle disorder. But when deposits are formed in e warm urine within the urinary apparatus, ov g either to the quantity of these matters con- ta d in the urine, or to changes in the states of th constituents, or of temperature, vital endow- m t, &c., and are discharged with the urine in th orm of a fine powder, or of crystalline sand- lik particles, or of small masses, then the disease is med *Gravel,* and the symptoms are sometimes ve severe.

21. The discharge of such gritty matters as th with the urine is usually attended by symp- to of irritation, and pain in the regions of the ki eys, ureters, bladder, and in the urethra, th eby constituting whilst characterising the co plaint commonly denominated gravel. The si s of irritation may be slight, or they may be se re in one or other of the situations just named, or ven in two or more of them. But the signs, as ell as the causes which produce this condition of the urine, are the same as those which attend the formation of calculi in the urinary apparatus, although they are very frequently much less severe. The chemical constitution of the gravel discharged is generally the same as that of urinary calculi; the difference consisting chiefly in the constituents precipitated from the urine being detached or incoherent, or forming numerous minute crystals, instead of large concretions, of many concentric layers. In the former case, the deposits within the urinary organs are washed away by the urine before they have been sufficiently long retained to concrete into a nucleus, or to become a large calculus — or to assume the characters now to be described.—Calculi. The *Treatment of Gravel* is manifestly the same as that recommended for urinary deposits and *Urinary Calculi.* (See § 179 *et seq.*)

122. V. Urinary Concretions or Calculi.— Correct views as to the composition and formation of urinary concretions or calculi are of comparatively recent date. Previously to Van Helmont these concretions were believed to be derived from matters contained in the food and drink; but he contended that they are not formed from these sources. Hales confirmed the opinions of Van Helmont as to the differences between urinary concretions and common stones, and first directed attention to the discovery of a solvent for these concretions. Boyle, Whytt, Alston, Slare, and others, subsequently speculated on the subject of solvents for calculi. Whytt proposed lime-water for this purpose; and Alston contended that, although lime-water is of some service in urinary affections, it is not a solvent of calculi. At the commencement of the last century the Leyden School of Medicine taught more correct doctrines of the formation of urinary concretions than had previously been entertained; and showed that these nuclei were derived from the kidneys or from the bladder. Van Swieten contended that the elements of calculi exist in the urine of men the most healthy, and that if the urine be evacuated before these elements concur in the formation of a concretion, no such production takes place. He considered that the concurrence of the elements in the formation of calculi is exerted more or less slowly in different persons; and that according to the rapidity or slowness of such formation, the concretions are formed either in the kidneys or in the bladder. In 1776 Scheele discovered uric acid, and found it in all the calculi he examined, as well as in all the urine. Bergmann soon afterwards discovered lime in certain concretions. In 1797 Wollaston published his discovery of three calculi in addition to those described by Scheele — viz., the fusible, mulberry, and the bone-earth—and demonstrated the chemical composition of these calculi. A few years afterwards Fourcroy and Vauquelin announced the presence of urate of ammonia and silica in urinary concretions. Dr. Wollaston, in 1810, discovered cystic oxide as an urinary calculus. Dr. Marcet published an able work on urinary concretions in 1817; and Dr. Prout furnished, in 1821, more extended and exact views as to their formation in his treatise on this subject. Since this period the works of Mr. Wilson, of Sir B. C. Brodie, of Mr. Crosse of Norwich, of Dr. T. Thomson, of Dr. Cumin, of Dr. Owen Rees, of Dr. Bence Jones, of Mr. Coulson, and the

more recent publications of Dr. Prout, have carried the pathology and treatment of urinary concretions to their present very high position in practical medicine and surgery.

123. *A.* The *form* of urinary concretions is generally more or less globular or ovoid, especially after remaining long in the bladder. Renal calculi are, however, often of an irregular form, owing to their being moulded in the pelvis of the kidney, &c., or are branched like a coralline. Sometimes those found in the ureter are cylindrical. When two or more calculi exist in the bladder they often present a polyhedral or an irregular shape, from one or more of their sides being flattened, either by attrition or by diminished concentric deposition on these sides. When the calculi formed in the kidneys and passed into the bladder are irregular or branched, the shape of the nuclei which they constitute is not altogether removed by the successive deposits formed around them in the bladder. When a portion of a calculus is embraced by a fold of the mucous membrane, or sacculated between the muscular fasciculi or coats of the bladder, the part exposed to the urine increases by successive deposits, so that the sacculated portion ultimately appears to form a pedicle to the entire calculus. (Coulson.)

124. *B.* The *size* and *weight* of urinary concretions are most various — ranging from a few grains to many ounces. Earle mentions one weighing forty-four ounces; Lister, one of fifty-one ounces; and Morand, one weighing six pounds three ounces! The concretion described by Earle measured sixteen inches in circumference. The *number* of calculi co-existing in the bladder or in the kidneys is often very various. Most frequently vesical calculi are solitary; but two or even more are not uncommon. They are often numerous in one or both kidneys; but generally not equally so in both. From ten to twenty or even thirty in both are not uncommon. An equally great number are very rarely found in the bladder; although it is stated that fifty-nine small calculi were found in the bladder of Buffon.

125. *C.* The *surface* of calculi also varies in its colour and characters. The *colour* passes from “ white through pale yellow to brown, brownish-green, and even almost to black. Phosphatic calculi are often white; those of uric aci from yellow to brown; those of xanthic have a cinnamon brown tint; while cal oxalate of lime vary from yellow to yell brown, brownish-green, or even blackish-g The surface is either smooth, and even polisl covered with minute crystals, or more rough, and even tuberculated, as in the mu calculus.

126. *D.* The *internal structure* or sectio calculus is either uniform, or formed of con layers surrounding the nucleus; and, in a to the concentric lines indicating the separa the layers, other lines, radiating from the n to the periphery, are observed in many of th cretions. In some the concentric layers are separable, in others very firmly adherent, cially when the layers are indicated only b faint lines, as in the oxalate of lime calculu

127. *E.* The *chemical composition* of the nu and of the concentric layers or deposits, m the same; or that of the superimposed strat differ from the nucleus, or each of the strat be different. The *constituents* are *first* those form entire calculi or layers, in a nearly pure and *secondly* those which contain, associate these constituents, small quantities of othe stances.

128. *First Class.* — 1. Uric acid. — 2. U xanthic oxide. — 3. Urate of ammonia. — 4. oxide, or cystine. — 5. Ammoniaco-mag phosphate. — 6. Oxalate of lime. — 7. Pho of lime. — 8. Carbonate of lime. — 9. Mixed phate of lime, and phosphate of magnesia an monia.

129. *Second Class.* — Those concretions with the foregoing, contain the following in quantities. — 1. Urate of potass. — 2. Urate of — 3. Urate of lime. — 4. Urate of magnesia. Carbonate of magnesia. — 6. Silica. — 7. O matter, fat, extractive, albumen, vesical m blood. In addition to these, oxide of iron, be of ammonia, phosphate of iron, urea, oxal ammonia, hydrochlorate of ammonia, in minute quantities, are said to have been for

130. The following Table, drawn up b Bence Jones, shows the readiest means of taining the composition of urinary calculi:—

1. *By Heat.*	2. *By Acids.*	3. *By Alkalies.*	*Nature of Calculus.*	*Additional Tests.*
Destroyed by heat.	With nitric acid, red.	Soluble in carbonate of potash, evolving ammonia.	*Urate of ammonia.*	Soluble in water when bo
		Soluble in carbonate of potash, evolving no ammonia.	*Uric acid.*	Not soluble in water v boiled.
	With nitric acid, not red.	In ammonia, soluble, crystallising when evaporated.	*Cystic oxide.*	Soluble in strong caustic tash: the solution gives phuret of lead, when b with a solution of aceta lead.
		In ammonia, soluble, not crystallising when evaporated.	*Uric or xanthic acid.*	Dissolves without effer cence, in nitric acid, lea a lemon-coloured resi soluble in strong sulph acid, not precipitated dilution.
		In ammonia with difficulty soluble, not crystallising.	*Fibrine.*	With nitric acid beco yellow.

By leat.	2. *By Acids.*	3. *By Alkalies.*	*Nature of Calculus.*	*Additional Tests.*
des yed by at.	With hydrochloric acid, soluble; before heat effervesces.	Solution in acid, when neutralised, gives a white precipitate with carbonated alkalies and oxalate of ammonia.	*Carbonate of lime.*	Soluble in dilute acetic acid, with effervescence.
	With hydrochloric acid, soluble; after heat effervesces.	Solution in acid, when neutralised, gives a white precipitate with carbonated alkalies and oxalate of ammonia.	*Oxalate of lime.*	Insoluble in acetic acid. Decomposed by strong sulphuric acid, yielding carbonic acid and carbonic oxide.
	With hydrochloric acid, soluble, without effervescence; or before or after heat.	Solution in acid, with excess of ammonia, gives a white crystalline precipitate.	*Phosphate of ammonia and magnesia.*	With phosphate of lime is very fusible before the blow-pipe.
		Solution in acid, with excess of ammonia, gives an amorphous white precipitate.	*Phosphate of lime.*	With phosphate of magnesia and ammonia is very fusible before the blow-pipe.
		Solution in acid, with excess of ammonia, gives a white, partly crystalline, partly amorphous, precipitate.	*Mixed phosphates.*	Easily fusible, without addition, before the blow-pipe.

1. i. *Uric acid calculus.*—Uric acid is the most eq nt constituent of urinary concretions, either lon or in combination with bases, especially rat of ammonia, &c. Calculi consisting of uric cid nly, or containing in addition a small quan- ty colouring matter, are more common than hos of any other single constituent. Mr. Coul- on ates the relative number of pure uric acid alc in the Museum of the College of Surgeons o b ne-third of the whole collection. Dr. Prout sti ted the general average of this concretion in he veral known collections to be nearly 1 : 6½. Th elative proportions of those composed chiefly f c acid mixed with urate of ammonia, and of ra of ammonia with minute proportions of urate inc xalate of lime and phosphates, are estimated t 3½; and including the calculi in which the nu are formed of uric acid, the proportion is bo 1 : 1½. The calculi into which uric acid ent in larger or smaller proportions, as one of the nstituents, in the Collection of the London Co ge of Surgeons, are as 1 to 1·36 of the wh number. Two chief varieties of this cal- cul consist—1st, of that in which the uric acid is posited in more or less distinct concentric lay , the section of the calculus presenting a ser of concentric circles of a compact and semi- cry lline structure;—2nd, of that in which the aci orms a mass of crystalline amorphous grains. Th varieties, however, often are mixed, or pass int ach other. The first of these have a some- tin granular or finely tuberculated, but smooth or lished surface. When broken, the fragments are ngular, whose surfaces are fibrous, as if the co retion were composed of crystalline fibres ra ting from the centre to the circumference. Th fracture is always in the direction of these ra ting fibres and of the concentric layers. The se d variety, in which no concentric lamellæ are se consists either of a firm aggregation of crys- tal e grains presenting a radiated appearance, or of porous and earthy structure, often more or le loosely cohering. These calculi are less re- gu r than the former, "have a rough surface, a gr ular and unsymmetrical fracture, and are m frequent in the kidneys. The nucleus of the la nated variety frequently presents this cha- ra er. This form of calculus is more liable than th compact laminated variety to spontaneous fracture in the bladder." Calculi sometimes present cracks in the direction of the radiating fibres, probably owing to an unequal density in the deposits.

132. A third variety of uric acid calculus is known as the pisiform, and is very common. It is seldom solitary; many may exist at the same time in the bladder, and some may be voided by the urethra. They are chiefly formed in the kidneys, and are rarely larger than a common bean or large pea. They have irregular angular shapes caused by attrition against each other, are crystalline, laminated near the surface, and often coated with a thin layer of urate of ammonia.

133. The specific gravity of uric acid calculus varies with the density, and is usually from 1·5 to 1·786; but it has been observed in rare instances as low as 1·276. The colour of this calculus varies from pure white to a deep brownish-red; the colouring matter being of the same nature as that of the urine. (§ 18.) Uric acid is insoluble in alcohol and ether; but is soluble in solutions of potash and soda when heated, and in phosphate and biborate of soda, and is precipitated from these by acids. Solutions of the alkaline bicarbonates do not dissolve it. Nitric acid dissolves and decomposes it, equal volumes of carbonic acid and nitrogen being evolved. "Sulphuric and hydrochloric acids do not affect it. Uric acid is a feeble acid, but combines with bases, and forms salts with them. The alkaline urates are sparingly soluble, but very much more so than the pure acid."

134. ii. *Urate of ammonia calculus*, unmixed, is rare. In the collection of the College of Surgeons it exists in the proportion only of one in 500, although this substance forms the nucleus of nearly one-third of the whole collection. (Coulson.) Dr. Prout, in 1823, first fully demonstrated the nature of this concretion, which seldom exceeds an inch in diameter, and is almost peculiar to childhood. It very rarely occurs in an unmixed state after puberty, and its formation is attended by much constitutional irritation. It is flattened, ovoid, smooth, of a brownish-grey or clay colour, often with a greenish tinge. It is usually compact in structure, earthy and brittle, consisting of thin concentric layers, so closely applied to each other as to appear homogeneous. The laminæ are, however, easily separated. Urate

of ammonia is a common deposit from urine, having an alkaline reaction, carrying with it more or less colouring matter, which gives it a yellow or brown hue. In its pure state it is white, and much more soluble in water than uric acid.

135. This salt is often associated with oxalate of lime in calculi, the formation of this latter being preceded by a condition of the urine which favours the deposit of urate of ammonia, so that the nucleus may be formed of urate of ammonia, while the surrounding layers are a mixture of these salts. These calculi sometimes also contain a small quantity of urate of lime. Urate of ammonia is also frequently associated with the earthy phosphates, either as a nucleus or in alternate layers, or mixed in various proportions with the other constituents.

136. iii. *Xanthic or uric oxide calculus* is so very rare as hardly to deserve notice; only four specimens of it having been found. It may be distinguished by the means stated in the table given above (§ 130.).

137. iv. *Cystic oxide calculus* is also rare. It is a product of the kidneys only, and hence should be differently named. Dr. Prout found it only in four out of seven museums. That of the College of Surgeons contains one or two specimens. It is small, round, and yellowish, with a smooth semi-transparent and glistening surface. This substance is generally free from admixture with others; "but uric acid sometimes forms the nucleus, and a layer of uric acid has been found surrounding a nucleus of cystic oxide. It is also occasionally associated with ammoniaco-magnesian phosphate, and carbonate of magnesia."

138. v. *Oxalate of lime calculus*, in an unmixed state, exists in the Museum of the College of Surgeons in the proportion of 1 : 20; in that of St. Bartholomew, as 1 : 15; and in that of Guy's Hospital, as 1 : $14\frac{1}{2}$. When oxalate of lime calculi having nuclei of urate of ammonia are included, the proportion in the Museum of the College of Surgeons is 1 in $3\frac{1}{2}$. If all the calculi be taken in which the oxalate of lime exists in any amount, then the proportion is, according to Dr. Prout, in St. Bartholomew's Hospital, 1 : $4\frac{1}{2}$; in Guy's, 1 : 4; in Norwich, 1 : $7\frac{1}{2}$; in Manchester, 1 : $6\frac{1}{6}$; in Bristol, 1 : $3\frac{1}{3}$; in Swabia, 1 : 27; and in Copenhagen, 1 : $2\frac{1}{10}$; the average proportion being 1 : $4\frac{1}{3}$. Oxalate of lime calculus is rarely pure, being associated with urate of ammonia, uric acid, urate and carbonate of lime, colouring matter, and blood. This calculus, long known by the name of Mulberry Calculus from its tuberculated surface and its resemblance to that fruit, has usually a rounded shape, its surface being dark brown, or nearly black. Its internal structure is compact and hard, imperfectly lamellated, the layers forming waving lines, the colour of which is such as to give the surface of its section a resemblance to a section of a piece of gnarled oak, varying from white or yellow to yellowish-brown, or dark brownish-green. The tubercles of the surface appear to consist of stellate crystals. A second variety of the oxalate of lime calculus is crystalline throughout, its surface being studded with crystals of the oxalate in acutely angled octahedra, these being nearly pure oxalate of lime. A third variety consists of small rounded masses, with a smooth, polished surface, known as the hemp-seed calculi. It is occasionally c line at the centre and laminated towar surface, but the laminæ are so fine as to gi section almost a compact appearance. It is posed of mixed oxalate and phosphate of l variable proportions.

139. vi. *Phosphate of lime calculus* is ra pecially in a state of purity. Two varieties been described,—"one evidently of rena other of vesical origin. Although entire of pure phosphate of lime are uncommon substance is often found nearly pure in the la of alternating calculi." Dr. Prout state calculi of phosphate of lime are in the r 1 : $32\frac{1}{4}$ in St. Bartholomew's Hospital; of in Guy's; of 1 : 132 in Norwich; and of 1 in the Bristol hospital. The general prop of these calculi to others is 1 : 117. No men exists in the Museum of the College o geons, and in some other collections. Th culi considered renal are composed of the tral phosphate of lime; those considered are more common than the former. Conc of neutral phosphate of lime are usually brown, with a polished surface, regularly nated, and the laminæ so slightly adheren be easily separable into concentric crust some, radiating lines are seen perpendicu the laminæ. Those calculi contain animal which is precipitated from the alkaline urin the phosphate of lime.

140. vii. *Ammoniaco-magnesian phosphate ca* is commonly known as the "triple phosphate. double salt rarely forms an entire calculus, a very common constituent of other calculi, mixed with phosphate of lime, as in the calculus, or forming layers in alternating c The proportion of calculi consisting of pure phate of magnesia and ammonia, in the tion of St. Bartholomew is as 1 : 129; in as 1 : $43\frac{1}{2}$; in the Bristol hospital, 1 : 21 Copenhagen, 1 : $19\frac{1}{2}$; in the Museum of th lege of Surgeons, 1 : 200; while the oth lections mentioned by Dr. Prout conta specimen. The general ratio is 1 : $126\frac{2}{3}$. moniaco-magnesian phosphate is a freque posit from alkalescent urine, but usually with more or less phosphate of lime. Cal this double salt "are generally white, uneve roughened by the projecting summits of the tals, which are transparent in the recent stat opaque and without lustre after being ke some time. These calculi are either not nated or imperfectly so, are friable and easi duced to powder. But occasionally the hard, compact, and laminated; exhibiting a transparent crystalline fracture, which gives the aspect of alabaster" (Coulson, *O* p. 291.).

141. viii. *Fusible Calculus.*—Calculi know this name consist of a mixture of phosph magnesia and ammonia, with phosphate of li very variable proportions; and they form a siderable portion of all collections. In the C of Surgeons they are as 1 : $13\frac{1}{2}$; in St. B lomew's, as 1 : $12\frac{1}{10}$; in Guy's, 1 : $3\frac{1}{2}$; in Nor as 1 : 19; in Manchester, 1 : $8\frac{1}{2}$; in B 1 : 12; in Swabia, 1 : $11\frac{1}{2}$; and in Copenh as 1 : $19\frac{1}{2}$, according to Prout: the av proportion being 1 : $12\frac{1}{4}$. Fusible calcul white, grey, or dull yellow; and more f

n any others, "being sometimes so soft as to iten the fingers like chalk when handled: these not laminated. Others have distinct lamellæ, h sparkling crystals of triple phosphate be- een them, which are so slightly adherent as to readily separated; others, again, are composed crystals aggregated into a confused mass." ese calculi are usually globular or ovoid, but netimes very irregular in shape, being occa- nally moulded by the cavity in which they are med. "They often attain a large size, and some- nes fill the whole cavity of the bladder; in this e impressions of the folds of the mucous mbrane are visible on the surface, and when o or more in the bladder, they take a cubic or rahedral form." Excrescences composed of triple osphate are sometimes found, resembling pearls. e ammoniaco-magnesian phosphate is most undant in those which have a shining crystalline ture, the phosphate of lime in the earthy and orphous variety. The fusible calculus is found all parts of the urinary organs, and in large ts, or in cavities in the prostate gland. Ac- ding to Mr. TAYLOR the earthy phosphates are ely succeeded by any other deposit; the only eptions being one in the College of Surgeons, which layers of mixed phosphates exist in an alate of lime calculus, and one in St. Bar- lomew's Hospital, in which a fusible calculus surrounded by a layer of uric acid. The two redients of fusible calculi seem to have a dis- ct origin; the ammoniaco-magnesian phosphate ng derived from the urine, while the phosphate, h a small proportion of carbonate of lime, is reted together with mucus by the irritated cous membrane. This is shown in calculi med around a foreign body introduced into the dder. This body is first incrusted with phos- ate and carbonate of lime, derived, it is believed, efly from the mucous surface of the bladder; l subsequently, the irritation being extended the kidneys, the urine becomes alkaline, and moniaco-magnesian phosphate is deposited; layers near the nucleus containing more osphate of lime than those near the surface the calculus. As a secondary deposit the xed phosphates are very common, few calculi naining for a long period in the bladder without ng incrusted by them. The uric acid calculus east subject to this incrustation. These calculi nmonly contain urate of ammonia and animal tter in considerable proportion, together with bonate and urate of lime and uric acid.

142. ix. *Carbonate of lime calculus*, associated y with a little animal matter, is very rare in human subject, but common in herbivorous imals, usually mixed in these with carbonate magnesia. Carbonate of lime is, however, en found in variable proportion in the oxalate lime and phosphatic calculi. BRUGNATELLI, OUT, and SMITH have described the carbonate lime calculi. They are always small, the gest not exceeding the size of a large almond; white or grey, but sometimes yellow, brown, reddish, and the surface is dusted over with a ite powder. They show no concentric laminæ, t irregular waved lines similar to those in the lberry calculus. They are sometimes re- rkably hard, and capable of receiving a high lish. Others passed by the urethra of a rounded d flattened form are compact, lamellar, and light brown. "No specimens of this calculus exist in the museums enumerated by Dr. PROUT, nor in that of the College of Surgeons." "Mr. SMITH describes eighteen removed from the bladder of a young man; and BRUGNATELLI forty-eight from a similar source, and sixteen, the size of a nut, from a woman."

143. x. *Alternating calculi* form a very large proportion of those formed in the human urinary apparatus. This alternation of the constituents in the layers of the same calculus is manifestly owing to successive changes in the urinary secretion, depending upon varying states of the constitution and vital and assimilative power. Alternating calculi consist of a series of alternating layers, differing in chemical composition. Some are composed of two layers, a nucleus of uric acid being covered by a deposit of urate of ammonia, or of oxalate of lime, or phosphate of lime, or mixed phosphates. The nucleus may be oxalate of lime, followed by uric acid, or urate of ammonia, phosphate of lime, or mixed phosphates. "Other calculi have three differently constituted layers; thus, a nucleus of uric acid may have deposits of oxalate of lime and mixed phosphates, or oxalate of lime and uric acid; or a nucleus of oxalate of lime, covered by uric acid and urate of ammonia; or a nucleus of mixed phosphates followed by phosphate of lime and mixed phosphates. Others, again, consist of four or even more layers: thus, a nucleus of uric acid incrusted by urate of ammonia, uric acid, and urate of ammonia; or oxalate of lime, followed by uric acid, oxalate of lime, phosphate of lime, &c." (*Op. Cit.* 296.)

144. The proportion of *alternating calculi*, of two layers differing in chemical constitution, appears from several sources to average $1 : 2\frac{2}{3}$. The proportion of calculi consisting of three alternations are $1 : 8\frac{1}{8}$; and of those of four alternations in the Norwich collection are $1 : 26\frac{1}{2}$. The order in which different deposits succeed each other in calculi has been examined by Dr. PROUT, with the view of elucidating the changes in the economy upon which this order depends. He found, that the frequency of alternation of uric acid and oxalate of lime is nearly equal; that oxalate of lime follows urate of ammonia more frequently than uric acid; that the general ratio in which phosphates succeed other deposits in all the collections is $1 : 4\frac{1}{15}$; and that a decided deposition of the mixed phosphates in calculi is not followed by other deposits.

145. xi. *Fibrinous calculus* was first described by Dr. MARCET. It is stated by Dr. PROUT to be usually of an amber colour and waxy consistence, with more or less of a fibrous texture. As to the chemical tests for this and the other calculi described above I must refer the reader to the *table* given above from Dr. BENCE JONES (§ 130.); and to the chapter on "The Chemistry of Urinary Concretions," in Mr. COULSON's able work already referred to.

146. VI. CAUSES OF URINARY CALCULI. — The causes of urinary concretions may be inferred from what I have stated above with reference to the pathological conditions occasioning the several forms of urinary deposit, the concretions taking place in different parts of the urinary apparatus being merely early deposits in those situations of the same constituents as are precipitated by the

urine after being discharged from the body. Whether the concretions are formed within the body, or the deposits take place after the urine is evacuated from the body, many, indeed most of their causes, are the same; the states of the urine which produce them arising chiefly from (*a*), age and habits of life; (*b*), from climate, locality, and race; (*c*), from diet and regimen; (*d*), from morbid digestion and assimilation; (*e*), from pathological states of the kidneys, and from the metamorphosis of tissues and of blood globules, in connection (*f*), with constitutional and vital conditions. But it may be asked, Wherefore should concretions form within the urinary organs, consisting of the same or nearly the same constituents as are deposited from the evacuated and cold urine? To this question the chief answer must be that which I have stated above (*see* §§ 80—4.), namely, that low states of vital power favour the more rapid evolution of that portion of vital emanation which all secretions (the urine as well) possess for a shorter or longer period after secretion according to the amount of vitality endowing the secreting organs, in connection with the extent of change in the constitution of the secretions, with their accumulation and retention, and with the amount of vital influence and animal heat retained by them, or furnished to them, during their retention. Although these causes of urinary deposit and concretion have been above considered with reference to the deposits found after the urine is evacuated, certain topics connected with them, more especially with the formation of calculi, require a more particular notice than they have yet received.

147. Deposits from the urine, more or less abundant after evacuation, may proceed for a very long time without any deposit taking place within any part of the urinary apparatus. This immunity from the formation of calculi may arise either from the circumstance of the urine having not been saturated with the substance or substances which usually pass into calculus, or from the states of vital power being unfavourable to the formation of renal or vesical concretions, or from the absence of other causes, which favour such formation.

148. i. *Age and sex.*—The liability of children to calculi has been remarked from the days of HIPPOCRATES; and Mr. COULSON quotes the "*Methode of Physick*," in which the author, PHILIP BARROUGH, remarks that "stones in the bladder do engender oftener in children than in older folk." (*Lib. iii. c.* 41. *editio quinta*, 1617.) Although the liability of strong and well-fed children may not be greater than that of any other class of subjects, yet there is no doubt of weakly, unhealthy, and ill-fed infants and children being more frequently affected with gravel and calculi than older persons. Of 478 operations for stone in the Norwich hospital during a period of forty-four years, 227 were in children under fourteen years. According to Dr. PROUT, the following is the relative frequency of urinary calculi at different ages: — Under 10 years of age, 500; — from 10 to 20, 192;—from 20 to 30, 104;—from 30 to 40, 94;—from 40 to 60, 112;—from 60 to 70, 97; — and from 70 to 80, 12. Taking into consideration the numbers of those living at the most advanced ages, urinary concretions are more frequent at these ages than in the prim life.*

149. Females, notwithstanding their n sedentary habits, and their liability to retain t urine for long periods, are less frequently sub to calculus than males. This is partly owin their temperate and abstemious habits, and pa to the facility with which a small calculus escape from the female bladder soon after its scent from the kidneys, and before its retentio the bladder has enabled it to acquire a great by successive depositions around it. The fe urethra, admitting of greater dilatation, and b less complex than the male urethra, and other differently connected and circumstanced, all the spontaneous passage of calculi which w be retained in the male bladder, and could be moved only by an operation.

150. ii. *Habits of living.* — Sedentary ha and luxurious feeding, are more or less influen according as they may be associated with o causes, in occasioning urinary concretions. former impairs very remarkably the function the skin, and prevents that amount of blood-de ration which these functions effect; the la furnishes the pabulum, or source, from which nary concretions are in great part derived. W these habits exist in, or are conjoined with, a g diathesis, the occurrence of gravel or calcu often observed; and much more remarkably w a meat diet and malt liquors are very liberally dulged in; for this diet, especially the more ni genised kinds, forms urea and the urates in g abundance, and generates either gout, or gra or calculi, or both, and subjects the kidneys much greater amount of depurating function increasing the quantity of morbid materials wl require removal from the blood.

151. When the skin ceases to discharge share of this process of blood-depuration, an creased demand is made upon the kidneys, an increased supply of the constituents of urin deposit is furnished to these organs. It will t appear very manifest that, as the same causes are more or less concerned in the productio gravel and calculi are also productive of g these two diseases must be frequently associate the same person. The association of calculi v rheumatism is much less frequent than with go but when it occurs it may be imputed in g measure to a similar combination of causes.

152. iii. *Climate, locality, and race* very co derably influence the occurrence of urinary c cretions. It is very difficult in many instance explain the operation of these; but there is doubt of these maladies being more frequent humid, temperate, and changeable climates, t in very warm or very cold countries; in so localities than in others even of the same count and in the white than the dark races. Holla France, England, Germany, have been regar as furnishing the greatest number of calcul cases; but other countries are by no means

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* M. CIVIALE, in his "*Treatise on Calculous Affectio* states that of 5,376 cases, 2,416 were children, 2,167 adu and 793 old persons. He says that 1,946 occurred be the age of ten, 943 from ten to twenty, 460 from twe to thirty, 330 from thirty to forty, 391 from forty to fi 513 from fifty to sixty, 577 from sixty to seventy, 199 fr seventy to eighty, and 17 after eighty. Instances of culus have been recorded from birth, and very soon a birth. Mr. COULSON operated for stone on a child eighteen months, and upon a man of eighty years of

em from them. Within the tropics, urinary co retions are more rarely observed than in tem-pe e countries, and chiefly, or only, in the very yo g and ill-fed. The marked infrequency of th concretions in the dark races is chiefly to be im ted to the very small proportion of animal fo constituting the diet of these races, especially wi n the tropics, and to the greater activity of th cutaneous functions.*

he imputed infrequency of calculi in very cold co tries is accounted for with much difficulty, es cially as animal food is generally freely used. T active employments followed by the natives of hese countries, a fish diet adopted by many, an other unascertained influences, may combine to roduce this partial immunity. The greater pr alence of calculous diseases in Norfolk than in ny other county in England is fully ad-m ed. Mr. Crosse, the eminent surgeon of N wich, considered this prevalence to be owing to combination of causes — to the variableness of he climate of Norfolk, to the prevalence of no h-east winds, and more especially to the fre-qu ncy of dyspepsia and acidity in the stomach, ar to the consequent superabundance of uric acid in he urine. Sœmmering states that calculous ar gouty affections are unknown, or most rare, in so e situations bordering on the Rhine. Liebig in ates this immunity to the Rhenish wines, w ch contain a considerable quantity of the bi-ta ate of potash. This salt, he contends, changes in he progress of digestion to the carbonate of p sh, and acts the part of an alkali.

53. It was formerly believed that the waters o locality had some influence in producing uri-n y concretions. This opinion has, however, been c roverted by several modern writers; and it is u etermined whether or no the waters which a und in calcareous or other mineral substances h e any effect in occasioning urinary calculi. The s ject has not been investigated with precision, a the arguments on both sides are loose, and in terminate as to facts.

54. It has been contended by Mr. Copland H tchison and Sir G. Ballingall that sailors a soldiers are almost exempt from urinary con-c ions. But, when it is considered that both s ors and soldiers are of those ages in which t e concretions are seldom observed, the extent o his exemption cannot be great. Whatever it m y be, the activity of the digestive assimilating a depurating functions in these classes and at t r periods of life evidently constitutes its chief c se.

55. iv. *Diet and regimen* has more influence o the frequency of calculous diseases than is g erally believed. The evil produced by animal f l used in excess — and many use it in excess relatively to the amount of exercise taken — has been already adverted to (§ 150.). Highly nitrogenised animal diet furnishes a rich and an abundant chyle, which, during its circulation in the blood through the several viscera, becomes oxidised and otherwise changed, and, in various states of metamorphosis, under the influence of vitality, originates the most important parts of those materials which require a continued elimination from the blood; and if this end be not attained by the active discharge of the several depurating functions—by the kidneys, skin, mucous surfaces, &c.; and if it be not promoted by exercise sufficient for its fulfilment, an accumulation of these materials in the blood takes place, and, becoming more and more highly animalised and morbid, and irritating by their retention and accumulation, occasions serious diseases, amongst which Gout (as shown in that article, §§ 33—42,) and urinary concretions are the most common.

156. v. *Metamorphosis and waste of tissues*, &c. —It will be seen, from what has been stated above (§§ 41—5.), that Baron Liebig and Dr. Golding Bird have attributed the solid materials dissolved in the urine, with their deposits and concretions, to the chemical combinations of the elements resulting from the metamorphosis and waste of the tissues in the course of the regeneration and nutrition of these tissues. But if we take into consideration the great amount of these materials discharged into the urine, and refer them only to the sources from which these writers derive them, it must follow that these tissues ought to be renewed several times every successive year of existence! It must be admitted that the metamorphosis and waste of the tissues — to which I would add similar changes in the red globules of the blood also — furnish some part of these materials; but a much greater share is supplied by the food, by the chyle conveyed into and circulating with the blood, and by the successive changes therein produced, under the influence of vitality; the regeneration and nutrition of the tissues requiring only a small but appropriate portion of the constituents thus supplied, the less appropriate materials being eliminated from the circulation by the kidneys, skin, and other depurating organs.

157. vi. *Indigestion, fermentation, and malassimilation* are causes of urinary deposit and concretion intimately connected with a too full, rich, or unwholesome diet. Numerous articles of food are indigestible in their nature, more especially if not sparingly partaken of, and are liable to become rancid in the stomach, and to occasion rancid eructations; whilst others are more disposed to fermentation, and to generate acidity in the stomach and bowels; both rancidity and acidity sometimes occurring simultaneously, according to the nature of the food, to the quantity taken, and to the powers of digestion and assimilation. Owing to undue and superabundant quantity, or to improper quality, or to both, an imperfectly digested and assimilated chyle is formed and carried into the circulation, furnishing the material elements of disease, and more especially of urinary concretions. But it is not only to full diet, much animal food, or to unwholesome aliment, that these concretions may be remotely imputed; but also to insufficient food, especially in early life. In this latter case, the powers of

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* Dr. Gross (*On the Diseases and Injuries of the* l *nary Bladder, &c.*, 8vo. Philadelphia, 1851) confirms t rare occurrence of urinary calculi in the coloured r es. In ten years he never met with an instance of g vel or of stone in a coloured person. Dr. Dudley i Kentucky, who has the largest practice there, never c rated for stone on more than two or three persons, w o are constantly exposed to hard labour, and fare often t n the coarsest food. Dr. Gross states that urinary c uli are rare in Canada, in Texas, Mexico, and Cali-f nia, that in the United States a larger number of c dren are subject to calculi in Kentucky, Ohio, Ten-n see, and Alabama than in any other part; and that t inhabitants of Missouri, Iowa, Wisconsin, Michigan, l iana, New York, and New Jersey are comparatively e mpt.

life are so reduced by the insufficient nourishment as to imperfectly digest and assimilate what is taken, and the blood is thereby diminished in quantity and impaired in quality.

158. vii. *Constitutional and vital conditions* manifestly combine with the preceding causes in occasioning concretions in the urinary apparatus. These conditions I have viewed above (§§ 45, 157.) as consisting of more or less manifest impairment, not only of the digestive and assimilating and depurating functions, but also of the vital endowment throughout the frame. This general impairment of vital power accounts for the prevalence of urinary excretions in delicate and in imperfectly or improperly fed children, or previously to puberty, and in the aged, and for the comparative rarity of these concretions in persons during the prime of life, or during the period of sexual activity, and in those who are neither over-fed or under-fed, and who are not exposed to the remote causes above mentioned.

159. viii. *Bodies or substances introduced or passed into any portion of the urinary apparatus* are liable to become the nuclei, around which urinary concretions may form and increase by successive deposits. Numerous instances of bodies having passed into the bladder, and become the nuclei of large calculi, are recorded by medical writers. To these it is unnecessary to refer, as they are sufficiently known; but they satisfactorily prove that these bodies give rise to the first act of deposition or crystalline formation by the urine, when more or less loaded or saturated with the constituents of urinary deposit and concretion.

160. ix. *Morbid states of some part of the urinary passages* may be attended by an extravasation of a minute quantity of blood, or by a purulent or mucous discharge, which, either in the uriniferous tubes, or in the pelvis of the kidney, or in the bladder, may become the cause of deposit, by attracting the uric acid, the urates or other saline constituents of the urine, and form the nucleus of successive deposits. It is not improbable that a change, such as I have just stated, may take place in some portion of the kidney, or even in some other part of the urinary apparatus, owing either to external injury, or to other causes, and, by favouring the concretion of the superabundant saline constituents, or uric acid in the urine, thus form the nucleus of a renal calculus, which may either remain long in the kidney, and increase slowly, or pass into the bladder, and become, as in the case of a foreign body, the centre around which successive and large deposits collect. Most calculous concretions are thus formed, their nuclei and earlier deposits being formed in the kidneys, their chief increase taking place in the bladder.

161. *Inferences.*—The efficient causes of urinary calculi may doubtless operate differently in different diatheses and constitutions, and in different circumstances; more especially in determining the *nature of the deposit;* but there is some reason for *concluding,* — 1st. That a diet composed chiefly, or of a large proportion of animal food, tends to increase the quantity of the uric acid and urates, and to favour their deposition, and to lessen the generation and deposition of the phosphates; —2nd. That rancid and acescent ingesta, and rich sauces, exert nearly similar influences to the foregoing;—3rd. That whatever promotes the functions of the skin, tends to prevent the deposition of uric acid, and to favour that of the
phates; — and 4th. That indolence and
gestion tend to increase the deposition of uric
and to lessen that of the phosphates, both by
ducing acidity of the *prima via,* and by impa
the functions of the skin and liver.

162. x. *The Origin and Growth* of urinary ca
was first clearly stated by Van Swieten (C
in Aph. Boerh. 1414.) He remarks, that "s
proceed from elementary principles, which,
state of solution, previously existed in the hum
and when these meet with an indissoluble
they fix themselves thereto, and form a calc
which continually increases in bulk from th
plication of fresh calculous matter." This
ment is probably correct as far as it goes;
various topics connected with the original n
and primary formation of urinary concretion
not comprised in it. Dr. Golding Bird
others contended for an oxaluric diathesis, v
gives rise to the secretion of oxalic acid
oxalates from the uric acid and urates existi
the blood. Dr. Owen Rees has opposed
doctrine, and has argued that the oxalic aci
its compounds are not produced from uric
or from urates already existing *in the blood*
that the change is effected *in the urine,* aft
secretion by the kidney. "In this latter cas
uric acid in combination will be secreted as
into the urine, but by after processes, occu
either in the urinary passages, bladder, or cha
vessels, it will present itself converted into a
pound of the oxalic acid." If this be reall
case, then we must admit that the state of sy
in which we observe a tendency to the form
of oxalate of lime in the urine must be consi
identical with that accompanying the uric
diathesis, and as requiring the same treatr
and the same precautionary measures.

163. Dr. Aldridge of Dublin has showr
manner in which uric acid and its compo
become decomposed into an oxalic salt.
has proved that uric acid may be theoreti
considered as representing the elements of ox
and carbonate of ammonia, hydrocyanic and fo
acids, if we merely add to its atoms the elen
of water in varying proportions. He has de
strated that this really occurs; for, by he
urine, and in some cases by evaporating it
has succeeded in causing a deposit of oxala
lime, while evidence of the presence of hy
cyanic and formic acids could be obtained
the fluid." (O. Rees, *on Calc. Dis. &c.* p. 5.

164. *a.* The chemical reasoning, Dr. O. Ree
marks, which shows how unlikely it is that ox
of lime should exist in the blood, is quite b
out by pathological conditions. He then
concludes, in opposition to Drs. Garrod
G. Bird, that, whenever oxalate of lime is fo
in the urine, it should be regarded as *prod*
after secretion, and that there is no such t
existing as an oxalic diathesis. Lehmann,
has also opposed the opinions of the late
Bird, has stated that morning urine, left to s
some hours, often contains oxalate of lim
quantity, when the fresh urine did not contain
trace of it. Wohler and Frerichs found
the urates when injected into the blood produ
oxalate of lime in the urine. Dr. O. Rees
"regards oxalate of lime merely as uric aci
urate altered after secretion," and that the list

cal li contained in museums will show that the uri acid diathesis produces nearly the whole of the calculous diseases observed, especially by for ng the nuclei of most of those which are for ed of other constituents.

5. The greatly increased quantity, and the ins ability of uric acid, are quite sufficient causes of e deposit of it in the kidneys, especially when in cess, and in the circumstances about to be no ed (§§ 167, 169.), without calling in the aid of y other agency. If the deposition of the uric aci in the calculous form in the kidneys, where it ginally takes place in the great majority of cas , if not in all, and if the calculus, having pa d into the bladder, “fail to produce any gre irritation of the vesical mucous membrane, the it will be enlarged by the continued depositio of uric acid layers; but if, as is generally the cas this calculus irritate the surfaces, then the bla der becomes inflamed, and the mucous membra e throws out an alkaline fluid, which now de mposes the ammoniacal salts contained in the ur and liberates the ammonia. This may unite to portion of uric acid, forming urate of ammo a, so that the next layers of the calculus may co st either entirely of urate of ammonia, or of th salt in admixture with uric acid. The changes ma cease here, and the calculus, though it incre e under these conditions, be thus compounded mo ly of two constituents. The next change ma however, occur, and may determine the for ation of a more compound form of concretion; an this will consist in the pouring out of an *exce ve* quantity of alkaline secretion by the infla ed mucous surface. This will not only compl ly neutralise the acidity of the urine, but ca e—like all alkaline solutions—a precipitation of he earthy phosphates.” (*Op. cit.* p. 28.) Th e will coat the calculus, intermixing or not wi the urate of ammonia, or uric acid, according to e amount of secretion and its alkaline chara r.

6. *b.* In respect of the *Phosphatic Deposits* and *C retions*, Dr. O. Rees further contends for their pr uction uniformly from irritation or disease of th urinary mucous surfaces, and for the presence of ric acid or some other form of concretion be g a sufficient cause for the formation of phosph ic layers on a calculus. In answer to the qu tions as to how phosphatic calculi are formed wh n *no* other calculous matter can be detected as a nucleus, and what were the conditions antece nt to the phosphatic deposit in such cases, he sta s that these calculi are rarely met with, and wh n present are the consequences of disease of th mucous membrane of the bladder, and where, of necessity, the alkaline secretion consequent up n irritation of this membrane is poured out fr it in quantity. “This state of things often fo ws upon enlargement of the prostate with str ture, so that the bladder is not easily emptied.” T retained portions of urine will have their ea hy phosphates precipitated by the alkaline secr on of the diseased mucous membrane, and th formation of a calculous result. Hence it follo s, — 1st., that the presence of other calculous m ers, by irritating the bladder, causes a depositi of the earthy phosphates, these matters formin the nuclei around which the phosphates are de osited;—2nd, that the alkaline secretion from th irritated urinary mucous membrane occasions a concretion, independently of such nuclei, by precipitating the phosphates. It was long ago remarked by Dr. Prout, that these salts, when present, were always found covering other deposits, and rarely alternating with them; so that, if the nucleus were phosphatic, the crust would be the same, and no covering be found of any other form of calculous matter.

167. Since uric acid is the nucleus of the great majority of calculi, the conditions under which this deposit occurs should be considered. In persons subject to the continued excretion of uric acid and the urates, the quantities discharged may be very great, without showing any tendency in these substances to concrete into the calculous form. These materials may even give rise, from their abundance, to attacks of “gravel,” without any considerable calculus being formed, and very common means may give relief. In other cases, the deposits in evacuated urine may be in far less proportion, and yet the tendency to concrete into calculi be very early shown. These facts, as Dr. O. Rees contends, seem to prove that, in order to produce a calculus, some condition must be present besides that which we recognise in a tendency to the deposit of solid matter from the urine. It is necessary to bear in mind what has been said above (§ 166.) respecting the chemical effect of the alkaline secretion from the inflamed urinary mucous membrane, upon which he places more stress than the proofs may be supposed to warrant. But besides possessing the imputed chemical qualities, Dr. O. Rees infers that the secretion from the inflamed membrane evinces mechanical conditions which must influence the result where a tendency exists to deposit solid matters from the urine, and that the secretion from the inflamed mucous surface, being of a tenacious character and containing fragments of epithelium and mucous corpuscles, will cause the particles constituting the deposit to unite and form a nucleus or concretion of successive deposits.

168. Instead, therefore, of viewing the earthy phosphates as secreted by the mucous membrane, Dr. O. Rees believes that this membrane acts merely through its alkaline secretion, which precipitates the earthy phosphates from the urine; and he further infers, that the same conditions noticed with regard to the bladder are present also in the kidneys, and that it is to these conditions in these latter organs, rather than to what exists in the bladder, that we ought to look for the chief cause of the formation of nuclei, and the very general origination of calculi in the kidneys. “At any rate this would appear to apply so far as the production of a nucleus is concerned.” The mechanical conditions presented by the pelvis and urinary tubules certainly are far more favourable to the agglutination of deposits, than those observed in the bladder; for these are smaller conduits and cavities, and in the immediate vicinity of the tubules the first deposited matters are brought in intimate contact with the spheroidal epithelium, which under irritation rapidly desquamates and is more especially liable to entangle floating particles of deposit, and so to favour the formation of calculus. “The reasoning,” Dr. O. Rees adds, “I have used with respect to the bladder, applies with full force to the formation and growth of calculi in the kidney. From what I have now

adduced, I would submit, that if we except cases in which are formed of the four following rare substances, viz., cystine, carbonate of lime, silicic acid, and uric oxide, we may consider all calculous disease as originating in the gouty or uric acid diathesis." (*Op. cit.* p. 38.)

169. A nucleus may form in any part of the urinary canals; but the tubules are by far the most frequent seat of the original deposit. Small particles are sometimes found in the secreting structure; and if these do not pass onwards to the tubular structure, they may increase by deposit of successive layers until a calculus of considerable size is produced. In this case a portion of the organ, corresponding to the development of the concretion, may be destroyed, and symptoms varying with circumstances be produced. The first deposit may, however, pass lower down into the tubular structure, or thence into the pelvis of the kidney, and either remain in either of these situations or pass along the ureter into the bladder, causing more or less distress, in some cases extreme suffering, during its passage; and having reached the bladder, it may be expelled through the urethra by the stream of water, or remain in the bladder and become the nucleus of a large concretion.

170. VII. SYMPTOMS OF URINARY CALCULI.—i. *In the Kidneys.*—The symptoms produced by a calculus or calculi in the kidney vary with the size, form, or smoothness of the stone, its situation in the organ, and the constitution, temperament, and diathesis of the patient. The calculus may remain in the kidney, or even several may remain, or pass thence into the bladder. If it remain, either relief of more or less severe symptoms may take place after a time, owing to a cystic covering forming over it, or disorganisation of the kidney sooner or later supervenes and destroys the patient. If the calculus remain in the kidney and become encysted, more or less severe pains in the loins or in one or both sides, often extending down the thigh or thighs, and sometimes upwards under the shoulder blades, colicky pains in the abdomen, nausea, vomiting, hæmaturia, and frequent calls to pass the urine, are complained of. These symptoms may gradually subside, and they may recur oftener than once, after indefinite periods and with various degrees of severity, especially after sudden or severe exertion, particularly when the trunk of the body has experienced a shock or concussion. The pain often becomes dull or aching, or is seated chiefly on one side of the abdomen, or extends to the groin, or a sympathetic pain, resembling neuralgia, is experienced at a distance from the region of the kidney, and not infrequently extends to the testicle of the affected side. After a lengthened period, and after frequent recurrences of the symptoms in slighter grades, the patient either experiences an immunity from further suffering, or complains only of slight and wandering or recurring pains, which often may be traced to one or other kidney.

171. In less favourable cases of retention of the calculus or calculi in the kidney, the symptoms assume the features described when treating of *Inflammation of the Kidney* (§§ 48, 49. 59. *et pluries*), and of *Pyelitis* (Art. KIDNEY, §§ 174—183. 192—198. *et pluries*), and are fully described, with the several relations of this subject, in the article, and more especially at the places now referred to. I may, however, remark at this place, the difficulty of diagnosis between a calc ls in the right kidney and the passage of gall st s. At the commencement of the irritation prod d by a calculus in the right kidney, and wher e symptoms are very severe, or when a calculu s entered the ureter from the pelvis, the comp t may readily be mistaken for gall stones, espec y, when the vomitings, pain, and spasm are y urgent, and if all the symptoms be not care y examined. I have found it even recently y difficult to determine at first as to the seat of s-ease; and this difficulty is increased if there e; as there frequently is, pre-existing disorder o e biliary functions, more especially interruptio f the biliary secretion, or some degree of jaun e. As the symptoms of renal calculi proceed, and e-cially as the calculi pass into or along the ureter e nature of the complaint becomes more man t, and indeed is most frequently so from the n-mencement, especially when the symptoms t-tending the secretion and excretion of urine re well marked, and blood-globules are observe n the urine. When the hæmaturia is very c i-derable, especially after exertion or sudden m e-ment of the trunk, in connection with the er symptoms of *calculous nephritis* (see KID , § 48 *et seq.*) the nature of the case is evident; d if the draining of blood continue for a conside e time, and the local symptoms are very acute e oxalate of lime calculus is not infrequentl ts cause.

172. ii. The *Diagnosis* of renal calculus is i-dered most difficult in the gouty and rheur c diathesis, and in cases of chronic disease o e urinary bladder and prostate gland; for the n in one or both sides of the lumbar region ma e rheumatic or gouty, or may proceed from a-chectic nephritis, or BRIGHT's disease, or n pyelitis or abscess of the kidney, occurring e r primarily or caused by calculi or follo g chronic uro-cystitis or stone in the bladde r even from inflammation or abscess of the lur r muscles. If any tumour or swelling be e-tected in the region of the kidneys, the antece t symptoms should be duly estimated, and the ex a-nation directed to the existence of collectior f matter in the pelvis and calices of the orga r to their distention by urine from obstructio f the ureter, or to the presence of malignant di e of the kidney. Of these several states of diseas s well as of the passage of a calculus along the ur r, no correct diagnosis can be formed until the u e be tested, and the results considered with e reference to the quantity, specific gravity, ap a-ances, deposits, and quality of this secretion o the ability of retaining it, to the frequency o e calls to void it, and to the particular alteratior f sensibility complained of in the regions o e kidneys, ureters, bladder, and urethra, as we s in the testes, abdomen, and lower extremities, d to the states of constitution and of vital po . In the course of renal disease associated with a-culi, the symptoms are so varied, and manife o numerous combinations, with the seat, dura , extension and associations of morbid action, t descriptions applicable to all cases would e hopeless; but, by recollecting that irritation -isting in one part of the urinary apparatus wil -tend to, and more or less affect the whole; t although the symptoms will be present ch y in the situations just indicated, they may ex d

sti further; and that a correct examination of th rine will indicate with more or less accuracy th ature of the affection, especially when viewed in onnection with the local and constitutional sy ptoms, the difficulty of forming a diagnosis be een the disorders which result from renal ca li and those which most nearly resemble th will altogether disappear. In this subject I ust refer the reader to what I have stated re ecting the inflammatory and organic diseases of Kidneys and Urinary Bladder, and the co plications which they present in practice.

3. iii. The *symptoms* indicating the *passage of a ca lus from the kidney to the bladder* may be so sli t, especially when the calculus is small and sm oth, as to occasion but little inconvenience an o excite no anxiety or even the attention; an it may remain long afterwards in the bladder wi out the patient being aware of its presence. B if the renal calculus be large, or rough, more es ially if it be an oxalate, its passage along the ur r is attended by the most excruciating sufe g. The pain is seated more especially in the lo , generally of one side, extends from the co se of the ureter and down the thigh, the ch d to the testes; and is attended by retching, vo tings, and by intermitting colicky or abdom l pains. The patient is bent double, or to on side, rolls about, and is in the greatest agony. In e less severe cases there are rigors, nausea, re essness, pain in the back, stretching in the co se of the ureter to the bladder, thigh, and te le, often with its retraction, coldness of the ex emities, and prostration. The descent of the ca ulus commonly occupies from 12 to 24 or 36 ho s. "The calculus may become impacted in th vesical orifice of the ureter; the flow of urine fr the corresponding kidney may then be preve ed; dilatation of the ureter, and distension of th ubular structure of the kidney will ensue, te inating in absorption of its secreting surface; bu most of the usual symptoms of stone in the bl ler will be absent.

4. iv. *The symptoms of a calculus in the bladder* ar well known, and require at this place but few re rks. But in tracing back the history of these ca , and when inquiring into their existing states, th facts should not be overlooked, — 1st, that sto in the bladder originates, in the great majo y of cases, in a calculus formed in the kidney, wh h, having passed into the bladder, forms the nu eus of further deposit and concretion in this or n; — 2nd, that the formation of the calculus in e kidney, and its passage thence along the ur r into the bladder, must have been attended by ore or less ailment referable to these situatio ; —3rd, that a calculus very rarely or never or nates in the bladder without previous disease eit r of this viscus, or of the prostate gland, or of th rethra.

5. The *symptoms* chiefly characterising the exist ce of a *concretion in the bladder* are frequent ca to micturate, pain at the end of the penis, ha aturia, especially after exertion, and pain wi or without hæmaturia on a jolting motion or su ussion of the trunk. If these, however, be al e recognised, they may mislead the physician; fo hey may all be present, and yet a calculus m not be present in the bladder. Hence the ne ssity of inquiring into the history of the case, an of duly estimating the early symptoms. For some malignant growth may exist in the bladder and occasion all the symptoms just mentioned. A calculus in the vesical cavity generally falls behind the prostate, but it shifts according to the posture of the patient. In the earlier stages of vesical calculus, the viscus being yet healthy, a dull pain, with a sense of weight about the neck of the bladder, or uneasiness, extends to the hypogastric region, perineum, groins, or thighs. If the stone be smooth, the symptoms commence and advance so slightly and slowly as to excite but little attention and no anxiety; but sooner or later, either from the size of the calculus or the irritation produced by it, the features of the affection become manifest. The bladder is irritable and cannot contain its contents; the calls to micturate are more frequent; and the expulsion of the last drops is attended by pain, shooting along the perineum and penis, and centring in the glans. Sometimes when the urine is flowing in a full stream, it is suddenly stopped, as if by some body falling into and obstructing the orifice of the urethra. Exercise, sudden movements, and the jolting of a carriage occasion great suffering, and even a discharge of bloody urine, which in plethoric or other habits of body may be of considerable extent or continuance; as the disease continues, and the bladder becomes more affected, micturition becomes more and more frequent and distressing. Patients often grind their teeth with agony; and the last drops of urine are expelled with spasm of the bladder which endures for some time. The urine and contents of the vesiculæ seminales are sometimes passed involuntarily, and increase the distress and exhaustion of the patient. There is occasionally priapism, with or without sexual desire.

176. I need not further describe the symptoms of vesical calculus, but merely briefly advert to the importance of recognising some of the *complications* of this malady, and which may either precede it, or follow it, more especially the latter. Of these the most important is disease of the kidney or kidneys. This may have preceded the vesical calculus, and been associated with, or caused by, the formation of the renal calculus, which formed the nucleus for further deposit and concretion when it passed into the bladder. But in this state of complication the renal disorder is generally slight, or even hardly exists when the calculus has reached the bladder. If, however, it be arrested in its course, more particularly at the vesical extremity of the ureter, the renal complication may be most severe and dangerous. After the calculus has been long in the bladder and superinduced much disease in this viscus, the interruptions in the way of urinary excretion, the extension of irritation along the ureters, and other circumstances, often develope serious disease, and even extensive disorganization of the kidneys. In some cases, also, the irritation of the bladder by a calculus may superinduce prolapsus ani in children or even in older subjects, and hæmorrhoids in the latter class.

177. v. *Diagnosis.* The symptoms described above (§§ 174—6.) generally lead to the important measure of ascertaining, beyond a doubt, the existence of a stone in the bladder, viz. *to sounding*. The circumstance of malignant disease of the bladder being often attended by most of the symptoms characterising vesical calculus; and the fact of this

operation, which is so requisite in the latter malady, being often most injurious in the former, should lead us to pause before it is resorted to, and the states and appearances of the urine very minutely examined. In cases of vesical calculus the urine generally contains more or less of the ordinary sedimentary and organic matter, and the blood discharged with the urine is generally in smaller quantity than in malignant growths in the kidneys or bladder.

178. In calculus, hæmaturia generally follows upon some unwonted exertion. In malignant growths in the bladder or kidneys, the tendency to nausea and vomitings is greater, and there are more marked appearances of cachexia and of anæmia than in calculus. In some cases, also, a careful examination of the abdomen will lead to the detection of tumors, if there be malignant disease of the kidneys, especially after the bowels have been freely evacuated. Malignant disease of the kidneys or bladder, or fungoid growths in the latter, especially when far advanced, is characterised by discharges of urine, with much blood, intermixed with which the cells constituting malignant disease may be detected by the aid of the microscope. Dr. Owen Rees reposes much confidence in the evidence furnished by these cells, of the existence of such disease. He describes them to be "of variable size, the smaller being about four times the diameter of a blood corpuscle, the larger twice that size, or even of greater diameter. They are colourless and more transparent than the white corpuscles of the blood, and contain within them nuclei of varying size. These nuclei differ in number in each cell. Sometimes one only is present; sometimes four or five. Though there would appear a general tendency on the part of these bodies to assume the circular form, they are for the most part of irregular outline. Sometimes a mass of them may be seen agglutinated together, and then they are more or less square, or they may approach to the hexagonal form." Dr. O. Rees states that he has never seen corpuscles like these in the urine, except in cases of malignant disease. Where these are found, he contends that the sound should never be introduced into the bladder, as it may be followed by excessive, or even fatal hæmorrhage, a case of this latter issue having fallen under his observation.

179. VIII. Treatment of Urinary Concretions. — i. *Of calculi in the kidneys.* — When the symptoms indicating the existence of calculi in the kidney are severe, and the patient is strong or plethoric or not reduced by hæmorrhages from these organs, then cupping over the loins, followed by warm baths and fomentations, will afford relief. The preparations of soap and extract of henbane, or of belladonna, may be prescribed internally, whilst mucilaginous or demulcent fluids, containing the carbonates of the alkalies with narcotics, should be freely administered. The bowels ought to be kept open by means of olive oil, in frequent doses; or by the citrate of potash taken freely, in a state of effervescence, and with the alkali in excess. If hæmaturia be excessive, the acetate of lead with opium, or the spirits of turpentine, cautiously exhibited in small doses, epithems of the same being applied to the loins, will be found of service; or the gallic or tannic acids, &c. may be prescribed. In cases where it might be injurious to abstract blood, dry-cupping
the loins may be employed.

180. Having removed the more severe
ptoms by these or similar means, a course o
dicines calculated to prevent the formati
uric acid and urates, and to lessen their irrit
effects, should be entered upon. But su
course will prove ineffective if the diet and
men of the patient be neglected. The citrat
bicarbonate of potash, the citrate or carbon
magnesia, and other antacids, conjoined
tonics, will generally be of service, both in
venting acidity and promoting digestion, ar
depurating the blood. A vegetable and fa
ceous diet should be adopted, the quanti
flesh-meats much diminished, and the white
of fish, boiled only, and with no other
than a squeeze of lemon, should replace a
portion of the other articles of animal food us
taken. The beverage of the patient may c
of any of the mineral waters in which the al
most abound; or distilled water may be d
when effervescing with the bicarbonate of p
and citric acid or lemon juice, or with the
tion of either the citrate of potash or citr
magnesia, according to the state of the bo
When the bladder is irritable the several kin
soap, with henbane, or with opium, may be
at bed-time. In all these cases, I have
much benefit result from the use of dis
water, as the vehicle for depurants of the b
and for the important domestic purposes of
ing tea, coffee, &c. The due promotion o
functions of the skin, in this class of patients
the use of the warm bath, of flannels next t
skin, should not be overlooked.

181. ii. *The Treatment of the passage of*
calculi is often of urgent importance, owing r
to the agony produced than to the danger inc
The sufferings of the patient are generall
creased in these cases by constant or fre
retchings, which also require to be assuaged
warm bath should be immediately ordered,
before it is ready, or while it is being prep
from 40 to 50 minims of laudanum, or a l
dose of Battley's solution of opium, may be g
If the symptoms be still severe, and the vomi
continue after the patient's removal from
warm bath, creasote may be prescribed wit
mulcents, or other substances; or hydroc
acid, or chloroform, may also be added to t
The warm bath may be repeated, or warn
mentations be employed, and emollient and
cilaginous fluids, containing alkaline carbor
and anodynes be freely taken. If the pat
sufferings be not very considerably relieve
these, the extract or tincture of belladonna
be added to the pills or mixtures already adv
and to the fomentations, which should be
tinued until complete relief is obtained.

182. During the passage of calculi from
kidneys the state of the urine should be care
ascertained, and the bowels satisfactorily ev
ated, either by magnesia or the citrate of
nesia taken in demulcent vehicles, or by ol
nous enemata, administered in large qua
and repeated as they may be required. Afte
lief is obtained, the medical treatment advise
renal calculi should be persisted in for some
conformably with the indications furnished b
appearances and deposits of the urine. The

gimen recommended above (§ 180.) should ntinued throughout, or modified according state of the patient and the alterations in ine may suggest, due care being taken not uce the digestive and the assimilative func- not to lower vital or constitutional power, ot to impair the secreting and depurating s.

. *The treatment of vesical calculi* differs but rom that advised. The avoidance of exertion udden movements, &c., as advised for renal e, strict attention to diet, and the adoption of dical treatment recommended for the several of urinary deposit, conformably with the xisting in the urine, and for renal concre- are also required for vesical calculi. In cases, however, the irritation produced in dder, the consequent inflammation, hæma- &c., and the complication of disease of the s, of the prostate, &c., render the treatment difficult, and its benefits often doubtful, er rationally conducted. It is unnecessary at this place to what I have already stated describing the treatment of diseases of the ary Bladder, and of the Kidneys, and noticing the indications of cure furnished by ary Deposits. When a stone exists in the r and produces irritation of more or less st severity, the probability of that irrita- eing followed by the consequences just , however judicious the medical treatment e, is very great; and hence the necessity of ing the stone by a surgical operation, unless nsecutive diseases or lesions, — the super- d complications, forbid its performance. this and other topics connected with the al treatment of vesical concretions, I must he reader to the very able surgical works rated in the subjoined Bibliography and ences.

. IX. Diseased Excretion and Sup- on of Urine.—The urine may be voided not the very different degrees of quantity, and states of chemical constitution described as indications and important parts of dis- d vital function, and of local disease, but it nay be discharged with more or less effort ffering on the part of the patient. It may, ver, be retained in the bladder, owing either alysis and over-distension of the organ, or to nical obstacles at the neck or outlet of the , or in some part of the urethra. The urine often either secreted in remarkably small ty, or suppressed altogether, owing to of the kidneys, the blood and nervous becoming poisoned by the arrest of the ant depurating function of these organs, y the resulting excrementitial plethora of scular system, and accumulation of urea, vhich these organs eliminate from the blood g as these functions continue. An altered oned state of the blood may also arrest the ons of the kidneys.

. ii. *Difficult excretion of urine, urinæ diffi- rcretio*, or *Dysuria* (from δυς, difficult, and urine), is entirely symptomatic of disease ng some part of the urinary apparatus, or organ or part in the vicinity. It is generally terised by heat and pain, as well as diffi- and delay, in procuring the discharge. *Dy-* nay depend upon the properties or chemical constitution of the urine, especially in irritable states of the urinary bladder and urethra; and, in such cases, as well as in others where these properties are not present, it may be symptomatic of disease of the kidneys, especially of inflammatory and organic diseases. Most frequently, however, it is a symptom of the diseases of the urinary bladder, and of the urethra, and of gravel and urinary concretions. It is not infrequently present in diseases of the neck and body of the uterus, in the severe cases of dysmenorrhœa and leucorrhœa; in dysentery and inflammation of the rectum, and in cases of inflammatory hæmorrhoids.

186. ii. *Strangury, stranguria* (from σταγγειν, to squeeze, and ουρον, urine), is a more severe degree of the preceding complaint, and is most frequently a symptom of diseases of the urinary organs, more particularly of over-distension of the bladder, of lesions of the neck of the organ and prostate gland, and of the urethra, and of urinary calculi and gravel. In dysuria the urine may flow in a full stream; but in strangury it is much interrupted, or passes in small quantities, or in drops, after great effort.

187. iii. *Ischuria* (from ισχω, I arrest, and ουρον, the urine) has usually implied, an arrested discharge of urine; the arrest taking place either in the *kidneys* — *ischuri renalis; anuria* (Willis), renal ischuria; or in the *bladder*, from paralysis of the organ, or from some obstruction at its outlet — *ischuria vesicalis, I. vera, I. retentionis*, vesical ischuria; or in the urethra — *ischuria urethralis*, from stricture, phymosis, &c. Besides those symptomatic states of ischuria, or of retention and suppression of urine, other forms of retention arising from calculi, and from disease of, or tumours in, the uterus or vagina, &c., may be enumerated. This subject is more fully discussed in the article Symptomatology (see §§ 210 — 218.); but there is one part of it, and that of the highest importance, which requires a more particular consideration, namely, *Ischuria Renalis, Anuria*, of Dr. Willis, or *Suppression of Urine*, the excretion not being eliminated by the kidneys, urine not being secreted.

188. iv. *Suppression of Urine* is always a symptom of pre-existing disease, but of so many, and of so dangerous maladies, as to require a short notice at this place. It is very doubtful whether or no it ever is a primary or idiopathic malady, in the strict acceptation of the word; although it occasionally deserves this rank as much as some others which have been so denominated. It is often observed in the course of pestilential maladies, more especially in the severer grades and advanced stage of *pestilential cholera*. It is also not infrequent in the *Hæmagastric Pestilence*. It sometimes occurs as a fatal, or at least a most dangerous symptom of exanthematous fevers, more particularly of *scarlet fever*. In these, and in other continued fevers, in which it is occasionally observed, suppression of urine has been either too often overlooked, or not viewed with due consideration. In all these maladies it may be either *partial* or *complete*. In either case, the consequences, as respects the blood, nervous system, and structures generally, may be readily inferred. It also frequently supervenes, either partially or completely, in cases of inflammation, acute or chronic, of the kidneys, and of organic lesions of those organs, most frequently of *granular disease*, or

cachectic inflammation of the Malpighian bodies, but most generally in a partial or incomplete form. *Suppression* of urine is a more complete or rapidly dangerous or fatal form; often follows injuries and diseases of the spinal chord or its membranes, although *retention* is a more common result; and it is not an infrequent consequence of various modes of poisoning, owing either to inflammatory action or congestion thereby induced in the secreting structure of the kidneys, or to a paralysis of the ganglia and nerves supplying these organs.

189. *A. The symptoms* caused by *suppression of urine* vary with the circumstances of the case, and more especially with the slowness or rapidity with which suppression takes place, and with the disease of which it is a consequence.—*A.* When this condition proceeds from granular lesions, atrophy, or other organic change in the kidneys, it is generally slow in its progress, and it is often not observed, or rather the diminished excretion of urine has been of considerable continuance, before it has attracted notice; the urine being not only very scanty, but also very much altered from the healthy state, as shown in the articles on Dropsy and diseases of the Kidneys, and in the preceding sections. In these cases, with the slow progress of diminution of urine and of the solid constituents of this excretion, the cutaneous and pulmonary exhalations are sometimes increased, and their odour is most offensive; effusion often gradually supervenes in the cellular tissue and in the shut cavities, sometimes with evidence of a chronic inflammatory irritation of the serous membranes investing these cavities; and ultimately the dangerous and commonly fatal phenomena rapidly supervening upon the acute form of suppression, or of that occurring in the advanced stage of malignant maladies, make their appearance.

190. *B.* When suppression of urine takes place more rapidly, the disease is then characterised by many of the symptoms of continued fever. There are pains in the back, but chiefly in the loins and in the lower extremities, with nausea and vomiting, and often with a sense of weight or of uneasiness if actual pain or severe aching in these situations be not felt. In some cases vomitings are urgent, and the fluid thrown up is generally watery, and in a few instances has an urinous odour. The pulse is rapid, full, and distended; perspiration, at first scanty, becomes more copious, in some instances abundantly so, and ultimately it has often an offensive urinous odour. After a time varying from three to five days, or occasionally longer, effusion takes place in the cellular tissue and shut cavities, with a tumid or bloated state of the countenance, especially about the eyes. In cases of somewhat longer duration, œdema of the face and extremities comes on and advances more slowly; but as these changes advance, sopor supervenes and passes into profound coma, and sometimes into coma terminating in convulsions, especially in children. Generally long before these symptoms appear, either the extreme diminution of the quantity of urine, or its entire suppression, has been recognised by the physician, if he have been consulted so early; and when the catheter is introduced to determine correctly the existence of urine in the bladder, — the presence or absence of which, however, is generally evinced by the state of the hypogastric region, — nothing beyond a very minute portion of a
muddy, or mucous and offensive urine is
drawn. This form of suppression of urine,
ther occurring primarily, as I believe I hav
it in a very few instances, or in the early pr
of other diseases, or in the gouty diathesis,
a consequence of misplaced or suppressed
may be ascribed to a state of congestive i
mation of the secreting structure of the ki
in which the organic nervous or vital influe
these organs is rapidly exhausted or suppre

191. *C.* When suppression of urine, or a
occurs in the advanced progress of malign
pestilential maladies, the duration of the sym
more especially appertaining to it is much sl
and the course of the malady in which it a
is very much hastened by it to a fatal issue.
changes usually consequent upon the anuria
do not take place until shortly before death
earlier effects of the lost function of the ki
being chiefly an aggravation of all the sym
and diagnostic characters of the malady in
it occurs. It is very remarkable in the c
malignant scarlet fever and pestilential c
and yellow fever. Very soon, however, gen
in a day or two, and often after a few hours.
pestilential cholera, sinking, sopor, convulsi
coma, &c., occur and terminate life; œde
the face and extremities, effusion within th
nium, &c., also taking place shortly before
in scarlet fever, and sometimes in the hæma
pestilence. In pestilential cholera, the v
discharges from the stomach and bowels p
the excrementitial plethora of the vascular s
from taking place, that occasions the coma
sion, &c., which are usually the results of a
when it supervenes in the course of other
maladies.

192. *D.* Drs. Willis and Schönlin des
a form of anuria which sometimes occurs in
and cachectic children, and which I have obs
also in the children of the poor living in
damp, or low situations. In these the dig
mucous surface is much disordered; the secr
and excretions are acid and offensive, an
cutaneous surface is affected by various eru
chiefly erythematous, vesicular, and pustular
urine is scanty, is sometimes more or less
minous, is voided in drops after short inte
with pain and difficulty, and is ultimately
suppressed. The pulse is at first quick and
but it gradually becomes slower, as sopor,
or convulsions supervene. These symptom
usually preceded by constipation, by œde
the face and extremities, by vomitings
retchings, and are ultimately followed by
In some cases, especially when perspiration
abundant towards the close of the disease
excretion has an urinous or an acid and offe
odour. The breath also often has a similar o

193. *E. In fatal cases* of rapid or sudden
pression of urine, and when this event occurs i
anthematous and malignant diseases, the ki
are found of a very dark colour, from the
gestion of dark blood, or they present a liv
bluish-brown tint; or they are flabby, enla
and friable. These changes are most remar
in the secreting structure, the tubuli being
filled with epithelian débris. In malignant s
tina, suppression of urine presents appearan
the kidneys described when treating of Sca

(see § 66.). In the slower or more chronic the appearances are altogether the same as stated when treating of granular or *cachectic* *mation of the* KIDNEYS (§ 99. *et seq.*). The es in the cases of suppression of urine in en, which I have had an opportunity of ob- g, were similar to those which I have men- under the head of scarlet fever. Indeed, ne of these cases I had viewed the disease abortion or latent state of scarlet fever, in the affection of the throat and skin had not red, as I have described it in that article. § 26. *et seq.*)

. It is manifest that the fatal result, in of suppression of urine, arises from two ogical conditions: — 1st, from the excre- ious plethora of the vascular system, the bundance of the watery element causing n on the brain, its membranes, cellular , and shut cavities; and, 2nd, from the ac- ation of urea, uric acid, &c. in the blood, poisons the nervous masses and vital struc- thereby aiding the destructive effects of n, or even proving fatal independently of ffects.

. *F. The treatment* of suppression of urine is encouraging, owing to its want of success, e fatal results which surely follow the very l failure of it. Yet treatment should not lected, as it may succeed in a few or rare Besides, hopes of success may be reason- ntertained, if the suppression be incomplete. es occurring in acute, exanthematous, malig- r pestilential maladies, the small quantity ne passed before complete suppression takes may or may not be albuminous, and of shed specific gravity; it is sometimes thus l in scarlet fever, but it is not, as far as I een, in other malignant diseases. In these, state of the pulse and other circumstances the patient should be cupped on the loins, e operation repeated, to an extent accord- the features of the case and the effect pro- If the loss of blood cannot be hazarded, pping should be adopted; and the patient, all circumstances, should be placed in a bath, rendered more or less alkaline by the n of the carbonate of potass or soda. leaving the bath, a turpentine epithem or cation may be placed over the loins, or an cation consisting of equal parts of the com- turpentine and camphor liniments should plied in the same situation, or over the ab- . The bowels must be kept freely open by ore diuretic purgatives, and by terebinthinate er enemata; and diuretics should be taken, sly combined, or conjoined with sedatives odynes, according to circumstances, more ally the preparations of taraxacum, of digita- scoparium, &c.; the carbonates, the nitrates, etates, the tartrates, the bitartrates, and the ates of the fixed alkalies, in large doses, or large as the stomach will tolerate. If these fail the following may be tried as a *dernier* *ressort*: —

364. ℞ Olei Terebinthinæ ʒij.; Spirit. Ætheris ℥ss.; Spirit. Juniperi Comp. ℥ss.; Olei Caju- ♏ xx; Potassæ Nitratis ʒj.; Pulv. Tragacanth. ʒiij.; Pulv. Glycyrrh. ʒss.; tere bene et adde Rosæ, Syrupi Tolutani, āā ʒjss.; Aquæ destillatæ ij. Misce bene. Sit mist. cujus capiat Cochl. ij. 3tiis, 4tis, vel 6tis horis, prius agitata phiala.

If the vomiting preclude the retention of these medicines, a very small quantity (½ or i minim) of creosote may be added, or from three to six drops of tinctura opii, to each dose, or both may be given in addition, and the terebinthinated embrocation applied over the epigastrium. When suppression of urine follows chronic disease of the kidneys, complicated with dropsy, and more especially when it is associated also with organic disease of the heart, then little or no permanent benefit will be derived from any means of treatment; those just mentioned being the most appropriate, and sometimes affording temporary benefit.

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The BIBLIOGRAPHY OF URINE, URINARY DEPOSITS, and CONCRETIONS, *especially of the Causes, Symptoms, and Treatment of Urinary Concretions*, is the most extensive of any branch of Medical Literature. I have mentioned only a few of the best works and memoirs on these subjects; but those who desire to be further informed, will find numerous other references in PLOUCQUET'S *Literatura Medica Digesta*, articles *Calculus Urinarius* and *Urina*; in the *Repertorium* of J. D. REUSS, arts. *Calculus Urinarius*, vol. xii. pp. 178—217, and *Urina*, vol. xv. pp. 134—174; and in the *Appendix* to Mr. CROSSE'S able and laborious work, referred to above. Most of the References I have adduced are, however, not contained in these works.

URTICARIA. — SYNON.: — *Urticaria* (from *Urtica* a Nettle, the eruption resembling that caused by it); — Swediaur, Vogel, Willan, — *Febris Urticata*, Vogel; — *Exanthema Urticatum*, Borsieri; — *Scalatina Urticata*, Sauvages; — *Purpura Urticata*, Juncker; — *Uredo*, Linnæus; — *Essera*, Heberden; — *Erysipelas Urticatum*, *Exanthesis Urticaria*, Young; — *Epinyctis pruriginosa*, *Aspretudo*, Auct.; — *Exanthesis Urticaria*, Good; — *Nesselfieber*, *Nesselsucht*, *Nesselauschlag*, Germ.; — *Fièvre Orliée*, Fr.; — *Orticaria*, Ital.; — *Nettlerash*.

CLASSIF. — ORDER GENUS (Willan) III. CLASS. I. ORDER (*Author.*)

1. DEFINIT. — *A febrile, non-infectious exantheme, characterised by an eruption of prominent wheals or spots, paler or redder, or even both, than the surrounding surface, rarely of long continuance, often recurring or becoming aggravated in fits, and always attended by a burning and stinging sensation.*

2. I. DESCRIPTION: — Dr. WILLAN has enumerated six species of Urticaria: — 1st, Urticaria *febrilis*; — 2nd, Urt. *evanida*; — 3rd, Urt. *perstans*; — 4th, Urt. *Conferta*; — 5th, Urt. *Subcutanea*; and 6th, Urt. *tuberosa*. These have been arranged by M. RAYER under two heads, according as their course is *acute* or *chronic*.

3. i. URTICARIA ACUTA. — The *first variety* under this head is the *Urt. febrilis*, which is generally caused by the ingestion of various articles, and frequently by shell-fish (see §§ 427. *et seq.*); and is to be imputed rather to a peculiar susceptibility or idiosyncrasy of the individual than to any noxious or poisonous quality in the article occasioning the eruption. Commonly in an hour or two after the ingestion of the article causing this affection the patient complains of a weight at the epigastrium, of nausea, sinking, or giddiness. These are followed by febrile symptoms, by heat of skin, and by the appearance of an eruption on the shoulders, breast, the loins, the inner sides of the arms, thighs, &c., generally consisting of reddish or whitish elevated spots, surrounded by bright crimson areolæ. The spots are generally irregular, but sometimes circular, varying in size, and elevated above the surrounding surface. When numerous in any part they are often confluent, the skin presenting a red tint, and being stiff and swollen (*Urt. Conferta*). The eruption is attended by distressing itching, pricking, or stinging, especially during the night; and sometimes the confluent variety is associated with erythematous blotches. When this form of the disease is caused

by shell-fish, or by poisonous ingesta (§§ 427. 434.) the eruption is sometimes preceded or attended by vomiting or purging, or by both; and spasms, sensations of choking or suffocation, convulsions, sinkings, &c. have even supervened, and in rare instances terminated fatally. In the slighter cases of urticaria, caused by the ingesta, the white itching elevations of the skin are not observed; a simple efflorescence, resembling scarlatina, and belonging rather to erythema than to urticaria, being the characteristic symptom. After twenty-four, thirty-six, or forty hours the eruption usually declines, and soon afterwards leaves only slight traces on the skin, which are effaced in a few days.

4. Febrile urticaria sometimes appears without any appreciable cause, excepting teething in children, and intense moral emotions in adults. The symptoms are nearly the same as those caused by the ingesta, excepting that vomiting and purging are not observed, that the febrile symptoms continue longer, usually a week or longer, and that the eruption is less general, but appears and disappears in almost all parts of the surface, preceded by slight febrile symptoms. The patient can often excite spots of urticaria by friction; but these generally disappear in a few hours. In some instances the rash continues for two or three weeks (*Urticaria perstans*, Willan) and is attended by anorexia, functional disorders of the digestive organs, febrile symptoms, general depression, malaise, &c. The eruption usually declines imperceptibly, but it often returns with itching in different parts, and it last disappears. When urticaria has been severe, or has continued long, a slight desquamation generally follows.

5. ii. Urticaria Chronica.—Chronic urticaria often lasts for months. M. Rayer states that he has known it continue for several years. This form of the disease is most frequent in females, and in persons with a delicate or sensitive skin. Although most common in those who complain of disorder of the digestive functions, yet it sometimes occurs in persons who are otherwise in good health. The eruption appears at irregular intervals, sometimes in one place, at other times in another (*Urt. evanida*, Willan), without fever, and often for a few hours only. The patches are generally irregular, and closely resemble the wheals produced by flagellation. They have no erythematous areolæ, and are attended only by severe pruritus. In some cases, instead of itching, a stinging or pricking sensation under the eruption is experienced (*Urt. Subcutanea*, Willan). In these the eruption is scanty, consisting of a few red points, but little elevated above the surface, and a small number of spots, that appear at very remote intervals. M. Rayer considers this form of Urticaria to be very uncommon, and to be caused by violent moral emotions.

6. A severer variety of nettlerash sometimes appears (*Urt. tuberosa*, Willan). It consists not merely in slightly prominent elevations, but in true tuberosities of various sizes, which are hard, deep-seated, extending to the subjacent cellular tissue, attended by slight ecchymosis, and by a tense and sore state of the limbs. These tuberosities generally appear in the evening or at night, with itching and stinging, and disappear before morning, leaving the patient weak, restless, and depressed. They occur more particularly on the loins and extremities; but they may com over the whole of the body, causing swelling neck, limbs, and even the face; and are att by various symptoms, as dyspnœa, irregular of the heart, &c. They are usually deve with febrile action, and subside with the sion of the fever, reappearing with its acc (*Febris intermittens Urticata*, Frank).

7. The varieties of chronic urticaria are irregular in their courses. They sometime appear for several days, and reappear with o out an appreciable cause, after uncertain int They often are not entirely removed for months, in rare instances, not for some and either spontaneously or by a methodica of cure. Turner, Heberden, Rayer, and mention cases which continued many years. recently attended a case with Mr. Pettigrew, resisted for above a year the most active ment. When the eruption of these chronic of the disease is very severe, it is followed bran-like desquamation, constitutional sym of varied characters and severity being p or recurring irregularly.

8. *The Associations* of Urticaria are con and often important. With constitutiona turbance and disorder of the digestive o often depending upon an improper regimen an urticaria is very generally associated. J. Fran it *complicated* with quotidian and tertian at Pavia, in May and June, 1794; and at in March and April, 1812, in so many ca to appear epidemical. In acute rheumatis wheals of urticaria may appear, although frequently as the efflorescence of erythe roseola. Nettlerash is uncommon in conn with diseases of the respiratory organs an sages. It is sometimes observed during v chronic visceral diseases, or cancerous and o maladies; and after miscarriages occurring i vous females. Urticaria may be complicate other cutaneous eruptions, especially with e ma, or with roseola, or with lichen, and sionally with impetigo. Wichmann saw it ciated with variola; Hufeland with me Rayer with prurigo; and I have seen it case of jaundice, and in another of senile pr

9. ii. The Causes of urticaria are mo quently articles of diet, which, owing to unwholesome or indigestible natures, or t syncrasy or peculiarity of susceptibility, di the digestive and assimilating organs; and v by passing into the circulation, excite m less febrile action, and affect the capillary of the skin. The ingestion of numerous arti liable to induce urticaria, one article being certain to occasion it than another, in those disposed to it. Mussels, cockles, lobsters, shrimps; the roe of a fish; dried, smoke salt fish; dried, smoked, and preserved mushrooms, nuts, and kernels of fruits (se Poisons, §§ 434. *et seq.*); cucumbers, and or stale fruits; some kinds of honey, preserves meal, especially when long kept; certain cines, as the balsams, resins, &c., and many articles, according to particular idiosync often occasion this eruption. I have s caused by fresh pork. Some persons are s ceptible as to become affected by it after friction. J. Frank states that it is rare in and frequent in Russia. This is to be attri

y to the general use of olive oil in the former, f animal oils and rancid substances, and meats and fish in the latter country. Net- is most common in summer, especially in n, and persons of a nervous and sanguineous rament; and is much more frequent in en, the young, and adults, than in the aged. or rather exposure to the air, appears to considerable influence on the development wheals of urticaria, especially in respect of parts of the surface which are usually d.

iii. Diagnosis.—It should not be overlooked e leaves of the urtica urens, urtica dioica, us toxicodendron, the bite of the common f the gnat, of the flea, and the hairs of cer- terpillars, may occasion an eruption of wheals , although evanescent, may at first, if the be not inquired after, be mistaken for urti- The white and raised wheals surrounded eolæ, characterising *urticaria*, differ from es of *erythema* in these respects, and in g, pricking, and itching. *Erythema nodo-* distinguished from *urticaria tuberosa* by the tent nature of the former, and the inter- g course of the latter. *Roseola* cannot be nded with the wheals of urticaria, as it ts red spots and patches, and not the dull spots of urticaria, and is not attended by us, and the pricking or stinging of this latter. istory and all the phenomena of the case revent the eruption from being, at any time its course, mistaken for either *measles* or *tina*. The papulæ of *Lichen Urticatus* are more likely to be mistaken for urticaria; hey are less extensive and less prominent he spots of urticaria; their colour is deeper, re harder, and they never disappear spon- sly. The bites of insects already mentioned, gh causing wheals and itchings, cannot be ken for any form of urticaria.

iv. Prognosis.—This eruption has appeared salutary crisis in some instances of internal mmatory disease, as remarked by Koch, r, and others. Whilst, on the other hand, udden disappearance of urticaria has been ved by the development or the increased ty of some internal disease. This has very bly been owing to the occurrence or progress e latter causing the subsidence of the urti- , rather than to the suppression of this ion. No one of the forms of urticaria is ded by any danger, although the chronic are often accompanied with much distress, frequently resist the most appropriate treat- for a long time. The acute forms, follow- he ingestion of poisonous articles, however e, or even when fatal, cannot have the un- rable results imputed to the eruption, inas- as these results proceed from other changes uced by these causes, the eruption being east important of their effects.

. v. Treatment. — When acute urticaria is uced by the ingestion of poisonous substances, y articles which are injurious from the idio- rasy of the patient, emetics and the other s advised when treating of those poisonous les which usually cause this eruption, are re- d (see Art. Poisons, §§ 443. 450.). After the ach and bowels have been evacuated, liquor oniæ acetatis and nitrate of potash may be given in the camphor mixture, or in any demulcent infusion or decoction; or the hydrochlorate of ammonia in similar vehicles. Subsequently a warm bath may be resorted to and repeated, and the bowels kept open by means of cooling aperients. I have found olive oil, taken in frequent doses on the surface of mint water, and the application of this oil to the surface, either before or after a warm bath, of very great service. In full and robust habits of body, or in the young and strong, especially if visceral congestion be present, vascular depletions, in form and amount according to the circumstances of the case, should be early prescribed, a strict diet and regimen enforced, and in all cases a free state of the bowels, by means of cooling aperients, and emollient and demulcent decoctions, be preserved. The insomnia and restlessness so generally observed in the severer cases of this eruption require opiates, but they should be conjoined with cooling diaphoretics and alkalies. I have found James' powder, or the antimonial powder, with the compound soap-pill, or the compound ipecacuanha powder, or a full dose of the carbonates of the fixed alkalies, or of magnesia, in a demulcent infusion, very successful in mitigating these symptoms, especially when either of these means has been resorted to after due evacuation of the bowels, and when taken early in the night, or rather in the evening. If febrile action be present, saline aperients, the acetate or citrate of potash or soda, with nitrate of potash, and spirits of nitric æther, in mint-water, or in camphor mixture; or the citrate of magnesia, in doses sufficient to act on the bowels, will be found of great service.

13. The chronic states of urticaria are often most difficult to remove; and more especially as they are generally caused by errors in diet, and perpetuated by the use of articles which either disorder the digestive organs, or impair the depurating functions, or otherwise affect the circulating fluids, so as to irritate the capillary vessels of the skin. In these cases patients should adopt a restricted diet and regimen, and avoid spirituous, vinous, and fermented liquors, all kinds of shell-fish, and live entirely on farinaceous and vegetable food. I have seen the most obstinate cases, which had been treated by the too generally prescribed preparations of arsenic, iodine, &c., in large and improperly combined doses, yield to the use, chiefly or entirely, of farinaceous and vegetable diet, and distilled water; the secretions, excretions, and depurating functions generally being duly promoted by gentle cooling aperients, such as those mentioned above.

14. When the chronic states of urticaria assume a remittent or intermittent form, and if they do not readily yield to the means already advised, then the preparations of cinchona may be given with the carbonates of the fixed alkalies, or with the solution of the acetate of ammonia, or with the addition of the nitrate of potash; and warm alkaline baths, or vapour baths, be resorted to. External applications, especially those which are oily or greasy, should be avoided, excepting the olive and almond oils, to which the hydrocyanic acid may be added when the stinging and pricking are distressing. But even these should be washed off in a few hours, before they are made rancid by the air and the cutaneous exhalation.

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UTERUS. — Some of the diseases of the *uterine organs* have been considered in the articles on the Ovaria and their diseases, on Menstruation and its disorders, on Dropsies of the ovarium, uterus, and Fallopian tubes, on Leucorrhœa, and on the diseases of the Vagina and Vulva. Certain uterine maladies have also been fully described with reference to the puerperal states, when treating of Puerperal Diseases. It now remains for me to view those morbid conditions of the uterus which are not noticed under other heads, and which appear to be of such importance as to require attention.

I. Morbid Sensibility of the Uterus. — Synon. : — *Hysteralgia* (from ὕστερα, the womb, and ἄλγος, pain); *Metralgia*; *Uteralgia*; *Hysteradynia*. Ὑστεραλγὴς, Hippocrates. *Neuralgie de l'Uterus*, *Métralgie*, Fr. *Der Gebärmutterschmerz*, Ger. *Neuralgia of the uterus*. *Irritable uterus*.

Classif. — I. Class; V. Order. (See *Preface.*)

1. Defin. — *Pain of the uterus, generally very severe, sometimes continued, at other times remittent or intermittent, particularly of the neck of the organ; occurring generally at a mature age, but seldom after the cessation of the catamenia; and not necessarily depending upon very manifest organic disease, although more or less inflammation and alteration of structure frequently exists.*

2. *Morbid sensibility* of the uterus occurs, according to my observation, in two forms; — 1st, in that which has been denominated *irritable uterus*, when indications of a slow, chronic, and often most protracted state of irritation, amounting in some cases to inflammation and its usual consequences, are present in the os and cervix uteri; and, 2nd, in that which is more *neuralgic*, where these indications are not manifest, and where the nervous characters of intermission, &c. are most evident. An approximation of the characters of the one affection to those of the other may, however, be remarked in some instances.

3. i. Irritable Uterus, or *irritability of the uterus*, was first fully described by Dr. Gooch. The notices taken of it in the works of Riedlin, Pouteau, Riverius, Stoll, and some others, are extremely unsatisfactory, and even calculated to mislead, it having generally been referred by em to rheumatism or gout affecting the womb. bee the publication of Dr. Gooch's observatio on this affection, Prof. Dewees has directed att ion to it; and the more recent writers on the im- plaints of females have further illustrate his subject, and shown its connection with cl hic inflammatory irritation.

4. Irritable uterus is seldom met with bre twenty-three years of age, and as seldom aft the menstrual epoch has ceased. Dr. Gooch ys that it is not attended by change of structur nd that it does not tend to such change, whils Dr. Dewees states that he has usually found me change about the neck of the uterus. In the ses of this affection for which I have been cons ed, some have been unattended by any manife al- teration of structure, and others have been a m- panied by indications of chronic inflammat of the cervix and os uteri. (§§ 21. *et seq.*) In ase in my own family, no alteration could be de ted for a very long time, but a change of stru ure subsequently became manifest, and assur a malignant form.

5. ii. Symptoms.—*A.* The *constitutional sym ms* are, increased frequency of pulse on the sli est emotion or exertion; sometimes flushes, alt nat- ing with chilliness, previously to the exac a- tions; pain in the lowest part of the abd en along the brim of the pelvis, and often also he loins, exacerbated by exercise, whilst it is ni- nished, although not removed, by perfect qui de and the horizontal posture; the pain some es recurs in paroxysms, even when the patie re- clines, or is quite still, and is generally incr ed for a few days either before, or immediately er, menstruation; emaciation, paleness, weakness nd increased sensibility and irritability of the le frame; an irregular state of the bowels, with fi- cult or painful micturition, and a pale, white to ue, particularly in the morning. Sometimes the is soft, at other times firmer than usual; an l- though generally somewhat quickened, it is a sionally not above the usual frequency. Th i is commonly dry, and its temperature some augmented, whilst the hands, legs, and feet, r ticularly the latter, are cold. The febrile ex r bations seldom terminate in perspiration. h patient occasionally complains of headache, v h is often increased towards night. The appe i usually impaired or capricious; and the b l either are confined, or much relaxed — most e quently the former, the latter more particu when acted on by purgatives, which gene excite a paroxysm of pain. The urine is e sparing, high-coloured, and depositing a co sediment; or it is pale, copious, and limpid, ticularly when the affection is complicated hysteria or neuralgic pains in other parts o body: it is generally voided with difficulty pain referred to the urethra; sometimes it i tained for a long period, and passed with suffering.

6. *B. The local symptoms.*—If the uterus be mined, it will be found exquisitely tender, culary its orifice and neck, the former gene being neither misshapen, nor indurated, alth frequently somewhat swollen — a state in w the cervix often also participates. When the is excited by an examination, or by coitus, w is also very painful, it does not readily sub

it is often induced by the patient seating her-
suddenly upon a hard chair or bench, and
lly by the sexual congress. In addition to
she frequently complains of a throbbing or
ering sensation in the pelvic cavity and va-
. Walking, riding, or any exercise increases
ymptoms, and causes severe lancinating pains
ugh the pelvic cavity, particularly in the
se of the urethra, and about the centre of the
um: as these subside, a dull, diffused pain is
n the same direction. Leucorrhœa frequently
mpanies this affection, and often becomes
ndant, the discharge varying from a thin trans-
nt and inodorous matter to a thick, muco-
ulent, and offensive fluid. There is often
eased heat of the vagina. The uterus is
sionally found lower in the vagina than na-
l, and its neck is generally shortened and en-
ed, and sensible to the touch. Pain is felt
ediately behind the mons veneris and anterior
of the brim of the pelvis. The catamenia are
rst but little affected in this complaint, but
ultimately become more and more scanty,
st the sufferings of the patient are generally
eased at their accession. They often prema-
ly cease, the patient being reduced by the
racted disease and by the confinement.

ii. NEURALGIA UTERI, or *uterine neuralgia*,
been considered a distinct disorder by some
ers, and a modification of irritable uterus
thers. (See NEURALGIC DISORDERS, § 43.)
this form of altered sensibility of the uterus,
pain is most exquisite, is generally referred
the body of the organ, does not continue
a very long time, and subsides entirely, or
rly entirely. It is altogether paroxysmal,
sometimes almost periodic. The general or
stitutional symptoms are less evident, or alto-
her absent in this affection; but the debility and
austion may be greater. Examination per
inam does not excite the pain in the intervals,
ough it may aggravate it in the paroxysm;
neither heat, nor leucorrhœal discharge, is
ally present. This form of complaint is not
monly — or it is rarely — induced or aggra-
ed by the causes which occasion or increase
sufferings in irritable uterus. The chief fea-
es of the neuralgic disorder are the extreme
ence of pain during the paroxysm, and the
plete or nearly complete subsidence of it
ing the intervals. Cases, however, occur in
ch the symptoms of the one form of disorder
ear to lapse into those of the other.

. C. The *diagnosis* of morbid sensibility of the
rus is manifest in the severity of the pain, and
he localisation of it in the *cervix* and *os uteri*,
ecially of the *irritable form* of disorder, these
ts evincing the utmost tenderness on examina-
, and the existence of great irritation, and
mately of chronic inflammation and its conse-
ences, namely excoriation, leucorrhœal dis-
rge, &c. The *neuralgic form* of disorder, as
ll as the irritable form, is unattended by any
nifest change of the body of the womb, the
ptoms of metritis or inflammation of the body
the uterus (§§ 53. *et seq.*) also being absent.
hough both affections are independent of dis-
cement of the uterus, yet they may be accom-
ied with displacements in one or other form.
ey cannot be mistaken for dysmenorrhœa or
nful menstruation, for they may be present during the intervals between the menstrual periods, although they may be aggravated by the accession of these periods. On vaginal examination of cases of these complaints, the uterus is usually found in its natural position, excepting that it is sometimes situated lower down in the pelvis, or otherwise more or less displaced. In recent cases it is free from organic change, beyond slight tumefaction or fulness, and occasionally softness of its mouth and neck; but in protracted cases, the changes produced by continued irritation and consecutive chronic inflammation usually supervene.

9. *D.* The *prognosis* of the above states of morbid sensibility of the uterus is favourable as regards the life of the patient, although it is not so favourable as respects a quick recovery. It may, if the causes continue to operate, be followed, after some years, by organic change, or even by malignant disease of the os and cervix uteri. Whilst most of these cases will recover, if judiciously treated, some can only be relieved, and others may continue to suffer for many years, especially if the secret habits or vices in which the malady has originated, be persisted in. The issue of these cases will depend much on the causes inducing them, on their recurrence, and on the physical and moral conditions of the patient.

10. *E. Causes* — *a.* The *predisposing causes* of these states of morbid sensibility of the uterus, are constitutional sensibility and irritability, the nervous and irritable temperaments, the impulsive and susceptible disposition, a spare habit of body, previous liability to painful, difficult, or scanty menstruation; repeated abortions, and masturbation. — *b.* The *exciting causes* are not accurately ascertained; but they appear to consist chiefly of fatigue, exertion, prolonged walks, or dancing or standing too long, and falls on the hips or back, or succussions of the body, particularly when the uterus is susceptible, or during the catamenia. Riding on horseback or in a carriage, especially if the road be rough, and during the menstrual period, or without duly evacuating the bladder; the use of cold or astringent lotions or injections to stop a profuse lochia or leucorrhœa; exposure to malaria, &c.; sitting on damp or cold stones, earth or iron seats, venereal excesses, and self-pollutions; neglected or protracted leucorrhœa.

11. *F.* The *nature of irritable uterus* was supposed by Dr. GOOCH to be similar to that of painful menstruation, the former being permanent, the latter recurring with the periodic discharge. He further inferred, that it is not inflammatory, because it does not terminate in change of structure; but it may, and often does, terminate in such change. He states that, after repeated examinations, nothing is discovered excepting exquisite tenderness and slight swelling, or rather tension of the cervix and os uteri. He further supposes, that the fact of many cases, after having lasted for years, terminating in entire recovery, is a sufficient proof that it is a disease of function only. Dr. DEWEES contends, that it consists of a chronic inflammation, which he conceives may exist in some instances for an almost indefinite period without any very manifest derangement of structure; and he states besides that he has generally detected in this affection increased heat, and tumefaction as well as pain, which he views with justice as characteristic of chronic inflammation. M. GENEST nearly adopts

the views of Dr. Gooch, which, however, are much more applicable to the nature of neuralgia of the uterus, than to the irritable form in which morbid sensibility of the os and cervix uteri most frequently occurs in practice. (See Neuralgic Affections, §§ 43, 44.)

12. My experience, derived from many cases in which my opinion has been requested in consultation, leads me to conclude, that the two forms of morbid sensibility of the uterus are characterised by very different pathological conditions: 1st, that *neuralgia* of the uterus is an affection of the nerves of this organ, induced by depressing and exhausting causes, and is altogether independent of inflammatory action and organic change, although it may be associated with one or other of the several displacements and organic lesions of the womb about to be noticed; 2d, that *irritability* of the uterus is caused by irritation of the os and cervix uteri, this irritation being attended by exquisite morbid sensibility and tenderness, and by some degree of inflammatory action; that the irritation superinduces chronic inflammation of these parts, which may be protracted for a very long period, before it is followed by excoriations, by a morbid secretion and discharge from the excoriated surfaces, and from the irritated mucous glands in these situations, and ultimately by granulations, ulcerations, and even more serious organic change. According to this view, the greatest number of the cases formerly termed irritable uterus, or which had this term appropriately applied to them at an early stage only, were actually instances of irritation followed by chronic inflammation of the os and cervix uteri and its consequences. The writings of Dr. Henry Bennett have fully demonstrated the existence of these lesions, which, although denied by Dr. Robert Lee and some others, have been very often observed by Dr. Simpson, Dr. Tyler Smith, Dr. West, Dr. Whitehead, of Manchester, M. Chomel, and numerous continental writers, and by myself. The imperfect manner in which affections of the os and cervix uteri were observed when Dr. Gooch wrote, prevented the true state of these parts from being duly recognised and estimated: and yet his admission of the existence of tenderness, fulness, tension, &c., in this situation, is a sufficient proof of the presence of inflammatory irritation, or of irritation usually passing into inflammation. (See *Inflammation of the Os and Cervix Uteri*, §§ 21. *et seq.*) When writing upon this subject in 1829, I remarked that, if morbid sensibility of the os and cervix uteri exist for some time, it often induces, or is attended by, an alteration of the circulation in these parts, by swelling and tension, by great tenderness, and by increased secretion from their surfaces—the augmented secretion generally tending to prevent the disorganising effects of inflammatory irritation or action from taking place.

13. iii. Treatment.—Very different means are requisite for these two forms of morbid sensibility of the uterus. It should not be overlooked that the one is unconnected with inflammatory action, is purely nervous, and is sudden in its accession and in its subsidence, whilst the other is more or less inflammatory either originally, or consecutively upon irritation, the morbid action, owing to the organisation and sympathies of the parts affected, being more or less modified in character, and prolonged in duration. The circumstance of the os and cervix uteri being possessed of s i- bility only inferior to that of the clitoris, ir erectile organisation, and their abundant su y of mucous follicles, often render them exquis y tender and painful when inflamed, or even v n they are the seats of irritation, and enable the o furnish an abundant secretion tending to res e or to diminish inflammatory action, and to pre nt the usual consequences of this action. Notv i- standing the advantages these parts derive n their organisation, vital powers, and free disch re from their surfaces, when irritated, inflame r otherwise affected, inflammatory action, v n once developed in them, is the more dispose o be protracted, but it is, from these circumsta s, much less liable to consecutive alterations of st - ture; the chief organic lesions which occur b g superficial excoriations, granulations, and ulc - tions, with a more or less abundant leucorrhœal s- charge. These alterations are the more likel o take place when the uterus falls low in the pe s, when the morbid secretion accumulates, or i e- tained, in the vagina, when vital or constituti al power is depressed or exhausted, and when e treatment pursued, and other circumstances, r- mit the air to have access to the irritated o - flamed parts. This form of altered sensibili of the uterus, however severe the pain character g it, being either identical with, or nearly allie o, irritation or chronic inflammation of the nec of the organ, the treatment appropriate to it wi e necessarily the same as advised for that dise ; the more painful symptoms being treated by h combinations or modifications of the remedie s have been found most beneficial in neur ic affections, and in irritable and exhausted stat of the system.

14. *The Neuralgic Affection, or the ne is form* of morbid sensibility, of the womb l, therefore, be chiefly considered at this place ; e means, however, to be recommended for it ll often be also required in the inflammatory st s, and their consequences hereafter to be not l, either conjointly with other constitutional d local remedies, or after recourse has been ha o them. The *indications* of cure in this affec n are, 1st, to subdue the sufferings of the pat t, and 2d, to prevent their recurrence, by resto g the constitutional powers, and healthy state o e uterus. Certain of the means calculated to f il the first, will often aid the accomplishment of e second intention. The means to be empl d with these views are the same as have been y considered, when discussing the *Treatmen f* Neuralgic Affections (*see* §§ 80. *et seq.*) ; d they may be used as there recommended and - scribed.

15. In the more violent cases, the more e - getic sedatives and narcotics may be applie - *cally*, in the form either of suppositories, c f injections thrown into the vagina, or of enem , the bulk of which should not exceed thre r four ounces; sufficient care being taken nc o prescribe too large a dose of the more seda e substances, especially in the injections, as e effects produced by them when thus exhibited, y be as violent as when taken by the mouth. a case which I attended with the late Dr. Mo , very marked relief was procured by carrying y means of a small piece of sponge, about h a drachm of the tincture of belladonna, in a fe e

sy nge, and pressing it out when it reached the os o ervix uteri. The paroxysm generally subsided af a very few minutes, and the more restorative m ns recommended in the article now referred to w e afterwards taken. These should be adapted to e peculiarities of the case, and more especially w due regard to the states of the vascular syste , and to the causes and associations of the c plaint. These last, it is most important to re gnise; for not only may the disorder be the re lt of depressing or exhausting causes, but it m be complicated with one or other of the severa forms of displacement of the uterus, and even w tumours or other organic changes of the o n.

6. Besides the means now mentioned for the re oval of the paroxysm, others may be tried; *ch roform* taken in doses of from twenty to thirty d s, by the mouth, or injected into the vagina, in e same or somewhat larger quantity; or supp tories in which the extract of *belladonna* forms a ingredient, may be introduced; or other narc cs may be similarly employed. In the most se re cases vomitings or retchings may occur and a to the patient's distress; for these the *oxalate o erium* has been prescribed by my friend Dr. P TON, conformably with the opinion entertained o he salts of cerium. In a case which I atte led with Dr. PANTON, the oxalate of cerium w suggested by him, in doses of two grains, th ce daily, and gave great relief. Besides these, v ous means have been recommended to be app d either above the pubis or over the sacrum. E brocations of turpentine, containing opium or w m epithems of turpentine, have often succeeded in iving relief in a short time when thus employed. A nite or veratria applied over the sacrum, has b n resorted to; a small quantity of the extract o f the tincture of either of these being mixed in a ointment or liniment; but the use of these p erful sedatives requires caution, although ext ally applied. In some instances, warm narc c injections, repeated and varied according to c umstances, will be of service.

7. If this complaint be dependent upon chronic i ammatory irritation or action, or upon some o er lesion of the uterus (§§ 21. *et seq.*), the means r uired by such lesion should be adopted in additi to that which may appear most appropriate of t remedies now advised; and the *diet* and *regimen* o he patient ought to be regulated with due refe nce to such associations and to other peculiarities o he case. In the great majority the recumbent p ture, varied as may be required, rest, and ease o ody and mind, are necessary, and in all strict a idance of the predisposing and exciting causes, b n ascertained and inferred, should be insisted u n. A reference to these causes will show (§§ 1 22.) that certain of them when once indulged i re not readily relinquished, and that persistence i hem will render the most judicious treatment o no avail.

8. The means which are most suitable for t fulfilling of the *second* intention, viz., the rest ation of the general health, and of the healthy s e of the sexual organs more especially, are the s ne for this complaint as for accomplishing the s ond indication of treatment advised for the sever forms of inflammatory irritation or action of t uterus (§§ 108. *et seq.*). In some instances, i which I viewed neuralgic or very painful affections of the uterus as the result of the influence of malaria, I have during the intervals between the paroxysms, and with the view of restoring the healthy functions, prescribed either the arsenical solution in the usual doses, or the preparations of iron with quinine and camphor.

II. INFLAMMATIONS OF THE UTERUS AND APPENDAGES.

CLASSIF.—III. CLASS. V. ORDER (*Author in Preface*).

19. DEFINIT.—*Pain and weight or uneasiness in the hypogastric region, and behind the pubis, often with pain in the lumbar and sacral regions and in the regions of the ovaria, extending to the groins and tops of the thighs, with more or less symptomatic fever, increased towards evening.*

20. Inflammations of the uterus present very different phenomena and occasion very different results, according as the morbid action is seated chiefly or entirely in the neck of the organ, or in the body, or in the internal surface, of the uterus, or as it may implicate the peritoneal surface of the fundus. The symptoms vary also with the degree in which the adjoining viscera are affected either coëtaneously or consecutively — with the nature and extent of the complications, so often presented by inflammation of this viscus; and they vary with the grade of morbid action, and with the manner in which the sensibility and sympathies of the uterus are excited.

21. i. INFLAMMATION OF THE NECK AND MOUTH OF THE UTERUS AND ITS CONSEQUENCES. — Inflammation of the cervix and os uteri is generally *chronic* and often very protracted. It is rarely acute unless it be caused by the gonorrhœal virus, several instances of this form of disease having come before me, one of them at the commencement of my practice, when the possibility of the occurrence was generally denied by the physicians of this country. But this specific form of the disease will be noticed hereafter. When inflammation attacks this part of the uterus it is often slight and insidious in its accession, and, being frequently attended by more or less discharge, is too commonly viewed as a form of leucorrhœa, and considered of comparatively slight importance. This circumstance often tends to its neglect at a period when a judicious treatment might have removed the disorder without any difficulty. But, being overlooked or neglected, and perpetuated or aggravated by persistence in the causes which occasioned it, the disease becomes most obstinate and protracted, and is followed by changes of structure which generally render the treatment more or less difficult. In all cases where the local and constitutional symptoms suggest even the idea of disorder or disease of the uterus, the advice given by a most eminent and able physician, M. CHOMEL, should be followed: "La fréquence et la diversité des affections de l'uterus, la forme latente de beaucoup d'entre elles, l'éloignement qu'éprouvent la plupart des femmes à parler des sensations et des dérangements dont cet organe est le siége, sont autant de motifs pour le médecin de porter de lui-même son attention de ce côté, d'adresser aux femmes les questions relatives à ce sujet, et enfin de ne négliger aucun des moyens d'exploration, toutes les fois que quelque circonstance en indique la nécessité. L'oubli de ce précepte deviendrait la cause d'erreurs de diagnostic aussi graves que fréquentes." Unfortu-

nately the worst features of our common nature — the most bitter manifestations of the "*odium medicum*," which is generally the most bitter and unjust against those by whom success is achieved — have been displayed respecting a recourse to those means which are requisite to "exploration," and the existence of those lesions which are to be ascertained chiefly by the exploration in question — namely, by examinations *per vaginam*, by means of the senses of touch and sight. On this subject it is quite unnecessary to remark further, than that the abuse of any particular mode of investigation, or an improper recourse to and employment of it, cannot invalidate the proofs of the great advantages which are derived from its proper and judicious use; and that the evidence and practice of men of character, position, and experience, are not to be impugned or disparaged by others who are not entitled in any point of view to become the censors of their professional brethren.

22. *A. The causes of chronic inflammation* of the neck of the uterus and its consequences are those which have been enumerated as producing the two chief forms of altered sensibility of the organ (§§ 10.), more especially difficult or disordered or arrested menstruation, excessive sexual indulgences, and masturbation; falls on the back or hips, or injuries in the vicinity of the pelvis or peritoneum; difficult and instrumental labours and abortions; the extension of inflammatory irritation to the neck of the uterus from the vulva and vagina; gonorrhœal infection; the foul air ascending open privies; the use of pessaries; displacements of the womb; cachectic habits of body, and neglect of cleanliness. In many cases the cause of disorder is either not manifest or can only be inferred. The disease seldom occurs before puberty, or long after the cessation of the menses. It is most frequently observed from 20 to 50 years of age.

23. *B. Symptoms.* — The existence of inflammation of the neck and mouth of the uterus is evinced by the appearances of the part; by the local signs and symptoms, and by the sympathetic or constitutional phenomena. The appearances of the cervix and os uteri, it might be supposed could not fail of evincing the existence of inflammation of them, more especially since those appearances have been disclosed by the use of the speculum. Even previously to the use of this instrument, this disease might have been detected by the sense of touch and the phenomena resulting from examinations by this sense, and by the secretions and alterations of sensibility attending it. If the appearances constituting inflammation of these parts admitted of doubt, and consequently of discussion — although discussion has not in this instance been always the consequence of either doubt or unbelief — surely the several results of inflammation, more especially tumefaction, excoriation, granulations, ulcerations, &c., need not have been misunderstood nor misrepresented. When treating of LEUCORRHŒA in 1841 (published in 1842), I referred the two most important states of this complaint to "inflammatory irritation of the mucous glands of the os and cervix uteri," and to chronic inflammation of the internal surface of the uterus, and contended that these forms of Leucorrhœa, especially the latter, are not infrequently of a specific inflammatory nature, or gonorrhœal. Of this specific for I have seen several cases, the first of which curred at the very commencement of my p tice (in 1821); the last very recently, the inf mation having extended to the Fallopian tu s. (See Art. LEUCORRHŒA, § 19. *et seq.*)

24. *a.* The *appearances* of the cervix an s uteri vary with the severity and character o e inflammation — with the amount of irritation d congestion preceding and attending it; with e intensity of the morbid action; with its dura n and the amount of exudation and secretions companying it; with its extension to the inte l surface of the cervix; and with alteration f structure which may have already taken pl . The earliest appearances are not always obser ; for congestion or irritation, of a more or less flammatory character, may have existed f a longer or shorter time before the complaint d advanced so far as to induce the patient to e medical advice. When the mucous surface o e cervix is simply congested or inflamed, it usu y presents a red or livid hue, instead of the pin r pale rose colour of health; it is often dotted a florid papulæ, or with whitish pustulæ, accor g as its mucous glands are inflamed or disten d with a muco-puriform matter. Frequently surface of the cervix is covered with this ma r so as to prevent its exact state to be obser d until this secretion is removed. At first the vix is somewhat swollen or enlarged, but still s ; but with the persistence of the inflammatory tion, and with the exudation into the structur f the cervix more or less induration is superad . At this early period the os and cervix uteri hotter and more tender or even painful to touch than in the healthy state; but the amo of tenderness and of pain appears to depend m upon the temperament and susceptibility of patient than upon the severity of the inflammat action — or rather upon the irritable characte this action; the pain being in some cases, both this stage and throughout the disease, such as constitute the irritable uterus of several writers noticed above (§§ 3. *et seq.*).

25. *b.* As the disease becomes more chro or protracted, the cervix becomes somewhat el gated, and approaches nearer or almost lies up the posterior part of the vagina. At the sa time the os uteri is more open than natural, owi in some cases, to the congestion, inflammation, enlargement of the muciparous glands at the c fice and internal canal of the neck, externally the os internum of the uterus, and in others congestion of its internal mucous surface and su jacent tissues. This inflammatory state of t mouth and canal of the cervix was shown wh treating of LEUCORRHŒA (in 1841) to be a f quent cause and form of that complaint, as it an associated condition of chronic inflammati of the cervix; and it usually presents a da reddish or livid hue. The muco-puriform matt secreted by the inflamed mucous surfaces the cervix varies much in appearance and qua tity in different cases; but the chief part this secretion, as I have stated in the article ju referred to (§ 19. *et seq.*), manifestly procee from the cervical canal. The state and charact of this secretion, especially upon its discharg depend much upon the time of its retention in t vagina and upon the exclusion or access of air.

. c. Inflammation in the neck of the uterus m continue a long time without giving rise to its ual results. This may be owing to the partia esolution it may experience from the exudatic or secretion from its surface and from the m ous glands, or from the menstrual flux. But aft an indefinite time, the mucous membrane of th ervix and os uteri, more especially that portic immediately surrounding the mouth of the ce ical canal, undergoes further change, genera commencing with excoriations or abrasions of e surface and passing on to ulcerations, but ve rarely with loss of substance. These may pr ent minute red granulations, or vegetations of a id hue. When an abrasion or excoriation is al e present, the surface is generally of a vivid re and the granulations on its surface are very m ite; this state of the lesion occurs chiefly w n the mouth and canal of the cervix, and m frequently in single females. In a more decid form of ulceration, the granulations of the ul rated surface may be firm, of a vivid red hue, sc cely bleeding on pressure, or they may be large, fu ous, livid, and bleeding readily on a slight to h. Sometimes the granulations or vegetations of e inflammatory sore rise above the level of th surrounding parts, bleed profusely when they ar touched, or even separate partially. Inflamm ory ulceration of the cervix is rarely or never ex vated; it is always on a level with or above th non-ulcerated tissues, and its margin never pr ents any abrupt induration. Hence the difficu y of determining its existence and limits by th touch, and the source of differences of opini as to the existence of ulceration of this part. T cervix very seldom presents more than one u ration situated around the mouth, dipping in its cavity, and extending more or less on the ou r surface. If the ulcerated state consist of se ral patches, it may be referred to aphthous or ul rated mucous follicles.

7. The form of the os uteri is generally ch ged, owing to the existence of the ulcerated st now described both within and around this pa . The lips of the os swell, enlarge, expand, ar open the cervical canal. This opening varies w the amount of inflammation and of the ch ges above described, but it is generally gr test in females who have had several children. W en with these changes the lips of the os uteri ar much hypertrophied and indurated, the opening m admit the first phalanx of one or even of two fi ers; and it may then assume the form of two se ents of a sphere, separated by a deep fissure, w in which the ulcerated surface is situated.

8. Ulceration, or the changes now described as onstituting the ulcerative state of the cervix a os uteri, gives to the surface of these parts a sc velvety character, when examined by the to h. This sensation and the open state of the os teri are the chief indications which this sense ca furnish of the existence of this lesion; but, as flammation alone will open the cervical canal, ar as the velvety sensation cannot be depended u n, the existence of ulceration can only be dete ined by an instrumental examination. The state o he parts, detected by touch and the symptoms a ut to be noticed, warrant a resource to this exa nation. "In nearly all the cases in which u ration occupies the exterior of the cervix, it w also be found, on examination, to penetrate more or less deeply into its cavity. The entire canal of the cervix, as far as the os internum, may be ulcerated. Even when the cervical canal is free from ulceration, if ulceration exists externally, it is generally inflamed to a greater or less depth." The natural coarctation of the os internum appears generally to constitute a barrier to the extension of ulceration into the cavity of the uterus. But to this rule there are exceptions, as respects the inflammatory state, which obviously extends in many instances.

29. *d. The discharges from the vagina* caused by chronic inflammation of the cervix uteri are identical with those which are described under the head of Leucorrhœa. For, as I described these, in that article, as resulting from inflammatory action, as evinced by the local and general symptoms (see § 19. *et seq.*), their connection with the changes above described and disclosed by the speculum is obvious. The discharge generally consists of varying proportions of mucus and pus, it is rarely the latter only or chiefly, unless the inflammation be specific or gonorrhœal. It is not infrequently tinged with blood, especially after violent exertion or sexual intercourse. In these circumstances, the blood is exuded from the ulcerated or granular surface and is seldom in considerable quantity — when in quantity it may be unmixed with the muco-puriform discharge.

30. *e. Hypertrophy* of the neck of the uterus is generally a consequence of chronic inflammatory action, congestion and swelling of this part being an early result. It may, however, remain long without further change; its structure retaining its softness and elasticity. After a time, the exudation of plastic lymph in the insterstices of its structure either is considerable, or becomes partially organised, and renders it both hypertrophied and indurated. At first, the inflammatory action is often acute, as indicated by increased heat, vivid redness, and tenderness on pressure; but these signs subside, the hypertrophy advancing with more chronic indications; and sometimes so far as to very greatly increase the size of the cervix. In virgins and women who have not had children, the cervix seldom enlarges to any great extent. It may be indurated and yet not increased in size: but when it is enlarged in this class of patients it seldom is more than two or three times the natural size. In women who have borne children the hypertrophy of the cervix with induration may, according to Dr. J. Henry Bennet, in extreme cases reach the size of the fist. Some French writers ascribe the ulcerations existing in these cases to the hypertrophy; but he justly contends that the ulceration may commence as early as the hypertrophy and advance with it; and he has seen ulceration confined to one lip, accompanied with induration and hypertrophy of that lip only. When the chronic inflammation causing these changes in the cervix has followed a miscarriage or delivery, the hypertrophy is generally the more remarkable. Hypertrophy and induration are commonly confined to the cervix, but sometimes they extend to the body of the uterus, indicating that it is also the seat of chronic inflammation.

31. As the indurated cervix enlarges, the external opening expands and assumes a transverse form; so that instead of a nearly circular orifice, there is a deep fissure with well-defined lips.

This occurs more especially when the induration is attended by ulceration. Sometimes one of these lips may be many times larger than the other. When the superior lip is much enlarged it covers the os uteri, which is underneath it: when the inferior one is thus changed the os is above it. Dr. H. Bennet says that he has seen both the superior and the inferior lips separately enlarged to such an extent as to form a kind of tumour projecting a couple of inches beyond the non-hypertrophied lip. He states that the hypertrophied cervix is sometimes divided into separate lobes, owing to antecedent laceration of the cervix during an abortion or instrumental labour. The laceration not healing, the ulceration in the course of time is followed by hypertrophy of the segments into which the cervix is divided. These segments sometimes assume a stony hardness; and they may be mistaken for scirrhus; but may be distinguished from that malady as follows: — "When the lobular, knotty irregular condition of the cervix is the result of laceration, and is simply inflammatory, the fissures which separate the lobes radiate round the cavity of the os as a centre, — which is not the case in a cancerous tumour, — each separate lobe being perfectly smooth in itself, and free from tubercles, or superficial irregularities. Not only is this lobular form of induration erroneously considered cancerous, but even the hard inflammatory hypertrophy is still more erroneously considered to be frequently malignant."

32. *f. Displacement* is often consequent upon inflammatory hypertrophy of the cervix; the entire organ generally descends, and the cervix is thus brought nearer the vulva, and at the same time directed backwards. The retroversion of the neck of the uterus is commonly met with in married females suffering from inflammatory induration. With them it is chiefly owing to intercourse; and generally becomes permanent. Enlargement and induration, when very considerable, often occasion more or less prolapsus, unless the vagina be very contractile. In women who have had many children, and in whom the vagina is lax, and offers an insufficient support to the uterus, the prolapse may be so great, especially when standing, as to reach the vulva, or even to appear externally. When the cervix thus lies low in the vagina, a sensation of weight, dragging, and bearing down is experienced, especially when erect. This sensation is caused by the traction of the organ on its ligaments and organs with which it is connected, and by the pressure of the cervix on the vagina and vulva. The hypertrophied cervix may be directed anteriorly, or behind the pubis, and be more or less high. This position is generally owing to some enlargement of the body of the uterus, causing the organ to fall back into the cavity of the sacrum, thus throwing up the cervix. The enlarged cervix occasionally lies diagonally, or to either side, but this position seldom amounts to a diseased condition.

33. *g. Pain* is not always experienced in chronic inflammation of the neck of the uterus, and when it is felt, the situation of it is very often such as not to designate the seat of disease. In some cases pain is almost or entirely absent, although there may be leucorrhœal discharge, and considerable constitutional disturbance, even with
slight feverish symptoms towards evening.
experience enables me to vouch for the accu
of Dr. J. H. Bennet's remarks respecting
seat of pain; for in several cases to which I
been called, an examination has confirmed
connection of the pain with the local affec
The pain is dull, aching, constant, and gene
circumscribed, usually felt in one or both
ovarian regions, but much more frequently in
left than in the right; pain of a similar char
is also often experienced in the back; and
still more frequently, according to my experie
in the lower region of the sacrum, just above
os cocygis. When it is felt in this situation
neck of the uterus will be found low in,
pressing upon the posterior walls of, the va
Sometimes the pain in the back is scarcely
ceptible, or is described only as a "weakn
excepting after fatigue, when it is usually
severe. The patient says that her back is bro
and that she can neither stand, sit, nor walk
comfort. "When there is pain in the regic
the uterine neck, it is experienced behind
above the pubis. It is seldom circumscri
like the ovarian pain, but radiates all over
lower hypogastric region. These three pains —
lumbo-sacral, the ovarian, and the lower h
gastric (I name them in the order of their rel
frequency), may exist conjointly or separa
They are produced alike by inflammation wit
ulceration, and by inflammation with ulcera
They are, however, much more marked w
there is ulceration, more frequently severe,
much more constant."

34. These pains are not to be mistaken
neuralgia of the uterus, which is much more ac
comes on suddenly after intervals, and ceas
suddenly, and is seated in the uterus itself. (§§
et seq.) The neuralgic pain is sometimes pre
only for an hour or two, and rarely longer t
ten or twelve hours, the intervals being cha
terised by freedom from pain. It is someti
symptomatic of organic disease of the womb
fibrous tumours in the structure of the org
But it is often felt independently of any evic
lesion, the os and cervix uteri being healthy
free from any morbid sensibility.

35. In addition to the pains described,
patient sometimes complains of pain in the
round the crista of the ilium, in the groin,
down the thigh; posteriorly along the course
the sciatic nerve and its divisions; and anteri
and internally along the course of the ante
crural and obturator nerves. These pains I h
referred rather to chronic inflammation of
inner surface of the uterus and enlargement
the organ than to chronic inflammation of
cervix. In the former case they may be cau
by deficient support of the vagina, partial prola
and pressure; in the latter case, they may
sympathetic. The pains caused by diseases of
uterus are always increased by standing, sitti
walking, and exertion, but relieved by reclin
and the horizontal posture.

36. *h. The functions of the uterus* are of
interfered with during the continuance of chro
inflammation of the cervix. As respects *m*
struation, it may be stated, that it may, for a tir
go on without any marked change. But it usua
becomes more painful, very scanty, or excessiv
abundant, and irregular as to the interval,

duration, and the quantity. The pains, especially on the accession of this period, are greatly increased in the situations above described, and are often attended by retchings and vomiting, by recurring uterine tormina, and by marked tenderness of the hypogastric region. The irritation, congestion, enlargement, and other lesions of the cervix become aggravated during this period.

37. This disease must necessarily be a cause of sterility, in many instances; the morbid states of the cervix and os, and the discharges from them, interfere more or less with impregnation, not only in recently married females, but also in women who have borne children. Some females, however, become pregnant notwithstanding the existence of extensive disease of these parts; but when it takes place under these circumstances, it is generally painful, and apt to terminate in abortion. Sterility proceeding from this disease may be removed by curing its cause. Dr. Bennet states that he is continually seeing patients, who have ceased child-bearing for years, owing to inflammatory disease of the cervix, recover the power of conception when the local affection is cured. Sometimes they become pregnant even before they are quite well, in which case they seldom miscarry, even if the treatment is suspended, although the pregnancy is often laborious.

38. *i. Uterine inactivity*, or exhaustion, is often a symptom of chronic inflammation of the os and cervix uteri, especially when attended by profuse leucorrhœa and ulceration or granulations, or when the disease is severe. Dr. J. H. Bennet remarks that this absence of natural sensations, or sexual desire, sometimes exists independently of any physical pain, and occasions great unhappiness in married life. He attributes this change to the modified vitality of the diseased uterine organs, and impaired general health. The cases of this description, which I have met with, have been chiefly those in which there was reason to believe that the complaint had been caused by self-pollution, and where the tenderness of the os uteri and adjoining parts rendered sexual congress more or less painful; for instances are not rare of masturbation being persisted in, although marital congress is resisted or evaded. When the cervix is so tender from this disease as to render congress painful, the sensation is experienced at the time, and for some hours afterwards, or even longer. It may be felt either behind the pubis, or in its usual situations. But, although the disease may be severe, the cervix being ulcerated and enlarged, congress may not be painful. Whether painful or not painful — the former especially — this act may be followed by a discharge of a little blood, or even by considerable hæmorrhage. That the evasion of marital congress is owing rather to the circumstance just adverted to, than to the disease of the cervix, is evinced by the fact that such evasion is not manifested in other diseases of the uterus, or very rarely.

39. *k. Constitutional and general symptoms* are always present when the cervix uteri is diseased. It should not be overlooked that this part of the uterus possesses marked sensibility and intimate relations with all parts of the œconomy, through the medium chiefly of the ganglial and sympathetic system. Hence the digestive functions are more or less disordered according to the duration and severity of the local complaint; and there are frequently both nausea and vomiting on the accession of the catamenia. The disorder of the stomach and digestive organs is often somewhat similar to that consequent on early pregnancy, and is the consequence of the inflammation. The leucorrhœa so generally present has been too often imputed to this disorder of the digestive organs, instead of these complaints being regarded as results of the inflammation of the cervix. The urinary function is often more or less disturbed, in respect both of the saline constituents of the urine, and of the frequency of the calls to discharge this secretion and the sensations attending the act. Dysuria is sometimes complained of, and a portion of the secretion from the inflamed cervix often passes from the vagina at the time of micturition.

40. The *pulse* is sometimes very materially affected, and becomes more or less accelerated towards evening; and as debility increases, it is generally weak, or small and irregular, and readily accelerated on any mental or physical excitement. A protracted state of the disease, especially when characterised by granulation, ulceration, and abundant leucorrhœal discharge, ultimately occasions anæmia, pallor, a sickly or sallow appearance of the countenance, loss of flesh, and a flabby state of the muscular structure. Contingent upon the course of the disease, various sympathetic affections often appear, especially nervous headache, depression of mind, a sense of weight or pressure at the summit of the head or on the forehead, pain and tenderness in the course of the spine, and numerous hysterical symptoms. These phenomena are generally exacerbated during the catamenial period, especially when this period is disordered in any way. Most of the symptoms described in the articles Hysteria and Spinal Irritation originate in this disease of the cervix and os uteri.

41. Dr. J. Henry Bennet was the first who gave full accounts of the diseases of the cervix of the uterus; and he was followed by Dr. Whitehead of Manchester, Professor Simpson of Edinburgh, and Professor Miller of Louisville, U. S. Various other writers on uterine disease have coquetted with the subject, and, after having endeavoured to controvert the statements of these physicians, have at last fallen in with their views. From these and other sources of information, furnished not only in this country, but even much more abundantly on the continent, as will be seen in the Bibliography, the great importance of inflammatory disease of the cervix uteri is made apparent. Dr. Whitehead has given an enumeration of the lesions of this part of the uterus; and, although I do not profess this or any other speciality, but endeavour to practise as a physician in all medical cases, yet I am sometimes consulted respecting uterine diseases; and I am thus enabled from some experience to say that the statements and descriptions furnished by the physicians whom I have mentioned, are unassailable.

42. "1st, Inflammation and superficial erosion, implicating one or both lips of the os uteri, and more or less of the external and internal cervix; — 2d, Varicose ulceration, commonly occupying the back part of the anterior lip, sometimes confined to the posterior, and occasionally implicating both. It gives rise to hæmorrhages obeying, more or less perfectly, the menstrual periods,

and to purulent discharges in the intervals;—3d, Œdema of the cervix;— 4th, Fissured ulceration of one or both commissures, of the anterior or posterior lip, or implicating all these parts at the same time; — 5th, Induration of the cervix, with or without abrasion of surface; — 6th, Endo-uteritis, or inflammation of the lining membrane of the uterus, affecting the body as well as the neck, and sometimes accompanied with induration of the cervix, or erosion of one or both lips of the os uteri;—7th, Follicular ulceration;—8th, Gonorrhœal inflammation, affecting the lips and adjacent cervix, and especially liable to spread to the lining membrane of the entire organ; — 9th, Syphilitic disease, in its primary, secondary, and tertiary stages; — 10th, Prolapsus uteri, which owes most commonly its existence to disease of the lower part of the uterus, as the primary exciting condition."

43. To this enumeration of lesions, given by Dr. Whitehead, may be added *hypertrophy*, with or without ulceration, or granulation, or dilatation of the cervical canal. This, in one or other of these states, is a frequent consequence of chronic inflammation of the cervix. *Gonorrhœal inflammation* of the cervix and its canal is of greater importance than is usually considered. I have seen several instances of this form of disease; and in nearly all it extended to the lining membrane of the uterus, and was accompanied with great suffering. In three cases of married ladies, not only did this extension occur, but the *ovaria* also became remarkably enlarged. Recovery ultimately took place; but the ovaria remained more or less enlarged in all.

44. *C. In the virgin and unmarried female*, inflammation and its consequences noticed above are by no means infrequent; and, although partially described by me in the article L[illegible]corrhœa in the section on "*Leucorrhœa from inflammatory irritation of the mucous glands of the os and cervix uteri*" (§§ 19. *et seq.*) before the appearance of Dr. Henry Bennet's work, yet to him the distinction is justly due of having first fully described and elucidated this subject in respect of this class of patients; and I can fully corroborate his statement that inflammation and ulceration of the cervix uteri in the virgin is not an uncommon disease, and that to it may be referred most of the severe forms of dysmenorrhœa and leucorrhœa which resist the ordinary modes of treatment. Even within these few months I have been called to several cases, under the care of other practitioners, where this disease existed, from ages varying from nineteen to thirty. Scanty, excessive, and irregular menstruation, as well as the complaints just mentioned, not infrequently proceed from inflammatory states of the cervix, and internal surface of the uterus, as shown in the article on Menstruation. (See more especially §§ 85—129.)

45. The *causes* of inflammation of the cervix uteri in unmarried females have been already noticed. (§§ 10. 22.) The *symptoms* in them are not materially different from those already described: the permanency of a leucorrhœal discharge; the local pains; dysmenorrhœa, and otherwise disordered menstruation; spinal irritation; sympathetic pains in the hips, thighs, spine, and under the left mamma; bearing down, weight in the pelvis, debility, pallor, anæmia, emaciation, &c. In addition to these, *partial prolapse* of the uterus, and other *deviations* of its position, are not infre nt in this class of patients.

46. *D. During pregnancy* inflammation ar ul-ceration of the os and cervix uteri may be pr nt, having existed previously, or supervened s e-quently to impregnation. MM. Boys de L ry and Costilhes first noticed this state of the dis e; and soon afterwards Dr. Henry Benne in 1846, and Dr. Whitehead, in 1347, ly illustrated this association of inflammation he cervix uteri. Dr. Bennet remarks that he r-merly believed that the disease mostly origi ed subsequently to conception. This opinion, w-ever, his later experience on a wider fiel as shown to be erroneous. Although it some es thus originates, the cervix is diseased in he majority of cases previous to conception. He adds that the disease generally produces ste ty when it attacks young married females at he onset of their married life, but not so gene ly arrests conception when they have had chi en before they are attacked. The *indications* r-nished by tactile and ocular examinations in is state of the disease are the same as alread e-scribed. The disease is attended by pain in the back, sacrum, above and behind the p s, and by a sense of weight and bearing d n, and muco-purulent discharge. As pregn y advances the pains increase; the sickness d vomitings attending this state become sev ; and the muco-puriform discharge is often ac n-panied with more or less hæmorrhage. D r. Bennet has very satisfactorily shown that is disease in the pregnant state is often a cause o e various disorders complained of in this stat r hæmorrhage, obstinate sickness, death of the f s, abortion, moles, &c.; and Dr. Whitehead s fully corroborated this statement. These are st important practical facts; and, however sne d at by some, doubted by others, and disbelieve y a few, I have had occasions, since the date a e mentioned, to be convinced of the truth of e statements made by these physicians. I may e adduce a summary of Dr. Whitehead's resear s on the influence of the lesions under consider n in producing *abortions;* and in this he conf s what had been previously adduced by Dr . Bennet. Inflammatory ulceration was the c e of abortion in 26 in every 100 cases; and s event occurred between the middle of the s n and the middle of the ninth month of pregna . Varicose ulceration induced abortion in 6 or 8 t of every 100; and it operated during the l r two or three months. Œdema of the cer , acting likewise in advanced pregnancy, was - served in about 1 in 25 or 30 cases. Fiss d ulceration was found to exist in 20 to 24 o f every 100 cases, and may cause abortion from e fourth to the middle of the seventh month.

47. *E. During and after abortion and parturit* , inflammation, ulceration, and induration of neck of the uterus are often productive of m and serious disorder. Induration, enlargem , and rigidity of the os and cervix uteri, in abor or in labour at the natural period, render t acts both difficult, painful, and prolonged; these lesions of this portion of the uterus, as as ulceration, often occasion hæmorrhage a abortions and parturition and this hæmorrhag frequently followed by profuse, purulent, or co-purulent discharge. "When the patient

ts to rise and walk, she feels a sensation of and bearing down, which gradually in- , instead of diminishing. If the hæmor- and purulent discharge are continued and ant, and the uterine pains are very severe, se- eeks often elapse before she is able to leave l; and when she does, she remains weak, l, and is unable to make the slightest exer- Inflammatory ulceration, during the first f the puerperal period, powerfully predis- o puerperal fevers, and to abscess of the li- ts. It is so commonly developed after abor- r. Bennet remarks, that he always looks hen the patient does not rally, but presents nptoms already described.

F. In advanced life, and after the cessation of nses, inflammation and ulceration of the f the uterus are sometimes met with. At iod, especially when the menstrual epoch ng ceased, ulceration is the form which in- tion of this portion of the uterus generally s. The most prominent symptoms at this are severe and constant pain in the sacrum ver part of the back, less severe and less t pains in the ovarian regions, and in the strium, leucorrhœal discharge in some nly, and bearing down and prolapse of the much less frequent and more slight than nger females. Ulceration of the neck of rus, in advanced age, seems to be oftener ains of inflammatory disease present at the hen the menses ceased, than an affection had commenced subsequently to that

ii. Inflammation of the Body of the s in the Non-puerperal State. — Sy- — *Metritis; Hysteritis; Inflammatio Uteri.* ammation of the womb may assume various or states. It may be *acute, sub-acute,* or ; it may be *sthenic,* or *asthenic* or *septic;* be *common* or *specific;* and it may affect the *internal surface,* or the *whole body* of an. In the article on Puerperal Dis- discussed *Inflammations of the Uterus, its lages, and Veins* (see §§ 176. *et seq.*) *with ce to the several puerperal conditions;* and I oceed to consider those forms of inflamma- this organ which I have now mentioned, they commonly occur in the non-puerperal

A. Internal Metritis.—*Endo-Metritis. i-puerperal Inflammation of the internal of the womb,* in its most frequent forms, en partially considered under the head rrhœa (§§ 25. *et seq.*) and Menstrua- §§ 78—129.). I have there shown that matory states of the internal surface of rus may occasion certain forms either of hœa, or of menstruation, varying with dified states of vascular action, not only uterus, but also in the cervical canal; orbid action being rarely limited to the , but generally extending to the latter, and lso to the substance of the uterus. Dr. nnet considers that a *sero-sanguinolent* dis- is as characteristic of endo-metritis as st-coloured expectoration is of pneumonia. ternal cavity of the uterus in health is not larger than that of the neck; but it is not able that, during the period of menstruation, n congestion or inflammatory action exists in this part, this cavity may be somewhat enlarged, as, indeed, the whole organ frequently is in these circumstances. If, in addition to the discharge just noticed, there be a dull, deep-seated pain behind and slightly above the pubis, and more or less general febrile reaction, endo-metritis may be confidently inferred. Since, in the introduction of the uterine sound, and its improvement by Professor Simpson, a recourse to it has been considered as a means of diagnosis in endo-metritis; for, if the os internum of the cervix be so completely open as to allow the uterine sound to pass freely into the uterine cavity, and if this cavity be increased in size, and be more sensitive, the above symptoms being also present, this complaint is certainly present. But endo-metritis may exist and not be attended by the sero-sanguinolent discharge alluded to. It is only when the inflammation is most severe that it is present. In the less severe and congestive states, it is characterised by the discharges and the symptoms described in the sections on Leucorrhœa above referred to, and, during the menstrual periods, by the painful, difficult, inflammatory, or hæmorrhagic symptoms described in the article Menstruation. (See §§ 78—129.)

51. As endo-metritis is commonly attended by chronic inflammation of the cervix and os uteri, the symptoms of the latter are generally present. Nevertheless, the former gives rise to nearly the same symptoms; yet the deep-seated and constant pain behind and partly above the pubis, the sensation of weight and bearing down, the swollen, sensitive, and enlarged conditions of the organ evinced on examination, the states of the discharge and of menstruation already noticed, and the accompanying febrile action, although often slight, but always increased towards night, sufficiently indicate the nature of the disease.

52. The *progress* and *terminations* of endo-metritis depend much upon its causes and the circumstances in which it originated. It is often attended by more or less inflammatory action in the cervical canal, and in the substance of the organ; and, according to the extent of this association, to the occurrence of the disease after difficult or instrumental labours or after abortions, and to the domestic, moral, and hygienic conditions of the patient, the course, duration, and termination of the complaint should be imputed. A *chronic form* of the disease is apt to supervene, especially in the circumstances now alluded to; and even in favourable cases the acute form generally passes into the chronic, the constant discharges from the internal surface and neck of the uterus, whether sanguinolent, serous, muco-puriform or purulent, and the catamenial discharges, whether difficult, scanty, or excessive, or attended by coagula, or by plastic exudations, ultimately tend to reduce the acute into a chronic state of the disease. *Ulceration* of the internal surface of the uterus has been rarely noticed as a consequence of endo-metritis. When this occurs, the cavity of the uterus is considerably enlarged, and contains pus, mucus, and a bloody matter, which are discharged more or less freely, and often at intervals. Dr. Hall Davis examined the uterus of a woman which exhibited these appearances, with several large ulcerations in the internal surface.

53. *B.* Acute Metritis, *in the non-puerperal state,* is a rare disease. At the commencement

of my practice (in 1822), having described an undoubted instance of it, at a meeting of a medical society in this city, the case was considered apocryphal. Since then, I have been requested to see other cases, both simple, specific, and complicated, but in most of them the inflammation had commenced in the neck and internal surface of the uterus, or had extended to these parts, and thence to the body of the organ, and in some instances to the uterine appendages. On referring to the notes which I took of the more remarkable cases—since the one in 1822—which I have seen, I find that the disease occurred in seven married females who had never been pregnant, and in three unmarried females. In four cases it was referred to gonorrhœa communicated by their husbands, and in three of those the disease extended to the uterine appendages, the ovaria becoming acutely inflamed and ultimately remarkably enlarged. These four females had never been pregnant. I have notes of the disease as I observed it in six married females who had had children, but who had not been pregnant for a very considerable time previously to their attacks. In two of these last, the cause and course of the disease were so singular as to require a more particular notice in the sequel. Within these few years other cases have been seen by me; and I am at this time seeing in consultation a very acute case of the disease in a single woman. In none of these instances could any doubt be entertained as to the seat of the malady.

54. *a. The seat* of metritis is the whole body of the uterus; but the disease may commence in different ways. It may attack the whole organ primarily, or extend to it from the internal surface or the neck. These parts may themselves be affected consecutively upon inflammation of the vulva and vagina, especially when they are inflamed by specific, or asthenic, or contaminating causes. Inflammation of the body of the uterus, in the non-puerperal state, seldom extends to the peritoneal surface so as to give occasion to either partial or general peritonitis, as so generally observed in puerperal metritis. An instance, however, occurred, to which I was called towards its close, of a lady who had been treated by very astringent injections for the removal of profuse discharge from the internal uterine and cervical surfaces. With the suppression of the discharge, acute metritis supervened, and was very rapidly followed by inflammation of the peritoneum covering the pelvic viscera, and ultimately by death; the progress of the disease being manifested by examination after death. Metritis, in very rare cases, may occur in the non-puerperal state from the extension of inflammation from the rectum or bladder. Many years ago I attended, with Dr. Robert Lee, a married lady, who was attacked at first with dysenteric tenesmus, manifestly owing to inflammatory action which had commenced in the rectum and sigmoid flexure of the colon. Soon afterwards unmistakable evidence of acute metritis appeared. This lady had not conceived for several years. Soon after the full developement of the metritis, which was attended by intense suffering, phlegmasia alba dolens of the left thigh began to appear, and when the subsidence of it commenced, the right thigh became similarly affected. She ultimately recovered. But disease may commence almost simultaneously in the rectum and vulva
from certain septic emanations, especially i
males who have had children. I was calle
two families living in the opposite outskir
London, during a very warm autumn, after
summer. The privies of both houses were
very full, and offensive. Several younger
bers of these families were attacked by dysen
with distressing tenesmus, and their mother
came the subjects of both the dysenteric affe
and asthenic inflammation of the vulva, ra
extending to the vagina, and to the neck and
of the uterus. In both these cases the symp
of acute metritis were unmistakable and
violent, and were, with the dysenteric affe
manifestly caused by the state of the privie
which, indeed, the patients themselves ref
them. I have, both in this and in foreign cour
had frequent reason to impute the occurren
Dysentery (see § 24.) to open privies,
but these two are the only instances I recoll
both dysentery and acute metritis having app
coëtaneously in the same female.

55. *b. Symptoms.* — The patient compla
severe and constant pain deeply seated in th
pogastric region, chiefly behind and abov
pubis, darting into the ovarian regions, aroun
hips, and sometimes down the thighs, with
sation of weight and uneasiness in the pelvi
of severe pain of the lower lumbar, lumbo-d
and sacral regions. Pain on firm pressure
just above the pubis, in the median line
equally to the right and left of that line. C
amination, the vagina is generally hot and
the cervix and os uteri are swollen and se
to the touch or to pressure. The body
uterus is enlarged, and attempts to ascert
size are attended by extreme pain, and of
nausea or retchings. The symptoms are
aggravated by sitting down on a hard seat,
an examination per vaginam, and the pat
unable to walk or stand, or to sit up in bed.
generally lies on her back with her knees
partially upwards. Calls to pass urine a
quent, and attended by dysuria. The bow
usually constipated, and costive motions are
with extreme pain and difficulty, the ha
fæces being surrounded by much mucu
many cases violent paroxysms of pain occu
intervals of comparative ease.

56. This acute state of the disease
often preceded by chills or rigors, and it is
not attended by any vaginal discharge, un
have supervened upon vaginitis, or endo-m
as in some cases of asthenic or diffusive i
mation of the vagina and vulva. However,
the inflammation has commenced in, or ex
to, the inner surface of the uterus (§ 5
sero-sanguinolent, or purulent discharge
place. As the disease subsides, a copio
charge, of various appearances, occurs.
dition to the usual febrile or constitutiona
ptoms, especially thirst, restlessness, scanty
coloured urine, constipation, headache, w
sleep, &c., there are constant nausea; a
or furred tongue; pain and swelling of the
mæ, and sometimes hysterical sympton
chiefly in nervous and hysterical females.
severe cases the symptoms are milder, a
nature of the complaint is evinced chiefl
careful digital examination.

57. *c. Terminations.* — In from seven t

ys the disease subsides, generally without
suppuration or inflammation of the uterine
n the non-puerperal state; but this latter
may occur in this state, as shown in the
tended by Dr. R. Lee and myself (§ 54.),
two other cases for which I was con-
and which terminated fatally, the uterine
s having been followed by secondary pu-
formations, as shown by examination after
It is chiefly in the cachectic habit of body
les addicted to intoxicating liquors, as in
the two cases just now alluded to; and
he causes are of a septic or infecting
and the disease assumes an asthenic cha-
that either the veins become implicated on
hand, or the peritoneum on the other.

Acute metritis may degenerate into the
state, and occasion the inflammatory forms
orrhœa and of disordered *Menstruation*,
ose Articles), or various consecutive le-
and it may give rise to purulent collec-
ither near to, or even in the cavity of the
In either case the collection, as it be-
increased, is evacuated sometimes more or
denly, and after a greater or less increase
ring per vaginam. When matter is formed
e outer surface, it most frequently extends
ellular tissue between the lateral ligament,
ds its way, as in cases of suppuration oc-
in those ligaments.

l. The Prognosis of acute non-puerperal
is generally favourable when the consti-
f the patient is sound; when the disease is
promptly and judiciously, and the causes
of a contaminating or specific nature, as
cases above alluded to (§ 54.). In
n females, in the cachectic, and when the
has been produced by infectious or con-
ing agents, the extension of inflammation
varia, to the veins, or to the peritoneum,
e dreaded; and in either case the patient's
be placed in the utmost jeopardy. Even
cute should lapse into the chronic state, or
e to chronic inflammation of the lateral
ts, much and prolonged suffering will

. *Diagnosis.*—Acute metritis may be mis-
r acute cystitis, or the latter for the former.
careful examination of the hypogastric
of the state of parts per vaginam, and of
dition of the urine and the phenomena
g the discharge of it, will readily disclose
n affected. When the lateral ligaments
med, the pain and tenderness on pressure
erienced on one side of the median line,
ne side of the pelvis; "and the finger
p towards the uterus, detects the inflam-
tumour lying on one side of the uterus."

Examinations after death from acute metri-
e non-puerperal state are rare, unless death
n caused by uterine phlebitis or by peri-
s in the cases alluded to above which
d in my practice. In these cases, the
was considerably enlarged, and very much
, especially towards its internal surface.
bstance of the organ was infiltrated with
ichorous fluid, in one case; and with a
brown fluid in the other. The cavity of
us was much enlarged in both, but much
in one than in the other, and its surface
vered with a chocolate-coloured or rusty
exudation in the one, and by a rusty purulent exudation in the other; this latter containing a little of a softer matter of the same appearance and of an offensive odour. The spermatic veins were inflamed, and contained coagulated blood, phlebitis extending throughout the uterine and spermatic veins to the vena cava, with coagula mixed with an ichorous or sanious purulent matter. In one case purulent collections, more or less of a sanious appearance, and offensive odour, existed in the liver; and in another, matter was formed in one of the eyes, which had burst shortly before death. In a third case above alluded to (§ 57.) peritonitis supervened, the uterus presenting but slight alterations of structure; but the *peritoneum* exhibited the lesions described in the article on this membrane. (See §§ 80. *et seq.*)

62. *C.* Sub-acute and Chronic Metritis. — *Sub-acute metritis* is merely a less severe form of the acute, most of the symptoms described above (§§ 53. *et seq.*) being present, but in a slighter degree. The *chronic* form of the disease may, like the acute, vary much in severity; but, unlike it as respects frequency, is a common form in its simple and complicated states. It generally is seated in a part of the body of the uterus; and, in the opinion of Dr. H. Bennet, in nine cases out of ten in the posterior wall of the organ, in its inferior region, adjoining to the base of the cervix. It is commonly the result of extension of chronic inflammation of the cervix, and in some instances of the acute or sub-acute state of the disease. In these instances it may exist either in the anterior wall, or in one of the lateral walls, of the uterus.

63. *a. The symptoms* vary much with the exact *seat* of the disease, and with the periods during or near menstruation. In the intervals between these periods, the patients are comparatively easy; the local symptoms are either much mitigated, or but little complained of; and fever is either slight, or experienced chiefly in the evening or night. In many cases, however, the functions of digestion, assimilation, and nutrition are impaired, and various nervous symptoms are experienced. When the vascular determination preceding menstruation supervenes, then all the symptoms characterising the disease are developed. A constant, dull, aching pain is felt in the lower hypogastric region, behind and a little above the pubis, and in the left or right ovarian regions, most frequently the left. A dull aching pain is also present under the left mamma or in the left hypochondrium, in the lumbar-sacral region, extending around the hips, and down the insides of the thighs; and is often more complained of than the deep-seated pain in the pelvis. Walking, descending a stair, or riding in a carriage, and every kind of motion, are extremely painful, more especially before, during, and after menstruation; and in some cases are then agonising. On the accession of this period, the patient's sufferings are sometimes aggravated by sickness and vomiting.

64. On examination per vaginam, in addition to co-existing disease of the cervix, the seat of disease is easily detected. The finger, when passed to the base of the cervix, and around it, meets with an exceedingly sensitive elevation, in some cases regular, in others irregular, but spherical. Pressure on the tumefied part is very painful. Occasionally there is hardly any per-

ceptible swelling, but exquisite tenderness; pressure giving rise to sickness. The womb is generally movable, but the attempt to move it is attended by pain and nausea. Owing to its mobility, inflammation and enlargement of a portion of the uterus is generally attended by more less displacement of the organ, which falls more or less in the direction of its enlargement. If the posterior wall be the seat of enlargement, as is most commonly the case, the organ falls backwards towards the cavity of the sacrum, and the cervix is turned upwards and towards the pubis; producing *retroversion;* but never in such a manner as to press upon the urethra, as sometimes occurs in retroversion during pregnancy. The cervix, however, may remain in its usual position, and not be anteverted, it forming an angle with the body of the uterus, which is said to be retroflected. If it be the anterior wall which is tumefied, the uterus may fall forwards, especially in married females, and occasion *anteversion.* When retroversion is connected with much enlargement, the uterus presses upon the rectum, and becomes a mechanical obstruction to the process of defæcation. In both forms also of displacement, especially when very marked, considerable disorder of the functions of the urinary bladder results, the calls to urinate being often, difficult, or otherwise affected. Chronic metritis affecting chiefly one of the sides of the uterus, or associated with disease of the appendages of that side, may likewise occasion more or less displacement in that direction; but this is comparatively rare. Chronic metritis may not be necessarily attended by any vaginal discharge; but such discharge is most frequent, owing to the co-existence of inflammation of the cervix and vagina, and is either muco-purulent, or purulent with a more or less sanguineous tinge.

65. *b. The constitutional symptoms* of this disease, especially when protracted, are well-marked, and are, according to my observation, well described by Professor Simpson and Dr. H. Bennet. The countenance is generally pale and sallow, and offers an expression of languor and pain; the "*facies uterina*" being more especially manifested by this malady, and particularly during or near the period of menstruation. Emaciation is a frequent sign, although not always recognised or recognisable at first. Nausea is generally present; in the most severe cases, it is almost constant; in the less severe, only at the accession or during menstruation. Nausea, or sickness with loathing of food, but without vomiting, is so characteristic a symptom of metritis that, when it is present in chronic inflammation of the cervix, the extension of the disease to the body of the uterus may be inferred. Besides the intimate sympathy existing between the stomach and uterus, numerous other sympathetic derangements occur in the course of the disease, more especially palpitations, heartburn, headach, feverishness, want of sleep, restlessness, morbid states of the urine, constipation, dysuria, painful defæcation, &c.

66. *c. The progress and terminations* of chronic metritis are very variable. It is generally present for some time before the symptoms mentioned above are developed. It is at first attended by slight or obscure symptoms, which become more severe about the period of menstruation, and more and more constant with the advance of time, until the patient is prostrated by severity and continuance. Whilst recurring struation, by the vascular determination and gestion characterising it, tends to exacerba disease, the vascular discharge, especially considerable, reduces the severity of it, fav a partial resolution, and perpetuating the cl condition, when unaided by judicious treat When, with the periodical exacerbations, causes of developing uterine inflammation ar joined, the chronic may pass on to the acute and, in either form, may be extended to the u appendages, or even to the peritoneal su Cancerous degeneration of this state can rar never occur, unless in the cancerous dia The most common consequences of chronic tis are those already noticed, namely, dis ments, enlargements, and the extension of tl ease to adjoining organs or parts.

67. *d. Diagnosis.*—Patients affected with c metritis, existing either simply or with chro flammation and ulceration of the cervix, few years ago, were generally considered a ject only to functional dysmenorrhœa, or placements of the uterus. Dr. Henry B referred these latter to chronic metritis, and them when present as consequences of m which, however, might exist without hav yet been followed by these consequences. W or no displacements of the womb ever occu out previous inflammation and its consequ enlargement, &c., becomes a question, ar which requires solution; but there appe reason to doubt the fact of the latter ofte ducing, and frequently being associated wi former. However, it should not be overl that, when an enlargement of the uterus is when it is not attended by any considerabl or tenderness on pressure, it very probably from the formation of a fibrous tumour uterine walls. In these cases, there is ge displacement in the direction of the uteri mour. When the tumour is large, it is attended by more or less inflammatory actio when this obtains, then both pain and tend may be expected. "An inflammatory t also of the broad ligaments may be mistak chronic metritis, occupying the lateral reg the womb, especially if the tumour be lying uterus, as is often the case." The sym characterising the latter affection will be r in the sequel; but both affections are som associated.

68. It may be difficult to distinguish of the womb from chronic metritis. If th rine swelling presents nodosities or irregu of surface; if the pains are lancinating; general health is very much impaired; if t tient is sallow, cachectic, emaciated, anæmie weak, well-founded suspicions of cancer n entertained. It is chiefly from the history case, and from the consideration of a var circumstances, that a correct diagnosis c formed. Cancer most frequently commen the cervix, and extends to the body of the But in both situations it is either latent, or i not come before the physician until it has considerable progress. It is then, or it so comes, immovable, owing to adhesions be the uterus and surrounding tissues. "In c metritis there may be adhesions, but they a

perfectly immovable nature of those ob- in the malignant affection. In cancer, the ies and inequalities are sharp, knife-backed, ar ; in chronic metritis, they are spherical gular in their irregularity. Cancerous tis- e seldom very sensitive to the touch, where- is the reverse with the inflamed uterus. r has a tendency to progress and to pass h its periods in the course of a limited space , say one, two, or three years. The sym- indicating the existence of chronic me- n the contrary, may generally be traced or several years, and when recognised, the appears to remain nearly stationary, if left lf. The consideration of these differences so prevent cancer being mistaken for chro- tritis. If cancer of the uterus has become ed, the distinction is still plainer." (*Op. cit.*)

D. ENLARGEMENT OF THE BODY OF THE s.—Hypertrophy or overgrowth of the uterus, specially of its body, may in many cases be back for weeks or months to an abortion, or e labour, or to disease after delivery. It may, er, originate independently of any of the puer- tates. But in most circumstances it com- s without marked severity, generally with ailment only, and even when supervening abortion or delivery it manifests merely a of incomplete convalescence. When in- ation in any form follows either abortion or y, the process by which the womb is d in a few weeks to its condition previously ception — the *process of Involution*, as termed KITANSKY and WEST—is checked. This pro- akes place in the structure of the uterus, , having performed its grand function, under- state of degeneration, and a partial conversion fatty matter, rendering it more susceptible ng either absorbed or eliminated in the lo- During the second week after parturition this s is most active; but it proceeds also during rd and even fourth week. The process of truction soon follows, and, according to the n microscopists, cells, nuclei, caudate cells, he elements of new fibres are formed, and gan is built up anew. The manner of this truction has not been satisfactorily explained tologists; but it appears most probable that newal goes on *pari passu* with the removal old materials. The interior of the uterus goes similar changes to those which take in its substance. "It is not until its lining rane, with the exception of that of the , has been several times reproduced and ast off in a state of fatty degeneration, that mes the same condition as before impreg- . The occurrence of inflammation appears errupt these processes, for, though fatty de- ation of the tissues takes place, yet the al of the useless material is but imperfectly plished, while the elements of the new are themselves, as soon as produced, sub- to the same alteration; and the organ re- , long after all mischief has passed away, sed in size, and at the same time composed issue inapt for all the physiological processes nception, pregnancy and child-bearing.' T, *Lect.*, p. 92.) This result will follow nly the mild, or chronic, or sub-acute, states flammatory action developed in the organ during the process of involution, but even any excitement of the sexual organs occasioning determination of blood to the organ, more especially sexual intercourse too soon after delivery or abortion.

70. *Symptoms, &c.* — Enlargement of the uterus consequent upon *deficient involution* may continue a considerable time without causing more at first than protracted convalescence, and a feeling of local and general ailment; but generally further disorder ensues, often with increased organic lesion. A sense of weight and bearing down; pains deep in the pelvis, back, and sacrum, often extending to the hips and thighs, numbness or pains in the limbs; difficult and painful defæcation, frequent micturition, &c., are usually complained of. After a time various complications of this lesion occur, more especially prolapsus, retroversion, congestion or chronic inflammation, frequent, or difficult or excessive menstruation, &c.

71. *True Hypertrophy*, or enlargement of the uterus independently of defective involution, occurs in both married and unmarried females. Dr. WEST considers that it is met with in the former chiefly, and remarks that "excessive or intemperate sexual intercourse does not produce it, though that leads to its own train of evils; but there has in many instances seemed good reason for associating the condition with the imperfect performance of that function, and sometimes the evidences of that being the case have been conclusive." There can be no doubt of this being a not infrequent cause; although it is not the only organic lesion consequent upon this cause, ovarian disease being perhaps an equally frequent result. Although true or primary hypertrophy of the uterus may be most frequent in married females, it is by no means rare in the unmarried, especially after twenty-six or twenty-eight years of age, where there is reason to infer that the vice of masturbation has been long practised. It is, in this class, as well as in widows, and in married women who have either impotent, or nearly impotent, husbands, a consequence of frequently excited and imperfectly gratified sexual desire. Sexual intercourse is imperfectly performed, and although frequently attempted, never duly consummated; and thus congestion of, or active vascular determination to, the uterus is maintained, without conception and its successive changes taking place, whereby the mischief resulting from reiterated and inefficient sexual efforts are prevented. — Hypertrophy of the *neck* of the uterus has already been noticed (§§ 30, 31.). Enlargements which result from the development of tumours in the organ are more appropriately considered in the sequel.

72. iii. INFLAMMATION AND ABSCESS OF THE FALLOPIAN TUBES AND CELLULAR TISSUE. — Inflammation and abscess of the uterine appendages were, until recently, described only as a disease of the puerperal state. Under the head OVARIA, I have considered inflammation and other diseases of these organs, independently of the puerperal state; and in the article on PUERPERAL DISEASES, "*Puerperal Inflammations of the Uterine Appendages*," have received due attention (§§ 187. *et seq.*). It now only remains for me to describe *inflammation and abscess of the Fallopian Tubes and Cellular Tissues, independently of the*

puerperal conditions. This disease has been noticed by MM. Gendrin, Velpeau, Maréchal de Calvi, and by Dr. Doherty, Churchill, and Lever; but it was not fully discussed until Dr. Henry Bennet directed due attention to it in his work on *Inflammation of the Uterus and Appendages.* This malady in the puerperal states is always severe and generally dangerous; but, in the non-puerperal conditions, it is commonly much more mild, and is often either not recognised or confounded with other diseases. Indeed, inflammation of the uterine appendages occurring after parturition presents as great difference from the same disease in the ordinary state of the system as puerperal metritis offers to non-puerperal metritis. In the puerperal states of these maladies, as I have shown, inflammations of the womb, ovaries, Fallopian tubes, cellular tissues, &c., have a tendency to extend to the peritoneum, or to diffuse themselves, and produce most important and often fatal consecutive changes. But in the non-puerperal form, there is a tendency to assume the sthenic, instead of the asthenic diathesis, and to limit itself to the tissues primarily attacked; peritonitis and other consecutive or fatal alterations rarely occurring.

73. *a. The causes* of non-puerperal inflammation of the Fallopian tubes are the same as those which more commonly produce *metritis* (§§ 10. 22.) and *ovaritis* (§§ 6. *et seq.*); especially arrested menstruation, disordered states of this function, and abortive impregnation.

74. The inflammation may originate either in the cellular tissue, in the ovaries, in the tubes, or in the uterus, the disease of the one structure often extending more or less to the others. This extension of inflammatory action from the one part to the rest and to the peritoneum is most remarkable in the puerperal states (see Ovaria, §§ 6. *et seq.*, art. Puerperal Disease, §§ 181. *et seq.*), but it is much less so in the non-puerperal condition, the disease being generally limited to the cellular tissue, and to the organs contained between the folds of the peritoneum, this surface seldom being implicated in this condition. Dr. H. Bennet states that he has repeatedly seen inflammation of the Fallopian tubes supervene in females labouring under chronic inflammation or ulceration of the cervix uteri, this latter being the point of departure of the inflammatory action.

75. *b. The symptoms* of non-puerperal inflammation of the uterine appendages are nearly the same as those of acute metritis. (§ 53.) These are the usual febrile phenomena: severe pains in the lower hypogastric region, increased on stretching the body to the erect posture, or on walking; a sense of weight and tenderness deep in the pelvis; difficult or painful micturition and defæcation, &c. These symptoms are also present in metritis; but the pain is greatest in the ovarian region, to the right or left of the median line, where, if the ovarium be much affected, some degree of swelling may be perceived. So nearly, as may be expected, does the one disease approach to the other in characters and course, that, unless there be from the first a deep-seated tumour of an inflammatory nature perceptible in one or both ovarian regions on external pressure, it is most difficult to distinguish the one malady from the other by any other means than by a careful digital examination. The bladder having been emptied, the patient placed on her back, and the flexed, the finger should be passed into the v and carried underneath and round the cerv left hand being firmly applied over the hypo region, above the pubis. By pushing the v cul de sac by the finger in the several dir around the cervix, especially whilst e pressure is being made, the presence of infl tion of the cellular tissue, ovaries, and Fa tubes, or of its consequences, is evinced by usual resistance on the side or sides of the "The vaginal cul de sac has disappeare resting on the side of the cervix and body uterus, there is an indurated swelling, ve ferent from the normal condition, and fron obtains on the other or healthy side, sup disease to exist on one side only, as is mo quently the case. Pressure on the indurate is attended by very great pain, and ther marked increase of the natural heat." By ing the finger around the inflammatory t whilst the left hand is pressed downwar tumour is found to be movable and distin the parietes of the pelvis. This tumour generally situated close to the side of the seems to form one mass with this organ. inflammation of the lateral ligaments may b founded with metritis even when a vaginal nation is resorted to, and an inflammatory s recognised. If this examination should satisfactory, the uterus and appendages m further examined per anum. Dr. H. Benn lieves that a tumour formed by an inflamed ligament is more intimately connected wi uterus when it is purely phlegmonous, or t sult of inflammation of the cellular tissue when it is formed by the inflamed ovary. however, very difficult to distinguish betwee and acute or chronic metritis.

76. *c. Progress and terminations.*— In the stage, inflammation of the lateral ligame attended by the usual train of febrile sym As it passes into a *chronic state,* it occasion merous morbid phenomena, which have noticed as characterising other chronic u diseases, especially dyspepsia, cephalalgia, stipation, palpitation, insomnia, debility, en tion, evening exacerbations of fever, &c. I terminate in resolution in the first stage, promptly and judiciously treated: but, metritis, which very rarely, in the non-pue state, terminates in suppuration, inflammat the Fallopian tubes, especially when seated c in the cellular tissue, generally ends in suppu —it being purely phlegmonous inflammation

77. *d. Suppuration* may be expected i course of a few days from the commencem the inflammation, unless checked by earl energetic treatment. The occurrence of r followed by sweats, and a temporary abat of the more acute symptoms, and sometir deep-seated fluctuation perceptible to the through the vagina, or even through the abdo parietes, indicate the presence of suppur The purulent collection in this part is r absorbed; but it generally finds an exit, b the acute inflammatory symptoms have sub Adhesive inflammation connects the abscess either the vagina, rectum, abdominal pariet bladder, the contained pus making its way a variable period in one or other of these direc

frequently in the upper part of the vagina, or e rectum. It very rarely opens into the er or abdominal parietes. It sometimes in more than one situation successively. bscess may, however, ulcerate through the neal folds of the lateral ligament, and be ated into the peritoneum, causing acute peri- ; or "the purulent matter may pass along und ligament and appear in the labia ex- or, escaping from the pelvis along with the femoral vessels, follow their course, and in the thigh. These, however, are quite tional cases, and are very rarely met with, ally in the non-puerperal form of the dis- ."

e. The *abscess* generally opens into the vagina ctum, or into both. The perforation com- y occurs during exertion, or when coughing, the act of defæcation; and the purulent rge is very frequently either mistaken for an sed flow of the whites, or overlooked when assed from the rectum with the stools. This ly obtains when the disease is either not nised, or viewed as metritis. In some cases, erforation is attended by a sense of bursting. lischarge may take place a few days after the opment of the inflammation, or not until after l weeks. The quantity of pus discharged from a few drachms to half a pint. The ng of the abscess into the vagina is the most rable issue that can occur. The pus oc- ns some irritation of the vagina, but this is m considerable. The opening of the abscess he rectum is the next most favourable termina- but it generally causes considerable irritation s bowel, with dysenteric stools or tenesmus. perforation of the bladder or of the abdominal tes by the abscess is so rare, and the oc- nce so manifest, that the phenomena attending quire no remark, farther than that, as in the of the rectum, the urine does not pass through pening, owing to the pressure of the abdo- l organs keeping the opening closed.

. When the pus is discharged, a decided lull served in all the symptoms. The deep-seated , the tenderness and swelling, and the febrile rbance rapidly subside. When the abscess pened into the vagina, the improvement is rapid, and the patient is believed to be con- cent. But, as Dr. H. BENNET justly observes, mprovement is often deceptive, with reference e future. On making a careful examination, umour on the side of the uterus is diminished ze, and is much less sensitive to the touch; although less in size and less inflamed, nearly always still perceptible; and the toms indicating chronic uterine inflammation rally exist; pain, heaviness, bearing down, erness, often swelling in one or both ovarian ns; pain in the back, inability to stand erect, walk for any time, or to go up and down s, being complained of. The orifice by which us was discharged may remain open, or it may . In the former case the pus escapes as it is ed, and after some time it becomes closed, the tumour is resolved, the disease being ght to a close in the course of a few weeks, f a month or two. This, however, occurs in some cases; for in others the closing of the ce is followed by a re-formation of the abscess; before it again escapes, by the former or another opening, the acute inflammatory symptoms previously experienced are reproduced, generally in a mitigated form. The vascular determination attending menstruation favours the reappearance of acute symptoms, and thereby perpetuates the disease. These returns of the malady become less and less frequent as the inflammatory swelling of the uterine appendages diminishes, and as the structures return to their natural condition. "A female who has suffered inflammation and suppuration of the lateral ligaments, even in its mildest form, may be from several months to one or more years before all trace of local inflammation has disappeared, and before she can be said to be radically well." During this period she is never quite free from symptoms of uterine irritation, or of slight exacerbations of her former malady, especially at the menstrual periods, which are often delayed or irregular; the quantity of discharge being generally scanty, seldom excessive. A leucorrhœal discharge is always present, in various quantity. (See PUERPERAL DISEASES, §§ 181. *et seq.*).

80. *f. The Prognosis* of this disease in the non-puerperal state is not serious as regards the life of the patient: in the puerperal state it is much more serious (see PUERPERAL DISEASES, §§ 183. and 256. *et seq.*), and often most unfavourable. Apart from this state, this disease seldom terminates fatally, although it entails suffering for months or even for years. Acute metritis generally terminates by resolution, under judicious treatment (§§ 111. *et seq.*), without suppuration, and without consecutive lesion; but inflammation of the lateral ligaments, although apparently not a more severe disease at its commencement, and period of full development, occasions lesions which time only can remove, or which are never completely removed.

81. iv. ASSOCIATIONS OR COMPLICATIONS OF INFLAMMATIONS OF THE UTERUS, &c.—Inflammation of the vagina and vulva may be associated with inflammation of the neck of the uterus, or even with internal or endo-metritis also; and the inflammation may commence either in the vulva or vagina, and extend to the neck of the womb, or in this latter and extend to the former. In cases of *gonorrhœal inflammation* of the neck of the womb, it may be inferred that the inflammation commences most frequently in the vulva and vagina; but such may not always be the case; for it is not improbable that the neck of the uterus is sometimes primarily affected. In the cases, fortunately rare, in which septic or contaminating causes produce an asthenic or diffusive form of vaginitis, as well as in gonorrhœal inflammation, the disease is always prone to extend from the neck to the internal surface of the womb, and even also to the uterine appendages.

82. Various derangements of the uterus, formerly considered as functional, are in most cases merely symptoms or associations of inflammation of the cervix and internal surface of the uterus, as Dr. H. BENNET has fully succeeded in demonstrating, and as I have stated to be the case in several forms of LEUCORRHŒA, and of disordered MENSTRUATION. The leucorrhœal discharge varies with the tissue affected and the nature of the affection. It may consist of natural mucus from the mucous follicles of the vulva, vagina, and cervix uteri; of a white creamy mucus secreted

by the mucous membrane of the cervix and vagina, from congestion of this membrane, such congestion not always amounting to disease ; and of a puriform mucus, or a white or ropy transparent mucus mixed with pus, which is always the product of inflammatory action and of its consequences. These three forms of vaginal discharge may be combined in chronic inflammation of the cervix. But this disease may exist without any leucorrhœal discharge whatever, the morbid secretions being absorbed in the vagina. (See art. Leucorrhœa, §§ 19. *et seq.*)

83. Amenorrhœa and other menstrual disorders are often consequences or complications of uterine inflammations. Dysmenorrhœa is very frequently a result of inflammation of the cervix uteri ; and when thus associated, other disorders are often superinduced, more especially the several states of hysteria, convulsive affections, spinal irritation, &c. The changes which take place in the cervix and its canal, in consequence of inflammation or ulceration of them, are often such as occasion difficult menstruation as the consequence of contraction of the os internum, or of the canal which forms the cavity of the cervix. The swelling and hypertrophy of the cervix are frequently associated with this contraction, when the cervical canal itself is not the chief seat of inflammation. Dr. Simpson believes that, unless the uterine sound pass, without effort, into the uterine cavity, there is contraction of the os internum; whilst Dr. Henry Bennet contends that there exists, at the os internum, a kind of muscular sphincter, formed by a strong band of the circular muscular fibres of the cervix, and destined to close the uterus during pregnancy ; and that this sphincter in the healthy state prevents the uterine sound from passing into the uterus without considerable pressure be made ; and he adds, that when the inflammation of the cervix ascends as far as the os internum, or when endo-metritis exists, or the organ is enlarged by the formation of tumours in its body, then the sound passes readily into the uterine cavity, thereby furnishing a sign of the presence of these diseases.

84. It has been considered that *menorrhagia and uterine hæmorrhage generally* are results of active or passive congestion, or of tumours or polypi, or of malignant disease, of the womb. Dr. Henry Bennet, however, contends, and with apparently much truth as well as talent, that, in the absence of malignant disease and of uterine tumours, the quantity of blood lost during menstruation is seldom increased, for a continuance, so as to constitute menorrhagia, and that the menstrual periods are seldom morbidly approximated, unless there exist some degree of chronic inflammatory disease of the cervix, or unless menstruation be finally disappearing. Congestion of the uterus he admits to exist in menorrhagia, but it is generally the result of inflammation of the cervix ; and it assumes an active or passive character, according to the constitution of the patient, and to the amount of reaction produced by the disease on the system. If the inflammation is active and has not debilitated the patient, the hæmorrhage is also active or sthenic. If the disease of the cervix has existed long, and has produced anæmia or debility, the hæmorrhage is passive or asthenic. It is difficult to explain the reason why inflamma-
tion, granulation, or ulceration of the ce x
should, in some cases, render menstruation sca y,
too rare, or difficult, and in others profuse o o
frequent. But the fact is proved by observa n,
and it may be referred to the states of innerv n
of the uterine organs in different persons, d
to the sympathies exerted between this y
sensitive part of the uterine organs, in n-
nection with the vascular conditions of the
organs, and of the system generally. Dr. n-
net, however, believes that, where the inf n-
mation extends to the body of the womb, n-
struation is generally scanty or retarded ; whe s;
when it is limited to the cervix, it is often pr e
or more frequent than usual. Although is
association of inflammation of the cervix ri
with disordered menstruation is so commo as
now stated, still cases occur in which this l er
must be referred to other pathological sou s.
Indeed profuse menstruation is occasionally p-
duced by mere congestion or determinatio of
blood to the uterus, independently of the e-
istence of inflammation of the cervix, espec y
when the catamenia are finally disappea g.
The association of inflammatory ulceration o e
cervix uteri with hæmorrhage during pregna y,
in the opinion of Dr. H. Bennet, very frequ y
exists ; the former being the source of the la r,
and thus furnishing a natural explanation o e
presumed menstruation of pregnant females.

85. That chronic inflammation of the
and of the body of the uterus should occa n
and be associated with, *sterility*, with *abo*
with *Hysteria*, in its several forms; with *s*
irritation, with *chlorosis*, and with various an
lous *neuralgic* and other *affections*, in diffe
cases, according to the circumstances pec
to the individual, cannot be doubted, alth
the relation between it and these ailments
overlooked until Dr. H. Bennet and some
temporary physicians, British and contine
insisted upon the fact of its frequent existe
Besides the complications of this disease
these complaints, the former is often assoc
with other lesions of the uterus itself and its
pendages, as with *enlargements*, *polypi*, and *fil*
tumours of the womb ; with the various form
displacement of the organ, with *lesions* of
ovaria, and with *uterine phlebitis*.

86. Besides the above associations, ot
affecting the adjoining organs or parts are no
frequent, and are to be viewed as being n
more frequently consequent upon chronic inf
mation of the cervix and body of the uterus,
existing as the primary affections. Inflamma
of the urinary bladder, or of the rectum and
moid flexure of the colon, more especially of
mucous surfaces ; hæmorrhoids, and prola
or fissures of the anus, and syphilitic diseas
the cervix uteri, severally occur as complicat
of one or other of the forms of metritis.
these the diseases of the rectum and uri
bladder are chiefly consequences of the exten
of severe or protracted inflammation of the ce
and body of the womb, sometimes extending
to the uterine appendages, these latter, in a
instances, being the medium of morbid connec
between the different maladies. It is comp
tively more rare for disease of the large bow
or of the bladder, to occasion any of the form
metritis, than for this last to cause, by the ex

of inflammatory action, one or other of the
er. Yet I have seen instances, in the non-
peral states, of metritis which had supervened
ysentery, and even of asthenic inflammation,
had extended to most of the pelvic viscera,
equent upon a dysenteric attack. Such com-
tions as these are, however, much more fre-
t and fatal in the puerperal states; and in these
veins are also very commonly implicated. This
plication of metritis with uterine phlebitis may
r even in the non-puerperal state, as I have
in a few instances. In a very remarkable
of this kind, which was seen in consultation
me by Dr. R. Lee, metritis supervened upon
ntery in a married lady, aged about 35 years,
who had not been pregnant for several years.
rine phlebitis also took place, and was followed
phlegmasia dolens. Inflammation of the
um and pericæcal tissues may extend to the
us and uterine appendages; but this is a very
occurrence.

7. III. Treatment of Inflammations of the
rus and Appendages.—Much of what I have
d above respecting the treatment of the nervous
irritable states of the womb (see §§ 13. *et*
) is applicable to inflammatory action in either
cervix or body of the organ. It is manifest
, as the several inflammatory states of the
us, whatever may be their precise seats, occur
he nervous, the debilitated, the anæmied, as
l as in the plethoric and the robust, the treat-
nt, especially the general or constitutional,
st depend in great measure on the knowledge,
men, and experience of the physician, by
ch he is enabled to ascertain the precise pecu-
ities of each case. A most important part,
vever, of the treatment is entirely local or sur-
al; but, in the management of female diseases,
division should be made into medical and sur-
al means, for here, as in all other departments
practice, surgery, although ancillary to, is also
art of, medicine.

8. i. Of Inflammation of the Neck of the
mb, and its Consequences.—There are few
plaints more prone to relapse, and in its severer
es more difficult to remove, than the one now
ler consideration. But these are not the only
ls; the difficulty often of conducting the treat-
nt conformably with the requirements of the
e and the prepossessions of the patient, is
a positive obstacle to success, particularly
females whose circumstances of life require
rtion, or prevent them from enjoying the
uisite comfort and ease, and in unmarried
ales. The treatment must necessarily depend
n the peculiarities of the case, with what is
own or inferred as to its causes, upon the dura-
n of the disease, and upon the alterations which
ve taken place in the part. But in this, as well
in all other inflammations of the uterus, the
lications of cure consist, *first*, in subduing in-
mmatory action and painful symptoms; and,
ond, in restoring the constitutional energies,
d thereby the healthy state of the uterus. It
en becomes a great difficulty to know when to
continue the first indication, and when to aim
the second; for a too early adoption of means
lculated to restore the health, may occasion a
apse of inflammatory action and its attendants.

89. *A. The treatment before any organic le-*
ns have taken place, and whilst inflammatory action is unassociated, comprises the two *intentions of cure* just stated (§ 88.). The means which are found most successful in fulfilling the *first* intention, are the horizontal posture, and quietude of mind and body; injections of an emollient, refrigerant, or anodyne kind; cooling diaphoretics, with or without narcotics, warm or tepid hip-baths, local depletions, alterants, and sometimes derivatives. This state of the disease, especially at its commencement, is so often unattended by severe symptoms, unless when it is associated with the neuralgic and irritable conditions described above (see §§ 5. *et seq.*), that it seldom comes under medical care; and it is not, commonly, until either excoriations, granulations, or superficial ulcerations, very frequently associated with *leucorrhœa*, *disordered menstruations*, and *deviations* from the natural positions of the womb, that medical aid is resorted to. In all cases, due care should be taken to ascertain the admitted and probable *causes* of the complaint. It will be seen, on referring to these causes (see § 10.), that certain of them can hardly be fully ascertained, although they may be inferred with a near approach to certainty; and, in some cases, they will be admitted by the patient, if inquiries be made with due address. The state of general health should also receive attention, and the treatment be regulated accordingly, and with strict reference to the condition and periods of the uterine functions.

In the *mild cases*, if they have not been of long duration, and if the cause have been only temporary in its operation and not a persistent or habitual vice, means directed to the improvement of the general health, to the regulation and promotion of the secretions and excretions, more particularly to the prevention of fæcal and urinous accumulations, aided by rest, the avoidance of sexual excitement, and by emollient and astringent or refrigerant injections according to the peculiarities of the case, will be sufficient to restore the health, even without strict reference to the succession of indications of cure mentioned above (§ 88.).

90. In *severe* cases, especially in those of long duration, and in those where the above means fail of affording satisfactory relief, the indications of cure stated above should be adopted, more particularly if thickening or enlargement of the cervix or any other of the lesions described as consequences of chronic inflammation be present. For these the means enumerated for fulfilling the *first* indication should be prescribed. For this purpose, constant repose on a couch or sofa, avoiding very warm beds, and the upright or even the sitting posture, vaginal injections, hip-baths, local vascular depletions and a recourse to caustics, are the means of cure now in general use. But, although the chief remedies, they are not the only ones; and in all cases they should be aided by constitutional and moral treatment, by a proper diet and regimen, if indeed the local remedies be not considered as being aids only to the constitutional means. These latter require to be so diversified, according to the temperament, habit of body, strength, and other peculiarities of the case, that a selection of them appropriately to these peculiarities must depend upon the judgment of the physician.

91. *a. Vaginal injections* are often of great ser-

vice, whether *simple* or *medicated*. They wash away the secretion from the inflamed cervix, and prevent the stagnation of it in the vagina and around the cervix; an occurrence tending to increase irritation and morbid sensibility of the parts. The frequent injection of *cold water* only has not only a cleansing but also a tonic and healing effect. In some cases the temperature of the water may be heightened somewhat above fifty degrees of Fahrenheit. But in most cases the temperature of spring water is best, the quantity injected, or the duration of the injection, being regulated by the physician.

92. *Medicated injections* are either emollient, astringent, or anodyne. Various emollient injections are of service in slighter cases, and when pain or irritation is experienced; and they may be made vehicles for anodynes. Milk and water, decoction of marsh-mallows, linseed tea, &c., may be used, cold or tepid. When irritation is considerable, a small quantity of biborate of soda, or of any of the anodynes, especially vinum opii, tincture of henbane, or tincture of belladonna, may then be added to the above. Injections also of the decoction of poppy-heads, either alone or with chamomile flowers, may be prescribed. Astringent injections are very commonly resorted to in this complaint, especially when the discharge is abundant. In this and the above cases, the means advised for the treatment of LEUCORRHŒA (see §§ 16, 17.), and of that state of the disease especially which I have ascribed to "*inflammatory action of the mucous glands of the cervix and os uteri*," (§§ 23, 24.), are quite appropriate. Of the several astringent injections in common use, viz., sulphate of alumina, sulphate of zinc, acetate of lead, solution of nitrate of silver, decoction of oak bark, and solution of tannin, Dr. H. BENNET states that he prefers the first and the solution of nitrate of silver. The first three he uses in the proportion of a drachm to a pint of water, increasing or diminishing the strength according to circumstances. He, however, considers that injections are serviceable chiefly for cleansing the vagina, for diminishing uterine irritation, and for removing vaginal and vulvar inflammation; but that they are generally powerless to subdue confirmed inflammation of the substance of the cervix or even of the membrane lining its cavity; for he believes that their inefficacy in inflammation of the cervical canal is partly owing to the fluid not reaching the region affected; and that in inflammation of the cervix, a remedy which is only applied to the surface can scarcely be expected to subdue the deep-seated disease. When injections are prescribed, due care should be taken that they are properly administered. The patient should be on her back, with the pelvis raised, and means be used for their retention for a time in the upper part of the vagina.

93. When marked irritability and acute sensibility characterise inflammatory action of the cervix, Dr. DEWEES recommends lukewarm flax-seed tea, to be thrown up by a female syringe of sufficient size three or four times a day, and to be retained there for some time by applying a cloth to the vulva. I have more frequently prescribed, especially for unmarried females, in order to remove the more painful symptoms, injections into the rectum, containing either the extract or the syrup of poppies, or compound tinctu camphor, or vinum opii, or tincture of hen In a case of remarkable severity which I atte with the late Dr. MOORE, a small quantit tincture of belladonna was pressed from a pie sponge contained in a syringe, when introd as far as the cervix uteri, and always afforde mediate relief.

94. *b. Baths.*— Warm *hip-baths* at the te rature of 90° are occasionally of service. I H. BENNET advises them at a temperature of to 85° Fahrenheit, according to the season o year and feelings of the patient. At this perature they have a sedative effect, whil higher degrees he believes that they determin circulation to the pelvis. In painful or dif menstruation, a temperature of 94° to 98° is decidedly beneficial. Dr. GOOCH states tha has found a partial steam-bath, used by dra the flannel sack up to the præcordia, so as t close the abdomen and extremities, these b exposed to the action of the steam for hal hour every day, preferable to the warm hip- Entire warm baths are useful in winter, only occasionally resorted to, and when they be had in the patient's house or apartn During summer a tepid bath at 65° or 70° service every second, or third or fourth Cold and shower baths should be reserved advanced convalescence, and are important m for fulfilling the second intention of cure.

95. *c. Vascular depletions.* — These shoul chiefly local; and, with all respect for those cultivate this speciality, I cannot agree with t in the choice of situation from which the b should be abstracted. The situation preferre the more recent writers on diseases of the ut is the inflamed cervix itself; but the several culties in the way of the general physician, i be averse to the manipulation which this prac involves, and if he have due regard to the feel of the patient, and even in some cases to se ments of virgin purity, will induce him to ch other situations than this one from which bl may in this disease be abstracted with advant and to have recourse to other and various me by which the end in view may be accomplis I know that, in all cases, where this and o appliances to the neck of the womb are reso to by physicians who practise in this especial partment, the utmost attentions are paid by th to the modest feelings of the patient and to decent and even delicate observances; bu should prefer having recourse, in the first pla to such means as cannot be objected to by sensitive mind, or even by the captious; and le such measures as may become matters of repro to both the patient and physician, altho most unjustly, to the necessities of the case — a *dernier ressort* in practice. I may write un prejudice in favour of older modes of practi for I have employed these and seen the benefits t afford, when judiciously employed and combin but I nevertheless admit that the measures m recently had recourse to are often more quic successful, and sometimes succeed after the oth have failed.

96. Local abstractions of blood should be rected as near as possible to the seat of pa Cupping is more serviceable than leeches, pa cularly when the pulse is full or firm, and

p ent not reduced. In these cases, or when the p ent is young and plethoric, or when the mens al discharge has been scanty for some time p iously, a general depletion will be advantag usly premised, and more especially when the b od is taken from the feet when immersed in w m water. When pain is referred to the sac m, cupping may be directed on this part. I ches are generally most beneficial when app d to the vicinity of the anus, or the labia pud dæ, or to the inner parts of the tops of the thighs ju below the vulva or groins. The quantity of b od that may be taken away, should depend u n the habit of body, the state of the circulati , and on the severity and duration of the comp nt. My objections to the application of le hes to the cervix uteri are,— 1st, those alr dy hinted at above, and particularly in respect o unmarried females; and 2d, the risk of the a lication of them to this part being followed by a excessive determination of blood to the organ, o y ulceration of their bites, and consequently i reased irritation. It will, however, be adr ted that these are contingencies which may s lom occur; nevertheless they should not be l arded.

97. The repetition of local depletion should r essarily depend upon the effect of the previous c ration, and upon the circumstances just ment ied. In cases of long continuance, when the c stitution is much enfeebled, even local deplet n is but ill-borne, and should seldom exceed f n four to six ounces. In these its repetition i rarely attended with much advantage. But v en the repetition seems required and gives rel , it should generally be to a smaller amount t n the first, and be performed at a time when t return or increase of pain is anticipated. In t s way it may be repeated thrice, or even more f quently, to the small amount now named. ere are, however, instances where even a s all local depletion aggravates the symptoms. ese occur, chiefly, in weak, nervous, or anæmied f ales, and in cases of long standing, or where t leucorrhœal discharge has been long profuse. this class of patients, the *second indication* of e (§ 88.) should be immediately adopted.

98. Dr. Henry Bennet remarks that the ap cation of leeches to the cervix uteri, when often eated, is more frequently injurious than bene al, and that the consequences mentioned above n frequently result from them. I must, how er, refer the reader to his work for many ju ious observations respecting the local employ nt of leeches in this disease. Dr. West states t, "so long as acute symptoms are present, or enever they reappear in the chronic stage of disorder, local leeching generally affords more edy and more decided relief than other re dial means. The leeches should be applied to uterus itself; not above four in number at a e; nor is it in general expedient to repeat their plication above once in a week or ten days. other precaution consists in never leeching the mb within four or five days of a menstrual riod; lest the regularity of that function be dis bed, either by being brought on prematurely (which is much less frequent) by its occurnce being postponed for several days. The in which is left behind after menstruation in me of these cases, — in those especially in which the discharge is scanty, — is, however, often very greatly relieved by the application of a few leeches as the period passes off." (*Lect.* p. 140.)

99. *d. Cooling aperients* are generally required both at the commencement, and during the course of treatment, owing to the state of the bowels and to the effects of narcotics taken from time to time. Those aperients which will operate copiously once, or twice at most, and without irritating the lower bowels, are the most eligible. Castor oil, the electuary or confection of senna, either alone or with sulphur and bitartrate of potash, will prove the most certain. In very chronic cases, or when the digestive organs and the system generally are much weakened, rhubarb and magnesia; or the compound infusions of gentian and senna, in equal parts, with tartrate of potash, tincture of henbane, and tincture of cardamoms will be found of service.

100. *e. Narcotics* or *sedatives* are often required, not only in the injections, as advised above, but also in the medicines taken by the mouth, or administered in enemata. They are most serviceable after a gentle action on the bowels has been produced. Camphor, in the dose of one or two grains, with the nitrate of potash and the extract either of henbane, or of hemlock, or of poppy, given in the form of pill twice or thrice daily, or about ten grains of either of these extracts, dissolved in water gruel and injected up the rectum, immediately after the bowels have acted, will frequently afford relief when much pain is experienced. Subsequently the bitter infusions may be prescribed with tincture of henbane, and small doses of nitrate of potash and bicarbonate of potash or of soda. These means also serve to diminish irritability of the bladder by which uterine inflammation is often attended. If deposits of the phosphates exist in the urine, small doses of hydrochloric acid, with tincture of henbane and extract of pareira, prescribed in the infusion of calumba, or of orange peel, generally are of service.

101. *f. External applications* of various kinds have been recommended, as the croton-oil liniment (one part of the oil to ten of simple camphor liniment), by Dr. West, to be applied over the sacrum by means of a sponge twice a day; in order to relieve the back-ache, plasters of opium or of belladonna, to the same situation, and with the same intention; and a small blister, or an anodyne liniment, applied over the part, when pain is urgent in either iliac region. Dr. Oldham advises the following in this latter situation:—

No. 365. ℞. Extracti Belladonnæ ʒss.; Tinct. Aconiti (Fleming's) ℈iv.; Linimenti Saponis Comp. ℥jss. Misce. Fiat Linimentum.

In cases where pain either in the back, sacrum or iliac regions is most severe, I have found more relief procured from an embrocation, frequently recommended in this work, consisting of equal parts of the compound camphor liniment, of the turpentine liniment, with variable proportions of sweet oil and cajuput oil, applied over the part on folds of flannel or spongiopeline, than from any other application. Warm turpentine stupes are also very beneficial.

102. B. *When inflammation of the uterus is attended by granulations, excoriations, ulceration, and hypertrophy of the cervix*, additional means to those already mentioned are recommended, espe-

cially by recent writers on uterine diseases. Dr. Henry Bennet states, that the solid nitrate of silver or a strong solution, should be applied every three or four days to the inflamed mucous membrane covering the cervix, where there is neither ulceration nor hypertrophy of this part; and this treatment should be the first resorted to when the cavity of the cervix is inflamed, "carrying the caustic into the cervical cavity as far as it will pass." When ulceration and hypertrophy of the neck of the uterus are present, he adds that the means already advised seldom succeed in effecting a cure, unless the ulceration be recent, although they mitigate the severer symptoms; a relapse occurring in a short time. Repeated relapses, and a perpetuation of ulceration of the cervix and cervical canal, are the consequences of palliation merely, owing to the repeated determination of blood to the uterus during the menstrual periods. Should the disease not yield (and it seldom does) to the antiphlogistic means directed as above, the most efficacious treatment, he remarks, "indeed the only one that can be depended upon, is by direct stimulation of the diseased and ulcerated surface, and to modify its vitality in such a manner as to induce a healthy action, and, finally, cicatrisation. This end is obtained by the use of caustics of varied strength according to the nature and extent of the disease, its chronicity, and the effects produced." "We must first subdue sub-acute inflammatory action by emollients, depletion, and astringents; and then modify by direct stimulation the diseased surface, so as to substitute healthy reparative inflammation for morbid ulcerative inflammation."

103. The last part to heal in an ulceration of the neck of the uterus is that which dips into the cervical cavity. Dr. Bennet therefore insists upon the necessity of separating the lips of the os with a bivalve speculum, in a good light, and of thus carefully exploring the state of the cervical canal before the disease is pronounced to be cured. Unless this precaution be used, the ulceration may be only partially cured, and the disease will return and extend over the cervix in a few months. The agents recommended for the cure of disease of the cervix—for chronic inflammation, excoriations, granulations, ulcerations, with or without enlargement, induration and deviations—are chiefly the more energetic caustics, which he enumerates in the order of their powers of cauterisation:—The solution of, and the solid nitrate of silver, the mineral acids, the acid nitrate of mercury, potassa fusa, potassa cum calce, and the actual cautery. It is obvious that a recourse to either of these requires both address and careful appliances. The nitrate of silver, acid nitrate of mercury, and potassa cum calce, are chiefly recommended by British writers on uterine diseases; these and the actual cautery also being much employed by French physicians. For very full directions for the use of these caustics, I must recommend the reader to the works of Dr. J. Henry Bennet, Dr. Simpson, and of the other writers mentioned above; but as the directions given for the use of these means by Dr. West are more succinct, I shall give them nearly in his words; premising, however, that the able and experienced physicians now named generally have recourse to the more energetic of these caustics in the most severe and protracted cases, and when more or less hypertrophy of the cervix is associated other lesions.

104. When the granulations on the os cervix uteri become large, soft, very vascula bleed easily, the surface furnishing a cc glairy discharge, sexual intercourse being p and often followed by bleeding, Dr. West recommends "extensive scarifications, which be followed by the daily application of pow alum on a piece of cotton wool, or by the duction of a piece of cotton wool soaked strong solution of alum. By means of a pie thread tied to the cotton wool, it can be ren by the patient herself in the course of a few l though it must always be introduced throug speculum. In the greater number of inst the state of the os uteri becomes so much imp in four or five days, that this mode of treat may then be dispensed with, and the sedulou ployment of strong astringent injections will ally suffice to complete the patient's cure. this is not the case, but the morbid conditio continues, more powerful applications ma needed. The nitrate of silver is not in ge suitable in these cases, for its application is followed by pain, and also by bleeding. acid nitrate of mercury, both in this instance also whenever a strong caustic is required, seemed the most useful application; and moderate care its employment is unattende risk. When it is used, however, the patient lie on her back, and one of Coxeter's bi speculums being introduced so as thoro to expose the os uteri and include the cer little cotton wool must be carefully dispose round the edge of the speculum, so as to al any of the superfluous acid, and to prevent it running down outside the speculum, and th juring the vagina. A brush can easily be temporised by trimming a little piece of c wool after it is placed in the holder, and the w diseased surface may then be painted over the caustic, which immediately forms upon white eschar. A piece of dry cotton-wool pressed against the part will absorb any su fluous caustic; the little strips placed aroun edges of the speculum may then be removed, the speculum withdrawn." As an additional caution, a piece of moistened cotton-wool ma introduced up to the os uteri, before the drawal of the speculum, whence it may be moved in the course of a few hours by the pat "It is seldom that either pain or bleeding fol this application; and at the end of a week eschar will usually be separated; the surface be found to have lost its fungous character, cicatrisation to be commencing at its edges. zinc lotion of about five grains to the ounc the black wash employed as a vaginal inje twice a day will now generally be sufficient; sometimes the surface puts on an indolent racter again, and it may then be expedier touch it once or twice with the nitrate of si and I have occasionally found it necessary t peat the application of the acid nitrate of cury." (*Lect.* p. 146.) Dr. Henry Ben employs, as escharotics, either the acid nitrat mercury, or the potassa cum calce, fused in s of three different sizes, according to the pecul ties of the local lesion; and gives ample direct for the use of these and other caustics, ap

tely to the circumstances of the disease. He, ever, admits that cauterisation of the cervix is operation not without danger, and must not, efore, be either injudiciously resorted to, or carely carried out. Although his own "practice has n hitherto free, or all but free, from serious idents, the same immunity cannot always be ected. Indeed, I recently learnt from M. NDRIN that within the last few years he has l several cases of acute metritis and of abscess he lateral ligaments, the evident and immediate ult of deep cauterisation. But he also tells me t he has seen the same results follow the use of nitrate of silver and of injections; and I may ntion that the two most severe instances of te metritis that I have myself witnessed for e time in the unimpregnated womb occurred r the use of weak astringent vaginal injecns." (*Op. Cit.*, p. 426.) I believe, however, en vaginal injections are followed by those ere results, that the inflammation of the cervix, the leucorrhœa, for which these means were d, was only a part of the existing lesion; and t endo-metritis, or a chronic metritis, had also sted at the same time, and was developed into acute state by the injections.

105. *C. Treatment of Hypertrophy and Induran of the cervix uteri.*—These changes are the ults of repeated congestion, or of inflammatory ngestion and of nutritive hypertrophy. The ntinued existence, or repeated recurrence of lammatory congestion gives rise to increased velopment of the vessels, to the exudation of stic lymph, and to the partial organisation of s lymph, and to greatly increased size and nsity of this part of the uterus, often extending rtially to the substance of the uterus itself, and ociated with *chronic metritis* (§§ 62. *et seq.*). is lesion is commonly attended by more or less lapsi, and often with deviations. The enlarged rvix may, moreover, be excoriated, ulcerated, covered by granular formations, owing to the erations of its follicles. The *local means* of cure those already recommended, aided by the nstitutional treatment hereafter to be noticed § 106. *et seq.*). Dr. H. BENNET states that, f hypertrophy resists the ordinary antiphlogistic ans of treatment, it never withstands the meltg influence of deep cauterisation with potassa, the actual cautery." Of the two he prefers potassa, or potassa cum calce, Dr. WEST the id nitrate of mercury. The actual cautery may erefore be dismissed. It should be clearly unrstood that these means are not intended to stroy the hypertrophied cervix, "but merely to t up an artificial eliminatory inflammation, by eans of an eschar or issue, *of limited extent*, tablished in the centre of the hypertrophied gion. I do not calculate, in the remotest deee, on the destruction of tissue to which the ustic or cautery gives rise, for diminishing the e of the hypertrophied cervix; but solely and tirely on the *inflammation subsequently set up.*" n eschar, of the size of a shilling, will answer e purpose of reducing the hypertrophy. It may necessary to apply the caustic several times. The ulcerations occasioned by the deep applition of potassa heal very rapidly, even when left themselves. It is better, however, to touch em at intervals with the nitrate of silver, to event the granulations from becoming too luxuriant, and to favour the cicatrisation which usually takes place in from four to six weeks."

106. *D. Constitutional and general treatment.*—The constitutional treatment of chronic inflammation of the cervix and os uteri, and its usual consequences, should not be overlooked, even whilst local means are being applied. Indeed, in many cases, this treatment should precede a recourse to local measures, these latter only following the failure of the former. In some of the more recent works upon this and other diseases of the uterus, too little importance is attached to the recognition of the causes of the existing malady, and upon the prevention and removal of these causes, which, when removed, the salutary efforts of nature would then, of themselves, often effect a cure. In this disease, especially, as well as in the displacements and deviations of the uterus, sexual excitement and self-pollution are the most frequent causes, and these are usually allowed to continue, owing to the difficulty and delicacy of the subject, to ignorance of medical men of the great frequency of this vice, and to an equal ignorance of the immorality and injurious consequences of it on the part of those who indulge in it.

107. The constitutional treatment which I have adopted for many years, when uterine irritation, as it was then termed, or when chronic inflammatory irritation, as more recently shown, was present, always was much modified, according to the features of the case. If *leucorrhœa* was its prominent character, the means advised when treating of this complaint were prescribed. If the *menstrual function* was disordered, the treatment recommended for the various forms of such disorder was had recourse to; and, whenever inflammatory irritation of the uterus was inferred, then means more or less antiphlogistic were advised, often conjoined with tonics, and with other remedies adapted to the peculiarities of the case. In a very large proportion of the cases of this complaint, the causes which have produced it, and the discharges which characterise it, as well as its exhausting nature and duration, have produced so much debility and irritability, and so extensive a range of sympathetic disorders,—nervous, neuralgic, hysterical, cerebro-spinal, vascular, and anæmic—as to imperatively require constitutional treatment, however much the local means above described may be required or confided in. What this treatment should be, or how conjoined with regimen and local measures, must depend upon the acumen of the physician, and upon the appropriate use of each or of all in particular cases and circumstances. But in most cases, the patient should recline on a cool hair couch, should sleep, if married, apart from her husband, on a hair mattress, and avoid very warm feather or down beds, all sources of sexual excitement, and whatever appears to aggravate her complaints. She should preserve an open state of the bowels by means of cooling aperients, or of these conjoined with tonics. The bicarbonates of the fixed alkalies may be taken with the nitrate of potash in bitter infusions; or the liquor ammoniæ acetatis with nitrate of potash, in similar vehicles. The terebinthinate embrocation already advised (§ 101.) may be employed externally, and a cooling, and yet tonic or restorative, regimen and diet adopted, avoiding much animal food, and

all heating and stimulating beverages, as well as coffee and strong tea. In a severe and tedious case, for which I was consulted by Mr. Barnwell, the following pills proved of very great service: —

No. 366. ℞ Camphoræ rasæ ℈j.; Potassæ Nitratis ʒj.; Sodæ Sub-carb. exsic. ʒss.; Extr. Hyoscyami ℈ij.; Syrupi papaveris q. s. Misce. Fiat massa æqualis, quam divide in Pilulas xxx., quarum binas, ter in die capiat.

After these were taken for some time, they were replaced by the infusion of calumba, bicarbonate of soda, tincture of calumba, and tincture of hyoscyamus.

108. In the above manner, the *second indication* of cure may be initiated, and may thus advance to a more tonic and restorative or nutritious treatment, so as to restore the constitutional energies, and, thereby, the healthy state and functions of the uterus. This end can be attained only by medicinal and regiminal means, both of which, however, should be commenced with caution. In a few instances, I have prescribed, with marked benefit, the *cod-liver oil*, on the surface of a tonic infusion, with one of the mineral acids, as the compound infusion of orange peel with sulphuric acid; or the compound infusion of roses, or the infusion of cinchona with hydrochloric æther, or hydrochloric acid, or with both. In other cases, the tonic or bitter infusions or decoctions may be ordered with the alkaline carbonates, nitrate of potash, and tincture either of henbane, or of some other anodyne. In cases which have been of long duration, or have been caused by self-pollutions, or which are characterised by shattered health, by pallor of the countenance, cold extremities, and more or less anæmia, the milder preparations of iron, as the tincture of the muriate, or of the acetate of iron, may be prescribed with the preparations of calumba or quassia. Dr. Davies states that he has given, in these cases, the phosphate of iron with much benefit. In some cases, especially where there is hypertrophy of the cervix uteri, the iodide of iron may be tried in the syrup of sarzæ; or the iodide of potash may be taken with either the bicarbonate of potash or the solution of potash in a tonic infusion, &c.

109. The *mineral waters*, natural or artificial, may likewise be resorted to, according to the peculiarities of the case. The Bath and Tunbridge waters, the Harrowgate waters, the waters of Seltzer, Geilnau, of Ems, of Vichy, of Pyrmont, &c., have been severally recommended, and found of some service. The *regimen* and *diet* of the patient are of much importance. If married, she should sleep apart from her husband; and whether married or unmarried, she ought to avoid all causes of excitement and irritation. She should enjoy the advantages of a cool and pure air. The *diet* ought, whilst febrile and inflammatory symptoms are present, to be light, cooling, and chiefly farinaceous; and animal food should be given in very small quantity, until convalescence is advanced, when it may be taken more liberally. The beverages may consist of toast-water, barley-water, or of lemonade, or of the imperial drink. Afterwards, when recovery is far advancing, the Rhenish wines, or claret, or claret and water, &c., may be allowed. In most cases, coffee and tea are inappropriate. Cocoa, or cocoa-nibs, prepared in a simple manner, and dry-toast with little butter, should be preferred. Patients who have caused this complaint by self-pollutions, have generally great appetites; and their indulgences i food and in their unnatural vice tend to perpetuate the disease, and to frustrate the treatmen For them, the diet should chiefly consist in large proportion of vegetable and farinaceou substances, whereby the stomach may be filled with as little excitement of the circulation a possible. The mind should always be occupie by useful pursuits, and, as much as may be, b agreeable employments.

110. E. *Treatment of inflammation of the cervi uteri in the unmarried, during and after pregnancy, and in advanced life.* — A well informe practitioner may apply what has been already adduced to these circumstances of life; but wit due care and precaution. In *unmarried females* the great difficulty of treatment is in the local o instrumental part; but a recourse to it will depend much upon the severity and other peculiarities of the case, and upon the results of constitutional treatment, which should be previously employed; the causes of the disease having bee ascertained, and removed as far as possible. "Th existence of *pregnancy*," Dr. H. Bennet states "so far from being an obstacle to the local treatment of inflammatory and ulcerative disease o the uterine neck, is a strong reason why it shoul be adopted and carried out without delay, unles the patient have reached the latter period of he pregnancy. If so, as the child is viable, and it i rather difficult to bring the cervix fully into view it is as well, unless the symptoms be urgent merely to resort to astringent injections, and t reserve all instrumental treatment until after th confinement." In the early or first six months the local treatment, Dr. B. states, must consis in astringent injections, and cauterisation with th nitrate of silver, or the acid nitrate of mercury the potassa cum calce being much too powerfu in these cases. If ulcerative disease of the cervi exist after an *abortion* or *confinement*, he never interferes until four or five weeks have elapsed, an he then cauterises the diseased surface with th nitrate of silver. If blood be poured out fro the ulcerated surface, the cauterisation invariabl stops it; and the case then falls into the genera category. But it should be recollected that during lactation, the mucous surface of the cervi and vagina presents a vivid red or congested hue from sympathy with the mammæ and nipples hence this condition should not be mistaken fo inflammation, and ought not to be interfered wit by treatment. The disease of the cervix in female *past the menstruating age*, is generally intractable and requires the most powerful caustics; bu having been removed, the cure is permanent.

111. ii. Treatment of Acute Inflammatio of the Internal Surface and Body o the Uterus. — Although the treatment of *endometritis*, by local means, is supposed, especiall by some French writers, to be appropriate to thi state and seat of the disease, yet such means however cautiously resorted to, cannot fail o being more or less dangerous. As this form o metritis frequently commences in the cervix or it cavity, extending to the cavity, and to some extent, in most instances, to the substance or body o the organ, and in some cases also to the broad ligaments, these circumstances should always be considered, and the treatment should be promp

an decided. If the patient be young, or strong, or ethoric, especially if the disease has followed th suppression of the catamenia, or of other ev uation or excretion, blood should be taken fr the arm, or from a vein in the feet immersed in warm water, and cooling diaphoretics and ap ients exhibited. The warm or tepid bath, or hi bath, may follow the depletion; and, if the pa be severe, camphor, nitrate of potash, and ex act of henbane, or extract of belladonna, or a m ute dose of aconite, may be prescribed every fo or five hours; or after longer intervals, if the be donna or aconite be given. In the cases just de ribed, local depletions — by leeches applied ov the ovarian regions, or below the groins, or by upping on the loins or sacrum — may be dire d after the *blood-letting*, especially if this la r has not produced the desired amount of be fit; indeed in most cases the local depletions w also be required. In milder cases, and in le robust or plethoric females, the local depletic , when resorted to with decision, will generally be sufficient, especially when the internal or ge ral treatment is judicious. Their repetition m , in some cases, be required, but this, as well as he quantity of blood which should be taken, sh ld depend upon the severity and other featu of the case. After the local depletions a te l bath, and subsequently the terebinthinated ep hems and embrocations already advised may be laced over the hypogastric region, the flannel on which the embrocation is sprinkled having be either warmed or wrung out of hot water.

12. These measures having been employed, ti should be allowed for their operation, and for th subsidence of the disease. This latter object w however, be promoted by rest in the horizo al posture; by the avoidance of sexual exci ment; by recourse to cooling diaphoretic m icines, especially the liquor ammonia acetatis, w small doses of the vinum or liquor antimonii ta rizati, and some anodyne or narcotic. The or aperients allowed should be cooling and su as may not irritate the rectum: as the citrate or arbonate of magnesia; the phosphate of soda; th acetate or tartrate of potash, prescribed in e llient vehicles, or with either of the preparati of senna or rhubarb. Calomel, or calomel w opium, should not be given in metritis, as it is ot to aggravate the complaint by irritating the re um; and medicines containing aloes should al be avoided.

13. The *regimen* and *diet* of the patient should be strictly antiphlogistic, and the beverages allo ed ought to be demulcent, emollient, and sl tly alkaline. As convalescence advances, the al line mineral waters of Vichy or Ems may be al wed. When the disease is neglected, or imp perly treated, it may extend to the broad ligam ts and ovaria, as shown above (§§ 72. *et seq.*), or may lapse into a chronic state; which state, h ever, may be primary, although it is much m e frequently a consequence of chronic inflamm ion of the cervix, or of the cavity of this part, or f the body of the organ, and is most freq tly partial or limited in its seat, as shown al e (§ 64.).

14. iii. THE TREATMENT OF CHRONIC METRIT —Chronic metritis, often commencing in the c ix, is also frequently kept up by the inflamm ion of this part and its consequences. In most cases, therefore, the disease of the cervix should be first and chiefly attacked, by the means already advised for the several morbid conditions of this part (§§ 102. *et seq.*). The chief local means are, rest in the horizontal posture, emollient or astringent vaginal injections, the occasional application of leeches to the cervix, before or after menstruation, according to the period at which they appear most serviceable, and a recourse to anodynes when the sufferings of the patient are severe. These latter, or the narcotics already mentioned (§ 93.); a recourse to belladonna, both locally and internally, or to chloroform, or to the hydrochloric æther, or hydrocyanic acid, &c.; the introduction of opiate or other anodyne injections or suppositories into the rectum or vagina; and the external embrocations and epithems already advised (§ 101.), are the chief means by which we may hope to remedy this state of disease. In obstinate and protracted cases M. GENDRIN and Dr. H. BENNET have had recourse to an issue formed above the pubes, keeping it open for some months. In a severe and prolonged case, which I attended with Mr. FLOCKTON, many years before the appearance of this recommendation, I directed an issue to be made below both groins, with the most complete success.

115. The enlargement, partial or general, of the cervix and body of the uterus, in protracted chronic metritis, suggests, not merely the local measures noticed above for reducing this enlargement, and the other evils which usually attend it, but also such other general or constitutional means as are sometimes found of service in removing other states of enlargement, morbid deposition or growth. These means may not be of much avail in the disease now under consideration; but the most important of them may be so employed and combined as to very considerably improve the general health, which is usually injured by the local malady, and to alleviate the sufferings of the patient. These means are, the bi-chloride of mercury, the preparations of iodine, the iodide of arsenic and mercury, the fixed alkalies and their salts, and the preparations of sarza, severally but separately conjoined with tonics, anodynes, or narcotics, &c. On these principal medicines I proceed to offer a few remarks, in respect of the treatment of chronic metritis and its complications, especially when characterised by enlargement of any part of the uterus.

116. The *bichloride of mercury* is beneficial or injurious, according to the manner of prescribing it. It may be of service even when the constitution has been very remarkably injured by this protracted malady. But it should in most instances, and in these especially, be prescribed either in the fluid extract of sarza, or in the compound tincture of cinchona, or in the decoction or in mixtures, consisting chiefly of all these, with or without some narcotic, as the tincture of conium, or of henbane, &c., or with a few drops of the tincture of opium, or with the compound tincture of camphor, if the medicine should have too relaxing an effect on the bowels. This substance, thus taken, in doses varying from the sixteenth to the eighth of a grain, has a very salutary tonic and alterative effect, even although the hypertrophy of the uterus may not be much, or even at all, reduced by it.

117. The preparations of *iodine* are of service only when given in small doses, and continued for a considerable time. The *iodide of potassium* I have, in these cases, prescribed in doses of one to two grains, thrice daily, with the bi-carbonate of potash, or liquor potassa, or Brandish's alkaline solution, in a tonic infusion or decoction, or as I have prescribed the bichloride of mercury (§ 116.). The *iodide of mercury and arsenic* is sometimes of service when extemporaneously prescribed in the compound fluid of sarsaparilla, or in any better infusion. The *iodide of iron* may also be given in the form of pill (see *Form.* 535.), or in the syrup of sarsaparilla, but in moderate doses, and in cases evincing more or less anæmia, and when there is reason to suspect that the disease has been caused or prolonged by self-pollutions. In these cases also the carbonates of the *fixed alkalies*, the tartrates, the nitrates, &c., are of service, when taken in tonic or bitter infusions, and conjoined with *anodynes* or *narcotics*. I have had reason to believe that the combinations of the *bi-borate of soda* with these, in doses sufficient to preserve the bowels in an open state, without offending the stomach, has been of more service in reducing hypertrophy of the uterus, whether partial or general, than any other means.

118. Dr. H. Bennet states that, when all ordinary therapeutic agents fail to remove chronic inflammation and induration of the uterus, he has established, as a counter-irritant, an artificial ulceration or issue, in the neck of the uterus itself, with potassa fusa, or potassa cum calce, independently of any disease of that region, and with very great benefit to the patient.

119. As the chronically inflamed and enlarged uterus often falls back upon the rectum, thereby causing constipation, and painful defæcation, especially when the fæces are more or less solid, care should be taken to preserve the bowels in an open state. The means which I have usually preferred are electuaries, composed of the bi-tartrate of potash, the bi-borate of soda, and the confection of senna, sometimes with sulphur, and with any suitable syrup; which may be taken every night. They have a deobstruent effect upon the uterus, whilst they preserve a lax state of the bowels. In cases where emaciation or anæmia are prominent, in addition to nutrients, restoratives, or tonics, as circumstances have suggested, I have prescribed the cod-liver oil, and more recently this oil containing some one of the preparations of iron, of iodine, or of mercury, &c.

120. iv. The Treatment of Enlarged Uterus hardly differs from that recommended for *chronic metritis* (§§ 114. *et seq.*). Rest, attention to the secretions and excretions; cooling saline aperients and diaphoretics, local depletions, in moderate quantity, at intervals of about a fortnight; the preparations of iodine in small doses, with alkaline solutions or the bicarbonates; the bichloride of mercury in minute quantity, either alone or with the preparations of cinchona; the liquor potassæ with sarsaparilla; and more especially the avoidance of sexual excitement, and of all heating or stimulating beverages, and the recumbent posture, on a cool sofa, and on a hair mattress at night, are the means which will alone be of any service, if they be perseveringly adopted.

121. v. Treatment of Inflammation and Abscess of the Uterine Appendages. —
an early stage the treatment of Inflammation
the Uterine Appendages is the same as that advis
for Acute Metritis (§ 111.). But in order
prevent suppuration, which is very much mc
liable to occur in the former than in the latt
more prompt and more decidedly antiphlogis
measures are required, especially general a
local blood-letting. If, however, these mea
fail in preventing the formation of *pus*, or in pı
curing the absorption of whatever may ha
already formed, the purulent collection will fi
its way to the exterior, by the vagina, rectu
abdominal parietes, or bladder. In these circuı
stances, we can only endeavour to control t
symptoms, by means suitable for this purpose,
assist nature in throwing off the morbid form
tion, in the direction to which she points, to su
port the constitutional powers of the patient,
order that this end may be attained, and to pa
liate the more distressing symptoms which prese
themselves. The treatment advised for chror
metritis is suitable for this stage of the diseas
If the abscess open into the urinary bladder, t
means required will be suggested by the state
the urine. If this excretion continue acid, t
carbonates of the alkalies, with demulcen
opiates, or other anodynes, will be most se
viceable; and tonics, restoratives, the prepar
tions of buchu, or pereira, &c., be also required.
the urine become ammoniacal, or even neutra
the mineral acids, with cinchona, quinine or oth
tonics, opiates, &c., should be exhibited. If t
abscess open in the rectum, or flexure of t
colon, the consequent tenesmus, and other d
senteric symptoms, will subside after a sho
time, if, with restorative and anodyne medicin
amylaceous or mucilaginous injections, wi
opiates, be administered. The bursting of t
abscess into the vagina terminates favourably
the constitutional powers be supported, and t
unpleasant symptoms palliated, the vagina bei
occasionally washed by a lotion of tepid or
cold water. If the abscess point externall
tonics, with alkalies, and attention to the excr
tions, are necessary; and as soon as fluctuati
and redness of the tumid surface appear, an ope
ing, made by the lancet, should not be delaye
Afterwards, the powers of life should be du
supported; and the ingress of air into the cavi
of the abscess carefully prevented, whilst t
reaccumulations of matter should be prevent
or moderated by gentle pressure; and whenev
any collects, it should be discharged.

122. IV. Inflammations of the Uterus a
Appendages of a Specific Nature. — Infla
mation of the uterus may be caused by gonorrhc
or by syphilis — by gonorrhœa more frequent
than is generally supposed, by syphilis ve
rarely. — i. I have seen several cases of gono
rhœal inflammation of the womb and appe
dages, and in every case the disease was mc
severe; and whether extending to the os and ce
vix uteri from the vagina, or by possibility coı
mencing in the former, owing to the direct co
tact of the morbid matter with that part, tl
inflammation had advanced along the canal
the cervix to the internal cavity of the uterus, a
in three cases to the broad ligaments and ovari
— in one to both ovaria, and in another to tl
ovarium of the left side and pelvic peritoneu

Acton in his excellent work on “ *Dis-* *of the Urinary and Generative Organs in* *Sexes*,” has treated this subject in a chap- n “ Blennorrhagia of the vulva, urethra, a, uterus and ovary,” but he views the dis- as in all respects the same as inflammation ose parts occurring independently of a spe- contagion. That it is the same as respects flammatory condition — that it is an acute of inflammation there can be no doubt, but t is more severe, more disposed to extend to terine cavity and appendages, than common mation, whether acute or chronic, com- ng in the cervix uteri and produced by causes, would appear from the cases I have d. All these cases were of married women, onorrhœal infection having been communi- by their husbands; and, in all, the infec- was most manifest, the patients not being usly subject to any leucorrhœal discharge, vas followed by most severe symptoms of mation of the womb, and by the extension inflammation still further, as stated above. is subject Mr. Acton remarks that, “ a fe- suffering under uterine blennorrhagia may be with shivering and a feverish state of the sys- vomiting may come on, together with pain ed to the iliac fossa, where more or less ten- ay be present (in no way resembling the icial pain produced by peritonitis); but if ger be carried up the *cul de sac* of the va- and the patient desired to turn upon the op- side, pain of a most acute kind will be felt. lennorrhagia may cease for the moment, one may be attacked only, or both simulta- ly, as in epididymitis; revulsion will ex- the partial cessation of the discharge. Lastly, lieve that a great number of ovarian drop- ay result from a chronic inflammation of organ, the consequence of such complica- ” (*Op. cit.* p. 308.). I can fully confirm orrectness of this last remark by a recent of ovarian dropsy which occurred in the wife very eminent man, and was the ultimate which followed gonorrhœa communicated r husband. She was from the commence- and is still, under my professional care.

1 3. i. Syphilitic Ulceration of the Cervix I. — Both Dr. Henry Bennet and Mr. agree in considering syphilitic ulceration cervix as a rare occurrence. The latter ks that, in the vagina and os uteri, the cir- ances favouring contagion do not often oc- or if the contagious pus of chancre reaches it is generally deposited on a layer of mu- which protects the membrane beneath. He des that “ ulcerations of the neck of the are in ninety-nine times out of a hundred y simple affections, the result of acute or c inflammation, very intractable in ordinary ent, and will persist an almost indefinite unless we employ local applications.” True itic ulcers of the cervix uteri are described r. Acton as differing from all other ulcers s part. “ They are small, covered with a ois leather secretion, which it is difficult to e, their edges are distinct; they look as if ion of mucous membrane had been punched the os uteri, and inoculation has shown that vere true chancres, situated on this unusual n.” (*Op. cit.* p. 292.)

124. iii. *The treatment* of these specific diseases of the uterus is not different from that advised for the affections above described.—*A*. As respects *gonorrhœal* inflammation of the womb and its appendage, the means are the same as those advised for the more acute inflammations of these parts; the chief modifications consisting in a more prompt and decided use of these means, especially when the symptoms are very severe. In many cases, the inflammation of the vagina is so severe, and the swelling of both it and the vulva so great, as to prevent a recourse to many of the means already advised, especially at an early stage, injections of an emollient and anodyne kind being first prescribed, and sedatives, demulcents, refrigerants, and narcotics internally. In other respects, and as the disease continues or is prolonged, the remedies already recommended for inflammation of the uterus and its appendages, should be administered appropriately to the peculiarities and complications of individual cases.

125. *B. The treatment of syphilitic* ulceration of the cervix consists in the use of the acid nitrate of mercury locally, as directed above (§ 104.), and in the employment of the constitutional means indicated by the existing state of the case, and by the appearance of any signs of Venereal Cachexia (*see that article*).

126. V. Displacements of the Uterus. — The womb being suspended in a cavity more or less capacious, but liable to alterations in the extent of its capacity; its supports being not only yielding, but also admitting of considerable mobility; its manifest changes in size and position during pregnancy; and its movements during coition, and the venereal orgasm, are circumstances requiring consideration whilst endeavouring to describe and explain displacements of the uterus, as well as to remedy these evils. The causes of these disorders are often manifest, but in some cases they can only be inferred from insufficiently conclusive evidence. It is not to be disputed, that an enlargement of the organ will favour its descent; that muscular efforts, especially lifting heavy weights, will have the same effect, even independently of enlargement, and particularly when the vagina and ligaments are relaxed by childbearing, leucorrhœa, &c.; and that partial or general enlargement, the pressure of loaded adjoining viscera, too severe or prolonged exertion, especially during the menstrual period, falls on the back, hips, concussions of the trunk of the body, &c., will occasion either that or other forms of displacement.

127. It should not be overlooked that, in the great majority of instances of displacement of the womb, other lesions of the organ, either inflammatory or structural, are associated with the displacement. This circumstance is of no mean importance both in recognising the cause, conditions, and relations of displacement, and in regulating the treatment and regimen of the patient.

128. i. Descent or prolapse of the womb is the most common form of displacement; and proceeds from increased weight of the organ, or from impaired tone of its supports.—*A*. Dr. West has considered this lesion with reference to its *grades*, and divided it into the *first*, *second*, and *third* degrees of prolapse. “ In the *first* degree the organ is merely lower than natural, but still preserves its proper direction, its axis corresponding

with that of the pelvic brim, and this, even though it should be so low that its cervix rests upon the floor of the vagina. In prolapsus of the *second* degree, the uterus is situated with its fundus directed backwards, its orifice forwards, so that its long axis corresponds with the axis of the pelvic outlet. In prolapse of the *third* degree, or as it is often termed, *procidentia* of the uterus, the organ lies more or less completely externally, hanging down beyond the vulva, though it generally admits of being replaced within the vagina, if not of being altogether restored to its natural position." It is obvious that a due recognition of the circumstances, both physical and pathological, favouring and causing this displacement, is of the greatest importance in preventing and removing the different grades and complications of it observed in practice. The womb is not merely suspended by the duplicatures of the peritoneum within which it is contained, but it is also poised upon the vagina, which, in the healthy virgin state especially, furnishes it very considerable support. The curved direction of the vagina, the connection of the organ, appendages, and vagina with the adjoining viscera, with the pelvic and perineal fasciæ, &c., also aid in supporting the uterus in its situation.

129. These combined supports, however, may severally be relaxed or overcome during the epochs of life following puberty. In the virgin and unmarried state, leucorrhœa, menorrhagia, anæmia, exhausting discharges, and frequent excitement of the venereal orgasm by masturbation, severally tend to relax the tone of the parts which support the womb in its natural position. During the sexual orgasm its mobility is manifested to the greatest natural extent, its descent often occurring in various degrees, without becoming greater than is consistent with the healthy function; but it is obvious that, when unnaturally produced, the healthy condition is at last exceeded, and that more or less displacement is apt to occur, especially as the same cause practised to excess tends remarkably to relax the tone of the parts upon which the healthy position of the organ depends. In the married state, as well as sometimes in the unmarried, although more remarkably and much more frequently in the former, enlargement and greater weight of the womb, and the stretching, relaxation, and other changes of the supporting parts consequent upon abortions, child-bearing, difficult labours, and puerperal diseases, very materially predispose to the descent and other displacements of this organ. If, in these circumstances, the erect posture be too early resumed after delivery or abortion, if falls or concussions of the trunk of the body be experienced, or if violent muscular efforts be made, as in lifting or carrying heavy weights, a greater or less descent, or hernia of the uterus is apt to take place. Aged and emaciated females, married or unmarried, are most frequently liable to this displacement, sometimes to its utmost extent, owing to the absorption of the adipose tissue adjoining the vagina and vulva, especially when the exciting causes just mentioned have occurred.

130. Descent of the uterus, even in its first and second degrees, is very commonly attended by some degree of retroversion; and this state is often, as well as the descent, increased by constipation of the bowels; the hardened fæces, in the efforts at defæcation, augmenting the exter both states of displacement, by pressing upor fundus of the uterus. Dr. West justly rem that "the close connection between the ce uteri and the neck of the bladder is a tempo obstacle to the complete descent of the wc while, at the same time, it favours the retrovei of the organ; but, if at length this yields, urine accumulating in the bladder distent fundus and the vaginal anterior wall into a pc which drags down the uterus in front just as prolapse of the rectum drags it down behind; the organ now soon comes to lie beyond the ternal parts; the case being thus converted one of procidentia uteri, or of prolapse in the t degree." (*Lect.* p. 156.)

131. This displacement of the uterus is, in course of time, followed by still further chan The neck of the womb, being the first part truded, and the most exposed to irritation, comes more and more hypertrophied, and c excoriated; the enlargement being both in lei and thickness. The protrusion of this part of organ is partly due to inordinate growth, its th ness being sometimes equal to, or even gre than, that of the wrist. The lips of the os u become enlarged with the rest of the organ, the transverse opening formed in women have had children, is converted into a wide o ing situated deeply between projecting lips, wl surface is irritated, excoriated, vividly red or nulated, and covered by an albuminous secret The prolapse beyond the vulva may continue in a partial state for years, the fundus and a poi of the organ remaining within the pelvis, w the neck and the lower part are external. this state, the organ may still be replaced witl difficulty, especially when the prolapse has lowed soon after delivery at the full period, pelvic floor being sufficiently yielding in r instances. In the course of a variable dura of time, a partial descent is often followed b complete protrusion of the organ, "the va becoming inverted, and forming the outer w of a tumour, at the lower part of which the w is situated. So long as the procidentia is inc plete, this tumour is somewhat pyriform in sh its base being directed upwards; but afterwa as it increases in size, it assumes an oval fc owing to more or less of the bladder being dr down into it in front, and of the rectum also, in m cases, behind. Its bulk is also further swel in numerous instances, by the small intestines s ing down into the sac, and thus adding to its until it equals or exceeds that of the adult he

132. In these cases, the uterus itself fo only a comparatively small portion of the l external tumour. The susceptibility of the or and the disposition to hypertrophy, are much minished by constant and complete prola from the pelvic cavity. "The bulk of the tum and the difficulty of its replacement, depend chi upon two causes. Of these, the one consist the enormous hypertrophy which the vag walls undergo. Not only does their muc membrane lose its ordinary character and bec covered by a layer of cuticle like that of the s to protect it from the various sources of irrita to which it now becomes exposed, but the w themselves attain a thickness of as much as an inch, and present a dense muscular struct

her cause of the bulk of the tumour, and of
ficulty of replacing it, arises from the pre-
of the intestines in the sac, which seldom
there long without inflammation of their
eal covering being set up; not of so acute
racter, indeed, as to produce formidable
oms, nor even as always to call for treat-
but matting their different coils to each
and tying them firmly to the interior of
c." This latter cause of difficulty in at-
ng to return a long procident uterus, should
overlooked, for, even though no intestines
lescended into the external tumour itself,
c peritoneal inflammation may agglutinate
o each other, or to the walls of the pelvic
, and thus oppose the replacement of the

. *B. The symptoms of prolapse of the uterus.*
symptoms may be severe in some cases, and
experienced in others. In the unmarried,
ien occurring suddenly or rapidly, prolapse
uterus is attended by much more severe or
ymptoms than when it occurs in married
s after miscarriage or delivery, or when it
lace slowly. When it is caused in single
s after prolonged dancing or riding on
ack, the symptoms are generally rapid and
; and even in married females who have
children, and have subjected themselves to
auses, the descent is usually rapid, and the
oms are also severe, but the prolapse is ge-
greater than in the single. The sensation
requently experienced is that termed "bear-
wn," or of falling down of the pelvic vis-
This feeling is augmented by lifting weights,
bodily exertion; and then it is often at-
by a sharp pain. Defæcation is difficult
ainful, and is followed by some degree of
ius. Pain in the direction of the vagina,
sitting down, especially on a hard seat,
the back and low in the sacrum, and a
equent desire to pass water, are always ex-
ced. Leucorrhœa is often complained of,
e catamenia are either profuse, prolonged,
frequent. The digestive organs are soon
nore or less disordered, the bowels are con-
d, and the general health suffers; and as
olapse becomes chronic or prolonged, the
and even the body of the uterus become
rophied.

. External prolapse, or procidentia uteri,
lly follows the internal prolapse, or that in
the uterus and cervix still remain within
ternal parts; and usually takes place gra-
. It is favoured by emaciation or the ab-
n of the adipose substance in the vicinity
vulva; and it occurs most frequently after
arly change of position after parturition or
riage, or too early exertion, or walking
after these occurrences. In these circum-
s especially, sudden, unusual, or great exer-
r straining at stool, or lifting weights, may
on procidentia suddenly; and the symptoms
ien be severe. As the cervix, the lower
ind the body of the organ, successively pro-
— the former parts only occasionally at
– the pains, inconvenience, and distress in-
, and ultimately the whole organ lies
always or constantly without the external
After the protrusion, the sensibilities of
erus become blunted by the exposure, and
the vaginal leucorrhœa subsides. But, as the procidentia increases, the relations of the uterus with the adjoining organs and parts are changed. The urinary bladder and urethra are more particularly implicated, occasioning dysuria, a frequent desire to empty the bladder, or incontinence of urine. The rectum is also affected so as to render defæcation difficult or painful; whilst the descent of the small intestines into the pelvic cavity, and the excoriations, thickening, irritation and ulcerations of the exposed parts, owing to exposure to the air, and to the dribbling of urine, and to other contingent occurrences, increase the sufferings of the patient. With the complete prolapsus, hypertrophy of the organ increases, more especially its cervix and the lips of the os tincæ, which, moreover, become ulcerated to a considerable extent, the cavity of the cervix being drawn apart, so as to become open or gaping, the ulcerations extending into it. In many cases of internal prolapse, pregnancy takes place; but this period is often one of considerable suffering. If the prolapse be slight, pregnancy generally cures it, as the uterus rises in the pelvis with the advance of gestation, especially if care be taken, and the patient remains in a recumbent position long after delivery. When the uterus is either *partly* or *altogether* external, impregnation rarely takes place. In the former case, the sufferings of the patient are greatly increased by impregnation; and miscarriage usually takes place, the organ being unable to rise into the pelvic and abdominal cavities. "In some few instances, however, pregnancy runs its course undisturbed, in spite of a great degree of prolapsus; and cases are on record in which the uterus has descended further and further, until a great portion of it hung down between the thighs; but the developement of the fœtus has, nevertheless, gone on in this unnatural position; and others still stranger, in which coitus has been practised immediately through the os uteri, and impregnation and undisturbed gestation have followed in spite of the existence of irreducible procidentia." (WEST, *Lect.* p. 172.)

135. *C. Treatment.*—The causes which tend to oppose the return of any long existing procidentia of the uterus, have been explained above (§ 132.); and the same causes, although operating in a less degree in simple or internal prolapsus, often prevent the complete restoration of the womb to its normal position. The first object, in respect of treatment, is, to ascertain the causes of prolapse, and the circumstances connected with its occurrence and progress; for the means of cure or of palliation must be directed accordingly. Carefully avoiding the causes of prolapse (§ 126. *et seq.*), the patient should strictly observe rest and the recumbent posture; preserve a gently open state of the bowels, and have recourse to astringent injections, and the cold hip-bath. When the womb is much enlarged, as well as prolapsed, the measures advised above for the enlargement (§§ 115—120.), should be adapted to the peculiarities of the case. It should be recollected that there is always a tendency to a return of the descent, even when the womb has regained its proper position, upon the recurrence of the menstrual period. If, therefore, due care and proper precautions be not taken on the accession and during the course of this period, the descent may return; and each return will be attended by an

aggravation not only of the extent of the prolapse, but also of the enlargement of the organ, and of the profuse menstruation which generally attends it; especially if the patient be allowed to remain in an erect or sitting posture.

136. As respects a recourse to mechanical supports in order to preserve the uterus in situ, as well as regards a selection of those supports, I must refer the reader to directions contained in Dr. WEST's very able and instructive Lectures, and be contented with a reference to the more general principles and directions he has there adduced: — 1st, In cases of slight descent of the uterus, resulting from a general loss of tone in the parts, or from some temporary or accidental cause, as excessive fatigue, over-exertion; 2d, In cases where the descent of the womb is still comparatively recent, and is due to the persistence of puerperal hypertrophy owing to imperfect involution of the organ (§ 69.) after abortion or labour; 3d, In cases where uterine disease, of whatever kind, was the occasion of displacement of the organ, such disease being still in a stage requiring treatment. In these several circumstances, mechanical support of the uterus is not necessary or suitable. On the other hand, mechanical means of some kind or other are required,—1st, In all cases of external prolapse or procidentia; 2d, In cases of long standing prolapse of the second degree, associated with much relaxation of the vagina, and consequent weakening of the uterine supports; 3d, In all cases of extensive laceration of the perineum, and for a similar reason in cases of prolapsus in the aged; 4th, In cases of less degrees of prolapse attended by extreme suffering; 5th, In all cases of considerable prolapse of the vagina, with or without descent of the rectum or bladder, and in all cases in which the uterine prolapse is secondary to any of those other forms of displacement. It is unnecessary here to describe the several kinds of support or contrivances which have been advised. They are either external or internal, according to the manner of their employment. They are well described in Dr. WEST's work just referred to, where very judicious directions are also given for their use.

137. These contrivances for the relief of prolapsus of the uterus or vagina, are merely palliative; they bring about, however, a cure in some cases, by preventing any increase of the displacements, and by giving time for nature gradually to remove them, more especially in slight or recent cases. But in cases of long standing, and in those in which the descent is considerable or complete, there is much uncertainty in their results. Therefore operations have been devised for contracting the orifice of the vulva, and the prevention by such means of external prolapse. In cases of lacerated perinæum, the restoration of this part by an operation is obviously the most successful mode of curing a prolapse; and it has been often successfully attempted. But in cases where the orifice of the vulva is relaxed, or is widened by the uterine descent, means have been taken by Dr. FRICKE, Mr. BROWN, M. GERARDIN, M. LANGIN, and Dr. KENNEDY, for its contraction, with various degrees of success. These means will readily suggest themselves to most medical men. A further notice of them does not fall within the scope of this work.

138. ii. ASCENT OF THE UTERUS.—This s
displacement deserves notice only in as fa
is of some importance as a symptom; — 1
advanced pregnancy, from the fourth to the
month; — 2d, of some cases of inflammat
the pelvic cellular tissue, or of the tissu
tween the folds of the broad ligaments; —
an advanced stage of inflammation or of
of the ovaria; — 4th, Of fibrous or other tu
of the uterus when they increase in size and
the uterus upwards; — and 5th, A great
of contraction of the pelvis.

139. iii. OF OTHER DISPLACEMENTS AND D
TIONS OF THE UTERUS. — The displaceme
the uterus which consist of *versions* and *fle*
or, strictly speaking, of *deviations of the boo*
neck of the organ from their normal position
only recently received due attention; an
though descent of the womb, in its sever
grees, has been duly considered, owing
prominent manner in which it is brought
those who have professed the study of the
sive class of female diseases, yet other devi
of the womb from its natural position have
until lately, but imperfectly investigated by
in the married and child-bearing states, an
tirely neglected in unmarried females. Th
glect has in great measure originated in imp
knowledge, or entire ignorance, — 1st, of th
bability of the displacement being congenit
and 2nd, of certain of the causes of these
tions, especially those causes which mor
quently occur in unmarried than in marri
males, and to which I have sufficiently ad
already (see §§ 10. 22.).

140. *A.* Dr. W. HUNTER first directed atten
retroversion of the uterus as sometimes taking
in the early months of pregnancy; but it w
recognised as occurring in the unimpreg
womb until cases of it in this state were pub
by Professor OSIANDER in 1808, and Prof
SCHWEIGHAEUSER, in 1817, and SCHMITT, in
further illustrated the history and symptoms
displacement. More recently, Professor Si
of Edinburgh, and M. VELPEAU, have fully i
gated the nature and signs of the several
tions of the unimpregnated uterus from the n
state. Not only may the fundus of the
fall backwards into the hollow of the sacru
forwards against the symphysis pubis, but i
also incline towards either side. Its body
moreover, be bent upon the cervix, form
new class of deviations, called flections; an
WEST states that there is reason for believin
retroflection and *anteflection* are of more fre
occurrence than the corresponding alteratio
position of the whole of the organ, whic
known as *retroversion* and *anteversion.* Th
dency of the womb, when at all enlarged,
in the early period of pregnancy, or by disea
not only to sink below its natural position, b
the same time to fall back with its fundus to
the hollow of the sacrum; besides, enlarge
of the organ either from imperfect involutio
from disease, is generally most considerable
posterior parietes, thereby causing a tenden
fall towards the heavier side. The distenti
the bladder also, so frequently continued
prolonged period, and a loaded and consti
state of the bowels, aid in producing this fo
deviation, whether in the gravid or in the

gra l uterus; whilst sudden efforts, or violent exe ions, falls, concussions of the trunk, will co ir with these and other causes or circumsta es, as with the catamenial period in the non-gra l, in producing this form of deviation, namely, ret *ersion.* Previous delivery, miscarriages, diffici menstruation, congestion of the uterus, inten erate sexual indulgence, and increased deter nation of blood to the organ, will also predis se to, or even cause, this occurrence, as well as ne other conditions hereafter to be noticed (§ 2. *et seq.*).

1. *B. Anteversion* of the non-impregnated ute s was, only a few years ago, considered to be a r occurrence. I find in the notes of a case, wh I saw with Mr. Hoyland, in 1843, that I ren ked that one to have been only the fourth that I h seen, and that this case was most probably ow to adhesions of the fundus of the uterus, as the dy had been some considerable time previous the subject of pelvic peritonitis. Madame Bo n had, however, many years previously poi ed out attacks of circumscribed peritonitis as a n infrequent cause of abortion. Without such adh ions it is difficult to account for the occurren of anteversion, owing to the relative position of rts; and there is much reason for inferring, wit Dr. West, that many of the cases believed to be se of *anteversion* were actually cases of *anteflec n*, the fundus of the organ having been bent for rds on its cervix. But even in this case, the exp nation of its occurrence is not easy. In ma ed females, however, some allowance should be de for the mechanical effects of sexual interco e in connection with the venereal orgasm in the male.

2. *C.* As respects the deviations usually termed *ver n* and *flection*, Dr. West remarks "that in the eater number of cases of alleged version of the omb, either forwards or backwards, the organ s really flexed or bent upon itself; and fur r, that not infrequently the two conditions co- ist, the whole womb being thrown more forwa or more backwards than natural, while in add on the body of the organ is bent upon its cer x." As far as the symptoms are concerned to ich they give rise, these varieties of deviation pre t but little difference.

3. As to the point of *flexion of the uterus*, wh ier backwards or forwards, Dr. West agrees wit Professor Virchow of Berlin, in considering it t be the junction between the body and neck of e womb, or, in other words, the spot correspo ing to the internal os uteri; and that the flec on is owing to the anatomical fact, that, wh the neck of the womb is firmly connected wit the posterior and lower part of the bladder, its dy is perfectly moveable. As to the compar ive frequency of the two forms of deviation, Dr West states that his notes furnish the particul s of twenty-six cases of retroversion and ret lection, and of nine of anteversion and antefle on. M. Valleix, however, gives thirty-five dev tions of the uterus forwards, and thirty-three bac vards; and Dr. Mayer, of Berlin, sixty-three cas of the former, and sixty-four of the latter. Th requency of adhesions, and of other indicatio of previous inflammation, as a cause of deviatio of the uterus, is shown by the statement of Dr West, that he met with these lesions of the wo , its appendages, and the vicinity, in twenty-two out of sixty-six cases, in which he examined the uteri of women who had died of some other than uterine disease.

144. Protracted flexion of the uterus may be expected to be followed by further lesions. These are narrowing of its cavity, at the point of flexion especially, and atrophy of the parietes of the womb on the side towards which the flexion occurs, thereby rendering it permanent.

145. The cervix is very generally more or less diseased in all the forms of deviation of the uterus, presenting the several states of lesion described above as being seated in the cervix externally and internally — these being chiefly indicative of inflammatory irritation or action, granulations, excoriations, ulcerations, enlargement of the cervix, and an open or gaping state of the os and cervical cavity, enlargement of the posterior lip of the cervix, &c. (see § 27 *et seq.*); these severally, or two or more of them jointly, being very frequent *complications* of deviations of the uterus from the normal state. That these lesions of the cervix are not always consequences of the deviations, my experience induces me to believe, and to infer that Dr. H. Bennet more correctly attributes the deviations to pre-existing disease of the cervix. It appears to me that those alterations of sensibility of the cervix associated with more or less irritation or chronic inflammatory action, and with the several consequences of sexual excitement, leucorrhœal discharges, disordered menstruation, and their numerous and ever-varying sympathetic affections, are more likely to give rise to deviations of the position of the uterus, and not only to the deviations already noticed, but also to others, consisting of obliquity of position, or to *lateral deviations* (which I believe to be the most frequent of any, and to be generally of temporary duration), when unconnected with disease of the ovaria and the broad ligaments, than that these deviations of the womb from its natural position should occasion disease of the cervix. It may be readily allowed that any pre-existing disease in this part may be aggravated by lesions of position; but that the former is a consequence of the latter, requires further proof; and the positive evidence furnished of a different succession of lesions would require to be previously disproved.

146. *D. The symptoms of deviations of the uterus* have been subjects of contention even with those who have taken female diseases under their special protection. How, therefore, shall those who get only occasional glimpses of uterine diseases decide, when so very opposite views are entertained by the professors of this speciality? The former are, however, the judges in the cause; the latter are the partisans or advocates of their respective doctrines. Thus it is stated, by a very recent and able writer on these diseases, that "the symptoms are by some described as being both numerous and characteristic, and the appropriate treatment is by them alleged to be both simple, safe, and successful, while others deny that the mal-positions, taken by themselves, produce any symptoms, and assert that the proposed treatment, while attended by very considerable risk, is wholly inadequate to the removal of the evil which it is intended to cure. Each of these opinions, too, is maintained by men equal in the eminence of their position, in their practical

experience, and in their good faith." (*Op. cit.* p. 206.) This statement is borne out by the discussion on this subject reported in the "*Bulletin de l'Académie de Médecine*" for 1853-4 (vol. xix. pp. 778—976.), and is there fully and remarkably illustrated.

147. It is very obvious to the student of human nature, that, however well informed individuals may be in their especial department, and however eminent in popular estimation, as long as occurrences, morbid actions, and their consequences, vary so as to give rise to modified or different signs, phenomena, or symptoms, and to develope modified or altered features or aspects, so long will the observers of these see and believe certain of them in preference to, or to the neglect of, the rest, and thus form one-sided views, which the very majesty of their position, in either professional or popular opinion, or both, will not admit of being impugned, and for which they will contend with biassed judgments, even in opposition to the most obvious truths. Now, as one of the professed judges in such matters, and having no preconceived opinions as regards them, I venture to state, that the symptoms vary, in severity and number, with the causes — predisposing and exciting,—with the sensibility and irritability of the sexual organs themselves, and of the constitution, with the existing deviation and its extent, with its several associations with disease of the cervix and its consequences, with the states of the natural and morbid uterine discharges, and with the several complications which deviations of the uterus present with the adjoining viscera. Hence it may be inferred, that the slighter deviations, which have taken place slowly or gradually, in females evincing but little susceptibility or irritability, and which are not associated with marked disease of any part of the uterus, or of structures connected with it, may not occasion any disorder calculated to excite anxiety in the patient, or to require medical advice, and yet may exist for a long period, or may disappear altogether, from the efforts of nature or from changes in the female economy or in the constitution. But deviations of the uterus to a considerable extent, especially when occurring suddenly from well-recognised causes, and when associated with other uterine lesions, or with diseases of adjoining parts,—and even when existing simply in susceptible, sensitive or irritable females, married or unmarried, more especially in the latter when masturbation is suspected,—then will very generally occasion symptoms which, if they do not prove, should at least induce the physician to ascertain its existence or non-existence by an examination. That the symptoms are often, however, more or less equivocal, or that they may frequently accompany other lesions of the womb, must be admitted, but a vaginal examination readily solves the difficulty, and evinces the true nature of the complaint. The symptoms usually present in uterine displacements or deviations are, excessive, painful or difficult menstruation, leucorrhœal discharge, pain in the pelvis generally, and most severe in that part of the pelvis towards which the fundus uteri is turned or flexed, pain and difficulty in defæcation and micturition, constipation, frequent calls to pass urine, or sometimes retention of it, and sterility. According to the temperament and habit of body of the patient, various sympathetic disorders may be induced by uterine deviations, chiefly affections of the gestive organs, as nausea or retchings on the cession of the catamenia, hysterical sympt pain under or in the mammæ or in the sp neuralgic pains in the limbs, &c.

148. As respects this disputed question, West justly remarks that, although cases pr on the one hand, that flexions of the womb not, of necessity, give rise to any distress, and the other, that the removal of a flexion of organ may not be followed by relief of patient's sufferings, the fact still remains, that placement of the womb is in very many insta attended by various uterine ailments not e rienced before its occurrence. Here, howe the question suggests itself, — Are the suffer of the patient due simply to the displacemen to the morbid condition with which the displ ment is associated, or to the two causes conjoi Dr. West answers this question by stating "there are circumstances which appear to fa the opinion, that, in the majority of instances, symptoms are due not to displacement alone, to displacement accompanied by some other bid state of the womb." This opinion is co matory of that previously given by Dr. H. net, that the deviation is nearly always a co quence of chronic inflammation of the cervi associated with the cervical disease to which sufferings of the patient are mainly due, unles extreme cases of displacement. For some marks on the diagnosis of versions and flexio the uterus, and on the use of Dr. Simpson's rine sound for this purpose, I must refer reader to Dr. West's lectures, and to the c recent works on uterine disease. There however, be but little difficulty in the diag between such deviations and tumours in the ute for which they can hardly be mistaken.

149. *E. The treatment of deviations of the ut* has been a matter of dispute among modern thorities on uterine diseases. Certain of these tend, that the lesions of the uterus to which deviations are due, and to which the sympt are chiefly owing, should be made the object treatment, whilst others attempt to restore the rus to its right position, and to maintain it t by mechanical contrivances. Schweighaus Schmitt, Oldham, and others, have supported former treatment, whilst Dr. Simpson, Velp Kiwisch, and Valleix, have resorted to the la These contrivances have undergone various rations in the hands of the several authorities have had recourse to them. From what I h seen of cases in which they were employed*, from the opinions of M. Dubois and Profe Scanzoni, as stated by Dr. West, I bel that, although they may be successful in s

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* In two of unmarried females who had previo consulted me for hysteria with leucorrhœa, the chanical contrivance in question was resorted to by physicians to whom they had subsequently conf their treatment. I was requested by the parents of th two young females to see them in consultation with physicians then attending them, their parents ha been dissatisfied with this treatment. The contriva in use for them were shown me; their appliance object were manifest. The patients, themselves, w in favour of the treatment: but their general health peared much impaired since they were my patients stated to the parents that I could not approve of means employed for single females; that the cont ances could not be always applied, and that the compl would return when they were relinquished. I there refused any further interference in these cases.

cas, under the care of able and careful practitiers, they are attended by no small risk, as rescts the uterus, its appendages, and peritoneu; and that the return of the displacement is ver frequent after the mechanical contrivance is remved. At a recent discussion in the Academy of edicine at Paris, "M. Dubois stated that he had himself treated upwards of twenty cases by mes of the uterine supporter, which in some insnces was worn for several months, but that the displacement reproduced itself within a very sho time after the removal of the instrument; and hat he had made a similar observation in the cas of many patients who, having been thus treed by M. Valleix and Dr. Simpson, had bee dismissed by those gentlemen as cured." Pressor Scanzoni remarks that "the observation of ty-six cases of flexion of the uterus during the ast four years, compels me to express my decid conviction that the mechanical treatment of thi affection is either useless or positively mischvous." He concludes that, having quite disconued the use of these mechanical contrivances, an contented himself with a recourse to cold vanal injections, with the antiphlogistic treatment of ny chronic uterine inflammation, and the apcation of caustic to any ulceration of the os ut, and with the endeavour to remove the chlorot symptoms which are seldom absent, he has be much better satisfied with the results of treatme than he was when he was seduced into the apication of a variety of mechanical contrivaes. (*Lect.*, &c., p. 225.)

50. It is obvious from the foregoing, as well as om my own limited experience, that attention to he improvement of the general health, to the reoval of the local lesions of the uterus with wh displacement is often associated, as they adit of removal by local and constitutional treatmt, to alleviation of the more painful or distring symptoms, and to the improvement of the setions and excretions, are the true principles wh should guide the physician in the managemt of these complaints. The means which are chfly required are such as have already been remmended. If the catamenia be excessive, th sulphuric acid and sulphate of magnesia, or th supertartrate of potash, if the bowels be constated; the sulphate of alum if this state do not ex, or the gallic acid, tannin, or the infusion of mco, may be prescribed internally, and conjoed with henbane, or with conium, or with the exact or tincture of belladonna, or of the Indian hp, if pain be urgent. After the second or thd day, if the discharge be excessive, cold enema may be administered twice daily; and in or to remove the anæmia and debility generally chracterising these cases, chalybeate preparations, vously combined, according to the circumstances oe case, should be given, and the diet and regimn strictly enforced.

51. VI. Inversion of the Uterus—*the turnin of the organ inside out* — is clearly impossible in he unimpregnated healthy womb. It is one of t most grievous and fatal accidents which can bal a female. My late friend Dr. Crosse of Nrwich, in his elaborate essay on Inversion of t Uterus, states that, of 400 cases of inversion, o which he had found mention, 350 were csequences of parturition. Of the remaining 5 cases, 40 were said to have occurred from the presence of a polypus in the interior of the womb, the accident taking place either spontaneously or from traction in attempting to remove the growth. Enlargement of the uterine cavity, associated with some cause exciting contraction of its fibres, are the conditions essential to inversion of the organ.

152. *A. The symptoms* of inversion of the uterus are, sudden collapse or sinking, with abundant hæmorrhage, with disappearance of the tumour formed by the uterus in the abdomen, and the presence of a large spherical body either just within the vagina, or projecting beyond the external parts. My friend Dr. Radford has, however, shown that, except in cases where the placenta still partially adheres to the uterus, the hæmorrhage is not so formidable as might be anticipated; and that the shock to the system is in great degree independent of the loss of blood.

153. *B.* Inversion of the uterus is *caused* chiefly by the detachment of the placenta after delivery, owing to undue force or want of care; and, in rarer cases, by a spontaneous and unequal or irregular contraction of the uterus, either whilst throwing off the placenta, or even soon after or upon the detachment of it, whilst the cervix and os uteri are at the same time comparatively relaxed. This explanation of spontaneous inversion of the womb was ably given by Dr. Radford and confirmed by Dr. Simpson. The pressure of the bowels on the fundus caused by the action of the abdominal muscles during the detachment of the placenta may also favour this occurrence. A polypus or tumour firmly attached to the interior of the fundus uteri, having descended through the os uteri, may likewise excite irregular action and drag the fundus with it, thereby producing, with varying degrees of rapidity, inversion of the organ.

154. In most instances the inverted uterus becomes speedily firmly contracted; but in a few cases, the uterus remains soft and flaccid, and even capable of replacement. The hæmorrhage often continues at short and uncertain intervals, and in very variable quantity from the period of the accident, but to this there are occasional exceptions. The consequences of inverted uterus tend with varying degrees of rapidity to the destruction of life, — at least in the great majority of instances. Dr. Crosse states "that in 72 out of 109 fatal cases, death took place within a few hours, in 8 within a week, and in 6 more within four weeks. The immediate danger, however, being surmounted, there follows during lactation an interval of comparative safety and of cessation of serious symptoms, which reappear when suckling is over. It appears that of the remaining twenty-three patients only one died at the fifth month, and then, as the result of an operation which had an unsuccessful issue; one died at eight months, three at nine months, and the others at various periods of from one to twenty years."

155. *C.* The *diagnosis* of inversion may be overlooked or mistaken. The inverted uterus has even been torn away by ignorant persons who had believed it to be the placenta. Dr. Crosse considered that the womb may be partially inverted spontaneously a short time after the detachment of the placenta, or *depressed* at its fundus. This may increase to *introversion*; but the partial in-

version, although attended by much vital depression and hæmorrhage, will not occasion any tumour in the vagina, nor a complete disappearance of that formed by the uterus in the abdomen. Introversion of the uterus may, however, soon pass into *complete inversion.* An inverted uterus may be mistaken for polypus, and a fatal issue result, as indeed it has resulted, from this error. The history of the case generally will assist the diagnosis, but polypus may complicate pregnancy, and may occasion both a tumour after delivery and hæmorrhage. The firm constriction of the os uteri upon the cervix of an inverted womb causes the part to assume the form of a pedicle, thereby rendering the diagnosis more difficult, unless an examination be made *per rectum*, when the uterus, if inverted, will not be found in its place, whilst if the vaginal tumour be a polypus it will be found in its proper place, and probably also somewhat enlarged. The uterine sound, as improved by Dr. Simpson, will [illegible] aid the diagnosis, if properly used.

156. *D.* The *treatment* of inverted uterus is attended by great difficulty. If the accident occur before the detachment of the placenta, the removal of this body should be effected before the replacement of the uterus be attempted. Dr. Simpson's accurate views as to the source of hæmorrhage in parturition show that fears of serious bleeding in consequence of the removal of the placenta in these cases need not be entertained. Two modes of returning the uterus when inverted after labour have been recommended. The one by pushing back or indenting the inverted fundus with the finger; the other by grasping the womb between the fingers, compressing it, and by pushing it upwards into its proper situation. Either of these modes may succeed in recent cases occurring after delivery, whilst the organ is soft or flaccid, or as long after as it may remain in this lax state. In these cases, as well as in others, in which the replacement is attempted either when the organ is more firmly contracted, or when some time has elapsed from the occurrence of the accident, chloroform may be found of use in facilitating the operation, although in some cases where this substance has been employed, no advantage was procured from it.

If the inverted womb cannot be replaced, immediately after the occurrence of the inversion, it will remain irreducible and entail on the patient all the miseries and perils incidental to this state. The only means of averting these are by operations, which are attended by very serious hazards. The chief reasons which can be urged for such operations — the removal of the inverted organ by the knife or by ligature — are profuse hæmorrhages or discharges endangering the patient's life. Dr. West has given the following table of the

	Cases.	Recovered.	Died.	Operation Abandoned.
Uterus removed by ligature - -	38	28	8	2
Uterus removed by the knife - -	4	3	1	
Uterus removed by knife and ligature	8	5	3	
	50	36	12	2

results in 50 cases of inversion of the ute
after delivery, in which extirpation of the or
was performed.

157. It is of importance to know the res
of extirpation at different periods from the time
which the inversion occurred. If the operat
be performed soon after the occurrence of the
cident it cannot be expected to be as successful
at a remote period from the occurrence, as
organ will diminish in size, vascularity, and s
sibility by the lapse of time. Accordingly
find that, of 21 cases thus operated upon wit
twelve months from the occurrence of the ac
dent, 9 died and 12 recovered, whilst of 25 ca
in which the operation was not performed u
one year or much longer periods had elaps
23 recovered, and only 2 died. Of the occ
rence of inversion from a polypus, and of
various modes and appliances for extirpating
uterus I must refer the reader to works on s
gery, and to those enumerated in the Bibl
graphy and References to this Article.

158. VII. Of Polypi of the Uterus.—Pol
and tumours of the womb generally occur duri
the period of sexual activity, or, if they be
veloped at a somewhat later period, or soon af
the climacteric period, they have generally o
ginated some time previous to it. It is often ve
difficult to ascertain the *causes* which either p
dispose to or *excite* their formation; but there
reason to infer that inordinate excitement or
termination of blood to the uterus, with a dispo
tion to hypertrophy of one or more of the tissues
the organ, are the chief causes of these lesions.

159. i. *Mucous polypi* or excrescences from t
folds of the *arbor vitæ*, are often met with, varyi
from a third of an inch to nearly an inch in leng
to about three or four lines in thickness: they a
connected with the mucous or villous membra
of the canal of the cervix, by a very slender a
short pedicle. They are usually of a bright ro
tint, are supplied with a delicate net-work
vessels, and consist of mucous membrane with
small admixture of cellular tissue internally. Th
may spring from any part of the cervical cana
but they more frequently arise nearer to the e
ternal than to the internal os uteri. Althoug
generally pediculated, they are sometimes sessil
and in rare cases they seem as hypertrophied fol
of the arbor vitæ. These productions are eith
single or multiple, two or three existing in the sam
patient; and having been removed, they may b
reproduced in a few months afterwards. The
may even coexist with fibrous tumours of th
uterus. Dr. Montgomery, of Dublin, believ
them to be sometimes precursors of maligna
disease; and this was observed in one case whic
was under my care. In rarer instances thes
polypi are much larger than now stated, and co
sist of a cellular or fibro-cellular tissue investe
by mucous membrane; sometimes they reach th
size of a fig, are flattened, and hang down beyon
the os uteri into the vagina.

160. ii. *Follicular polypi*, or polypi from en
largement of the follicles of the cervix, are no
infrequently observed. They appear as *cyst*
of the size of a pea, imbedded between the fold
of the arbor vitæ, and hardly projecting beyon
the level of the canal. They are, however, some
times much larger, are more or less numerou
and are distended by albuminous matter. Whe

ar and numerous, they cause the absorption of the cervical structure, and even occasion the bung outwards of the structure of the cervix.

1. iii. *Complex polypi*, consisting of mucous folles, the mucous or villous surface, and fibrocelar tissue of the cervical canal, are more freently seen, than either of the foregoing. The polypi are either pediculated, the pedicles bei sometimes of considerable length, more rarely ve short, or appear as continuous tumours or grths from the inner surface of one or other of thps of the os. When divided they are found tontain a tenacious, transparent, albuminous maer, identical with that secreted by the Naboan glands. When small they consist chiefly ofsts filled with this matter. When they are mu larger, and reach the size of the first joint ofe thumb, these cysts or vesicles are not so disct, but exist in the form of canals, arranged lotudinally, between which a fibro-cellular tissunters more or less abundantly. Their surface oft presents an uneven or tubulated appearance, isnerally not very vascular, and is composed, acrding to Virchow, of a dense cellular tissue, cored by a thick layer of tasselated epitheliu.

2. iv. *The symptoms* indicating the existence of poi generally appear gradually, and may with inasing severity continue months or even years bee medical aid is required. There are usually atst leucorrhœal discharge, hæmorrhage, or both, fowed by bearing down pains in most cases. Wn the polypi are very small, they may produ either very slight symptoms or no symptoms atl. Hæmorrhage is, however, very generally exrienced, especially when the polypi occasion engement of the neck of the womb. The size ofe polypus may not influence the hæmorrhage, aall one often causing more than a large one. D West considers that the structure of the popus influences the symptoms, and that those popi which present the compound structure due toe enlargement of the Nabothian glands are alys productive of profuse leucorrhœa; and th vascularity of surface being less, they are lefrequently the occasion of hæmorrhage. The mh rarer occurrence of follicular polypi, is ateed by a profuse albuminous discharge, and is nassociated with profuse mennorrhagia, unless inre instances. The symptoms now mentioned shld always suggest digital examinations, and if nolypus can be felt, examination by the specum becomes requisite.

3. v. *The treatment* of polypi is thus described bDr. West. "The smallest may be removed baying hold of them with a pair of long forceps artwisting them off, while those which are somewt larger, after being twisted to check the risk ofleeding, may be cut off by a pair of scissors. T bi-valve speculum should always be empled in doing this, and both forceps and scissors armade for the purpose, so constructed as to be reily worked within the speculum." For the sele growths or tumours, noticed above (§ 1.), he applies the acid nitrate of mercury, wch destroys them, and arrests the bleeding. Aespects the removal of larger polypi and the seral means of accomplishing it, I must refer th reader to the work just quoted, or to the suical works where this operation is fully descbed.

164. VIII. Fibrous Polypi or Tumours within the Uterus are amongst the most serious organic diseases of the uterus, and the least amenable to treatment. They are uncertain in their rates of progress, being in some cases rapid, and in others slow; and in rarer instances almost altogether cured by the efforts of nature, which either throws off the morbid structure from the organ in which it is seated, or stops its growth. These tumours vary much in structure and in their seat. When they arise from the internal surface of the uterus, or underneath the internal membrane, they are generally considered as a form of polypus, and described as such, — as *fibrous polypus* of the uterus. Dr. West considers them to be fibrous tumours, growing from the inner surface of the womb, or less frequently from either lip of the os uteri.

165. *A. Fibrous polypus of the uterus* is nearly identical with other fibrous tumours of the organ; and differ chiefly either in being developed immediately underneath the internal membrane, or in having more or less of the fibrous structure of the womb interwoven with or covering it. Fibrous polypus of the uterus is pediculated, and, growing from the interior of the womb, is more vascular than other tumours of the organ. The pedicle is composed of uterine fibres mingled with more or less dense cellular tissue. A layer of uterine substance is continued a short distance from the pedicle along the tumour, in some cases, or invests it in part, or altogether in others. In addition, the polypus is always covered by the internal membrane of the uterus, which becomes firmer and denser than natural, both it and the fibres of the womb being developed with the growth of the tumour. These tumours are generally single, but they are sometimes double, very rarely more numerous. They are of very different sizes, and occasionally remarkably large. They may, in some instances, be enucleated from their coverings; in others, their substance is intimately connected with their envelopes. The vascular supply of these tumours through their pedicles, is generally small in proportion to their size and to the quantity of blood in their substance. This comparatively small supply of blood, the profuse hæmorrhages they occasion, and the arrest of the hæmorrhage by ligatures around their pedicles, have rendered it very difficult to determine the actual source of hæmorrhage. Dr. West seems to believe that it is rather from the irritated mucous membrane of the uterus than from the surface of the tumour itself that the bleeding flows; and a variety of considerations confirm this opinion.

166. These polypi being generally formed within the uterus, influence the organ in some respects, according to the situation whence they spring. If they arise low down, or in the cervical canal, the tumour soon grows beyond these limits, and, passing down into the vagina, may acquire a considerable size, without disturbing the uterine functions. If they arise from some part high up, or near the fundus of the uterus, they often remain until they have acquired a great size, occasioning enlargement of the organ and thickening of its walls, as in pregnancy. But in many cases, before or soon after the tumour has reached the size of an orange, the os uteri gradually dilates, allows its passage through it, and embraces

its pedicle. In some cases this result takes place without much suffering; but in others, violent uterine action is excited by the tumour, which recurs at intervals, and resembles the pains of labour. The tumour, or polypus, is thereby extruded from the uterus, into the vagina; and the irregular contractions of the uterus, especially when the polypus is firmly attached near the fundus, may drag down, or invert the organs, as stated above (§ 151.). Generally the polypus is detected soon after it has passed into the vagina; but if not detected, and when allowed to remain in this situation, it acquires a large size. I believe, however, that the largest tumours of this kind reach their full size within the uterus. In a case which came before me, and in which Dr. Lee was consulted, two tumours were thrown off of the size of between two and three pounds each, immediately after passing the os uteri.

167. Fibrous polypi may present œdema of their substance, extravasation of blood into their structure; and having passed into the vagina they may undergo ulceration, especially if air come in contact with them, or even sloughing. When they are detached spontaneously, or by means which produce firm contractions of the uterus, as in two cases where this was effected by the treatment which I adopted, their pedicles give way, and the whole mass (fibrous structure and envelopes) is thrown off.

168. *B. The Symptoms* of fibrous polypi are nearly the same as mentioned above (§ 162.) — are leucorrhœa, hæmorrhage, and bearing down. The hæmorrhage is at first experienced chiefly at the menstrual periods which are prolonged, or return at shorter intervals, or are more abundant, approaching to flooding, leucorrhœa being present in the intervals. Bearing down is almost constant in some cases, or recurrent in others, with expulsive pains or efforts, when the tumour has far advanced. When these symptoms are present, a vaginal examination should not be delayed. If the polypus have not passed the os uteri, the *diagnosis* becomes very difficult. In these circumstances the uterine sound, as advised by Professor Simpson, or dilatation of the os uteri by the sponge tent, as recommended by the same eminent authority, becomes necessary.

169. *C. The Treatment* of fibrous polypi has always hitherto been considered as entirely instrumental or surgical. In two cases which I treated, the means employed were strictly medical and proved in both, within a few hours, successful, the tumours having been extruded through the os uteri by the action of the uterus and entirely thrown off. In one of these cases the hæmorrhage was excessive. I prescribed immediately the biborate of soda in solution, and directed the dose, about six grains, to be repeated every hour or two. A tumour, about the size of a child's head, was soon after thrown off; six or seven doses of the borax having been taken, when vomiting was occasioned; but the hæmorrhage had very much abated a short time before the tumour came away. A day or two afterwards hæmorrhage returned, a vaginal examination was made, the os uteri was found somewhat dilated, and another tumour was felt pressing upon the opening. I then requested Dr. Lee to see the patient with me, when the same medicine was given as before, and the second tumour was expelled in a few hours by the contractions of the uterus. only other case of fibrous polypus of the w which I have had an opportunity of treating, one of a single tumour of large size, much morrhage had taken place, and I prescribed infusion of secale cornutum, with as much of bi-borate of soda as it would dissolve, to be g every hour or two, until eight ounces were ta Soon after the whole was given the tumour expelled.

170. The operations advised for remo fibrous polypi are by ligature and by incis Dr. R. Lee records twenty-seven cases of removal of fibrous polypi of the uterus, i terminated fatally (West). Excision of polypus has been dreaded in these cases, the of dangerous hæmorrhage from the opera having been considered great. Velpeau, L franc, Dupuytren, West, and Arnott, h ever, greatly prefer excision to the ligature. V peau found the hæmorrhage troublesome onl two of twenty cases on which he thus opera "Lisfranc states that he met with but two of 165 cases; and Dupuytren also but two of nearly 200; while they all refer to insta of phlebitis, or of peritoneal inflammation lead to a fatal issue after the operation by ligatu Torsion and strangulation of the pedicle by c pression have likewise been advised for remov fibrous polypi; but they are liable to the same jections as have been urged against the use of ligature. It is unnecessary to refer further to mode of operating by excision, inasmuch as w ever is capable of undertaking the operation quires no directions respecting it, or, if he sho he will find them in Dr. West's work now quo or in any systematic work on surgery.

171. I may here mention that fibrous pol may co-exist with *pregnancy*, and that, altho remarkably small previously to impregnation, t may participate in the development of the ute during this period. They do not, however, ge rally produce marked symptoms during pregnan nor interfere with its natural course. After commencement of labour their injurious influe becomes manifest, either presenting a mechani obstacle to the passage of the child, or giving ris very serious consequences subsequently, by oc sioning dangerous hæmorrhage, or other difficult They may also at this time lead to very seri mistakes as respects their diagnosis. The qu tion as to their *treatment* at this time is of small importance; for excision, however gr the hæmorrhage, may be followed by phlebi or metritis, or pelvic peritonitis. Therefore, the hæmorrhage cannot be controlled by opia and astringents, the ergot, or borax may be hibited, at first singly, and, if they fail, afterwa in combination.

172. IX. Tumours in the Walls and Ext nal Surface of the Uterus.—i. *Description.* These morbid growths are more or less intimat connected with the parietes of the womb, and are many instances identified with the structure of t organ. Several tumours are more frequently form in the same case, than one merely; but when th multiple, "one or two generally outstrip the oth in the rapidity of their development, the rate which, as well as the nature of the symptoms, greatly influenced by the situation that they cupy." However situated, or however lar

ne tumours are commonly firm, spherical in
, with nodulated surfaces, and their structure
ometimes interrupted by cavities containing
, and varies in density, elasticity, and succu-
y. They are thus well described by Dr. West :
a section being made of any of these tumours,
present great similarity to each other, being
posed of a dense greyish structure, intersected
umerous dead white bands and lines, which
almost invariably arranged according to a de-
e type or plan. In some instances these fibres
a concentric arrangement, while in others
have a wavy distribution, or are disposed
nd several different centres. Tumours of the
kind are usually remarkable for their hard-
, and their small degree of vascularity ; they
also contained within a remarkably distinct
-cellular investment, are imbedded in the
ine substance, and seldom attain a size exceed-
that of a shelled walnut. The other varieties
more vascular, less firm, have a less complete
ule, may occupy all parts of the exterior or
rior of the womb, and may grow to a very
e size, so as to weigh twenty, forty, or even
nty pounds. Moreover, it happens sometimes
in the course of their development, two or
e tumours coalesce, at least apparently, so
o form a large growth, though on a section it
be seen that the different growths remain dis-
t from each other, separated by fibro-cellular
a, the remains of the more complete invest-
t by which, when smaller, each was sur-
nded." (West's *Lectures*, &c., p. 267.)
en these tumours are seated near to the in-
al surface of the uterus, or under the internal
nbrane, the fibres of the womb either passing
r the surface of the tumour in some parts, or
ally passing into it, they form the fibrous
ypi, or internal tumours of the uterus already
ribed (§ 164. *et seq.*). The vascularity of
e tumours varies in different cases, and, like
tissues with which they are connected, they are
lved into gelatine by boiling.

73. These growths may be developed in any
t of the walls of the uterus. Sometimes they
formed "immediately beneath the peritoneum
ering the uterus, or the first half inch or inch
the ovarian ligament or Fallopian tubes," and
limited to the fundus, or upper part of the body
he uterus, more frequently on its posterior than
its anterior surface. They there generally re-
n of a small size, and hardly exceed that of a
or bean ; seldom projecting further than one
f of their bulk. In other cases they either grow
wards or inwards, from the thickness of the
rine parietes, being apparently only attached
hem by a thick pedicle, into which some ute-
e fibres enter. The tumours which grow out-
rds from the uterine walls, sometimes attain the
of a large orange, or even a greater bulk ;
y, unlike the tumours which grow into the
ity of the womb, receive no investment of
es from the substance of the organ, and are
en present in considerable number. Dr. West
ntions as many as twelve projecting from the
ernal surface, the interior of the organ being
e from disease. Wherever may be their origins,
se growths tend as they increase in size, with
exceptions, to become pediculated ; these ex-
ptions being the firm, slightly vascular tumour
h concentric arrangement of fibres, which remains imbedded in the uterine walls, without projecting either externally or internally. In rare cases, also, the more vascular, elastic, and succulent fibrous tumour is developed in the uterine walls, attaining the size of the fœtal head, producing very great enlargement of the organ, and retaining a spherical form. It may be imbedded in the substance of the womb, without projecting more in one direction than in another.

174. The influence exerted by these tumours on the womb depends more upon their situation than upon their bulk. When they are seated externally to the womb, and grow into the peritoneal cavity, they often acquire an enormous size, and the womb is much elongated, and even drawn upwards into the pelvis, but seldom increased in bulk. If, however, a small tumour be developed in the walls, or within the organ, more or less increase of size will be observed. These tumours reach the greatest size when they are single and attached to the external surface of the uterus. Walter has described one which weighed seventy-four pounds.

175. *b.* The *ultimate changes* which uterine tumours undergo, are interesting, and often tend, under the influence of vital resistance, to a more or less salutary issue. 1st, When the tumour is externally attached to the uterus, its pedicle may become ultimately so attenuated as to be detached nearly or altogether from the womb, especially if it had formed previously adhesions to the adjoining peritoneum ; such cases are, however, very rare. 2d, When the tumour is developed internally, or passes into the cavity of the organ, it undergoes the changes and their results already described (§ 166. *et seq.*). 3d, The tumour is sometimes softened, the more liquid parts are absorbed, and either a calcareous substance is deposited, or remains after the other elements are removed ; that the former or actual deposit of calcareous matter takes place is evinced by the quantity of the calcareous matter or deposit. This change takes place both in small and in large tumours, and most frequently in those attached to the outer surface of the uterus ; but it may also, but rarely, occcur, in those which are developed internally. Fibrous tumours of the womb were formerly believed to sometimes degenerate into cancer. This change is now considered never to occur. That a tumour, developed in the walls, or attached to either surface, of the uterus, may coexist with cancer of the cervix, is possible, and the coincidence has been observed in rare cases.

176. *c.* The *frequency* of tumours of the uterus has been very differently stated by writers; but they seem to be, with the probable exception of cancer, the most common of organic diseases of this organ. Mr. Pollock states that of 583 cases, in which the uterus was examined at St. George's Hospital, 265 were diseased, and in 39 of them fibrous tumours existed, and in 38 cancer was found. The statistics of the malady are very unsatisfactory. In 70 cases, in which Dr. West examined the uterus of women who died after puberty of other than uterine diseases, 7 presented fibrous tumours of the organ. From these and other observations made by Malgaigne, Braun, Chiari, and others, tumours of the uterus are observed chiefly between the ages of twenty-four and sixty ; and most frequently from thirty to fifty.

177. ii. *The symptoms.* — Tumours of the uterus are very often not manifested until they reach a large size; and they exist even many years without producing any inconvenience, or being suspected until they are detected after death. The growths from the exterior surface of the womb frequently occasion no symptoms but those produced by them when they reach a great bulk; or when they disorder the sensibility or functions of adjoining parts. But those which are imbedded in the walls of the organ, disturb either the functions or the sympathetic relations of the womb, although their size may be small. It has been already shown that the growths or polypi which occupy the cavity of the uterus, occasion abundant hæmorrhage and other phenomena. (§§ 162. 168.) When these tumours are formed after the cessation of the catamenia, the severity of the symptoms they occasion is much less than at an earlier epoch; and when they are developed in single women, the symptoms generally become much more severe after marriage, and they often either occasion sterility, or, if impregnation takes place, abortion. If pregnancy take place in these cases, the puerperal states, as well as abortions, are attended by much greater danger than in the healthy state of the uterus. The symptoms of uterine tumours are most commonly slight at their commencement, and slowly increase in severity. They sometimes, however, are sudden, more especially the uterine hæmorrhages, which recur after intervals, and are more and more severe; but, unless when caused by internal growths, are not followed by leucorrhœa or any offensive discharge. Dysuria, or retention of urine, sometimes suddenly occurs. As the tumour enlarges, pain in the region of the uterus, bearing down, and sense of discomfort in the pelvis, are felt, with frequent calls to pass urine. The character of the pain is somewhat peculiar; it is rather a dull, aching, or gnawing, but constant pain, seldom preventing sexual intercourse; yet sometimes attended by throbbings, or a sense of heat or burning, or with intense neuralgic pains such as have been already described. (§ 7. *et seq.*) When these symptoms are present, the abdomen, especially towards the pelvis, should be carefully examined; and if any tumour be detected, the diagnosis between an uterine and ovarian tumour should be made.

178. iii. This *diagnosis* is extremely difficult, and cannot be attempted without a careful examination first of the abdomen, and next per vaginam and in both situations. Tumour of the uterus, when so large as to be felt on examining the abdomen, is always firm, frequently nodulated or uneven, seldom mesial, and generally inclining to either side. On examining per vaginam, the tumour, if uterine, rarely draws the uterus upwards, unless it be attached near the fundus. It is most frequently seated in the posterior parietes, and is, more especially in these cases, accessible to examination. It is then found to be firm, sometimes uneven, carrying the cervix towards the symphysis pubis, and often more or less retroverting the organ, and often displacing it somewhat from the mesial line. The os uteri is generally small, circular, and healthy; or somewhat hard, or enlarged, or turgid. If the tumour be intra-uterine, or be imbedded in the walls, the uterus will be found larger, heavier, and less moveable than
natural, and if it be seated low in the womb, t
cervix uteri will not be unlike the form assumed
pregnancy, not unfrequently disappearing, and
lips being thinned. Dr. WEST remarks, that
enlarged, heavy, and somewhat hard uteri
coupled with causeless recurrence and freque
return of uterine hæmorrhage, while the os a
cervix uteri are healthy, and I might add absen
of pain, or but slight pain during coition,
almost always pathognomonic of fibrous deposit
the uterine substance.

179. Tumour of the uterus must be large to
mistaken for tumour of the ovarium. The form
is always slowly developed, and rarely rises out
the pelvic cavity; the latter much more rapic
increases in bulk, and when large rises out of t
pelvis. The one is hard, and non-fluctuating; t
other is softer, and obscurely, if not more ma
festly, fluctuating. The ovarian tumour genera
attains a much greater bulk than the uterine, is
first more inclined to either side, and is seldc
attended by hæmorrhage during its growth; or
retention of urine when largely developed. T
cervix uteri is sometimes drawn upwards, but
seldom altered; whilst large uterine tumours a
uneven, nodulated, solid, are attended by alte
tion of the lower segment of the uterus, and
the absence of, or difficulty of finding, the cerv
and os uteri, and not infrequently by retention
urine.

180. The hæmorrhage attending tumours of t
uterus, may be mistaken for abortion. The patie
not infrequently encourages the opinion of pre
nancy from a desire of being in this state, a
care should be had not to be thus misled; but
question the patient as to the history of the cas
and to examine locally with care and with refe
ence to contingent disease of the uterus and of
appendages. The frequent recurrence of h
morrhage; the absence or character of pain, a
the state of the cervix and os uteri will general
guide the diagnosis in these cases.

181. Fibrous tumour of the posterior uteri
wall may be mistaken for retroverted uterus, wi
which, however, it is often associated. It
nevertheless, of importance to ascertain the natu
of the lesion, although but little may be done
regards its treatment. In these cases, a recour
to the uterine sound, when it can be introduce
may aid the diagnosis; but in most cases, a di
gnosis is most difficult, and sometimes impossibl
It is also very difficult to distinguish betwe
cancer of the body of the womb and fibrous t
mour of the organ, but this will be noticed her
after (§ 199. *et seq.*).

182. The occurrence of hæmorrhages, the no
developement of the lips of the uterus, and th
history of the case, will prevent uterine tumou
from being mistaken for pregnancy; for whic
the expansion of the lower segment of the uteru
and sometimes a sound resembling the uterin
souffle, attending the former, may render th
diagnosis between it and pregnancy difficult, mo
especially as the latter may take place, during th
existence of an uterine tumour. In these, ar
many other cases of tumour of the uterus, diff
culties of diagnosis, which need not be more pa
ticularly noticed will occur, and which the acume
of the physician will readily overcome.

183. iv. *The prognosis* of uterine tumours is n
very unfavourable to the duration of life, at lea

several, if not for many years, unless they are y large, or are productive of very serious ptoms, or are associated with pregnancy. In latter state the abortion they generally occasion, parturition at a natural period, is often attended more or less danger. When the tumour is a-uterine, constituting the fibrous polypus ve described (§ 164. *et seq.*), a cure is then geally accomplished. But the other states of the lady do not admit of cure, and not always of liation, although this latter should always be mpted, inasmuch as it is often to be attained, nature, in rare cases, seems to effect a cure in h circumstances, especially when the disease urs at an advanced period of life,— the cessa- of the menses tending to favour this result. e prognosis may also be somewhat more favoure when these lesions occur in an unmarried ale, or in a widow, than when they affect a rried female during the epoch of sexual acty.

84. v. *Treatment.* Although the treatment of ours of the uterus is chiefly palliative, yet re active means should not be neglected, with view of promoting the gradual absorption of morbid deposit. The patient should avoid ual excitement; if married she ought to sleep rt from her husband; and be as physically l mentally tranquil as circumstances may per- her to be. Walking much, or standing long, re especially riding on horseback, or even in a riage, should be altogether avoided; and the umbent posture adopted as long as possible, l without any intermissions during the existence uterine hæmorrhage. The bowels ought to be t gently open by cooling laxatives, and more ticularly by such as neither irritate the larger vels, nor sympathetically excite the uterus. th this intention the carbonates, the tartrates, the acetates, or the phosphates of the fixed alies may be prescribed, either alone or with infusion of senna or rhubarb, or with the exct of taraxacum. Hæmorrhages are amongst more urgent symptoms for which palliation equisite. These generally at first occur as an essive menstruation, and recur with each ped; and ultimately they often appear intercurtly, or between each period. The means which ave advised above (§ 169.) for arresting the morrhage and expelling the tumour when seated hin the womb, might prove of doubtful benefit even injurious, if prescribed, when the tumour ot thus situated, or when seated as described this chapter. Therefore the recumbent pose, undeviatingly observed, and astringents and rigerants taken from the commencement of the morrhage, are indispensable.

185. Where there is either pain or tenderness the lower part of the abdomen on the accession this discharge, a few leeches may be applied this part; or a small cupping over the sacrum ordered; or dry-cupping on this situation may substituted for it, when the abstraction of blood ears injudicious; but in these cases the mon fashion of applying leeches to the uterus lf should not be followed. The turpentine brocation may be afterwards applied over the pogastrium. Sedatives and refrigerants should given with astringents; and if the pain be ent, narcotics and the other means advised for ralgia of the uterus (§§ 14—17.) may be added. The nitrate of potass may be thus prescribed with the liquor ammoniæ acetatis, with the acid in excess, and with the spirit of nitric æther and tincture of henbane; or the hydrochlorate of ammonia with hydrochloric acid, and hydrochloric æther, may be taken in the infusion of cinchona, or simple infusion of roses, in different circumstances of the disease. If the hæmorrhage be excessive, the more energetic anti-hæmorrhagic remedies, as the infusion or tincture of matico, gallic acid, tannin, the spirits of turpentine, the extract of log-wood, &c., may be had recourse to. When the patient is anæmic, or when there is a more continued draining of blood, the muriated tincture of iron, with an additional quantity of the acid, will be given with benefit, with the compound tincture of camphor, or with the infusions of calumba or quassia.

186. I have had reason to believe that a judicious recourse to the iodides has not infrequently been productive of some benefit. The iodide of potassium should generally be preferred, and be conjoined with the solution of potass, or with Brandish's alkaline solution, or with either of the carbonates; but it ought always to be prescribed in small doses, and be long persisted in. In other, or in anæmic, cases, the iodide of iron may be given in syrup of sarza. The bromides of magnesium and of potassium have been considered as being equal, if not superior, to the iodides, but chiefly from the circumstance of their presence in certain mineral springs, as those of Kreuznach, which have been much employed, both internally and as baths and hip-baths daily, in cases of uterine enlargements and tumours, and with apparent benefit in many cases. These waters may be had in this country. M. VELPEAU suggested an operation consisting of the enucleation of fibrous tumours of the uterine parietes by an incision through the os uteri or the lower segment of the womb. M. AMUSSAT performed this operation in 1840, and it has been subsequently resorted to by others—by BÉRARD, BOYER, SIMPSON, and others; and with success by my friend Dr. PANCOAST of Philadelphia, by Mr. TEALE of Leeds, M. AMUSSAT, in two cases, and by M. MAISONNEUVE; but as the number of unsuccessful cases is much greater than that of the successful; and as their details are by no means encouraging, the hæmorrhage and other consequences being alarming, this operation should not be recommended.

187. X. TUBERCULAR DEGENERATION *of the internal surface of the uterus* is sometimes met with, in the form of a dirty yellow matter, closely resembling the substance of a tubercular bronchial gland at an early stage of softening. This matter is about an eighth of an inch in thickness, extends over the whole internal surface, but rarely into the cavity of the cervix, and more frequently into the Fallopian tubes, which it more or less distends, and is sometimes associated with tubercular degeneration of the ovaries. I observed this association in a young lady who died of consumption at nineteen years of age, and who had never menstruated. ROKITANSKY thinks that it never occurs primarily in the cervical canal. Upon scraping off this deposit from the internal uterine surface, it is found that the whole of the internal membrane is removed and replaced by it, and that it is closely applied to the proper structure of the organ, which, with its cavity, is more or less

enlarged. At an earlier stage the internal membrane is seen to be opaque, more vascular than natural, and to present small yellow spots, which are found to be distinct tubercular deposits when examined by the microscope. This subject has been investigated by Louis, Kiwisch and Geil, the last of whom has furnished Dr. West with a table, according to which it appears, that, in 68 cases this lesion has been observed at all ages, from 10 years to 80; but most frequently from 20 to 50 years of age; and, according to the appearances in 45 cases, the uterus alone was affected only in 1 case; the uterus and tubes in 12; the uterus, tubes, and peritoneum in 19 cases; and the tubes alone in 8 cases.

188. The *symptoms* of uterine tuberculosis are amenorrhœa, or dysmenorrhœa, often associated with leucorrhœa, — very common phenomena of tubercular phthisis, of which this uterine lesion is generally secondary, or, if not secondary in very young subjects, at least coexistent with tubercular deposits in the lungs and other organs or parts.

189. XI. Fatty Formations have been deposited in the cavity of the uterus in very rare instances, and have been thrown off by the contractions of the organ when they had reached a large size. Dr. West refers to two instances, recorded by Drs. Busch and Seeger, where this product was expelled from females of the ages of fifty and fifty-three. In one the tumour was the size of the fist, and was composed of fatty matter closely resembling cholesterine. In the other case the tumour was the size of a child's head, was connected by a broad pedicle with the whole margin of the os uteri. It was removed by ligature; and the patient who had suffered from menorrhagia for a year previously recovered. The tumour weighed three pounds and a half, was said to have been an ordinary fatty tumour, having an investment of dense cellular tissue, septa of which dipped into its substance.

190. XII. Cancer of the Womb.—Of Cancer and of Scirrhous and other Tumours, as well as Fungo-Hæmatoid, and of other malignant diseases, full notice has been taken under their respective heads. I shall now only briefly notice the malignant lesions which are found in the uterus, and the treatment which has been advised for them. Before the chronic inflammatory states of the cervix uteri were investigated and their consequences shown, more especially by the writings of Dr. Henry Bennet, several of these consequences were viewed as incipient cancer of this part of the organ; and the mistake was the more readily made as cancer uteri in most cases commences in this part and often resembles the changes, more especially hypertrophy, hardening, pain, &c., which result from protracted inflammatory irritation. The profession is much indebted to the writings of Dr. H. Bennet, and more recently of Dr. West, for the researches they contain into the diagnosis of malignant diseases of the womb by the former, and into the pathology and treatment of them by the latter physician; and I would advise the reader not to be content with the brief view I shall now take of these maladies, but to peruse the more copious details, furnished by these able writers, not only of these but also of other diseases of the uterus.

191. I have defined Cancer, when treating of this malady generically; but much confusic has existed in consequence of the want of pr cision in the use of this term; for some patholc gists have employed it as representing the *genu* of malignant alterations of structure, commencin or manifesting themselves locally; whilst other have limited it to the carcinomatous state or va riety of the genus. The generic definition c Cancer given by Müller, is as follows:—"Thos growths may be termed Cancerous, which destro the natural structure of all tissues, which are cor stitutional from the very commencement, or be come so in the natural process of their develop ment, and which, when once they have infecte the constitution, if extirpated, invariably returr and conduct the person who is affected by ther to inevitable destruction." To this definition n objection can be offered, inasmuch as it com prises all the varieties of morbid structur usually denominated malignant or cancerou Much confusion, however, has arisen from th different terms by which these have severall been denominated, the desire of originating name, rather than of conveying a precise idea of th thing named, and of adopting foreign terms, bein amongst the *ludibria* to which modern medic writers expose themselves. Cancerous disease of the uterus, notwithstanding the microscopi researches of those anatomists who have dignifie themselves by the name of Histologists, hav not as yet been distinguished by any determinat character, by which they can be undoubtedl known under the microscope, as far as the de scribers of these characters or appearances hav furnished us with the means; and this failure o microscopic diagnosis is most remarkably mani fest in respect of those lesions of structure whic have been viewed as cancerous by some, an which have been as stoutly denied to be such b others, and which are considered by the latte as separate and specific forms of disease, especially epithelial cancer, melanosis, lupus, &c.

192. i. Forms.— Although no form of Cance is peculiar to the uterus, yet they do not all occu with anything approaching to the same frequency On this subject Dr. West remarks:—"Fungoid o medullary carcinoma is by far the most common next in frequency may be classed the epithelia varieties of the disease, if indeed it be not mor correct, as some men of high authority believe, t refer them to a separate category distinct from genuine cancer. Next to them, but divided b an interval which widens in exact proportion a fresh evidence is brought to bear on the subject may be classed scirrhus or hard cancer; whil almost as rare, or, perhaps even more uncommon stands the colloid or alveolar variety of the disease." (*Op. cit.* p. 336). Rokitansky says als that fibrous or scirrhous cancer of the uterus is o extreme rarity, whilst medullary carcinoma occurs with the greatest frequency. This opinion accords with those of Mr. Paget and Dr. West But Professor Kiwisch states that scirrhus o hard cancer occurs in about three in every ten cases of cancer of the womb; and he remarks, that with the softening of fibrous or scirrhous cancer, the characters of this growth gradually disappear, and, becoming more vascular, the mass is more easily broken down, and contains a brain-like substance, the ulcer which forms presenting the same characters as those which are observed

edullary cancer. Dr. West states, that of cases of uterine cancer, the disease appeared, an examination during life, to be medullary 8, epithelial in ten, and colloid in two; and 20 cases, the disease occupied the *body of the us* only in two.

3. *A.* It is fully shown that the cervix, or the of the womb which projects into the vagina, at in which cancerous disease commences, that the exceptions to this are very few. The e of its commencement, however, varies in lifferent forms. The *medullary form* begins a morbid deposit in the substance of the ix, enlarging or thickening it more than gating. The lips of the os are enlarged, , and tense, and, at the same time, irregular, lated, and wide or gaping. When the cervix cised, the structure is occupied by a white, and semitransparent matter, which seems rated in parts, and has displaced the structure in others. This deposit is more abundant the internal or mucous surface than near xternal. Softening of the diseased part soon place, death of the mucous covering follows, an ulcer, with ragged and uneven surface, with raised, irregular, hard edges supervenes, is covered by a dirty sanies. As the disease eeds, the lips and cervix are altogether deed, and the eroded parts are covered by a dirty white, and often offensive substance. carcinomatous ulceration may commence, r in the softening of the morbid deposit, exng externally or superficially, or in erosion he surface, the consequent ulceration proing more deeply; but the formation of the sore takes place sooner or later, and ades with very different degrees of celerity; granulations and fungous growths spring ; a fœtid pus, mixed with a fœtid, greenishn, or sanguineous fluid, or bloody débris, or more or less abundant hæmorrhages, marking the progress and destruction of the lower ent and upper portion of the vagina. In the retarded cases, cancerous deposits take place e substance, in the cavity, or on the external ice, and even in the close vicinity, of the n; and ultimately the disease invades more ess the whole body of the uterus, often exing to the ligaments and ovaries, and somes forming malignant polypi within the cavity. cerous tumours also form on the uterine peri al surface.

4. *B.* The *scirrhous variety* of cancer uteri is ribed by Rokitansky, as very rarely affecting uterus; the most common form being the ullary, either by itself or complicated with ormer. Fibrous or scirrhous cancer always mences in the cervix, its primary occurrence he body of the uterus being extremely rare. en closely examined, it appears to consist of e, whitish, retiform fibres, differing from the thy texture, and in their minute meshes a pale ish yellow, or greyish translucent substance eposited. This morbid growth invades the ine structure, and furnishes no marked bound. It is various in extent, and accumulating ertain points, gives rise to irregular, nodul elevations and indurations, and enlargement e cervix, or portio vaginalis uteri.

5. Cancerous degeneration of the uterus in r of these forms is generally confined for a considerable time to the vaginal portion; but the disorganization often extends with more or less activity not only to the body and fundus of the organ, but also downwards involving the vagina, thus associating with it vaginal cancer. It may even extend in other directions and thus invade the rectum, the bladder, the cellular and adipose tissues of the pelvis, and at last the ovaries and the peritoneum, cancerous growths either forming upon it, or perforating it chiefly in the state of medullary masses. The destructive process, when extending to the vagina, predominates on either the anterior or on the posterior wall; sometimes to both equally, and occasionally almost to the external orifice. In these cases it often involves the parietes of the bladder and rectum, producing in the most advanced states communications between their cavities, and the most distressing conditions, consisting of a large fungoid cavity, occupying the vagina, the uterine cavity, opening into the cavities of the bladder and rectum, and closed superiorly by the parts agglutinated around the fundus, by the medium of adhesions between the peritoneum covering the adjoining viscera. The formation of these adhesions increases the distressing symptoms of the last stage of the malady.

196. Cancer of the uterus is generally a primary malady, and continues for a long time, if not throughout, the only cancerous affection of the body. It is, however, sometimes developed concurrently with, or consecutively upon mammary or ovarian cancer; or it may be accompanied with or followed by degeneration of the structures just mentioned and of the lymphatic glands. It more rarely becomes associated with cancer of the stomach, or liver; more frequently with that of the mammæ and peritoneum, and occasionally with an universal cancerous deposit, or with mollities ossium. Uterine cancer seldom terminates fatally without extending to the upper portion of the vagina. It is commonly allowed that cancer uteri is confined to the part it commences in for a considerable period, and for a longer time than cancer of any other organ. M. Lebert states that secondary deposits in other parts occurred only in a third of forty-five cases of uterine cancer. Professor Kiwisch found the disease present in the bladder in 42 per cent. of his cases of uterine cancer. But in this, as well as in other diseases, statistics cannot be depended upon, and for reasons I have stated in other places.

197. *C. Epithelial cancer,* or *Cauliflower excrescence* of the os uteri, and which is doubted by some to be cancerous, is of very rare occurrence. It presents a cauliform appearance, or, according to Rokitansky, the appearance of a confervoid growth, consisting of lenticular, pale-red, transparent, and tolerably hard bodies, strung together like the beads of a rosary, projecting on the orifice of the uterus into the vagina, and bleeding on the slightest touch. The only case in which I have seen it, came only once before me in consultation, and it then seemed to me as a fungoid form of cancer; and, from the local changes, the bleeding upon examination, and the cachetic and anæmic appearance of the patient, as undoubtedly a variety of carcinoma or cancer. The case observed by Rokitansky is stated by him to have grown from an evidently cancerous base of the medullary variety. Dr. J. Clarke and Sir C. M.

Clarke, who first described this malady, have viewed it as less formidable, and have stated that that it is sometimes curable. It is not improbable that the medullary form of cancer of the cervix may present fungoid or confervoid growths, of a cauliflower appearance; and that an intractable but non-cancerous ulcer of the os uteri may give rise to large fungoid granulations bleeding on the slightest touch, and both lesions may be thus confounded, the former, however, not admitting of cure, the latter in rare cases. Both these lesions are attended by frequent, exhausting, and dangerous hæmorrhages. These morbid growths consist, microscopically, of "hypertrophied papillæ, composed of epithelial cells, richly supplied in their interior with large and delicate vessels, and covered by a thickened layer of epithelium. The enormous looped capillaries of the cauliflower excrescence explain the abundant hæmorrhages, and the profuse serous discharges which attend it; while the absence of that solid structure which is found in other forms of epithelial cancer accounts for the favourable results that have followed its extirpation."

198. *D. Corroding ulcer* of the os and cervix uteri, first described by Dr. J. Clarke, begins in the mucous membrane, and involves the whole circumference of the os, utterly destroying both it and the subjacent parts. It differs from cancer in the absence of thickening, hardness, or deposit of heterologous matter, and in its prolonged existence — sometimes for several years without being attended by any dangerous symptoms. It appears to be analogous to lupus, and is more strictly a rodent form of ulcer, than a variety of cancer.

199. ii. Symptoms of Cancer Uteri. — The symptoms which are most constantly observed in cancer uteri — namely, pain, hæmorrhage, and vaginal discharge — may attend other lesions of the organ; but in all cases where they, or even any two of them, are present, a careful vaginal examination ought to be made. — *a. Pain,* accompanied with hæmorrhage or leucorrhæa, is a very frequent, but not a constant, symptom. It varies much in character and intensity, both at the commencement and in the course of the malady; and very often, when the hæmorrhage is profuse, but little pain, or merely a back-ache, is felt. At an early stage the pain is generally not severe, nor is it always referred to the uterus, but more commonly to the loins. The organ is seldom tender to the touch, and sexual intercourse is not often productive of suffering. The pain, as the disease advances, is referred to one or other of the iliac regions, and either comes on, or is exacerbated in paroxysms, and a lancinating pain referred to the uterus occurs suddenly and at intervals. Menorrhagia may be either attended, or not attended, by pain. In many cases it is, when very profuse, followed by severe pain. With the progress of the malady the pain generally becomes more severe; but towards the close, when the cachexia and anæmia are most remarkable, the sufferings of the patient generally abate more or less. But before this ultimate stage appears, pain in the uterus is added to that in the back and hypogastrium, and to the other distressing symptoms experienced. The pain is, in some cases, described as burning, darting, cutting, &c.; and it is generally aggravated into intolerable paroxysms, es-
pecially towards or during the night, stabbing
lancinating pains recurring after short but ir
gular intervals. When an attack of hæmorrh
supervenes on severe pain, some degree of re
is sometimes afforded for a short period. As
disorganisation extends to the bladder, the vagi
or rectum, or even to them all more or less,
sufferings of the patient are accordingly increase
and when utero-vesical fistula is formed, the
tress is further aggravated, and rendered still m
harassing. In a very few cases, however,
disease runs its course entirely, or almost entire
without pain. But it is not so rare for pain to
absent through a great part of the course of
malady, and appear only at a far advanced peri
The absence of pain throughout the disease,
until an advanced stage, occurs chiefly in t
epithelial and medullary forms of cancer uteri.

200. *b. Hæmorrhage* is the next symptom in i
portance; but is not always a sign of the co
mencement of the ulcerative stage of cancer ute
for it is, in a very large proportion of the cas
the earliest sign, preceding, and unattended b
either pain or watery offensive leucorrhœa, fo
longer or shorter time. The occurrence of h
morrhage, whether with or without pain, witho
any sufficient cause, should always induce to
vaginal examination. The bleeding may not
profuse, but continuous and prolonged, or r
semble the ordinary menstrual period, excepti
only its non-occurrence at the proper period,
its frequent recurrence. It sometimes assum
this character in females past the catamen
epoch of life, and in whom the menses h
ceased for a longer or shorter time. When
thus appears, the existence of the malady shou
be suspected. When cancer uteri commences
an early period of life, the hæmorrhage most fr
quently occurs at the menstrual periods, or a d
or two after their cessation; but menstruation
generally irregular during the course of the di
ease, being either too early, or passing over a p
riod, the next being excessive. With the progre
of the malady, pain is generally added to hæmo
rhage. The source of this discharge appears
be chiefly the internal surface of the cervix a
body of the womb; for the hæmorrhage may b
excessive before ulceration has taken place, a
even when this has undoubtedly supervened, t
bleeding may still proceed from the surface
these parts, rather than the ulcerated part; fo
in many cases, this discharge has been the lea
where the ulceration has been the greatest, a
proceeded the furthest. The paroxysmal expu
sive pains often attending the hæmorrhage a
usually due to the efforts of the womb to exp
coagula formed within it.

201. *c.* The *leucorrhœal discharges* differ in t
forms and stages of cancer uteri. A muco
or muco-puriform discharge is frequent at
early period, and is then generally not offensiv
But as the malady advances, it is common
more or less offensive, and it becomes mo
watery, or appears as a dirty and very offensi
sanies. An offensive discharge may accompan
any of the chief organic lesions of the uterus
but, although it may exist in these, it seldo
occurs in so marked a manner as in cance
The continuance, the quantity, offensivenes
and other conditions of the discharge, deper
upon a variety of circumstances — upon t

and form of the malady, upon the ex- which ulceration has advanced, upon the ion or non-retention of the morbid fluid, the frequency of its removal by injections, rrhages, &c. In a few instances, an offen- ischarge has preceded either the pain, or the rrhage, or both, although much more rarely; till more rarely, this has existed for so long od, and has given rise to so little suffering se of complaint otherwise, that when at last rse to medical aid has been had, the cervix has been destroyed, and the finger has passed he cavity of the organ.

2. These symptoms, the most severe which l cancer uteri — the pain, the hæmorrhage, the offensive leucorrhœa — cannot un- edly prove the existence of the malady. may individually, or even conjointly, attend organic lesions of the uterus. But viewing severally and in connection with the evi- furnished by a vaginal examination, and the constitutional symptoms characterising urse and the advanced stage of the malady art. CANCER, §§ 20, *et seq.*), especially ncerous cachexia, the existence of cancer cannot be mistaken. The remarkable dis- of the digestive organs, the impaired assimi- , and the waste of the red globules of the , and even also of the tissues, and the con- nt cachectic or cancerous anæmia; the fre- recurrence of disorder of the bowels, more ally of diarrhœa, with both abdominal and astric pains; the distress often caused by ation, and more particularly by the state of inary organs, and by the urinary discharges, l indicative of the nature of the malady.

3. Cancer uteri does not prevent a female becoming *pregnant* at an early stage of the ly; but the process of parturition, and the es in the uterine organs and in the female my that follow, generally accelerate, often great rapidity, its course. Parturition, to the effect of this act upon the diseased especially the cervix, often is accompanied ngerous hæmorrhage, or followed by severe al inflammation. In some of these cases, mother and child have died before delivery een accomplished; generally the process is lt and prolonged. In some cases, gestation prolonged beyond the natural period, and, e instances, death has occurred without the of the uterus having been sufficient to the fœtus.

4. Dr. WEST has given, in his interesting es, a table of the result of seventy-four cases ncer of the cervix uteri *complicating labour*; f these 41 died soon after labour, and 33 ered for a time from the effects of this pro- Of 72 children, it is stated that 47 were born, and 25 born alive. He found that verage duration of 17 cases of cancer uteri, he carefully observed, was 15 months; and f 39 cases, as given by LEBERT, was 16 hs. It is thus apparent that cancer uteri is rapid in its progress than cancer in other s. The average duration of all forms of r is stated by this writer to be 18 months, f cancer of the mamma and of the testis, ost prolonged, not to exceed three years and .

5. iii. THE PROGNOSIS of cancer uteri may be inferred from what I have stated above, and in the article CANCER (§§ 20—22.) ROKITANSKY remarks that "cases of spontaneous recovery from uterine cancer are of extreme rarity, but they do occur; the carcinoma and the cancerous ulceration are then limited to the cervix, the internal orifice forming the boundary. The loss of substance heals with a funnel-shaped cicatrix." (*Op. cit.* p. 303.) In a case, the progress of which was constantly observed by me, recovery took place whilst a diet and regimen, hereafter to be noticed, was strictly observed. The cicatrix, which was formed low in the vagina, was shaped as ROKITANSKY has described it; not more than half an inch of the vagina above the urethra having been left uncontracted.*

206. iv. CAUSES OF CANCER UTERI. These are the same as have been stated respecting cancer in general. But there are certain particulars which require notice with reference to this malady, when originating, as it commonly does, in the neck of the womb. The mortality of cancer in females is nearly three times greater in London than in males, and more than double the number of the deaths from cancer in males throughout England; the excess in females being evidently due to the frequency of cancer of the womb and of the breast among them. According to TANCHOU, the deaths from cancer of the womb, stated in the Mortuary Registers of Paris, as compared with those from cancer of the breast, were as 2½ of the former to 1 of the latter.

207. Age manifestly predisposes to cancer: but this disease appears to occur at an earlier period in the uterus, than in the mamma; for in the latter it is rare at the age of thirty, whereas it is not so rare at this age in the former situation. Cancer uteri increases in frequency with the advance in life, as Dr. WALSHE has shown; but in order to render the increase more manifest, the number of cases at a given age should be calculated with reference to the number of females supposed to exist at the same progressive periods of life. The inference deducible from this fact is, that the occurrence of cancer is in some degree favoured by the depression or exhaustion of vital

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* Mrs. C—, at the age of 36, first complained of symptoms indicating an early stage of cancer uteri. The disease advanced, and several medical men were consulted at her own or my suggestion. The cervix had become much affected, and the disease extended far down the vagina with distressing irritability of the bladder. At this time she found Dr. LAMBE's work on "*a peculiar Regimen, &c., in the Treatment of Cancer, &c.*," in my library. He was consulted in her case; and he recommended her to remove to a dry and healthy locality in the vicinity of London; to strictly observe a vegetable diet, to drink only distilled water, and use only distilled water in cooking, and for infusing tea or other substances. These injunctions were observed without any deviation, and under his supervision. In the course of a few weeks amendment was very apparent, and in somewhat less than twelve months a cicatrix, as situated and described above, was formed. The patient continued this regimen for nine or ten years; and enjoyed excellent health. After this period she began to partake of fish, the flesh of chickens or rabbits, &c. She afterwards ventured further upon animal food, and occasionally took a glass of old wine. Five or six years more elapsed, when she complained of the right mamma, and when examined the disease was commencing in it; but no complaint was made of the parts in the vicinity of the first disease. The diet was now altered, but the malady proceeded slowly; and having been unusually prolonged, extended inwards, affected the pleura; and ultimately the vaginal cicatrix was attacked, and she ultimately sunk,—more than twenty years from the commencement of the malady in the cervix, and after an interval of nearly fifteen years of good health.

power taking place from the progress of age; as well as from other causes of vital depression. Dr. West has given a table of the ages of 426 cases of cancer uteri, collected from various sources: —

	Actual number.	In the proportion of 1 to 10,000 of the whole population existing at the respective ages.
Between 25 and 30 years	25	or 1 in 134
,, 30 ,, 40 ,,	112	,, 1 ,, 21
,, 40 ,, 50 ,,	178	,, 1 ,, 9·7
,, 50 ,, 60 ,,	71	,, 1 ,, 16·6
,, 60 ,, 70 ,,	35	,, 1 ,, 23·6
Above 70 ,,	5	,, 1 ,, 108·

From this data it would appear that, although cancer uteri becomes more frequent as life advances up to fifty or sixty, it diminishes considerably in frequency from these ages; and from this table, as well as from other sources of information, it cannot be inferred, that the actual cessation of the catamenia has any influence in favouring the occurrence of this malady in the uterus. Dr. West justly remarks that the state of the uterine functions previously to the appearance of cancer is not without interest; and he adds that, in 108 cases, this matter was made the subject of special inquiry. In 94 cases these functions were in all respects natural from their complete establishment to the commencement of the disease; and in 14 they were either habitually or frequently unnatural, being painful, postponing, or irregular. Out of 116 married women affected with cancer uteri, only 7 were sterile. The hereditary predisposition to cancer has been well established, as shown in the article on Cancer (§ 23.). Mr. Paget found that this malady in all situations was hereditary in the proportion of one to 6·1; Mr. Lebert, in the ratio of one to 7·2; and Dr. West in 1 to 6·2. The proportion of hereditary cases is very probably higher than here stated, as it is difficult to ascertain from the patients the nature of the disease which caused the death of either, or of both parents.*

208. v. Treatment of Cancer Uteri is necessarily confined to palliating the suffering of the patient, and to attempts at delaying the approach of death. The symptoms which more especially require mitigation are *hæmorrhage*, *pain*, and the *offensive discharge*. The means which should be resorted to for the first and second of these have been fully described in the articles Hæmorrhage, Neuralgia, and Cancer; but there are a few topics connected with the treatment of cancer affecting the uterus, and of the effects of this malady, which require further consideration.

209. *a. Hæmorrhage* is amongst the earliest and most alarming symptoms of cancer uteri. The obvious intention is to abate it when severe or too frequent, and to prevent its recurrence altogether, or before the catamenial period. The various means usually employed for *Hæmorrhage from the uterus* have been detailed (see art. Hæmorrhage, §§ 263—273.); but there are a few of these which require a more particular notice at this place. The *gallic acid* in doses of six to eight grains every four or five hours, have been often found decided service in arresting the hæmorrhage. T infusion of *matico*, used as an injection into vagina, is also very efficacious. Dr. West sta that, in some cases of medullary and of epithe cancer, when the hæmorrhage is excessive, prolonged, the morbid tissue may be broken do with the finger, and the tincture of the *sesquicl ride of iron* injected into the midst of it. T extravasated blood is thereby coagulated, and vessels destroyed, the whole mass thus trea sloughing away. Kiwisch, who first resorted this practice, remarks that it is not attended much pain or serious constitutional disturban He also advises a recourse to the actual caute where the surface is too firm to be broken do In one case, after other means had failed, I commended the injection of the spirits of turp tine, in the manner in which the tincture of muriate of iron has just been advised, the sa medicine being given frequently by the mout small doses; and the hæmorrhage was for time arrested. It is obvious that sexual int course is liable to occasion an attack of hæm rhage, and that it should, therefore, be stri forbidden whenever cancer uteri is suspected.

210. *b. Pain* is often so excessive as to requ energetic means of relief; but, as long as it is acute, the gentler remedies only should be ployed. The pain is sometimes brought on, aggravated by an irritable state of the blad or by the condition of the urine, and not frequently by neglect of the functions of bowels. Therefore, the states of both the urin and fæcal evacuations should receive due att tion. The former may be corrected, and irritable condition of the bladder mitigated, the exhibition of the solution or the bi-carbon of potash with tincture of henbane, or by mineral waters of Ems or of Vichy. If the u abound in the phosphates, the means I have vised for this condition, when treating of the m bid states of the Urine (§§ 90. *et seq.*), especi the hydrochloric acid taken in the decoction pareira, or in the infusion of buchu, may be scribed. The bowels may be regulated by me of the gentle cooling aperients ordered ab (§ 184.).

211. When the pain becomes so severe as require anodynes, then plasters of opium or be donna may be applied over the sacrum or ab the pubes; and chloroform may be tried as epithem, by means of spongeo-piline. Interna the pilula saponis cum opio, or tincture of opi may be given at night; and if these occas neither headach nor sickness in the morning, t may be continued without increasing the d The preparations of morphia, unless conjoi with aromatic stimulants, often cause unpleas depression. The black drop, and Battley's se tive solution, are often preferred to other opia but they are efficacious chiefly in their m powerful narcotic effects, the subsequent distr ing sickness, &c. being not less complained Henbane and conium are often employed. T former, without alleviating pain, or with sli alleviation only, often affects the head, occasi ing restlessness and headach. I have, howe found the two conjoined with camphor — th grains each of camphor, and of the extracts

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* I have noticed the question "Is Cancer contagious?" when treating of Scirrhous and other Tumours (§§ 79, 80.); and have referred to cases, one of which was under the care of the late Mr. Mayo and myself, in which cancer of the glans penis in the husband communicated the disease to the cervix of the uterus. I have there stated my reasons for inferring that the disease may thus be communicated to the wife by the husband.

ane and conium, being more or less of service. Vest says that after henbane he generally makes of the Indian hemp; for, although it is an rtain remedy, it does not disorder the sto-, or occasion headach. But I have not ys found it so pleasant in its ultimate effects. evere paroxysms of pain, the inspiration of apour of chloroform has been resorted to; but elief has been only very temporary. I have, few cases, directed the application of the ure of belladonna to the diseased part, in nanner advised and resorted to by the late Moore (§ 15.) with very marked relief. n internally, belladonna seldom affords much, unless in large doses, which are usually fol- l by much depression, unless they are con- d with aromatic stimulants; and these latter fail in correcting the evil.

2. *c.* The *discharges*, owing to their great ex- or their very offensive odour, require, besides sual attention to cleanliness, the means which been advised for the more severe cases of orrhœa, more especially the infusion of o, or tannin; the decoctions of oak-bark, of u, of cedar-bark, or of pomegranate bark, Weak acid lotions, and various other as- ents, have also been recommended. Dr. r mentions the use of an injection of ℨj of ate of iron, and ʒiij of the extract of conium oint of water; and he adds that a solution of ʒss of nitrate of silver to an ℥j of water in- l immediately into the diseased structure, has ffect of hastening the separation of the slough of destroying the bad odour. I have most ently employed, for these purposes, the chlo- of lime, or creasote, or both, in injections, sting chiefly of mucilaginous fluids, in quan- nd frequency according to the progress and cy of the case. When the disease was very lvanced, and the use of these appeared likely casion inflammation of the peritoneum or ad- g parts, I have preferred to have recourse to ered carbon, with tincture of belladonna, or ct of henbane, mixed in any mucilaginous as a vaginal injection. It has generally the of deodorising the discharge, and soothing ain.

3. *d.* The *complication* of pregnancy with can- teri must be treated according to the pecu- es of each case; but its treatment cannot be ed upon at this place. It is fully considered r. West's work already referred to, where the r will also find the results of extirpation of the s and of its cervix very satisfactorily dis- d. To this work, and to surgical writings on ubject, I must refer the reader.

4. *e.* The *constitutional treatment* of cancer or the means most appropriate to the ex- cancerous cachexia, is not different from I have advised in the articles on Cancer §§ 27—44.) and on Scirrhous Growths 13. *et seq.*) The chief objects proposed are omote the digestive and assimilating processes, o support constitutional power, and vital re- ce to the progress of the malady. Subordi- y to, and forming a part of, these may be ioned, due attention to the secreting and ting functions, and the alleviation of th distressing symptoms. The anæmia at- ng the advanced stages of the malady should claim our attention; and chalybeate preparations, and chalybeate mineral waters, ought to be conjoined with such other means as the circumstances of each case will suggest.

215. *f.* In respect of *diet* and *regimen* little need be added to what has been already stated in the places just now referred to. A digestible and nourishing food, in moderate quantity, and a temperate and dry air, are generally beneficial. It has been questioned whether much, or even any, animal food be of service, or rather whether it be not detrimental, in this malady. This matter has been fully and ably discussed by my late friend, Dr. Lambe, a very learned physician, and an original thinker and observer. He imputed this malady, as well as scrofula, gout, consumption, and some other chronic diseases, to the use of animal food and to impure water; and advised vegetable food of all kinds, in sufficient abundance, and distilled water, for all purposes of internal use, and exercise in a dry and open air, to be resorted to for the cure of this, as well as of those diseases. He did not believe that, when cancer was far advanced, this diet could then effect a cure, but he recommended it to be tried; and, at the same time all fermented and distilled liquors, or other beverages than distilled water, to be relinquished. This diet and regimen were employed with apparent success, as long as it was strictly adhered to by a married female, whose case I have briefly noticed in a note at p. 1281. § 205.

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CINATION. — Synon.:— *Vaccinia* (from cca, a cow), *Variola vaccinia*; *Variolæ vac- æ*; *Vaccine, vaccination*, Fr.; *Kuhpocken, utzblattern*, Germ.; *Vaccina, Vaccinazione*, l.; *Vaccine, Cow-pox.*

Classif.—III. Class. III. Order. (*Author in Preface, &c.*)

Defin.—*Variola vaccinia—a vesicular disease ped in the human subject by inoculation of ox, or of the lymph from the variolous vesicles, ing the cow.*

I. History of. — It would appear, from an- Sanscrit writings, that vaccine inoculation had practised in India from the earliest ages, and he preservative influence of vaccination was n, and had recourse to, in different parts of the Mr. Bruce, Consul at Bushire, states, that nation was well known in Persia for many Humboldt found among the inhabitants of ordilleras of the Andes the belief that the erup- n the udder of the cow preserved them from -pox. These indications of the practice of nations were, however, unknown at the time Edward Jenner, a general practitioner in ley, observed the protective influence of the e disease from the natural and inoculated -pox, and when he submitted this influence tests of experiment and practical observation. 75 Dr. Jenner remarked, that a number of ns in Gloucestershire could not be inoculated small-pox; and, having become aware that was a popular belief that persons who had t the cow-pox, from milking the cows, were bject to small-pox, he was induced to in- ate the grounds for this belief. In the e of his researches, and after encountering rous difficulties and opposing opinions, which have discouraged all but those who pos- a determined will and powerful genius, he that the cow was subject to a variety of ons on the teats, all of which had received riminately the name of cow-pox. He learned tinguish between these, and ascertained that only was possessed of a specific protective over the human body. This he called the *true* cow-pox, the others the *spurious*. He next ascertained that the true cow-pox underwent progressive changes; and that it was only at one period of its progress, or in the acme of eruption, when it was endowed with specific or preventive, or anti-variolous properties. During the investigation of this branch of the subject, Dr. Jenner was struck with the brilliant idea that it might be practicable to propagate the disease by inoculation, first from the cow, and successively from one human being to another. It was not, however, until 1796 that he was enabled to take the decisive step of inoculating for the cow-pox, upon the success of which his grand scheme mainly rested. An opportunity of testing his ideas by satisfactory experiments was not afforded him until that year, when cow-pock matter in an active state was found, and parents were met with possessing sufficient confidence to submit their children to the important trial. On the 14th of May, 1796, James Phipps was vaccinated with matter taken from the hands of Sarah Nelmes. He passed through the disorder in a satisfactory manner, and was tested by variolous inoculation, on the 1st of July following. The small-pox inoculation took no effect. Jenner now prepared to communicate the result of his long investigations concerning cow-pox, but delayed his work in the hope of furnishing additional proofs of the success of vaccination. These he was enabled to procure; and in June, 1798, he published, in London, his original essay, entitled, "An Enquiry into the Causes and Effects of the Variolæ Vaccinæ; a Disease discovered in some of the Western Counties of England, particularly Gloucestershire, and known by the name of the Cow-pox." This work deserves a particular notice. In it Dr. Jenner states his belief that this disorder does not originate in the cow, but is communicated to this animal from the horse, where it appears on the heels, and is known by the name of the *grease*; the hands of farm-servants and milkers being the medium of communication. He next suggests that the small-pox itself may have been originally morbid matter of the same kind, which circumstances had changed and aggravated into a contagious and malignant form. He afterwards states his conviction that cow-pox inoculation leaves the constitution for ever after secure from the infection of small-pox; and he concludes by enumerating four classes of persons to whom cow-pox inoculation holds out the prospect of great benefit: — 1st, Those who, from family predisposition, may be presumed likely to take small-pox unfavourably; 2nd, persons of a scrofulous diathesis; 3rd, those who, from idiosyncrasy, resist small-pox inoculation in early life; and, 4th, those who are labouring under chronic forms of disease, in which counter-irritation is desirable.

3. At the end of July, Mr. Cline made the first experiment with cow-pox in London, which succeeded perfectly; and soon afterwards recourse was had to vaccination in many places. In his second publication, dated April, 1799, Dr. Jenner judiciously recommended calmness and moderation in researches into the efficacy of cow-pox inoculation; but in 1800 he expressed his conviction that the cow-pox is capable of extirpating small-pox from the earth; and in his fourth publication, May, 1801, he again expressed

the same sanguine opinion. The commencement of this century was remarkable for the progress of vaccination. In 1801, upwards of six thousand persons had been vaccinated, and the greater part had been tested with small-pox. In 1800, 1801, and 1802, vaccination was introduced into France, Germany, Italy, Spain, and the East Indies. In 1802, parliament voted Dr. Jenner a reward of 10,000*l.* for the discovery, and, in 1807, the additional sum of 20,000*l.*; and in 1808 vaccination was taken under the protection of Government.

4. In 1809, Mr. Brown, of Musselburgh, published the opinion that the prophylactic virtue of cow-pox diminished as the time from vaccination increased. In 1818 and '19, an epidemic small-pox pervaded Scotland, and many vaccinated persons passed through a mild form of variola. The term, "modified small-pox," was now adopted. Dr. Monro, in 1818, published a volume on "*the different kinds of small-pox, and especially on that which sometimes follows vaccination*;" and in 1820, "*An Account of the Varioloid Epidemic*" was published by Dr. Thomson, of Edinburgh. Between this date and 1823, when I wrote on the subject, as well as subsequently to the latter year, some very remarkable cases came before me in both public and private practice, occurring in the same and in different families, proving the impairment of the protective influence of vaccination with the growth of the body, and the lapse of time, until it entirely ceased, at least in many cases, after puberty, when vaccination was performed in infancy.

5. In 1825 the Bills of Mortality announced 1300 deaths by small-pox, among whom were several persons who had been vaccinated. Small-pox was epidemic in France in 1826 and '27, and in the northern parts of Italy in 1829; and in consequence of the numbers of the vaccinated who had been attacked by small-pox more or less modified or unmodified, the practice of revaccination commenced in Prussia and the German States, and was subsequently encouraged by their governments. This practice has more recently been voluntarily adopted by many in this country. In 1833—4, small-pox prevailed epidemically in Ceylon, when a considerable number of the vaccinated died; and it made great devastations in Hindostan on several occasions, both prior and subsequent to this date, and many of the vaccinated have been carried off by it. Dr. Gregory states that the admission into the Small Pox Hospital, in 1838, more than doubled the average number received annually, prior to the discovery of vaccination, and that two-fifths of the admissions consisted of persons who had been vaccinated. Many had the disease severely, and more than twenty of the number died. Recently, parliament has legislated on vaccination and small-pox, but in a way which is neither satisfactory to our profession, nor beneficial to the community.

6. Having now stated, from the history and certain of the results of vaccination, what has been urged against it, and having, when treating of small-pox and of variolous inoculation, noticed what appeared in favour of the latter (see Small-pox, §§ 104—114.), it now becomes a duty to advert to the evidence which opposes what has been advanced both at this place and in that referred to. The facts evincing the failure of vaccination in many cases, and of the impairmen the protective influence of it with the growth the body, and with the course of time, are h stated, with no disfavour to the practice of vac nation, but with a due regard to what appea to be the truth as respects the results of this pi tice. When treating of variolous inoculatio took occasion to compare the results of it v vaccination, more especially as observed eastern and inter-tropical countries. Much the difference and of the difficulty in this ma must be attributed to imperfect, careless, or abor vaccination, and to the influence of small-p when prevailing as a severe or malignant epider on persons thus imperfectly protected.

7. Among the more recent evidence in vour of the protective influence of vaccinat there is none which seems to deserve more at tion than that which has been furnished by Balfour. His deductions have been founde the returns of the Army, the Navy, and the R Military Asylum. But, although these ap very favourable, they are actually not so much as a mere glance at the tables he has given m evince; for he adds up the aggregate numbe the several years to which he refers, and pl these numbers opposite to the number of case small-pox. It should be premised that sold are all protected by vaccination, or by small-p Thus, from the returns forwarded annually to Army Medical Board, during eight years, f the 1st of April, 1844, to the 31st of March, 18 inclusive, he constructs the following table cases of, and deaths from, small-pox, out of *aggregate* strength, or rather the strength m plied by the years: —

Among troops serving in	Aggregate strength.	Cases of Small-pox.	Deaths by Small-pox.	Annual ra per 1000 strength	
				Cases.	De
The United Kingdom - - -	254,597	557	56	2·188	·
Temperate Colonies - - -	557,112	160	29	·287	·
Tropical Colonies	314,131	28	8	·089	·
Total - -	1,125,840	745	93	·662	·

8. This table is, however, fallacious, as the *gregate* here given is not the actual number of ferent individuals, for the much larger proport if not the great majority, of the average num of troops in these eight years (140,730), are tually the same individuals enumerated ag and again, or even for several years, unless discharges and deaths have been remarka great; whilst the number of cases and of dea are the total amount furnished during the ei years from among the individuals actually se ing; for it cannot be shown that during th eight years the army was formed of 1,125, different persons.

9. The fallacy now pointed out exists in other tables, more especially in that giving the sults as respects the Navy, and from it no cor inference can be drawn. His Report, howe of vaccination of the boys of the Royal Milit Asylum, is a much more important docum and this I adduce. "Of 5,774 boys taken

th strength of the establishment from its opening in ugust, 1803, to the 31st of December last (1 51), 1,950 are recorded as having marks of sm ll-pox, 3,636 marks of vaccination, and 188 n satisfactory mark of either. The last having b n all vaccinated on admission, there were 1, 0 protected by previous small-pox, and 3,824 b vaccination."

	Number over whom observations extend.	Of whom subsequently		Ratio per 1000.	
		Had Small-pox.	Died of Small-pox.	Cases.	Deaths.
s with marks Small-pox -	1,950	12	4	6·15	2·05
s with marks Vaccination -	3,824	27	–	7·06	0·00

t must be presumed that the boys leave the a um when they reach puberty or manhood, o before this latter epoch. The results subse- q ntly are not known, and cannot well be ascer- t ed; and let it be remembered, that the lia- b y to small-pox, modified or otherwise, then b mes greatest. Nor should it be overlooked, th exposure to the infection of small-pox cannot b s great in garrisons and in an asylum as in th general community. Besides, when a case o mall-pox occurs in either garrisons or in an a um, it is removed to the infirmary, or other p es of seclusion; whereas among the public, w few exceptions, a case, whenever it occurs, b omes a focus of infection, from which the dis- e spreads in all directions amongst the un- p ected.

). There can be no doubt that vaccination, satis- fa orily performed, with recent lymph of a proper d ription — the vesicles having regularly matu- r d, without hindrance or accident, and with a su cient number of punctures—is a most valuable p ection from small-pox; and if this protec- ti be not afforded during the whole life of the in vidual vaccinated, in some cases; it at least, in ll, is a protection for many years, the vario- l s disease, when caught subsequently, notwith- s ding this protection, being, with few excep- t s, a comparatively mild disease — these e eptions, especially when they are fatal, still a itting of doubts as to the proper performance o accination, and as to the efficacy of the lymph o natter employed. It cannot, however, be de- r d, that the protection from small-pox furnished b vaccination to persons who have been vac- c ated in infancy, and have grown up, is not so f y manifested when small-pox is epidemic, as a other times; nor does it appear to be as com- p te when vaccinated persons migrate to warm c nates, and are there exposed to small-pox i ection, as when they remain in temperate coun- t s: but this requires further inquiry.

11. II. Of the Cow-pox in the Cow.—This d ease is not of frequent occurrence. It appears a an epidemic, and rarely or never unless where c tle are collected together in herds. It then b aks out at irregular periods, and from causes u known. Dr. Jenner's experiments concerning it were often interrupted by its complete disappearance. Dr. Jenner at first considered that cow-pox in the cow was generally a local disorder confined to the udder; and such it has appeared to be in some, if not in many instances. Subsequent observations, however, have shown that it is really a febrile constitutional disease, accompanied with eruption, although the febrile symptoms are often not very manifest. True cow-pox shows itself on the nipple of the cow, in the form of irregular pustules, or more strictly, as vesicles passing into a pustular state. At their first appearance they are commonly of a pale-blue colour, or rather of a hue approaching to livid, and surrounded by an erythematous or erysipelatous inflammation. They sometimes degenerate into phagedenic ulcers. The animal appears indisposed, and the secretion of milk is much lessened. The cow is subject to other pustular sores on the nipples, which are of the nature of common inflammatory sores, and possess no specific quality. They do not present any bluish or livid tint, or any erysipelatous redness around them. They desiccate quickly, and create no apparent constitutional disorder in the animal. Such a complaint is frequent among cows in the spring, when the calf is suckling. It was called by Dr. Jenner the spurious cow-pox.

12. *Casual cow-pox in man* is caught by milkers of affected cows, and appears on the hands and wrists in the form of inflamed spots, which go on to suppuration, forming pustules of a circular form, having elevated edges, and depressed centres, and are of a colour inclining to blue. After a time absorption takes place, and swellings appear in the oscilla. Fever succeeds with headache, sometimes with vomiting, and in some cases with delirium. The febrile symptoms decline in three or four days; but the sores on the hands often remain, very painful and difficult to heal for a considerable time. No eruption on the skin follows the decline of the febrile symptoms.

13. III. Inoculated Cow-pox.—i. *Regular Cow-pox.*— When vaccination has been successfully performed on a healthy child, the puncture may be felt slightly elevated on the second day; and on the third, and even on the second, a slight efflorescence may be distinctly seen, by the aid of the microscope, surrounding the inflamed point. On the fifth day a distinct vesicle is formed, having an elevated edge and a depressed centre. On the eighth day it appears distended, with a clear lymph. The vesicle on this, its day of greatest perfection, is circular, and either pearl-coloured or slightly yellow. In its form and structure it resembles the pustule of small-pox. Its margin is turgid, firm, shining and wheel-shaped. It is composed of a number of cells, by the walls and floors of which, the specific matter of the disease is secreted. On the evening of the eighth day, an inflamed ring begins to form around the base of the vesicle, which continues to increase during the two following days. This areola, or ring, is circular, its diameter extending from one to three inches. When at its height, on the tenth day, there is considerable hardness and swelling of the subjacent cellular tissue. On the eleventh day the areola begins to subside, leaving, as it fades, two or three concentric circles of a bluish tint. The

vesicle has previously burst, and its surface acquired a brown colour. The lymph which remains becomes opaque and gradually concretes; so that about the end of the second week, the vesicle is converted into a hard round scab, of a reddish-brown colour. This scab contracts, dries, blackens, and about the twenty-first day, falls off, leaving a cicatrix, which is permanent in after life, is circular, somewhat depressed, striated, and indented with six, eight, or ten minute pits, corresponding to the number of cells of which the vesicle has been composed.

14. Slight constitutional disturbance is observed about the seventh or eighth day, or sometimes a little earlier. The child is hot, restless or feverish, and the bowels slightly disordered; but this subsides in two or three days. A few children, however, present no sign of constitutional disorder, which is not by any means essential to the success of the vaccine process. About the tenth day a papulous eruption, of a lichenous character, sometimes appears on the extremities, occasionally extending to the trunk of the body. It continues for about a week, or even lasts after the scab has fallen off. This vaccine lichen is met with chiefly in children of a full habit, where numerous vesicles had been raised on the arm, which discharge freely. It is an accidental occurrence, which, like the constitutional irritation, indicates a full effect of vaccination on the system; neither the one nor the other, however, being deemed requisite to ensure such effect.

15. In adults, vaccination exhibits the same succession of phenomena as in infants. The vesicles, however, are thinner and more easily ruptured. The lymph is usually of a yellowish tinge, and the areola is more extensive. The glands of the axilla frequently swell, which is rarely observed in children; and constitutional irritation is more frequent and greater. Secondary lichen is less frequent and less marked. Dr. Heim, of Ludwigsburg, considers that the adult lymph is more energetic than infantile lymph, but this requires further investigation.

16. ii. *The irregular or anomalous vaccine vesicle.*—The above normal course of the vaccine vesicle is liable to be disturbed in various ways, and by various causes. Imperfect vaccination presents no uniform sign, but exhibits different appearances in different cases, such as pustules, ulcerations, scabs, and irregular vesicles. The *irregular vesicle* is attended at its commencement by urgent itching; provoking scratching or rubbing, to which the subsequent appearances are unjustly attributed. The vesicle throws out a premature efflorescence, and advances too rapidly; so that on the fifth day it has attained its height, when it will be found raised on a hard inflamed base. "It is accuminated, or conoidal, and gives the appearance of a common festering sore produced by a thorn." It is generally of a straw colour, and contains some opaque matter or pus, instead of a clear transparent lymph. The scab produced by it is small, of an amber colour, and drops off by the tenth day.

17. The causes of this abortive or irregular vesicle are not well ascertained. Sometimes the bad quality of the lymph employed may occasion the irregular vesicle, three or four children, or more, vaccinated from the same source, exhibiting the same irregular appearances. Dr. Gregory
supposed that it might arise from the influe
weather or season, as he observed it in
more cases on the approach of winter th
the spring or summer. Some believe that
irregularity arises from the use of lymph,
at too late a period of the disease. But alth
lymph taken after the tenth day will often f
reproduce vaccinia, yet when it does suc
the vesicle goes regularly through its co
and is perfectly effective in preserving
small-pox. Besides the scabs of cow-
moistened with a little luke-warm water,
often produce the disease in all its purity.

18. Irregularity of the vaccine vesicle is
times attributable to a bad habit of body. "
proof is, that one child only out of many v
nated with the same lymph, shall show the an
lous form of cow-pox. It is a singular but
important fact, that an imperfect vesicle, the
spring of a perfect one, degenerated by
peculiarity of habit in the individual vaccin
shall sometimes reappear in all its original p
and perfection, when transplanted into a hea
well-disposed subject."

19. In some instances the specific inflam
tion, or areola, is very severe, extends from
shoulder to the elbow, or even invades the tr
requiring a recourse to cold lotions, active
gatives, and febrifuges. The vesicle, instea
scabbing in the natural way, is converted int
ulcer, discharging freely. The inflammation
arising is, however, only temporary; and,
have commenced at its proper period, it does
appear to weaken, or in any degree to inte
with the protective virtue of the vaccination.
vesicle about the fifth or sixth day occasion
becomes scaly; a species of psoriasis taking
place of the areola. In a few other cases
erysipelas supervenes. These anomalies dep
the cow-pox operation of all claim to protec
influence. A much more frequent and succes
anomaly is retarded cow-pox; the advance of
vesicle being without any apparent cause
pended. The areola does not form before
tenth or twelfth, but ultimately the process
completed, the success of the vaccination be
in no degree prejudiced.

20. iii. *Complications of cow-pox.*—A chil
sometimes vaccinated after having been infec
by *measles* or *scarlatina*, and before their resp
tive eruptions have appeared. In such cases
cow-pox is generally retarded. In a case recor
by Dr. Gregory, it was retarded sixteen d
whilst the measles ran their course. Genu
chicken-pox (*varicella lymphatica*) will run
course along with cow-pox, without interferi
with any of its phenomena. The modificati
which cow-pox undergoes when *small-pox* inva
the system about the same time are interesti
When vaccination is performed during the inc
bative stage of casual small-pox, this latter bei
yet latent, the vaccine vesicle either does
advance, or advances tardily and imperfect
Sometimes, however, cow-pox and casual sma
pox may be seen running their full course in t
same person at the same time. In no case, ho
ever, does the cow-pox so inserted modify t
course of the small-pox. When the variolo
and vaccine fluids are inoculated on the same d
each disease occasionally proceeds, preserving
original character. In some cases, however, th

mually restrain and modify each other. The vcine vesicle in these is smaller than usual and irgular in its progress, while the variolous pustus which follow are of the kind termed *variolæ veucosæ*, or commonly swine-pock, stone-pock, o orn-pock (See art. Chicken-pox, §§ 2, *et seq.*); a hard and shining, surrounded by little inflamnion, and suppurate imperfectly; the little mter they contain being absorbed, leaving the ccle hard and elevated, for some days afterwds. The eruption on the extremities does not pulate, but is papulous, minute, and terminates b desquamation. Although the eruption be moded in most cases, there is generally considerable durbance of the constitution under the joint inflnce of the variolous and vaccine poisons.

21. When vaccination precedes variolous inolation by a period not exceeding four days, b diseases advance locally. "Sometimes an eption of small-pox papulæ follows. At other tis the variolous fever is slight, and unaccompied by eruption. Under these circumstances, mter taken from the primary vesicles shall somets communicate cow-pock and small-pox respctively; but more commonly the variolous pon predominates, and contaminates the lymph o he vaccine vesicle." Variolous inoculation at a period not exceeding a week from the date of vcination will take effect and be followed by a ustule: after that time no effect is produced. I Woodville on several occasions inoculated w a mixture of variolous and vaccine matter. T result was not to be depended upon, but in geral pure small-pox succeeded. When smallp inoculation precedes by three or four days t insertion of vaccine lymph, the vaccination aances, but after the tenth day the fluid in the vcine vesicle becomes purulent, and in that state w communicate small-pox. Those who have uergone variolous inoculation in early life are gerally unsusceptible of cow-pox. Vaccination, hever, in such circumstances produces a cert degree of effect, the disorder manifesting itf in an imperfect and modified form. The fll in the resulting vesicles cannot be trusted to f producing the genuine cow-pox.

2. iv. *Recurrent Cow-pox.*—When cow-pox has cpleted its regular course, the constitution is lc for a very considerable time at least, unsusctible of the same disorder. But this law does n obtain if the revaccination is performed at v short or at very distant intervals: — (*a.*) At a ery *short interval*, or on the fourth, fifth, or sih day after a regular primary vaccination, tl vesicles of the second vaccination are accelerd in their course, so as to overtake the first cp, and the whole maturate and scab together. T second crop of vesicles, however, is not more th one fourth the normal size, and the areola is eally contracted. Mr. Bryce (*On Cow-pox*, En. 1802) ingeniously availed himself of this cumstance, and, by testing by revaccination o he fifth day, he endeavoured to ascertain the fi influence and actual security of vaccinati. The plan, well known as Bryce's *test*, has bn extensively adopted. To obtain this test in gatest perfection, he advises the revaccination te performed at the end of the fifth or beginng of the sixth day; and if no acceleration of t second crop of vesicles be observed, it is to be ccluded that no constitutional effect has resulted from the first vaccination. The second is then to be regarded as the primary affection, which, in its turn, is to be tested by a third vaccination, and so on until we are satisfied that the constitutional effect has been fully produced. Dr. Gregory adds, that "some persons have claimed for this suggestion the highest honour, and have even considered Dr. Jenner's discovery as incomplete without it. Dr. Jenner, however, never laid much stress upon it. In doubtful cases, it is a prudent practice, but it has been extolled far beyond its real merits. It shows whether or not constitutional influence has been exerted by the primary vesicle, but it does not determine what has been the degree of such influence, — in other words, it does not show whether the constitutional effect has been *complete* or otherwise."

23. (*b.*) Revaccination at *distant intervals* from the date of primary vaccination, is deserving of notice. Dr. Jenner, in his original essays, stated that the human body, after a time, had the susceptibility of cow-pox renewed. Dr. Gregory describes four different effects of revaccination at distant intervals: — 1st, In many cases, especially if the interval from the primary to the secondary vaccination has not exceeded five years, the skin appears completely insensible to the vaccine matter; — 2d, At intervals exceeding ten years, the virus irritates locally. In three, or at furthest four days from insertion, an areola of irregular shape appears around a minute, itching, acuminated, and angry vesicle. The glands of the axilla frequently swell; and in particular habits of body, especially in adult females, irritative fever is superinduced. A scab forms on the eighth day, which soon falls off, leaving no permanent cicatrix; — 3d, In other cases, a vesicle forms more gradually, without either local or constitutional irritation; a slight areola succeeds, and the vesicle yields, on the seventh day, a considerable quantity of thin lymph; but this lymph is incapable of propagating the disease; — 4th, In this set of cases, the second vaccination runs a perfectly regular course. A circular areola forms on the eighth day, and the lymph propagates a genuine cow-pox.

24. IV. Nature of Vaccinia. — *The identity of vaccine and variolous disease.* — When Dr. Jenner announced vaccination as an antidote to small-pox, he was strongly impressed with the idea of the common origin of human and epizootic maladies; and, conformably with this idea, he viewed small-pox as the most remarkable malady which equally affects man and the higher animals; and that this malady, in its less malignant forms, assumes the form of cow-pox, chicken-pox, and swine-pox. This, however, had been long a vulgar opinion, and is somewhat analogous to the view I stated when treating of scarlet-fever, which, I remarked, had appeared within the last three hundred years, and was derived from a similar disease in the horse. Jenner believed not only that small-pox and cow-pox were essentially the same disease, but that the former was a malignant variety of the latter, the parental malady being the cow-pox. This opinion was expressed by the term *variolæ vaccinæ*, the name he gave cow-pox, when first introduced to the notice of the scientific community. The researches of Mr. Ceely have more recently confirmed the intimate connection Dr. Jenner contended for between cow-pox and

small-pox; inasmuch as he has shown that the inoculation of the cow with variolous matter produces in that animal the true vaccine or cow-pox; and that inoculation of the human subject with the vaccine matter thus generated in the cow from variolous inoculation, propagates genuine cow-pox in man. He has further adduced some facts, which, however, require further investigation, but which appear to prove the origin of the cow-pox, or vaccinia, in the infection of the cow by small-pox when occurring epidemically or sporadically in human subjects. Amongst other observations, Mr. CEELY states that he went to examine some cows affected with cow-pox; and that their proprietor, Mr. POLLARD, "at the same time, expressed his conviction, *that his cows had been infected from human small-pox effluvia*, to which he considered they had been exposed.

25. The above facts, although scanty as they are, go to prove the following: — 1st, That cow-pox originates in small-pox infection or contagion caught by the cow; — 2d, That the infection of the cow by small-pox gives rise to vaccinia — an eruption which resembles the pustule of small-pox, but which cannot communicate small-pox, although it propagates itself as true vaccinia; — 3d, That, unlike, or differing from, variola or small-pox, vaccinia is not communicated, at least from the cow to man, or from one human subject to another, by an effluvium or emanation proceeding from the affected at any stage of its course; — 4th, That, like variolous inoculation, vaccination is capable, when properly conducted, of protecting from small-pox, with few exceptions, and at least for a considerable time; — 5th, That the amount of evidence favours the opinion that vaccinia is a modification of variola, the modification proceeding from the virus of the latter having infected the cow, and occasioned the vaccine eruption; — 6th, That the amount of evidence also favours the inference that vaccination protects, at least in many instances, from small-pox only for an indefinite time, and that the length of that time is indeterminate or indeterminable; — 7th, That the duration of the protection may depend upon climate and various unascertained circumstances, and that there is reason to infer that, in such cases and circumstances where the protection fails after several or many years, the impairment of the protective influence is gradual, and progressive with the duration of time.

26. From the foregoing it will be seen that, while I believe, with Dr. JENNER, in the intimate connection of variola with vaccina, and with chicken-pox and swine-pox; yet we have no proof that variola has sprung from cow-pox; the evidence being in favour rather of cow-pox, and the other kinds of pox being varieties or species of small-pox, arising out of the passage of this latter malady through the higher of the lower animals— more conclusively of the passage of the variolous morbid pioson through the cow, as respects vaccinia.

27. Such appears to be the relation subsisting between cow-pox in the human subject and in the cow and small-pox; it may next be inquired what connection exists between *vaccinia in the cow* and the *grease in horses*. Dr. JENNER believed that they were both identical, and that cow-pox never occurs in dairy districts, except where there is access to horses; he thereby denied the spontaneous origin of the disease in the cow. Lat
observations have, however, proved not only t
identity of cow-pox and grease, but have show
at the same time, first, that cow-pox does orig
nate in the cow without access to horses; an
secondly, that cow-pox is communicable to m
from the horse without the intervention of t
cow, and with nearly equal facility as from t
cow itself. Dr. GREGORY states that this bran
of the theory of vaccination has been investigat
with great diligence by Dr. LOY, of Whitby, D
SACCO, of Milan, and Dr. DE CARRO, of Vien
The last-named author states, "that the matt
in use at Vienna from 1799 to 1825 was part
British vaccine, and partly originated from t
grease of a horse at Milan without the interve
tion of the cow. The effect was so similar
every respect that they were soon mixed; that
to say, that after several generations, and in t
hands of innumerable practitioners, it was impo
sible to distinguish what was vaccine, and wh
was equine." "The whole British settlements,"
adds, "were *equinated*; for the first liquid d
sent thither was the second generation of Mil
nese equine, or greasy matter, transplanted
Vienna." It cannot be inferred that the grea
in horses was the origin of variola; and there
as little evidence of the grease having caused va
cinia in the cow, as there is of the latter havi
produced the former. It is, therefore, by
means improbable, that both vaccinia and grea
being capable of communicating to, and prop
gating an identical affection, viz., that commo
called cow-pox, to human subjects in endl
succession, is variola modified in its manifestati
and properties by its passage through these t
species of animals. The grease of horses, bei
proved, or admitted, conformably with the ab
evidence, to communicate and propagate an aff
tion in every respect identical with vaccinia, t
same inferences which I have deduced respecti
this latter, apply also to it, if, indeed, this bran
of the subject of vaccination be not viewed as s
requiring further investigation, more especially
respects the protective influence of the affecti
propagated from the grease in horses.

28. V. PROTECTIVE INFLUENCE OF COW-POX.
This subject has occasioned much discussion duri
the last quarter of a century, and more especia
during the last few years; and the amount
protection which cow-pox affords against sma
pox has been often entertained, but as yet by
means satisfactorily ascertained.—*a*. There are va
ous circumstances which render it most diffic
to determine this question; for the idiosyncrasy
some individuals seems to oppose infection by t
vaccine virus, either for a time or through li
and, if such an insusceptibility of the disease
admitted, it may be further inferred that, in othe
the insusceptibility being less, the vaccine inf
tion may be incomplete, and the protection
forded be proportionately imperfect. It may
conceded that, where the disposition, in the c
stitution to receive the vaccine infection is eit
wanting or incomplete, the protection must
equally deficient; and hence, to estimate the p
tective influence of vaccination, it must be c
sidered, that the process has not been duly co
pleted, and that no protective influence can
claimed from it, unless the vaccine vesicles a
the local phenomena proceed regularly, and le

a atrix, as described above. But, independently of he indisposition of the constitution to receive th vaccine disease, or of the disposition to receive it perfectly, the health of the individual, and the st e of the season or weather, may render vaccine in ction either abortive or incomplete. It has been p ved that attempts to vaccinate have often failed i ot countries, and in the warm localities of te perate climates, during hot and dry states of th atmosphere; and a similar temporary insusc ibility to small-pox inoculation, during the s e state of the atmosphere, has been observed. T impaired health of a person also may render h insusceptible of vaccination, until his health is estored; and various unascertained circumst ces may have the same effect, either perman tly or for a time. It may be inferred, all t gs being considered, that, where an insuscepti ity to vaccination exists, an equal indisposition t small-pox may be expected; but, as a rule, th e may be many exceptions to this, and it w ld be unwise to confide in it.

9. *b.* Besides circumstances more immediately c nected with the individual, there are others d ending upon the virus itself. The vaccine ly ph may be deteriorated by long-keeping, or by a arm and humid, or a very warm and dry atmos ere, if it be even for a short time exposed to these st es of the air. It may also be either inert, or i erfect in its operation and constitutional as well a ocal effects, owing to its having been taken from th vaccine vesicles at a too early, or a too late st e of the process of maturation, as already noti d (§ 17.); or even to its having been too lo g kept, or to its insufficient protection from the a on of the atmosphere. The manner in which th inoculation of cow-pox is performed — or the e ient or imperfect operation of inoculation — m in some way also affect the results. The n ber of the incisions or punctures, and the a al deposit of the virus within the sphere of the a on of the absorbents or veins, may not merely p duce either a full and satisfactory effect, or no e ct at all, but also an imperfect or an insuffic ntly protective effect.

0. *c. Imperfect vaccination* has been referred to a ariety of causes. It has been very generally s posed that the vaccine virus becomes deterior d by its passage through numerous human b ies, or that the protective influence is weakened b the length of time, and the long succession of s jects through whom it has been perpetuated, fr n its direct inoculation from the cow. Of this, h vever, there appears to be insufficient proof. It h been remarked, that persons who have been v cinated by Dr. Jenner himself, before dete oration could possibly have commenced, have n ertheless been attacked by small-pox in afterli A recent writer remarks, that "so far from b eving in any deterioration of virus from succ sive inoculations, there is reason to believe th , by a careful selection of well predisposed c dren, the pock may even be restored from an i erfect to a perfect state, and by proper care, th efore, may be retained indefinitely in that c dition. If children are successively vaccinated f n each other, all of whom are from various c ses ill disposed to take on the perfect disease, t virus may unquestionably degenerate, and at l gth wear out altogether. In tropical countries, a in confined localities, such an occurrence certainly takes place, but this is very different from the notion of a virus deteriorated by the mere influence of time."

31. *d. Imperfect vaccination*, as a cause of failure of protection from small-pox, was much insisted on by Dr. Jenner. Vaccination is said to be imperfect when any considerable deviation from the ordinary course of the vaccine vesicles takes place. The deviations from perfect vaccination are imputed to one or more of the following causes:—1st, To spurious matter, or matter taken from the arm at an improper period of the process; — 2d, To an insufficient number of vaccine vesicles; — 3d, To preoccupation of the skin by some disease, in which a fluid is exuded capable of conversion into a scab, such as tetter, scald-head, ringworm, erysipelas, &c.;—4th, To robbing the vesicle incautiously of its contents, particularly when one only has come to maturity;—5th, External violence done to the vesicle, as rubbing or scratching it, especially during its early stages. That causes may, and often do, interfere with the success of the vaccine process, cannot be doubted; but the influence imputed to them cannot be determined; for it has been proved, by very few instances, it should be admitted, that vaccination, which, according to all indications, should have been considered perfect, has afforded only imperfect or only temporary security; whilst, on the other hand, cases in which one or other of the above causes has interrupted the regular process, have notwithstanding afforded perfect security. The instances in which single vesicles have preserved from small-pox, both casually and by inoculation, Dr. Gregory states to be so numerous that no reliance can be placed on the notion which would connect the security of the individual with the number of maturating vesicles. A case of small-pox after vaccination will sometimes occur in a member of a family, all of whom have been vaccinated in the same manner, by the same practitioner, and having similar marks on the arm, and equally exposed to contagion, that one alone having become infected. It should also be recollected that vaccination under the same circumstances, especially of the members of the same family, may, upon exposure to small-pox infection, be followed by this malady, in its various grades of modification, according to the time that has elapsed from vaccination. It has even been ascertained, that persons have caught small-pox after having been subjected to Bryce's test of the perfect constitutional affection of the original vaccination. It should, however, be recollected that these are merely exceptions to the general rule of protection; and as exceptions have attracted greater attention than those which prove the rule.

32. *e. The presumed decadence of vaccine influence and protection* has been believed by many from an early period of the history of vaccination. Dr. Jenner, in his third publication, in 1800, remarked that there were some "who suppose that the security from small-pox, obtained through cow-pox, will be of a temporary nature only. This supposition is refuted not only by analogy with the habits of diseases of a similar nature, but by incontrovertible facts, which appear in great numbers against it." That analogy may be considered opposed to this supposition may be allowed, although the analogy is neither very close nor very conclusive; but the

facts opposed to it were certainly neither strong nor very manifest, inasmuch as time, the necessary element of their manifestation, had not then elapsed. That Dr. JENNER was, however, convinced, or at least most sanguine in this matter, is shown in his petition to Parliament, where he states that his discovery had the "beneficial effect of rendering, *through life*, the person inoculated with it perfectly secure from the infection of small-pox." He rested his arguments as to the permanency of the protection of vaccination upon his belief, which subsequent researches have proved to be well founded, in the identity of vaccinia and variola; but, even granting the identity, a very marked modification of the former from the latter, by the passage of the poison through the body of the cow, must be admitted, the result being the conversion of a frequently malignant and generally severe malady, into a mild disorder. Are we, therefore, from the mere admission of identity thus modified, to infer protection by means of the milder form of disorder? May it not be as justly inferred, that whatever protection is actually afforded by the milder form of the disease may possibly be sometimes overcome by the contagion of the more severe malady? and that the protection of the former, being weaker or milder than that furnished by the latter, may not be so endurable, especially in some constitutions and circumstances, and more particularly if the process of vaccination has not been perfect or complete in all respects.

33. It was admitted by Dr. JENNER, Dr. WILLAN, and others, who believed in the permanency of vaccine protection, that, when the vaccine process has been *imperfectly* gone through, and when, from some peculiarity of constitution, the system receives only a portion of, or is insufficiently imbued with, that protective influence which cow-pox is capable of imparting, then "small-pox would recur, and thus the degree in which its phenomena were modified was proportioned to the degree of perfection which the vaccine vesicle assumed during its development."

34. This partial protection from small-pox, admitted in the circumstances just stated, has, however, been extended by many to the more perfect processes of vaccination; and there are many medical men and others, who believe that the protection is complete only for seven, or ten, or fourteen, or twenty-one years; but that the small-pox caught after vaccination is modified in proportion to the shortness of the time which has elapsed from vaccination; and that, after the longest of these periods, little or no modification is observed. This opinion has manifestly been pushed too far; for it cannot be correctly inferred, that these facts, which have undoubtedly been often observed, especially in certain families and persons, in whom peculiarity of constitution, irregularities or imperfections in the vaccine process and other circumstances, tending to account for the imperfect or non-permanent protection, by any means prove that such imperfect protection exists in all cases, or even in a very large minority of cases. The circumstances which secure the desired protection, or which weaken it, or even destroy it altogether, are as yet not known with sufficient precision, and are such as admit of very different opinions, being undetermined on this very important matter. It need only be inferred that the vaccine process should be studied, so to secure its perfection as far as possible, and i this state that it should be generally practise with the belief that, although not an undoubte or an universal, or always a permanent prote tion from small-pox, it nevertheless proves a pe manent protection in the great majority of i stances, and that, where the protection fails, renders in the vast majority the small-pox a con paratively mild disease.

35. It has been attempted to calculate *tl proportion of the vaccinated who take small-po* On this topic it is impossible to arrive at an approximation to the true result. The degree severity of a small-pox epidemic, occurring in community containing many vaccinated person may be expected to influence the result. D Crosse, in his account of the variolous epidem of Norwich, in 1819, stated "that of the vacc nated, not more than one in twenty will be any way affected by the most intimate exposu to small-pox contagion; and less than one i fifty will have the disease in a form answering t the generally received desciiptions of modifie small-pox." These calculations may have bee justified by the epidemic in 1819; but they car not be viewed as applicable to other circumstances, and more especially to later periods i the history of vaccination and of small-pox prevalence. This is one of the many instances i which statistics cannot be confided in whe applied to disease.

36. VI. SMALL-POX AFTER VACCINATION. — have adverted to this topic when treating of SMAL POX (§ 38.), but I may make a few remar respecting it which were then omitted. Variol as it occurs after vaccination, is generally a mil disease. The pustules are usually small, har and tuberculated, few of them maturating pe fectly. Yet the small quantity of matter they d contain commonly produces small-pox in others and the exhalation from the affected also communicates the disease. This modified state or variol is not usually followed by pits or scars. Case of much greater severity do, however, occur, an even assume the worst or confluent forms, o terminate fatally, as I have observed on severa occasions. In some instances, a fatal terminatio may be imputed to the accompanying or secondary fever of small-pox attacking a delicate o scrofulous frame — or persons advanced in life of a plethoric habit, or affected by some viscera disease, — or those predisposed to, or actuall labouring under, pulmonary or other maladies In such case the physician perceives the tru source of the fatal result, whilst the friends o the patient impute the event to small-pox. Soo after vaccination was introduced, cases of failur were imputed to imperfections in the vaccin process in these cases; and not unfrequently th varioloid disease which followed was so slight a to induce doubts of its nature; and very probabl there were sometimes grounds for entertaining th scepticism. But, with the lapse of time, facts proving the failure of the protective influence became more numerous, and were observe most frequently amongst adults. Dr. GREGORY who was for many years physician to the Small-pox Hospital, states that "very few children hav been received into the hospital under such circumstances (after vaccination); and those few

e invariably had a mild disease, more allied to ken-pox than to small-pox : whereas *all* the se- cases, and the greater proportion of the mild s, have occurred in adults, in whom an interval ying from 10 to 30 years (the average eighteen) elapsed since the date of-vaccination."

7. VII. OPERATIVE MEASURES. — *A. The ormance of vaccination* although a simple nice operation, requiring much attention everal circumstances. Care should be taken void a failure, as it often causes a delay, a neglect of the repetition of the opera- . Failures arise chiefly — 1st, From the ction of the lymph; 2nd, From the mode of rating; and 3rd, From the constitution or e of health of the individual operated upon. . The vaccine lymph should be recent, if it be obtained in this state. It should be per- ly clear and limpid, and the earlier it is n from the vesicle the better. Lymph may taken with every prospect of success after fifth day, and up to the eighth or ninth days. t taken on the tenth day should not be con- d in. When vesicles are too often or too ghly opened, on the seventh or eighth day, serum of the blood may commingle with the ph, and impair, or even altogether destroy, the acy of the latter. A vesicle should always treated gently. — *b*. The lancet used in the ration ought to be clean and sharp. A vac- ting lancet should have a broad shoulder, as l as a sharp point, to enable it to retain an quate portion of virus. The skin should be t tense during the operation, and six or eight ctures be made at convenient distances from other, and to a slight depth. Provided that enuine lymph of due intensity comes in con- with the absorbing surface of the cutis vera, atters not whether much or little blood flows the punctures. The quantity of blood that pes depends more upon the child's habit of y than on the operator. A plethoric child erally bleeds freely when vaccinated, but erally exhibits the most perfect appearances to the effect.—*c*. The child operated upon ld be in perfect health. Vaccination ought e delayed during the existence of any disease t the period of dentition — when the skin is cted by any eruption — or when the digestive al is disordered — unless some pressing occa- should require it. The best age for vacci- ng is between the third and fifth month after h, before dentition has commenced.

8. *B. Preservation of vaccine lymph.* — sh lymph should always be preferred when it be obtained; but there is often no other urce than preserved lymph. Being liable to ntaneous decomposition, as well as to other nges too slight or delicate to admit of demon- tion, unless in its effects after inoculation, either impairing or destroying its efficiency, t difficulty has been experienced in preserving nd more especially in transmitting it to tro- l climates in an active state. Dr. G. GREGORY es the following to be modes of preserving ph which are now adopted: — 1. It may be served fluid for several days between two es of glass, about an inch square, which fit h other accurately. When dry, the lymph often, if carefully moistened by the breath, pagate the disease. — 2. Vaccine lymph may be preserved on ivory points, shaped like the teeth of a comb. These should be twice dipped in the fluid of the vesicle, and allowed to dry slowly. They should be retained, when used, in the wound or puncture for about half a minute. They are considered very effectual. — 3. The lymph may be kept in a fluid state in capillary tubes, having a bulb at one end. They admit of being hermetically sealed. But to prevent spontaneous decomposition the lymph should be collected in minute quantities only. — 4. Mr. BRYCE, in 1802, stated that vaccine scabs may be used for communicating the disease, and it has been ascertained that this is the most certain mode of transmitting cow-pox to warm climates. When about to be used they ought to be rubbed to a powder, and moistened with a little tepid water. When thus reduced to the consistence of thin mucilage, they form an artificial lymph. Punctures should be numerous where the lymph is employed. — 5. Dr. JENNER occasionally used dossils of lint, saturated with the fluid of an eighth day vesicle. These he placed between glasses, one surface of which had a small central cavity; the glasses being tied together, their edges sealed, and the whole covered with sheet lead. Preserved in this manner vaccine lymph will retain its fluidity and efficiency for a considerable time.

39. VIII. REVACCINATION.—The phenomena presented by revaccination after comparatively short intervals, have been noticed (§ 23.). It, however, becomes necessary to take a brief survey of the practice of this measure after long intervals, with the view of affording a complete protection against small-pox. It having been believed by many medical men, and it having become the popular belief, in several countries, that vaccination, however completely performed, is weakened in its protective influence by the lapse of time, or growth of the frame, a recourse to revaccination has been had, in some countries to a great extent. Dr. GOLDSON, in 1804, first announced this doctrine, but assigned the remarkably short period of three or four years for the decadence of protection. In France, MM. CAILLOT, BOULU, BERLAN, GENOUIL, and others both in this and in other countries, supported this opinion, but assigned much longer periods for this occurrence, the time assigned by them varying in the opinions of each from ten to twenty-four years, but they all agreed in believing that the loss of protective power was gradual and progressive. M. P. DUBOIS endeavoured, in 1825, to refute this doctrine as a general inference, although he admitted the facts upon which the opinions of these physicians were founded. The epidemic prevalence of small-pox soon afterwards in France, Germany, and Denmark, confirmed, by the numbers of vaccinated attacked, the opinion that vaccination lost, after the lapse of a number of years, its powers of protection from that malady. From this period — about 1829—revaccination began to be practised on the Continent, and on great numbers in Germany, Sweden, Denmark, Prussia, and in France. In 1833, it was adopted in the Prussian army, and was performed on 48,047 persons, and was successful in 15,269. In 1834, 16,673 successful cases were obtained in 44,454 operations. In 1835, 15,315 were successful in 39,192 revaccinations. In 1836, in 42,124 revaccinations,

18,136 fully succeeded, and 9,040 presented an irregular form of the eruption. Of 14,048 persons, in whom revaccination failed, 1,569 were successful on the repetition of the operation for the second time. In 1839, 41,481 soldiers of the Prussian army were revaccinated; of this number, the cicatrices of the first vaccination were distinct in 33,225, imperfectly distinct in 5,889, and not detected in 2,367. Revaccination succeeded in 19,249, and was imperfect in 8,534. Similar results have been obtained from revaccination in several of the German states, in Hanover, &c., between the years 1835 and 1842. In France, revaccination has not been much practised, and in England still less. During the reign of LOUIS PHILIPPE, the Royal Academy of Medicine of Paris was consulted respecting the propriety of having recourse to revaccination. This body were opposed to this measure, as they believed that it would weaken confidence in vaccination. M. DEZEIMERIS protested against this decision, and was successively followed by MM. FIARD, HARDY, PRESSAT, and others, who published memoirs on the subject in the French journals. M. VILLARET, in 1843, practised revaccination in 401 soldiers of the 7th regiment of dragoons; it was successful in 307; and in 153, who had formerly had *small-pox*, the operation fully succeeded in 97. In a second series of 447 persons, who presented perfect vaccine cicatrices, 402 had cow-pox a second time; and, of 123 persons marked by *small-pox*, 89 presented a successful vaccination. MM. BOSQUET, FIARD, GUERSANT, and BLACHE, who, in 1828, expressed their belief in the permanent security furnished by cow-pox inoculation, have subsequently altered their opinions, and have practised revaccination in numerous cases; and have strenuously advised this measure, as the only certain means of preventing small-pox, by sustaining the prophylactic influence of vaccinia.

40. In 1845 the Academy of Sciences of Paris published a Report, containing the following conclusions: — 1. The protective influence of vaccination is complete as regards the great majority of the vaccinated, and temporary as respects a small number only; and in these latter it is almost absolute up to the period of puberty. 2. Small-pox rarely attacks the vaccinated before the age of ten or twelve; and it is from this age to thirty or thirty-five that they are chiefly exposed. 3. That in addition to its preservative influence, vaccination endows the constitution with an influence which renders the symptoms of small-pox much milder and of shorter duration. 4. Cow-pox, directly or recently derived from the cow, is attended by a much more intense local phenomenon, and by a more certain and permanent effect than that which has passed through a great number of human subjects; this intensity of local action subsiding after many successive vaccinations. 5. The preservative influence of vaccination appears not to be intimately connected with the intensity of its local effects; nevertheless, in order to preserve the properties of vaccinia unimpaired, it is prudent to renew it as frequently as possible from the cow. 6. Revaccination is the only means we possess of distinguishing the complete success of vaccinia from the less complete grades of protection. 7. Revaccination, however, is not certain evidence that the vaccinated in whom it had succeed
would have been destined to contract small-po
but merely that it was probably among those th
this latter malady was most likely to appear,
they became exposed to its infection. In ordina
times revaccination may be practised after fou
teen years; during epidemic small-pox it m
be practised after a shorter period.

41. It would appear from the circumstan
of so many persons having presented the regul
vaccinia after small-pox (§ 39.), as stated abov
that the complete development of the local acti
after revaccination cannot justly be viewed as
certain proof that the successfully vaccinat
could have been infected with small-pox, althou
they might have been infected if they had be
exposed to the more concentrated sources
infection. Nor can successful revaccination, n
its failure, be viewed as absolutely indicating
state of constitution, which shall resist the infe
tion of small-pox on all occasions, more especia
when this malady is present in an epidemic for
although it may resist this infection on nearly
occasions, or with very few exceptions; the
exceptions, however, being a mild or modifi
small-pox, in the great majority of instances.

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1. **VAGINA AND VULVA — Diseases of the.** — Affections of the vagina and vulva are as frequently surgical as strictly medical. As, however, certain of them require internal or constitutional means, either altogether or chiefly, in their treatment, they may be viewed as belonging to the latter category, although I can see no just reason for separating the two departments of practice, or for assigning them more to the one than to the other.

2. I. The Vagina is liable to several *congenital alterations*, or vices of conformation. The chief of these are:—1st, Its opening in an abnormal situation; — 2d, Its separation by a partition into two canals; — 3d, Its imperforation; — 4th, Its constriction; — and 5th, Its entire absence. As to either of these, I can add nothing to what will be found in the many excellent recent works on surgical pathology. The *last* of these conditions is of great importance as respects the diagnosis, and the results proceeding from it. It may become the subject of medical investigation as respects especially the retention of the catamenia, and the propriety of an operation, on this account, after due deliberation. The absence of the vagina may be only partial; but even in this case, and when the exact state is ascertained, the question as to the propriety of attempting an operation for the establishment of the canal should not be entertained, unless there be a pressing occasion for having recourse to it, as it may compromise the life of the patient. But what occasions may suggest recourse to a surgical operation in such cases? These are:—1st, Excessive uterine distension from an accumulation of the menstrual fluid;—2d, The supervention of metritis, or peritonitis, or both;—and 3d, Contamination of the circulation from the absorption of a portion of the retained and altered blood from the uterus. This operation has been, therefore, performed successfully by Cabaret, Ventura, Desgranges, Delpech, Willaume, Jefferson, and Coste; but unsuccessfully by Langenbeck, Macfarlane, and Freteau (Velpeau, *Médecine Operatoire*, t. iv. p. 356.). The accumulated menstrual fluid may be discharged, in the urgent circumstances just stated, by puncture either by the rectum or by the bladder.

3. The *diseases* and *organic lesions* to which the vagina is liable, are *inflammations, ulcers, constrictions*, or *contractions and obliteration, tumours of various kind, polypi, fistulæ, cancer, prolapsus, wounds, laceration, herniæ*, and *the impaction of foreign bodies*. Several of these belong more to the province of the surgeon than to the physician, or rather require surgical, in addition to medical means.

4. i. Inflammation of the Vagina. — Synon. *vaginitis, vaginite*, Fr.

Classif. — III. Class. V. Order (*author in preface*).

5. Definit. — *Heat, soreness, or pain, in the course of the vagina, sometimes attended by increase of pain, or by uneasiness upon sitting down on a hard seat; and always by pain and tenderness on vaginal examination, and by a whitish, or a muco-purulent, discharge, with slight febrile disturbance, increased or returning at night.*

6. Inflammations of the vagina rarely occur, unless in connection with inflammation of the vulva, or with inflammation of the neck of the

uterus; most commonly with both, unless it be *caused* by violence, by excessive sexual indulgence, by irritating injections, and by foreign bodies, as pessaries, &c., lodged in the vagina. It commonly presents an *acute* or *sub-acute form*, whether simple or thus complicated; but it is also often *chronic*, especially when it is associated with disease of the neck or body of the uterus, and in many cases which are commonly viewed as simply those of leucorrhœa. In these *chronic* and *sub-acute* cases, the mucous follicles of the vagina, and often also of the cervix and vulva, are more or less implicated — either partially or chiefly.

7. *A. Acute vaginitis* rarely occurs in a simple or *sthenic form*, unless when it is *specific*, or *gonorrhæal*. In rare cases, also, it is *asthenic* or *diffusive*, owing to the occasions about to be mentioned. *Acute sthenic vaginitis*, and the *sub-acute states*, are most frequently consequences of the causes just stated, or of sitting on cold or damp seats, especially during, or soon after, the menstrual period. In these circumstances, it has been termed, by some physicians, *vaginal catarrh*, or catarrhal inflammation of the vagina, especially in its slighter or sub-acute state. In this state, it is not infrequently met with in pregnancy, and, in rare instances, as a complication of hæmorrhoids. In these simpler forms, vaginitis is attended by a copious whitish, or greyish, or nearly colourless, mucous discharge, which soon passes into a muco-purulent and yellowish matter, especially when retained for some time in the vagina; there are also soreness and tenderness in the course of the vagina, sometimes with frequent micturition and slight dysuria. I have met with several cases, in public and private practice, of this form of vaginitis, as a sequela of measles, but much more frequently of scarlet fever, especially in children among the lower classes.

8. *B.* Acute and sub-acute vaginitis is often mistaken for *gonorrhœal vaginitis*, or the *blennorrhagia* of French pathologists, especially of M. Ricord and his disciples; and it is generally very difficult to distinguish between the simple and specific forms of the disease. Generally, however, the latter, or gonorrhœal, is attended by characteristic signs referable to the vulva; by itching, smarting, or stinging in this situation; by frequent painful micturition, by inflammation and swelling of the labia nymphæ and urethra; pain and soreness being greatly increased when sitting. The local signs and febrile symptoms are more acute, and the swelling, tenderness, and intolerance of an examination are greater, than in the non-specific states of vaginitis, and the discharge more copious and more completely purulent. In all the cases of gonorrhœal vaginitis which I have seen the disease extended to the uterus, and in three to the ovaria. In this form of the disease, the history of the case, especially with reference to the affection of the vulva, and the probability of its being caused by an impure connection, will much assist the diagnosis. In most of the cases which I have seen, the disease was communicated by the husbands of the females affected, the fact of this having been the cause having been acknowledged by the former. In some instances, much difficulty has occurred in the diagnosis, especially when vaginitis has been produced soon after marriage, in consequence of excessive sexual indulgence, and of the states of both the male and female organs previously, and even of the constituti and habit of body of the female. A similar difi culty is sometimes met with in the vaginitis, foll cular or mucous, which occasionally appea during pregnancy. In both these circumstance the discharge may infect the husband, in such manner as to be distinguished with great difi culty, or not at all, from gonorrhœa in the mal The *urethritis* thus produced on rare occasions, somewhat different from the specific disease, far as my observation of a few cases enables me state. The earlier signs referable to the openi of the urethra, and the distressing chordee chara terising, are either wanting, or are slight in tl simple urethritis; whilst micturition is neither painful nor so difficult as in the specific diseas The inflammation, however, of the former is mo disposed to extend to the mucous surface of tl urinary bladder, and less disposed to affect tl testicles, than that of the latter malady.

9. *C. Asthenic vaginitis*, or diffusive inflamm tion of the vagina, has been hitherto unreco nised. I have referred to two instances of i occurrence associated with adynamic dysente in married females, when treating of *metrit* (see art. Uterus, § 54.), the inflammation ha ing extended from the vulva to the vagina a uterus; and having been produced by the sept and infectious exhalations evolved, during a lo continuance of warm weather, from full, op privies. In these cases, the vaginal discharge w muco-purulent, streaked and discoloured wi blood, and rusty, at times of a brownish, or greeni brown hue, and very abundant, with remarkab swelling and tenderness of the parts, and wi the symptoms accompanying acute metritis (s Uterus, §§ 55, *et seq.*). The pulse was rapid, wea small, and compressible; the vital prostration a the other symptoms of adynamia being so mark as to require powerful tonics and restorative Recovery ultimately took place, but after a ve protracted illness. This form of Vaginitis may complicated with asthenic dysentery, as observ in the cases now referred to.

10. *D. Phlegmonous inflammation* may atta the connecting cellular tissue of the vagina, esp cially that between the vagina and rectum, a occasion a small abscess which may open eith into the vagina or into the rectum. Inflammati also of some portion of the pelvic cellular tissu or of the cellular tissue connecting the uteri appendages (see Uterus, § 122, *et seq.*) may exter in this direction, and open into the vagina, occ sioning more or less inflammation of this part of the rectum, or even a fistulous communicati between the vagina and rectum. When the i flammatory action is limited to the cellular tiss of the vagina and its immediate vicinity, and o casions only a small abscess between the vagi and rectum, the opening into either part is gen rally followed by quick recovery, unless the co stitution be in fault, and then ulceration, or a fi tulous communication between the vagina an rectum may result.

11. *E. Consequences of Vaginitis.* — *a. Co traction* and *Obliteration* of the vaginal canal seldom observed, the latter especially. Either these lesions may, however, occur after inflam mations caused by injuries, wounds, laceration ulcerations produced by pessaries, foreign bodie and irritating injections; but contractions in v

ous grades and extent are much more frequent an obliteration, which is a very rare occurrence. juries or lacerations during delivery are the ost frequent causes of these lesions. The in-ction of irritants and stimulants to provoke abor-n has in a very few instances been recorded as uses of both contraction and obliteration of the ginal canal. These changes may occur in any rt of the canal, but most frequently in the part xt to the vulva, unless when they are caused malignant disease, and then they generally com-ence in the cervix uteri, and extend to the por-n of the vagina adjoining, and progressively more or less of this canal. In the Article TERUS (§ 205.) I have mentioned a case where arly the whole of the vagina was obliterated cicatrisation consequent upon a rare instance the spontaneous cure of malignant disease of e cervix uteri and vagina. Similar occurrences ve been noticed by ROKITANSKY.

12. *b. Chronic inflammation*, limited or more less extended, sometimes either follows the ute and subacute states of vaginitis, or occurs marily, but much more frequently as a conse-ence of the irritation caused by morbid secre-ns from the cervix uteri, or from the internal face of the cervix or body of the uterus, and is often complicated with inflammation of the rvix. This form of the disease may occur her in the puerperal or in the non-puerperal tes, and it may, moreover, be complicated with, d then be masked by, the uterine disease, or by lammation of the vulva, or by the leucorrhœal charge, with which it is attended, both in its nple and complicated forms. Chronic inflam-tory irritation, thus originating and related, may followed by organic changes of an important ture, especially when it more particularly affects mucous follicles, or extends to the connecting lular tissue. In such cases, *ulcerations*, and en *perforations*, of the vagina are not very rare currences. The *ulceration* may be *common*, *ofulous, syphilitic*, or *cancerous*. The first of se usually occurs in consequence of inflamma-n, chiefly of the phlegmonous character noticed ove (§ 10. *et seq.*), and commences either in mucous follicles, or in the connecting cellular ue. In these follicles, scrofulous ulcerations y also commence, or be chiefly seated. These er have been well described by Dr. CARSWELL; l Dr. HOOPER states that these ulcerations as-e the character of scrofula in other parts. he sides of the ulcerations are tumid: solid iform depositions are found about them in the lular structure between the membranes; and re are perhaps fistulous communications with urinary bladder, rectum, or psoas muscle." mmon and scrofulous ulceration may be deve-ed either primarily or consecutively in the la-æ and glandular bodies with which the lower t of the vagina is so abundantly supplied. en these glands are primarily affected, there is erally an abundant milk or cream-like dis-rge from the vagina, constituting a form of corrhœa, and depending upon chronic irritation inflammation of them. This state of morbid ion when prolonged, especially in cachectic or ofulous constitutions, may go on to ulceration, even to fistulous perforations. Disease of these nds, and chronic inflammation of the vaginal face, may also be developed or perpetuated by the morbid secretions from an inflamed or otherwise diseased cervix uteri, or internal surface of the uterus, or of its cervix. The most extensive ulcerations and perforations with fistulous communications with adjoining parts are produced by pessaries or other foreign bodies lodged in the vagina. SYPHILITIC and CANCEROUS ulceration of the vagina are noticed in the articles on Cancer of the UTERUS and on VENEREAL DISEASES.

13. *Complications of Vaginitis.* — Acute or chronic vaginitis may be associated with inflammation of the cervix uteri, or with vulvitis, or urethritis, or even with two or all of these. It is chiefly in girls under twenty that the complication with vulvitis is observed. In some instances of this complication, an abscess forms in the labia majora, especially when inflammation of the vagina and vulva is severe; and when the inflammation extends to the subjacent cellular tissue of cachectic habits, phagedena of the parts may supervene. Gonorrhœal vaginitis is generally associated with urethritis and vulvitis, and often also with sympathetic bubo, this latter being the consequence of inflammation of the lymphatic vessels and glands. Vaginitis is, in some cases, complicated with endo-metritis, and more rarely also with inflammation of the uterine appendages, especially when it is of a specific kind, as noticed above (§§ 8, 9.). In this complication the inflammation may originate either in the uterus, or in the vagina, and extend to the other parts. Vaginitis may also occur during pregnancy, and disappear after parturition.

14. ii. TREATMENT. — The treatment of the non-specific or common states of inflammation of the vagina is generally simple, and is locally and constitutionally antiphlogistic. In severe attacks, leeches should be applied to the upper parts of the insides of the thighs, or to the groins, or perineum, and the bleeding be promoted by warm fomentations, &c. Tepid or warm baths, general or local; cold, tepid, or warm injections into the vagina; cooling aperients, and cooling diaphoretics, and an antiphlogistic regimen, are the chief means of treatment, especially in the more acute cases, and in the early stage. Aperients which irritate or excite the large bowels should be avoided; and those injections, alvine and vaginal, which produce a cooling and an emollient effect, not only on the large bowels, but also on the vagina, should be selected. The injection of cold or tepid water into the vagina washes away the morbid secretion, which by remaining even for a short time, and accumulating in this part, increases or perpetuates the inflammatory irritation. Several medicated injections, either emollient, astringent, or anodyne, may also be prescribed. When the irritation, tenderness, or pain, is considerable, milk-and-water, linseed tea, decoction of marsh-mallows, either tepid, or cold, may be administered, with a little syrup of poppies, and with either a small quantity of the nitrate of potash, or of the biborate of soda. If the inflammation be severe, the emollient injections may contain either these in somewhat larger quantity, or a small quantity of the hydro-chlorate of ammonia. Or instead of those the decoction of poppy-heads may be employed, with the saline substances just mentioned, or simple water with the acetate of lead and a few drops of laudanum.

15. When the more acute and severe sym-

ptoms have subsided, then the more energetic astringents may be prescribed, such as the sulphate of alumina, the sulphate of zinc, acetate of lead, solution of the nitrate of silver, decoction of oak-bark, and solution of tannin. Dr. H. BENNET states, that the first three he generally uses in the proportion of a drachm to a pint of water, increasing or diminishing the strength according to circumstances; and after much experience he concludes that alum is the most efficacious of all these agents, with the exception of nitrate of silver. In order that injections may be efficacious, they should be administered abundantly, frequently, and with such appliances as may allow them to remain for some time in the vagina.

16. For *gonorrhœal vaginitis*, the antiphlogistic treatment advised for the early stage of common or simple vaginitis should be energetically prescribed, and cooling diaphoretics and aperients, with demulcents, emollients, and diluents, freely used. The irritation of the urinary bladder and urethra, and the associated vulvitis, will be most surely allayed by these means, aided by fomentations, warm local and general baths, and by the emollient and anodyne injections advised above (§ 14.). The patient should partake freely of mucilaginous diluents containing the nitrate of potash or of soda, and the carbonates of the fixed alkalies, with very small doses of camphor. After the acute symptoms have been subdued, the more astringent injections mentioned above may be resorted to. If gonorrhœal rheumatism should occur, which is seldom observed in females, the treatment for that species of rheumatism, advised in the article RHEUMATISM (§ 163.), should be directed. Gonorrhœal vaginitis extending to the cervix uteri, or occasioning endometritis, requires the means advised for this complication in the article UTERUS (§ 124.).

17. *Asthenic vaginitis*, in the form which I noticed above, as having fallen under my observation, requires a frequent recourse to vaginal injections. Those which I prescribed consisted of alum, or of sulphate of zinc, with a little camphor and laudanum; the decoction of cinchona, with the compound tincture of cinchona, nitrate of potash, and bicarbonate of potash, being taken internally; and full doses of DOVER's powder at night; lime-water or potash-water, with milk, being the beverage generally allowed.

18. As regards *other lesions* implicating the vagina, especially *ulcers*, *fistulæ*, *lacerations*, or extensive *ruptures*, *wounds*, *herniæ*, *polypi*, *tumours* of various kinds, *foreign bodies* lodged in the vagina, *prolapsus* of the vagina, and *cancer* of the vagina (see art. UTERUS, § 190. *et seq.*). I must refer the reader to surgical works, or to the article VAGINA, by MM. DESORMEAUX and P. DUBOIS, in the second edition of the *Dictionnaire de Médecine*, where these lesions are very ably described.

19. II. THE VULVA is liable to diseases which are either local or constitutional. The latter requires internal or constitutional treatment chiefly, and sometimes local means also; the former seldom receives permanent benefit from local appliances, without having recourse at the same time to general or internal medication. The affections of this part, as well as of several others, show that no distinction should be made respecting those which are commonly called medical, and
those which are usually termed surgical; althoug
I am obliged, by the scope and limits of th
work, to observe this distinction to a considerabl
extent. Diseases of the vulva are of frequent oc
currence at all ages and in all cases of society
They often assume serious characters, owing t
concealment, neglect, or delicacy of feeling, mor
especially in childhood, or in early or mature age
They most frequently proceed from want of du
cleanliness, from infection, from eruptive and othe
fevers, from diseases of the uterus and appendages
and from masturbation. The puerperal state
have also some influence in causing them. The
may occur primarily, or consecutively; and i
either case they may be simple, or complicate
with whatever disorder they may induce, or b
induced by.

20. i. INFLAMMATIONS OF THE VULVA — *Vu*
vitis. CLASSIF. — III. CLASS, V. ORDE
(*Author*).

21. DEFINIT. — *Pain, soreness, and tenderne*
of the vulva, frequently with swelling, painful mi
turition, and more or less symptomatic fever.

22. *Vulvitis* may assume every grade
severity, from the slightest pruritus and inflan
matory irritation, to erythema, to phlegmonou
diffusive erysipelatous, and to ulcerative or gar
grenous inflammations, simple or complicated.
shall briefly notice these, as well as other forn
of disease of the vulva which fall under the cat
gory of inflammatory, either sthenic or astheni
and offer some remarks on these varieties of vu
vitis which have fallen under my observation
the Infirmary for Children and in private pra
tice, and commence with the slightest or lea
inflammatory in appearance, and proceed to t
more violent and dangerous.

23. *A.* CATARRHAL VULVITIS. — This form
the disease is usually slight, unless it be neglect
or aggravated by neglect of cleanliness. It is n
infrequent in children; and in grown-up femal
it occurs as a form of leucorrhœa, or as a sy
ptom of disease of the neck or body of the uter
In infants and children especially, it assumes
catarrhal appearance, the discharge being at fi
chiefly mucous, and afterwards muco-purulen
the surface of the vulva being slightly red a
swollen; but neither very irritable nor excoriate
unless neglected. It is most frequently caus
by cold, by sitting on cold or damp seats,
general debility, and the irritation of ascarides
the rectum, or by disorder of the digestive orga
It is sometimes a sequela of low and erupti
fevers in childhood, especially of scarlet feve
and if it be overlooked, or continue long, it m
give rise, especially if aggravated by filth a
an improper regimen, to one or other of the m
serious forms of vulvitis about to be described.

24. *B.* IRRITABLE VULVITIS. — As observ
in some states of the disease of the uterus, so
some affections of the vulva, the inflammat
appearances are either slight, or not very rema
able; yet the pain and tenderness are v
great, or even acute. Sensibility is so mor
as not to admit of the slightest touch; and in m
ried females sexual intercourse cannot be
dured. On examination, the parts are sligh
red, or rose-coloured, and covered in parts b
whitish exudation, especially about the entra
of the vagina; in some cases there is also sli
swelling or fulness of the labia. The pati

complains of a sense of heat, or lancinating pains of the parts, of smarting painful micturition, and of inability of walking. This complaint is sometimes caused by the state of the menstrual discharge, and is most frequently met with in young persons about the age of puberty, or shortly before or after the first appearance of the catamenia, in females after marriage and during their first pregnancy, and in widows, but less frequently in these ast. It is sometimes associated with one or other of the forms of hysteria, or with spinal irritation.

25. *C.* Pruriginous Vulvitis. — *Pruritis* of he vulva is often a very distressing disorder. The tching or pruritus of the parts is sometimes such s cannot be endured without resorting to friction n some way or other to allay it. There is geneally a sense of heat, but seldom much pain, enderness, or soreness of the parts, unless what may be caused by the frictions resorted to. Nor s there much redness or swelling, unless such as may be referred to the same cause. But there is bviously more or less vascular erythism of the parts, or of others in their vicinity, sometimes with increased secretion from the surface or inerior of the labia and orifice of the vagina, or ven a more copious discharge, owing to the fricions resorted to. This disorder is not infrequent previously to or after puberty, and often is atended by inordinate sexual desire, amounting in ome instances to nymphomania, and frequently uggesting masturbation, which, although it may ssuage the irritation for a time, generally tends o perpetuate or aggravate the disorder. Pruritus ulvæ is also a frequent consequence of pregancy, especially of the first pregnancy, in young lethoric habits, and sanguineous temperaments, f the discharges after parturition, and of morbid ates of the catamenia. In both girls and mared females, it is often caused by the state of the ecretions from the follicles of the vulva and vaina, especially when they are allowed to acculate and irritate, owing to their alteration by e oxygen of the atmosphere, the sensitive muous and erectile tissues of these parts. It is also, all ages, sometimes symptomatic of worms, pecially of ascarides in the rectum.

26. *D.* Eczematous Vulvitis. — An eruption an eczematous character (see art. Eczema, 9.) is sometimes met with on the internal or xternal surface of the labia vulvæ, and is either ry or humid, and occasionally extends to the adining parts of the thighs. It generally presents copper-coloured redness, is liable to recur at tervals, and often continues for an indefinitely olonged time. It is attended by a sense of heat burning, with a stinging itching. It seldom curs in young females, but is very common after 5 or 40 years of age, and especially after the ssation of the catamenia; and in those it may ntinue for years, particularly in females of a ll habit of body, or who are corpulent. It is t necessarily connected with any venereal inction, or with leucorrhœa, although this latter ay be associated with it.

27. *E.* Erythematous Vulvitis. — The inrnal surfaces of the labia are not infrequently ghtly swollen, diffusely red, painful and smartg, and intolerant of touch. It presents no aparance of phlyctena, is smooth or shining, the rface being hot, with a sense of more or less painful heat. It soon becomes covered by an exudation of a whitish or ichorous lymph; and in some cases which I have seen at the Infirmary for Children, the labia have become adherent, and so firmly adherent, as to require surgical aid in separating them. This form of vulvitis is not uncommon in children of all ages, especially in those of a very full habit of body, and in these, as well as in corpulent females advanced in life, is owing to the acrimony of the secretions from the parts in their vicinity, to the state of the menstrual discharge, or of the lochia, and to the neglect of cleanliness. In many cases the discharges from the vagina, and cervix and os uteri, occasion or perpetuate the inflammation of the vulva. Although a comparatively slight disease, the neglect of it may be followed by more serious results; such as phlegmonous or suppurative inflammation, by inflammation of the lymphatics, or even, in rare instances, in young children, by adhesions of the labia.

28. *F.* Erysipelatous Vulvitis. — This form of vulvitis generally resembles the erythematous at its commencement; but owing to the state of the secretions producing it, or the habit of body of the patient, or to both, it is soon characterised by great swelling, and a disposition to terminate in suppuration, or sphacelation of the more superficial parts. It is attended by a quick pulse, and by more or less severe constitutional disturbance. This often becomes a serious disease, and goes on to *diffuse phlegmon*, or phlegmonous erysipelas. In the most unfavourable cases, particularly in cachectic habits, it is liable to occasion gangrene of the integuments, extending even to the adjoining parts. It results most frequently from the same causes as the foregoing varieties of vulvitis acting on cachectic habits of body, and during morbid conditions of the circulating fluids.

29. *G.* Pellicular Vulvitis. — Since M. Bretonneau described inflammation of mucous surfaces with the exudation of lymph — forming a false membrane over the inflamed surface — a form of disease which he termed *diphtheritis* — inflammation of the vulva with the formation of a false membrane — *Vulvitis diphtherique*, of French pathologists, has been occasionally observed in circumstances similar to those which occasion this form of inflammation in the cavities of the mouth, pharynx, &c., or when this disease of the mucous surfaces is endemic or epidemic. This form of vulvitis differs from all others in the rapid formation of a false membrane on the inflamed, but very slightly swollen, surface. As it is observed in the mouth and pharynx, so it is found to extend to the adjoining canals, advancing up the vagina to the neck of the uterus, or into the urethra. This state of the disease is obviously the result of constitutional disorder, in which the circulating fluids are in some degree, although not always demonstratively, affected. It is most frequently observed in girls or young females, at certain seasons, or localities, of a cold and humid description; and the febrile disturbance attending it presents an asthenic, rather than a sthenic character.

30. *H.* Phlegmonous Vulvitis. — Inflammation of a phlegmonous form may commence either in the cellular tissue beneath or connecting the mucous and cutaneous structures, or in the more deep-seated mucous follicles of the vulva,

or at the commencement of the vagina. It has been assigned to one or other of these seats exclusively by various pathologists; and it may very possibly originate in either, although most probably in the mucous follicles in consequence of obstruction in their ducts. This affection generally appears with heat and tension of the parts, followed by a dull and sometimes a severe pain, and affects chiefly, or more frequently, the lower halves of the substance of the labia majora. Pain, and a sense of weight, tension, and fulness, extend to the perineum, and more or less febrile disturbance is developed, which may, in the course of two or three days, assume a severe inflammatory character. The bowels are confined, and the urine scanty, high-coloured, and passed with pain. The whole vulva becomes hot, and one or other of the labia is thickened and swollen, the inflammation and tumefaction extending near to the perineum. In the course of five, six, or seven days, an abscess commences in the centre of the inflamed tissues; and although it cannot be perceived externally, it may be felt by firmly grasping, between the fingers of one hand, the swollen labium. A tumour, the size of an egg, or smaller, will then be found in the midst of the tumid structure; and if the abscess be at all advanced, fluctuation will be perceived by a finger of the other hand.

31. *Abscess of the vulva* occurs only on one side at the same time, and very rarely attacks both in succession. It is observed chiefly in young females, and especially in the recently married, and very rarely at a greater age than 40 years. M. Velpeau met with a case in a female aged 44. I was consulted in a case of a lady who admitted her age to be 45. This distinguished physician states, that it is commonly a result of excessive coition, of disproportion between the sexual organs, or of the introduction of a foreign body into the vagina; that it may also arise from neglect of cleanliness, from irritation of any kind, whether externally and mechanically, or internally and pathologically; and that in 18 cases out of 20, it occurs in girls who have prematurely had sexual intercourse, in prostitutes, and in young females who have indulged in excessive venereal pleasures or in masturbation. It is sometimes a consequence of leucorrhœa and of gonorrhœa, and of any violence or irritation to which the vulva has been subjected.

32. The *course* of abscess of the vulva is generally rapid; but owing to the structure of the parts, and to the circumstance of females being aware of the cause of the complaint, medical advice is deferred as long as possible; and the history of the early symptoms and changes is not obtained until the abscess has either burst, or is ripe for opening. When left to itself, it generally bursts from the seventh to the twelfth or thirteenth day; when it has acquired a size varying from that of a nut to that of a hen's egg. It rarely exceeds this latter size. Phlegmonous vulvitis very rarely *terminates* in resolution, and seldom in sphacelation or gangrene, and then only in cachectic habits of body. When abscess of the vulva opens spontaneously, it is generally by a perforation in the direction of the vaginal surface of the labium. In some instances more than one perforation is observed when the abscess has been large. A fistulous communication may even form, and, in rare cases, extend to the rectum, or by the side of the vagina to or around the urethra. In most cases, however, the abscess is discharged and healed in the course of a week or two. But if sexual intercourse take place during this period, the abscess may be reproduced owing to the injury or irritation of the cicatrix, and of the tender parietes of the former abscess, and to the greater susceptibility of the parts. Hence abscess of the vulva may be reproduced several times in the same female. M. Velpeau has seen it thus recur six eight, or ten times in the course of a few years.

33. *I.* Ulcerative or Asthenic Vulvitis — *Noma, Phagedenic ulceration of the labia vulvæ Gangrene of the vulva, Gangrenous inflammatio of the vulva.* Velpeau. — This form of vulvitis is observed chiefly in children from about the period of weaning to the ninth or tenth year of age. It was first described by Mr. Kinder Wood, and occurs chiefly in ill or insufficiently fed children, in those who live in low, unhealthy or crowded localities or apartments; or who are the subjects of low, adynamic, or gastric forms of fever; and in delicate, cachectic, and anæmic habits of body, especially in large manufacturing or other cities and towns. The disease may be preceded, as well as attended, by loss of appetite nausea, thirst, and other febrile symptoms of an adynamic character. The pulse is quick, small or weak; the countenance and general surface pale or sallow, and the tongue is pale and covered by a dirty-looking or clayey coating or fur. The patient first complains, locally, of painful or scalding micturition; or cries or struggles violently when voiding the urine. The labia vulvæ are inflamed and enlarged, and their surfaces are of purple, or livid-red tint, the inflammation extending over the clitoris, nymphæ, and hymen, and even into the urethra. A thin exudation may at this early period be observed covering these parts which may proceed from the irritation having extended to the lower part of the vagina. Twenty four hours hardly elapse until a number of small vesications appear within the labia, as well as externally, and soon afterwards burst, quickly spread into each other, and form large ulcers. In othe cases the inflamed surface passes into the ulcerated state without any manifest vesication. The thin exudation mixes with the secretion from the ulcerations; the resulting discharge is dark-coloured sanious or ichorous, copious, very offensive, and irritating to the tissues, — and rapidly extends th disease to the perineum and anus, and to the thigh contiguous to the labia.

34. The constitutional symptoms are now mos seriously adynamic. The pulse is rapid, irritable and compressible; the face and general surface are white or blanched; the bowels torpid and the stools offensive. The patient lies constantly on her back, with the knees bent and wide apart; and the distressing pain caused by micturition prevent her from using any effort to void the urine. The ulcerations vary in appearance and depth. In some cases they are foul and deep, in others they are superficial, and their bottoms present small red granulations; their states varying with the severity, constitutional tendency, and the treatment of individual cases.

35. The *terminations* of the disease also depend much upon the circumstances just now stated. When the ulceration is fully established

he swelling of the labia vulvæ diminishes, and the edness disappears with the extension of the ulceration, which is deep, foul, and spreading, in states of the system manifestly adynamic and cachectic, nd of the circulation not only anæmic, but also ontaminated. The secretion from the ulcerated urface extinguishes the vitality in succession of he tissues with which it is in contact until the external organs are progressively destroyed. As the rocess of destruction advances, the face becomes nore blanched, the pulse remarkably rapid and mall, the appetite lost, the bowels loose, the stools ffensive; emaciation and anæmia being remarkble, and the discharge from the ulcerated surace most offensive; and the patient expires in the ourse of a few days, the duration of the disease arying much with the circumstances and treatnent of individual cases.

36. If, however, this affection be seen early, nd be judiciously treated, the ulcerations become lean and heal. Yet, after they heal, a yellowish ischarge often continues for a considerable time rom the vagina and affected parts; and causes, vhere due precautions are neglected, a recurrence f the malady. In most cases, owing chiefly to he extent of the constitutional disturbance—to he low grade of vitality, and to the contamination nd insufficiency of the blood—the recovery of he patient is generally protracted, and is rarely of ss duration than eight or nine weeks. When e ulceration is large and deep, the patient very arely recovers, although the most decided means arrest its progress be employed.

37. The *nature* and *morbid relations* of this ost dangerous form of vulvitis, are manifest from e above. It has been viewed by M. Velpeau s a gangrenous inflammation of the vulva; but e destruction of tissues quickly following the esications on the inflamed, swollen, and livid arts, is not altogether similar to true gangrene, ut rather to that of phagedenic or rapidly deructive ulceration. It resembles in most respects *ncrum oris*, or that form of stomatitis which I ave described by the name of *stomatitis phagenica* (see art. Stomatitis, § 24. *et seq.*). The uses of both maladies are the same,—they are oth consequent, in rare instances, on low fevers, ontinued, remittent, and exanthematous, more pecially on scarlet fever,—and they are both rested when admitting of this termination by the me or similar means.

38. *K.* Gonorrhœal Vulvitis.—*Specific Vultis.*—This form of the disease, if not always, is nerally attended by more or less irritation of the rethra. The following is nearly the description the disease, by M. Ricord, as quoted in Mr. cton's able work. This complaint may affect e epithelium of the mucous surface only, or the ulvar glands also, these glands, according to M. Moulinier, being regarded as the organ secreting e venereal veins. At first the patient complains an unusual sensation in the vulva, with a desire r sexual intercourse. This is soon followed by ching, heat, redness, and swelling. The normal oisture of the parts is much augmented; but it on becomes increased and irritating, and aggraates the inflammation. The discharge rapidly ssumes a muco-purulent state, owing to the affecon of the mucous follicles. As the inflammation xtends more deeply, the swelling increases; and may then become phlegmonous (§ 30. *et seq.*), or be attended by œdema. If the nymphæ become inflamed, they may be so enlarged as to protrude beyond the labia. Abscess may follow the swelling, or the inflammation may extend to the vulvar glands, and occasion small abscesses. Owing to the extension of the morbid action to the urethra, and to the state of parts now described, the urine is voided frequently, and produces much scalding and smarting. Patients who have been subject to leucorrhœa readily distinguish the difference between the discharge and other symptoms now experienced, and those to which they have been subject. With very exaggerated sensibility of the vulva, the scalding on passing urine becomes very severe, and in some cases retention of urine occurs. The inflammation may even extend along the urethra to the neck of the bladder, producing very painful and constant desire of micturition. The existence of urethritis in these cases may be ascertained, if the patient has not recently passed water, by introducing the finger into the vagina, and then pressing the urethra from behind forwards; if muco-pus be in the urethra, it will be at once evident. *Syphilitic ulceration* of the vulva is noticed under the head of Venereal Diseases.

39. *L.* Consequences of Vulvitis.—These are, as partially noticed above, œdema, abscess, ulceration and molecular gangrene, sphacelation, extension of the inflammation to the vagina and cervix uteri, or to the urethra and neck of the bladder, or to the lymphatics and lymphatic glands. Œdema vulvæ, although sometimes caused by inflammation, is more frequently a consequence of organic disease of the heart, or of the kidneys, or of other internal organs; and it is thus generally associated with anasarca. It may also occur during the advanced stage of pregnancy, or even after parturition; in the former circumstances often rendering delivery more serious or complicated, and in the latter increasing the amount of suffering, and delaying recovery. Inflammation of the lymphatics and their glands rarely occurs in the course of vulvitis, but chiefly of the phlegmonous, ulcerative, and specific forms. It is seldom detected until pain and swelling are experienced in the inguinal glands, and then irregular streaks of redness may be perceived in the external parts, with irregular hardness or swelling of the labia, extending superficially to the groins.

40. ii. Treatment.—*A. The treatment of catarrhal vulvitis* (§ 23.) consists chiefly of frequent ablutions with weak solutions of alum or sulphate of zinc, or with camphor-water, or sea-water, &c. If the parts present much inflammatory irritation, the local means advised for the *irritable* and *erythematous states* of the complaint may be directed, and the treatment be in other respects the same. In most cases, and especially when connected with debility, or occurring as a sequela of fevers, &c., then warm salt-water bathing, followed by tepid, or cold salt-water bathing; or warm salt-water hip-baths; tonics internally, chalybeates, due attention to the digestive, assimilating, and excreting functions, and change of air, &c., will be found of very great service.

41. *B. Irritable Vulvitis* (§ 24.), *Pruriginous vulvitis* (§ 25.), and *Erythematous Vulvitis* (§ 27.), are so closely allied states of inflammation, and so generally affect only or chiefly the epithelial mucous surface, as to require

the same or very similar means of cure. At first emollient or demulcent lotions, containing a sedative or narcotic tincture, or solution, in small quantities; or weak solutions of the acetates of lead, or of the nitrate of potash, or hydrochlorate of ammonia, in the decoction of poppies; or a saturated solution of the bi-borate of potash, in camphor-water, or in the decoction of marshmallows; or cooling pomades, as cold cream, &c., may be prescribed. In the more obstinate or severe cases, pomades containing the oxyde of zinc, or the chloride of mercury, &c.; or lotions with a small quantity of the nitrate of silver, or bi-chloride of mercury, or of the sulphate of zinc. Or demulcent applications, containing camphor, with one or other of the substances just mentioned, may be resorted to. As these several forms of vulvitis are often symptomatic of disease of some adjoining organ, more especially of inflammatory irritation of the neck of the uterus, of leucorrhœa, of the irritation of worms in the rectum, of gravel or calculi in the bladder, &c., these morbid relations of the forms of vulvitis, now being considered, should not be overlooked; and the treatment ought to be directed more especially to the cure of the complaint of which they are severally a symptom merely,—but a symptom which also requires removal.

42. *C. Eczematous vulvitis*, or eczema of the vulva, may be treated by similar means to those now recommended, or by the local and constitutional remedies mentioned in the article Eczema (see § 16. *et seq.*).

43. *D. Erysipelatous vulvitis* is often a serious disease (§ 28.), and arises from the same, or nearly the same, causes as those producing the erythematous variety. In most of the cases of the former, however, the constitution is more in fault, especially the circulating fluids, than in the latter. The treatment, therefore, of this form should be more energetic, and be directed chiefly with the objects of depurating the blood, and supporting vital power and resistance. The former intention will be fulfilled by the exhibition of a smart emetic at an early stage, followed by a mercurial purge, and by saline aperients and depurants. After the prima via has been sufficiently evacuated, tonics should be conjoined with the alkaline carbonates, and such local means resorted to as the state of the parts may suggest. If diffusive phlegmon, or abscess, or gangrene supervene, the constitutional treatment should be energetic, and the local measures the same as advised for the phlegmonous and phagedenic forms of the disease (§§ 45, 46.), especially scarifications and incisions, which, when practised before suppuration or sphacelation commences, often prevent those serious consequences of the malady.

44. *E. Pellicular vulvitis* is generally most successfully treated by applying to the affected surfaces powdered alum, or calomel, or borax, with mucilage or honey, or strong solutions of the nitrate of silver, or of the chlorides, &c. Having arrested this form of the disease by these means, emollient or detersive lotions, hip-baths, and the remedies advised for the milder varieties of vulvitis may then be prescribed (§§ 40, 41.). The constitutional treatment should depend upon the peculiarities and circumstances of the case. But generally this form of the disease is not benefited, but it may be injured, by vascular depletions; whilst saline aperients, and alkaline, saline, and other depurants of the blood, conjoined with tonics, are beneficial. The treatment of this variety of the disease is in most respects the same as I have advised for *pseudo-membranous* Stomatitis (see §§ 14, 15.).

45. *F. Phlegmonous vulvitis* (§ 30. *et seq.*) may, when left to itself, especially in cachectic habits of body, occasion serious destruction of parts, sinuses and fistulous openings and communications with adjoining organs, or prolonged ulcerations. To prevent these consequences: — 1st, The patient should be kept in bed, or on a couch, in a cool temperature, with the thighs wide apart; — 2d, A considerable number of leeches should be applied between the labium and thigh, or upon the perineum; — 3d, To cover the phlegmon, twice or thrice daily, with mercurial ointment previously to applying linseed poultices; — 4th, To direct a warm bath every second day, or a hip-bath every evening or night (Velpeau). The abscess may spontaneously open, when thus treated, from the fifth to the eighteenth day; but it is generally more beneficial to open the abscess as soon as matter is formed, than to wait for a spontaneous discharge, which may take place in an undesirable situation, or after the abscess has occasioned more or less serious alterations, such results being not uncommon in unhealthy constitutions. The question as to the situation in which artificial opening of abscess of the vulva should be made, has been decided by M. Velpeau in favour of the external surface of the affected labium, and in the lower or posterior part of the swelling or abscess, for reasons he has assigned in the article referred to in the Bibliography.

46. *G. Phagedenic ulceration of the vulvæ* (§ 33. *et seq.*) is the result of a molecular loss of vitality of the tissues poisoned by the contact of the irritating and contaminating fluid into which the dead molecules are resolved. It is identical in its nature with *phagedenic stomatitis*, as already stated; and the local, as well as the constitutional, treatment is in every respect the same as I have advised for that dangerous malady. (See art. Stomatitis, §§ 31—33.)

47. *H. Gonorrhœal vulvitis* (§ 38.) is treated as follows by M. Ricord and Mr. Acton. In the commencement a soothing plan should be employed, and separation of the surfaces attempted, followed by lotions of nitrate of silver, in the proportion of ʒj to ℥ij of distilled water, and by warm baths. If the inflammation has gained the deeper tissues, the soothing plan should be adopted; or leeches should be applied to the groins. If a phlegmonous condition of parts occurs, depletions should be chiefly relied on; and the moment that an abscess is formed, an opening should be made into it, in order to prevent the pus from burrowing through the cellular tissue. When urethritis is much complained of, cubebs and the balsams, with demulcents, are then required. Afterwards, balsams and lotions of the solution of the nitrate of silver should be prescribed.

48. *I.* The *consequences* of the several forms of vulvitis must be treated with reference not only to their actual states, but also to the circumstances, features, and complications of individual cases. General therapeutical principles will guide the physician in respect of these as well as of other

rbid conditions, recollecting, however, as re- cts the most of them, that strict attention to utions by suitable means; to the digestive, milative, depurating, and excreting functions; l to the promotion of constitutional power, and vital resistance to the extension of disease, are surest principles of successful practice.

19. III. Structural and other Lesions of Vulva.—These consist chiefly of *hypertrophy* *the nymphæ*, of *tumours of the clitoris, throm-* or effusion of blood in the labia after injuries parturition, *fistula, cancer, herniæ, elephantiasis* the vulva or of the nymphæ, *tumours* or *cysts* erectile, sebaceous, follicular, or others—the wth of *hair within the vulva*, &c. These con- n the surgeon rather than the physician, and uire no remarks from me. The only exception y be made in regard of *hypertrophy of the nphæ*, which may take place to so great an ex- t as to require their extirpation. In unmarried ales, advanced in age, this change has un- btedly proceeded from masturbation. But in y young females, to whom this vice could not imputed, and also in children, the nymphæ are netimes so greatly developed as to protrude far ow the labia majora. Of this state of parts I e seen several instances. In one case which ne before me, the very enlarged and prolonged mphæ were extirpated. The hæmorrhage was y considerable, but recovery was complete. e clitoris may be enlarged as well as the nym- æ; and in such cases the enlargement is pro- ly owing to masturbation. These parts have n observed by Larrey, Gilbert, Clot-Bey, lrich, and others, to have been the seats of phantiasis; the tumours which resulted having n as large as a child's head. M. Velpeau s referred to several cases of this nature, which, wever, are not rare in Egypt and other parts of rica.

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VEINS, DISEASES of—1. This order of circulating vessels has not received that share of attention and research which it deserves in several states of disease, either implicating it more especially, or affecting the frame generally, and changing more or less not merely the blood circulating in it, but the whole mass of blood supplying all the organs and tissues of the body. Hence alterations of these vessels should not be viewed with reference to themselves only, and as local changes merely, but with a due recognition of the effects produced by them on the blood, and, through the blood, upon the whole frame. Even this apparently comprehensive view is not sufficient;—it is only one aspect in which this subject should be studied—one side of the object—for another presents itself to the experienced and searching eye, viz. the many noxious agents, and the numerous local changes and structural lesions affecting primarily the several tissues and organs, frequently altering either the blood in these parts, or the veins originating in them, or even both, successively contaminating the blood and circulating systems, and ultimately altering the vital cohesion and the intimate organisation of all parts of the living body.

2. It would be impossible, even were it necessary, to consider the diseases of veins, especially in connection with those of the blood, with that amplitude which I might desire, or others expect. This subject can be viewed only in its more practical and important relations, at this place. The full consideration which I have bestowed on the several matters and topics intimately connected with diseases of the blood and circulating organs and vessels, and on the treatment of them under their respective heads, in the early parts of the work, prevents me from attempting more at this place than to notice what has not already come under discussion.

3. It is chiefly to John Hunter that we are

indebted for the earliest and best information respecting diseases of the veins, and especially as to the treatment most appropriate to inflammation of them. Since his time the researches and works of Baillie, Hodgson, Cruveilhier, Meckel, Breschet, Davis, Dance, Lee, Gendrin, Ribes, Arnott, and others, have tended most essentially to advance our knowledge of these important subjects. Diseases of the veins resemble those of the *lymphatics* and *arteries* (see those articles) in some respects, and differ from them in others, particularly as regards the constitutional symptoms. The veins never exhibit an alteration in all respects similar to aneurism, because their coats yield equally to pressure, and are not subject to the forcible impetus of the blood: besides, their inner coats are more susceptible of dilatation without rupture, than those of the arteries; they are, however, more subject to inflammation and varicose dilatation than the latter vessels.

4. Ossific formations, which are so often met with in arteries, are seldom found in veins. The difference of texture is not sufficient to account for this; for, as M. Andral remarks, the structure of the pulmonary artery is the same as that of the aorta, and the right side of the heart is organised precisely as the left; and yet ossifications are much more frequent in the aorta and left side of the heart than in the pulmonary artery and right side. The more abundant supply of ganglial nerves to the arteries than to the veins may, perhaps, tend to create a difference as to the nature and frequency of diseases of these two orders of vessels. The constitution of the blood, and peculiarities of the circulation in each, may also contribute to diversify their maladies. The circumstance of the blood being oftener coagulated and organised in the veins than in the arteries may be chiefly imputed to this latter cause, and to the more frequent occurrence of inflammation in the former vessels. Pus is more commonly found in the veins than in the arteries; this is owing to three causes — 1st, to the greater frequency of inflammation of veins; 2d, to the circumstance of this morbid secretion being carried into the veins by absorption; and 3d, to the probable metamorphosis or alteration of the pus-globules before they reach the arterial circulation. Perhaps the second and third causes are the most influential.

5. The constitutional effects of diseases of the veins, and the consequences of inflammation of them, differ very considerably from those which characterise the maladies of the other orders of vessels composing the vascular system; but the differences are chiefly apparent in acute inflammations of these vessels, as will be observed upon referring to what has been stated respecting these diseases.

6. I. Inflammation of Veins. — Synon. *Phlebitis* (from φλεψ, a vein); *Aderentzündung, Blutaderentzündung*, Germ.; *Phlébite*, Fr.

Classif. — III. Class, I. Order (*Author in Preface*).

7. Definit. — *Tenderness, tension, acute pain, and a knotted, cord-like swelling or hardness in the course of a vein or veins, sometimes with discolouration, when the veins are superficial, extending both to, and from, the centre of circulation, with symptomatic fever, which often passes into an adynamic state, with indications of contamination of the blood, or purulent formations in the viscer or other parts.*

8. *The pathological anatomy* of phlebitis wil be more fully shown in the sequel; but it may b stated at this place that inflammation of veins occasions — 1st, The formation of coagula adhering by means of the lymph exuded from the inflame surface, to the internal membrane of the vessel — 2d, The secretion of pus, which may be surrounded by a false membrane, or by coagulate lymph, or be contained in coagula adhering t the internal surface of the vessel; — 3d, The secretion of pus, which is not surrounded either b plastic lymph, or by a coagulum, but which ha a free access to the current of circulation; — an 4th, The secretion of an ichorous or sanious flui from the inflamed inner membrane, which rapidl mingles with, and contaminates, the blood, an generally produces rapid and fatal changes of th structures. Instead, therefore, of viewing phlebitis, as heretofore, to consist of only *two* principa forms, viz. the *adhesive* and the *suppurative*, th latter being either confined or free, I would add *third*, the *ichorous* or *poisonous*.

9. *Inflammation of veins* is of the greatest importance as respects both the local lesions an the consequent contamination of the blood. It i much more frequently seen than inflammation o arteries. Its seat is the cellular tissue of th vein, and the circular fibrous coat, in as far as th latter exhibits any degree of redness or vascularity; and its products are deposited in both these and in the non-vascular or internal lining membrane extending into the canal of the vessel. I more frequently is *acute* than *chronic*, the forme being distinguished by an exudation on the inne surface of the vessel. When phlebitis — inflammation of the coats of the vessel — is the primar disease, the changes of the blood, and other alterations within the inflamed vein, are consequence of this inflammation, these changes being secondary. But, when the blood in a vein is coagulated, or is otherwise remarkably altered or poisoned, it may, in such a state, irritate the interna membrane of the vein, inflame it, or all the coat of the vessel, the phlebitis being thus consecutiv or secondary. The disease may be seated in single vein, or extended to several, or even t many, whether it be thus primary or consecutive.

10. John Hunter first demonstrated the pathological changes and the consecutive phenomena of phlebitis. Many years afterwards, Sasse B. Travers, Abernethy, Hodgson, and Breschet, directed their attention to this disease; an more recently Ribes, Arnott, Dance, Davis R. Lee, Maréschal, Bouillaud, Cruveilhier Velpeau, Blandin, Rokitansky, and others have contributed facts and opinions respecting it Nevertheless the subject is by no means exhausted; for there still remain various topics connected with it, both pathologically and therapeutically, requiring further elucidation and confirmation.

11. i. The Causes of Phlebitis. — Inflammations of the veins are much more frequent i the male than in the female sex, if phlebitis consequent upon parturition be excluded from th account, and in ages from fifteen years to fifty This greater frequency in males, and in the active periods of life, is probably owing to a greater ex-

p ure to injuries and other exciting causes in this s and age. These causes are numerous, but t y chiefly consist of external injuries of various k ds, more especially punctures, lacerations, abra- s ns, fractures, and contusions; punctures or divi- s ns of veins, particularly with blunt, ragged, foul c poisoned instruments; wounds, punctures or in- j ies in anatomical dissections or during post-mor- t inspections; cuts or scratches when preparing c dressing animal food, especially game, &c.; c rations, &c., when performed in foul wards of h pitals, or in low, impure, and ill-ventilated l alities or apartments; fractures, compound or c mminuted, in similar circumstances; ligatures c surgical operations on veins; the application of c stics or local irritants; the existence of ulcer- a l or tubercular cavities, or of abscesses or ma- l ant formations, with which veins communi- c e, or into which either of these morbid matters p s; and the imbibition of morbid matters by v ns or sinuses, from cavities in which morbid s retions, fluids, or deposits accumulate, as the c ities of the uterus and cervix uteri, or from u erated cavities in the lungs, liver, &c., or from n rosed bones, or sphacelated structures, or from p ulent matter lodged under the flaps formed in a putations. These last, venesections, and punc- t ed or other wounds, are the most common ex- c ng causes of phlebitis.

2. In hospitals, especially during the preva- l ce of hospital gangrene or erysipelas, either v hin them or in their vicinity; in camps or b racks, prisons or crowded vessels, especially t nsports; and in low, damp, crowded, and im- p fectly ventilated situations, and in localities e osed to noxious exhalations, particularly in n arious states of the air, or when erysipelas is p valent in them, and when the more common e iting causes are of frequent occurrence, p ebitis may then assume an endemic or epide- n prevalence. In these circumstances and s ons, venesection and other operations involv- i veins, can seldom be performed without the r of producing the asthenic, or most dangerous f n of phlebitis (§ 21. *et seq.*); and indeed these o rations, especially venesection, should be on s n occasions avoided as much as possible.

3. Phlebitis is sometimes not only *caused* by, b often also *associated* with, organic lesions o nternal organs, especially with ulcerations of t intestines, with abscesses in the liver, kidneys, l gs, brain, ears, &c.; and is occasionally de- t ed in the mesenteric, the portal, and the pul- n ary veins, and even in the veins and sinuses w in the cranium, upon dissection. It is, how- e , most frequently associated with uterine d ases, and with inflammations and abscesses o he uterine ligaments; the iliac, spermatic, a other veins, having become consecutively i med, as stated in the articles on diseases of t PUERPERAL STATES, and of the UTERUS.

4. ii. SYMPTOMS.—*A.* The *symptoms of st ic phlebitis* may be divided into *two stages*, n ely,—1st, Those which are local, and cha- r erise the local limitation of the malady;— 2 Those which indicate the contamination of th blood, and general infection of the frame. — st. *The local signs* are generally very manifest w n any of the more superficial veins are at- ta ed; but they are very equivocal when the de -seated and internal veins are implicated. Phlebitis usually commences with sharp or severe, sometimes violent, pain in a part, or in the course, of a vein. If the vessel be superficial, it will be found hard, tense, as if stretched, forming under the skin a cylindrical or knotted cord. At the same time the skin sometimes presents a reddish line or more extensive erythematous blush, or even an erysipelatous appearance. If the vessel is more deeply seated, tension and hardness may be felt in the situation or course of the pain. Congestion or engorgement of the capillaries of the cellular tissue adjoining or surrounding the inflamed vein, are afterwards observed; and if several veins, or a large trunk is affected, this tissue, and the parts below or distal to the seat of disease, become œdematous, or very remarkably swollen. With the local lesion, the constitution sympathises more or less remarkably, the general symptoms varying with the severity and extent of the inflammation, and with the temperament and habit of body of the patient; but quickness of pulse, heat of skin, headache, loss of appetite, thirst, and impaired secretion and excretion, with other symptoms of inflammatory fever, are commonly observed.

15. In favourable states of the constitution, and when judiciously and early treated, the disease may not proceed further. The coagulum formed in the inflamed veins adheres to the parietes of their canals; a collateral circulation is established, and the inflamed veins no longer permit the circulation of blood through them. In some cases the inflammatory exudation on the internal surface of the vessel, or the coagula formed on its sides by means of this exudation, leave a central canal, allowing a partial circulation of blood along it. In other instances the inflamed veins secrete pus, which may be so abundant as to give rise to fluctuation, or other indications of its presence in the sub-cutaneous chord, which is felt when the vein is superficial; and, if an artificial issue is not given to it, the matter makes its way into the adjoining cellular tissue, and forms an abscess, which follows the usual course. When the local lesion does not terminate in either of these ways; and when the morbid exudation, or purulent matter furnished by the inflamed vessel, is carried into the blood, the system becomes generally infected, owing to the contamination of the blood thus produced, and the second period or stage of the malady is developed—or the state of *pyæmia.*

16. 2d. This stage of phlebitis, or that of *vascular infection*, may take place rapidly, or not until after a few days, the rapidity of its occurrence depending upon the nature of the exciting cause and the constitution of the patient. It usually commences with chills or rigors, followed by hot skin, and other symptoms of fever, and by perspiration. These paroxysms of chills, fever, and sweats generally return at irregular intervals, assuming a remitting form; but in some instances they are periodic. With these exacerbations, anxiety, distress, or slight or occasional wandering delirium appear; and these are followed by more continued delirium, which is generally low or muttering, rarely lively or excited. The tongue, previously furred, now becomes dry or encrusted, is trembling, or imperfectly protruded; the teeth and lips are fuliginous; the countenance is sunk,

dusky or pale, and lurid, and the symptoms assume a typhoid or adynamic character. The pulse is small, very frequent, and soft. These phenomena are observed in nearly all the cases at this stage; and others are less constantly present, especially retchings and vomitings; diarrhœa, the stools being dark and very offensive, the urine turbid and fœtid or ammoniacal, and the surface dark or dusky, or slightly jaundiced.

17. During this stage, and often at an early period of it, secondary abscesses form in some internal organ, with indications of oppression, tenderness, or distress, referred especially to the regions in which the affected organ is seated. In some cases the larger joints become extremely painful and swollen, from the formation of pus within their capsules. Purulent deposits, without any very manifest indication of pre-existing inflammation, sometimes form not only in the internal viscera, or in the joints, but also in the intramuscular tissues, and even in the brain, occasioning profound coma. If this stage continue even for a few days, extensive bed-sores and sphacelations occur in the situations on which the weight of the body chiefly rests; and, the sensibility of the urinary bladder being in great measure lost, the urine becomes ammoniacal, or the functions of the kidneys much impaired, contamination of the circulation is further increased, and its consequences accelerated, death generally ensuing with a celerity according to the extent and rapidity of these changes.

18. The *extension* of the inflammation is generally in the direction of the heart, or of the current of circulation; but a fatal result often takes places before the inflammation reaches the vena cava, or even the larger venous trunks, owing to contamination of the blood by the exudation, or purulent matter, from the inflamed parts. In some cases, however, the disease pursues a different course, and extends to the smaller ramifications. Mr. ABERNETHY met with a case of phlebitis after bloodletting at the bend of the arm, in which the veins were affected down to the hand. This more unusual course is very probably occasioned by the complete obstruction of the part of the vein first affected by a coagulum or exudation of lymph. It may also be partly the result of the state of constitutional power. It is not infrequent in puerperal phlebitis, the cause of which is chiefly the imbibition of sanious matters from the internal surface of the uterus, aided by shock and vital depression, and by the predisposition produced by an impure air.

19. iii. OF THE DIFFERENT PATHOLOGICAL CONDITIONS OBSERVED IN PHLEBITIS. — The several pathological states constituting the different *varieties* of inflammation of veins have not been sufficiently investigated and demonstrated by pathologists; and most writers have described two varieties only, namely, 1st, the *adhesive* or common, — and 2d, the *suppurative;* and, whilst they have viewed the former as merely a local disease, they have considered the latter as productive of vascular *contamination* and general *infection*. — *a.* Of these varieties it may, however, be remarked, that, although the *adhesive* is characterised chiefly by an exudation of lymph more or less adhesive and concrete, on the internal surface of the inflamed vein, and often no further affecting the blood than causing the formation of a clot within
or near the inflamed part, yet it is attended by n
or less sympathetic febrile disturbance; and
the coagulum thus formed may be productiv
much consecutive disease of the vein, if the l
and constitutional treatment be not judicio
managed. Even after the exudation of lym
or the formation of a coagulum, by means of wl
the extension of the inflammation and contam
tion of the blood are prevented, if constituti
power and vital resistance be much reduced,
coagulum thus formed may irritate the inte
surface of the vessel, and either perpetuate or
kindle the inflammatory action.

20. *b.* The *suppurative* variety of phlebiti
generally productive of contamination of the bl
and of most dangerous constitutional dise
Nevertheless instances are occasionally obser
in which the purulent matter at first forn
mingling with the blood in the vessel, causes
coagulation, and the coagulum thus formed
rests the circulation and the extension of the
flammation in the direction of the heart,
either allows the morbid action to subside, or
vours the extension of it to the more exte
coats of the vessel and to the surrounding ce
lar tissue, occasioning abscesses in the cours
the inflamed vein, and prolonging the disease.
these cases little or no contamination of the
neral mass of blood takes place, unless the c
stitutional powers and vital resistance to the
tension of the local disease be much impai
either by the continuance and amount of the l
lesion, or by an injudicious or a too lowe
treatment.

21. *c. Asthenic*, or *diffusive*, or *poisoned p*
bitis, has not hitherto been described as a
important variety, although it is the most dan
ous of any form which the disease assumes.
occurs in all the circumstances, and arises f
all the causes, which occasion the other form
phlebitis. But it more especially proceeds f
causes superadded to these, more especially f
those which depress the vital energies, and in
the system. It is generally the result of
classes of causes, — 1st, those which depress
constitutional powers, and produce more or
of general cachexia before the vein is inju
or wounded, — and 2d, those which lower or
haust the energy of the body, and either prev
the depuration, or favour the contamination of
blood during or after the infliction of the inj
or the other exciting causes of the phlebitis.
first class comprises malaria of all kinds; the
air of crowded wards; or that produced from
discharges or exuviæ of the sick or of others;
proper or insufficient food, &c.; the *second*
cludes those already mentioned, when they co
into operation during and after the infliction of
injury, or subsequently to the other exciting ca
of the disease, violent shocks to the vitality of
frame, poisoned wounds, abrasions, &c., in
tious emanations from erysipelatous or gangren
sores, or morbid discharges; the absorption
purulent, putrid, sanious, or diseased matters fr
sphacelated, necrosed, or otherwise altered str
tures, or of decomposed blood, or vitiated se
tions and excretions.

22. (*a*) This variety of phlebitis is characteri
by the rapidity, severity, and the fatal tendenc
the local and constitutional symptoms, and
marked depression of vital power, and the c

iation of the circulating fluids, by which they ttended. Organic nervous energy is remark- impaired, and all the manifestations of life or less lowered. The functions of the brain arly disturbed, and the pulse becomes rapid, open, and compressible; the surface of the soon losing its vital appearance, and be- ng livid, dusky, and sallow, sometimes dry iarsh, and ultimately clammy and cold. De- a occurs early, and passes into stupor or . Locally, œdema, cellular infiltration, great rness on pressure, boggy swellings, and di- hed temperature of the affected limb, are remarked; and if the injured or affected be exposed, as when the disease follows vene- n in the circumstances just alluded to, the d is gaping, union of the divided tissues not g taken place, and an ichorous or a sanious exudes from the part, or slight hæmorrhage s on examination. In addition to the above constant phenomena, others are observed, g out of the varying combination of the pre- sing and exciting causes, and the state of the nt. These are chiefly a tympanitic state of bdomen, retchings or vomitings, diarrhœa, vacuations being offensive and unnatural; the occurrence of bed-sores; offensive or ammo- l states of the urine, severe pains and swellings e joints or extremities; congestions or puri- infiltrations of internal viscera, with tender- and opression referred to the regions corre- ding with the affected organ, &c.

. When *uterine phlebitis* takes place, it may ne either of the forms above described, and g to such forms, and to the circumstances in h they severally appear, the different varieties uerperal fever are developed; the more ma- nt kinds of these fevers being the results of horous and sanious fluids imbibed from the or of the uterus by the uterine sinuses and , or of the morbid exudation from the as- cally inflamed veins of the uterus and its ap- ages, and of the consequent contamination of lood, aided by the vital shock of parturition, by the foul or infectious air in crowded or ill- lated lying-in hospitals or wards. (See Art. RPERAL DISEASES.)

. iv. The *appearances* observed in dissection al cases of phlebitis, as respects the *veins*, are ibed in the sequel (§ 57. *et seq.*); those which d the frame generally, are fully given under iead PUERPERAL DISEASES (§ 221. *et seq.*), are nearly the same as those observed after *adynamic* FEVER (§ 513. *et seq.*); and those h are found when phlebitis occasions *consecu-* and *diffusive abscess*, are described in the le ABSCESS (§ 27. *et seq.*)*

25. v. The DURATION of phlebitis is very variable. It is often very short in the asthenic and puerperal states, and may, when accelerated or exacerbated by the foul air in lying-in wards, not exceed 48 hours, although more frequently it continues several days, or even longer. Phlebitis consequent upon venesection is rarely of less duration than three or four days. The suppurative form of the disease generally continues from ten to twenty-one days, and the adhesive form much longer, or several weeks; but the duration of each of the varieties of the disease varies much according to the causes, the treatment, and the constitution of the patient.

26. vi. SEATS OF PHLEBITIS. — Inflammation may attack several veins, or only one vein, or small part of a vein. It generally extends to the whole circumference of a vein, and is very rarely limited to one side of the vessel. The veins most frequently inflamed are those of the extremities, after wounds and injuries; next, those of the uterine organs and appendages, especially in the puerperal states, and the pulmonary veins. The veins least frequently affected are the ramifications of the portal and hepatic veins; the sinuses and veins of the dura mater; the vena cava, and the veins of the spine, and of the spongy structure of bones. Phlebitis of the umbilical chord, or inflammation of the umbilical vein in new-born infants, is not a rare occurrence. Several recent pathologists, more especially MM. RIBES and CRUVEILHIER, have supposed that the venous capillaries may be the seats of inflammation, and have ascribed erysipelas to phlebitis of the most minute of these vessels.

27. (*a*) *Inflammation of the veins of the arm* is most frequently consequent upon venesection, and especially when this operation is repeated. It may, however, occur after amputations, fractures, punctured or other wounds, &c. It commences with pain in or near the seat of incision or puncture, extending upwards. If adhesion has not taken place, the margins separate, swell, suppurate, and the pus formed in the vein escapes externally, especially if pressure be made on the vein from above downwards. If the incision through the integuments has closed, the margins swell, and the cicatrix opens. The inflammation may extend from the seat of injury to the axilla, to the jugular, to the superior cava, or even to the right auricle. In this case death generally soon ensues, although instances of recovery have

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* n the following case, by M. LE HERISSÉ, as quoted r. ARNOTT, some of the most remarkable secondary s of phlebitis are described. "Gasper Goldinger, ct for the last six weeks to epilepsy, was bled twice the arm on the 1st of November, 1806; on the 8th, the foot; and on the 10th and 13th, from the ju- vein. On the 16th, he was again bled from the the right), which on the following day felt painful; redness and tension were observed round the aper- 15th, arm very painful and swollen from the der to below the elbow; edges of the puncture, face and skin of the body of a yellowish colour, feeble and frequent; 19th and 20th, fever more se; tongue, dry and coated; great pain in the arm; nd 22d, lies supine; prostration of strength; heat n; tongue, dry; pain in the right side of the chest; respiration, short; 23d, tension of the arm diminished; some pus flowed from the wound made in bleeding; respiration short. Died at night, seven days after the receipt of the wound in the vein.

"*Dissection.* — The wound in the cephalic, open; the vein filled with pus through the whole length, *i. e.* from where it terminates in the axillary to the bend of the elbow, where it divides into the medial cephalic and superficial radial; the latter of which cotnained pus for two inches below its origin. The coats of the vein were much thickened, indurated, and red. In the interfibrilear cellular tissue of the pectoral muscle of the right side was a quantity of thick greenish pus. Eight or ten ounces of yellowish opaque serosity were contained in the right sac of the pleura. The lung of this side was unadherent, that of the left was adherent over its whole surface by a delicate false membrane. Both lungs presented a number of hepatised portions, varying in size from that of a nut to that of a large walnut, gorged with fluid, which in some of them was puriform. The arachnoid membrane was opaque, thickened, and indurated, effusion of fluid between it and the pia mater, and into the texture of the latter. Some yellowish serum in the ventricles."

been recorded. The disease may also extend along the veins below the seat of injury, especially when the circulation in the vein is obstructed by lymph, coagula, &c. Phlebitis in this situation may present either of the forms described above.

28. (*b*) *The veins of the lower extremities, and the iliac veins*, or either separately, may be inflamed; the former from the same causes as occasion phlebitis in the arm, the latter most frequently as a consequence of the puerperal state, or of the cancer of the uterus, and of tubercular disease. Inflammation of the iliac veins is most frequently manifested in the form of *phlegmasia alba dolens* (*see this Art.*), although phlebitis is not the only pathological lesion of this disease. M. Toulmouche contends that the much more frequent occurrence of the malady in the left thigh than in the right, is owing to the accumulation of fæces in the sigmoid flexure of the colon, and to the consequent pressure made on the iliac vein, to the retardation of the circulation through it, and to coagulation of blood in it. (*Gaz. Méd.* Avril, 1844.)

29. (*c*) *Inflammation of the vena porta* has been observed by MM. Ribes, Bouillaud, Dance, and Frey, and they, as well as others, have ascribed redness of the internal surface of the ramifications of the vena porta, and of the hepatic veins, to inflammation; but it is not improbable that this appearance is more frequently owing to cadaveric imbibition of the colouring matter of the blood. True inflammation of the vena porta is a very rare occurrence; it is attended by a sense of weight and of pain in the right hypochondrium, greatly increased on pressure; by regular or irregular rigors; by extension of pain to the right shoulder; by jaundice, more or less developed; by nausea, vomitings, and sometimes singultus; by diarrhœa, more or less bilious, and ultimately by the usual indications of purulent infection of the blood. These symptoms are, however, in most respects, the same as those accompanying acute abscess of the liver.

30. (*d*) *The sinuses of the dura mater* are not infrequently inflamed, consecutively on injuries to the cranium, membranes and substance of the brain, on inflammation of these parts, on inflammation of the ear, on caries of the temporal or other bones of the cranium. They may also become inflamed in the advanced course of erysipelas of the scalp, and of other maladies and lesions, as I have fully described many years since. (See Art. Brain, Sect., *Inflammation of Sinuses of the Dura Mater, and of the Vessels of the Brain*, § 37. *et seq.*, vol. i. p. 208, 9.)

31. (*e*) *The umbilical vein* has been found inflamed in recently born children, by MM. Sasse, Breschet, Duplay, Trousseau, and others; and has been referred to ligature of the chord. It has been observed associated with erysipelas, with peritonitis, and with enteritis. The *veins of bones* have also been noticed by M. Gerdy. *Uterine phlebitis* has been considered in the Article on Puerperal Diseases. (See §§ 189—197.)

32. (*f*) *Inflammation of the vena cava* is met with only consecutively upon inflammation of the uterine iliac or other veins. M. Bérard has found inflammation of the vena cava extending as high as the confluence of the venal veins in cases of *phlegmasia dolens*: cases of inflammation of the cava have been observed and describ by Travers, Hodgson, Dance, and others. he symptoms indicating extension of inflamm on and of its consequences to this vessel are er inferential than positive. These consequ es are the exudation of lymph, the formation of is, or of coagula, or of all these, and more o es obstruction of the circulation along the vena a. If there be observed, consecutively upon e- bitis of either lower extremity, acute or ra ly developed œdema, or dropsy of both the mities, especially during the puerperal state, at an advanced stage of fever, or at an early p od after the subsidence of fever; and if, afte he occurrence of œdema of both extremities, di- cations of the development, in the surface o he trunk, of a supplemental venous circulatic it may be inferred with much probability tha n- flammation and its consequences have extend to the vena cava.

33. *Obliteration* has been observed by Hai r, Wilson, Baillie, Cline, Reynaud, the w rs already named, and by others, to follow inflan a- tion and obstruction of the vena cava. The es which have been recorded of this remarl le lesion have presented extensive anastomoses ot only between deep-seated veins, but also bet en the principal superficial veins of the trunk, he latter appearing uncommonly enlarged, and a- stomosing with each other. This very grea e- velopment and free anastomoses of the super al veins of the trunk have followed gradually n the dropsical or œdematous state of both ext i- ties; but, in some cases, especially those u er consideration, and of most marked enlarge nt and anastomoses of the superficial veins, the e- matous state of the lower extremities grad ly diminishes. The particular veins by which e supplemental circulation is carried on are in e respects different in different cases, accordi o the seat of obstruction or obliteration of the a, and to the trunks of veins, from which the inf a- mation extended.

34. vii. The Diagnosis.—Phlebitis ma e mistaken, at an early period of its course, r lymphangitis, or the latter may be mistaken fo e former. But the large cylindrical chords, wre ing in diverse forms, appearing when the superf l veins are inflamed, and the œdema of the d l or more remote parts, cannot be readily mist n for the reddish, painful, small, straight, and kn d lines passing in the direction of, and enlarg , the lymphatic glands, above the seat of the c plaint. In neuritis and neuralgia the pain is r e acute or pungent than in phlebitis, and the pearances observed in phlebitis are not pres , especially the œdema of the parts below the t of pain, &c. When the consecutive or cont nating effects of phlebitis supervene, the v fever, the dusky, sallow, and discoloured skin, e diarrhœa, the rapid weak pulse, delirium, , although assuming the form of adynamic fe , may be distinguished from this latter by the a cedent local symptoms, by the causes, and by e whole history of the case.

35. viii. The Prognosis.—The danger of phl tis is always considerable, because, although it i y no means imminent as long as the disease is me y local, yet infection and contamination of e blood, on which great danger depends, may u pectedly and suddenly supervene. The sympt s

ed above (§ 16. *et seq.*), as indicating this
nination of the blood, and more especially
which attend consecutive or diffuse abscess
lungs, liver, or other organs, are always
of extreme danger. Cases presenting signs
rnal consecutive abscess are irremediable.

3 ix. PATHOLOGICAL INFERENCES. (*a*) — The
y to phlebitis as a consequence of the ope-
of any of the exciting causes, or even
t any other cause than that which favours
ability, is great in proportion to the amount
morrhage, or of vascular depletion, which
en the result of the injury or incision of a
— (*b*) Persons addicted to the abuse of in-
ting liquors, or of tobacco, are more liable
s malady than others; and the liability
ls to those who are weakened or anæmied
-existing disease, or who are of an unhealthy
hectic habit of body. — (*c*) In the circum-
s now stated, and in convalescents from,
en in the advanced stages of, exanthematous
dynamic fevers; in the course of acute
atism, of pulmonary consumption, and of
es of the womb and its appendages, blood
coagulate in some situations in the veins,
either to its remora, or to its altered state,
lefective vital power in such situations, and
nflame the inner coats of the vein in which
gulates. — (*d*) The passage, or imbibition of
nt, ichorous, sanious, putrid, or tubercular
r into a vein or venous capillary may either
late the blood as it circulates onwards in a
s trunk, and in consequence of this coagu-
inflame the vein; or the morbid matter
rritate, inflame, or poison the internal surface
e vein, the inflammatory exudation from the
coats of the vein coagulating the blood in it,
iling in this, contaminating the blood cir-
ng through it. It must be difficult to de-
ne the exact sequence of results, and pro-
either or all may supervene. — (*e*) The morbid
tions in the veins may extend far along the
from the seat of injury, as that produced by
-letting, or even to the vena cava, or to the
itself; and they may proceed also in an
ite direction, or beyond the injured part,
gh rarely to any considerable distance; the
ssue, however, is not owing to this extension,
gh aided by it, but is chiefly the result of
ntamination of the blood, and of the effects
ced by this contamination on the organs
ssues of the frame. — (*f*) Consecutive diffuse
s in the viscera, suppuration of joints, &c.,
t occasioned by the transmission and depo-
of purulent or other morbid matters from
ed veins, or absorbed from primary seats of
ration, caries, or other disease, but are the
quences of acute asthenic inflammations of
viscera or joints caused by the thus poisoned
ntaminated blood. — (*g*) The sequence of
d phenomena, or the succession of alterations
the commencement of irritation and inflam-
n in the vein, until the disorganisation con-
nt upon the diffusive suppurations ultimately
ced in the viscera or joints, is accelerated by
s which lower vital power and diminish the
nt of blood circulating in the body.*

37. II. TREATMENT OF PHLEBITIS. — The concluding one of the above inferences will indicate the principles which, in my opinion, should guide our practice in phlebitis. The following circumstance may have had some influence in directing my attention and influencing my views regarding this important subject. When in London for a short time, in August 1815, I had occasion to converse with a well known public man of that time, who informed me that he had been, about thirty-five years previously, a patient of JOHN HUNTER, he having suffered an attack of inflammation of the veins after venesection, which had been twice repeated, to a large amount, for pneumonia; and that the inflammation supervened on the last blood-letting. But it was not only the occurrence of the phlebitis after the last depletion which made the impression on my mind, but chiefly the treatment which he informed me had been prescribed by JOHN HUNTER in his case. This consisted, as he stated, of preparations of bark conjoined with other medicines, and of a very liberal allowance of port wine — upwards of a bottle daily — until he recovered. This treatment was altogether so different from what was generally taught in lectures and surgical works, that I continued to reflect upon it, and to contrast it with the means of cure, which I afterwards saw adopted on the Continent and in this country, for this disease, and which are still recommended in surgical and medical works. When it is considered that a very large proportion of the diseases of the puerperal state, and most of the fatal cases of amputation, proceed from inflammation of veins, and from the imbibition of purulent or sanious matters by the veins into the blood, inflaming the veins and contaminating the circulating fluids, or in other words, producing effects to which the term *pyæmia* has recently been applied, but with little regard to pathological accuracy, the importance of determining the true intentions and principles of cure for this malady must be apparent. Upon what rational grounds can we advise, as very generally advised, large local and general depletions, and a strictly antiphlogistic regimen for a disease which is frequently a consequence of such depletions and regimen?* Upon what therapeutical principles can means be recommended for the prevention or cure of phlebitis that tend to promote the imbibition, or absorption, and the circulation of morbid or poisonous fluids in the blood, to prevent the formation of a healthy lymph whereby the extension of the disease may be arrested, and to prostrate the vital resistance opposed by the constitution to the contamination, not only of the blood, but also of the soft solids? — and to the production of all these effects the means usually advised for phlebitis

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* he above inferences formed the conclusion of a
read before the Medical Society of London, in
nd were arrived at after an observation of many cases of phlebitis in France and Germany during 1815 and 1816, and during 1819 and 1820; and, after duly considering the treatment which was there generally adopted. These inferences, as well as the treatment which I have recommended in consonance with them, have always been given in my lectures on Practical Medicine, from 1824 until 1842, when I ceased to lecture.

* "Les premiers accidents inflammatoires que l'on observe sur le trajet d'une veine seront immédiatement combattus par les antiphlogistiques les plus énergetiques: Saignées; applications de sangsues en grand nombre, et plus ou moins répétées, suivant la force des sujets, fomentations émollientes, tels sont les moyens qu'il convient de mettre d'abord en usage." (Art. VEINE, Inflammation, in *Dict. de Méd.*, 2d ed.)

most certainly tend. With what rational intention are means prescribed to arrest the extension of inflammation of the veins and the contamination of the blood that actually and incontrovertibly favour both these results, and that have a more certain tendency to accelerate, if not to cause, a fatal issue than the natural course of the disease itself? The operation of the means of cure in this disease require to be studied and ascertained with as great care as should be devoted to the pathological changes and the consecutive alterations which constitute the nature, and occasion the imminent danger of the malady. An empirical treatment of phlebitis more frequently increases than diminishes the danger; and such empiricism, whether in phlebitis or in any other disease, being the result of ignorance, increases the number of fatal cases, and generates and perpetuates in the mind of the practitioner who is thus imperfectly informed, a scepticism in which he takes refuge, and under which he attempts to conceal his ignorance and to debase his vocation. The sceptic in medicine is ignorant not only of the nature and procession of morbid phenomena, but also of the operation of remedial agents. He is incapable of forming rational views, and is quite impotent as to their accomplishment. He therefore decries what he feels himself incapable of performing, and instead of relinquishing his efforts, he endeavours to impute his failures to the imperfections, if not to the total inefficacy, of the science; and by continuing his practice, and by thereby perpetuating his wants of success, he persists in furnishing evidence, not only of his own incompetency, but also of the insincerity of his professions; he at once admits that he practises a lie; that he professes to perform what he has no hopes of performing; that he may delude, but that he cannot cure. But, leaving the medical sceptic to luxuriate in his practice and in his belief, and advising him to reconcile the former with the latter, if this be possible in any other way than by relinquishing the one in favour of the other, I proceed to consider those indications and means of treating phlebitis, which extensive opportunities of observation disclosed; opportunities, however, in which I was then an observer only, not an actor, and which furnished more numerous proofs of a practice which ought to have been carefully avoided, than evidence of any resulting benefit.

38. i. A View of the Treatment which has been advised for phlebitis may, not without some advantages, precede the consideration of the means which I have long believed to be the most appropriate to this malady. Former writers have generally advised very opposite means for the different stages of the disease, for the local affection, and for the general infection of the frame consequent upon it. Thus we find in one of the ablest treatises on diseases of veins (in *Dict. de Méd.*, 2d ed.) which have recently appeared, it is recommended to have recourse to general blood-letting, to the application of leeches in great numbers, and more or less frequently repeated according to the strength of the patient; to emollient fomentations; to refrigerants; to the application of ice, or to cold effusion to the seat of inflammation, in the first or local period of the disease; and, in order to second the effects of this rigidly antiphlogistic treatment, the application of large quantities of mercurial ointment so rapidly affect the salivary glands.

39. M. Pasquier and others have had course to the application of narcotics local the form of the decoction of poppy-heads, taining the watery extract of opium, or to si applications, placed along the course of th flamed veins, and frequently renewed, so as always wet. M. Bonnet, of Lyons, has recourse to a very opposite treatment; vi the application of the actual cautery to the where the vein is wounded, in order to pr the absorption of pus from the inflamed But the cases which he has adduced in supp his practice are too few and inconclusive to f upon them so novel a plan of cure.

40. The local treatment advised by Hunter, and advocated by Abernethy, I Velpeau, and others, had for its object to pr the extension of the inflammation toward heart, by enabling the constitution to thro coagulable lymph at the inflamed part, by m of which the blood might be coagulated, o vein obstructed. Compression of the vein a the seat of inflammation was likewise ad with this intention. These measures often successful, but they often also failed. The r dies prescribed, however, with this view, wer always appropriate to the period of the dis or to the constitution and habit of body o patient, and were often resorted to at a too vanced stage, when the blood had already be contaminated, and when means calculate neutralise or to counteract the contamination to depurate the blood, were required. M. schet attacked this very rational indicatio method, of arresting the extension of the in mation, by contending that it was most dif to obtain an adhesive form of phlebitis by me treatment. But the supporters of John Hun doctrine had more extended views than the development of the adhesive form of the di by enabling the constitution to throw out co lable lymph. They knew, or at least hoped, the lymph effused would favour the coagul of blood in the inflamed veins, whereby the culation in these veins would be entirely structed, and the extension of the inflamma as well as the contamination of the blood, w be either delayed or prevented, as they also k that the best means of limiting inflammatio any surface, more especially in that of circul vessels, were those which supported or devel constitutional power and vital resistance to impression of injurious agents.

41. If the views as to the treatment of local stage or changes in phlebitis were diverse, those proposed for the second stage that of vascular infection and contamina were no less so. The young pathologists of in this matter displayed their accustomed i nuity; but beyond this quality no further p can be awarded them. Some, relying upon experiments of MM. Leuret and Hamont, stated that the injurious effects of pus inje into the veins of animals were delayed or vented by repeated blood-lettings, proposed mode of evacuating the morbid matters cont nating the blood; but they failed in showing these matters could be removed with the b which was taken away, without leaving the s

rtion in the blood which was left in the body.
ate of those who were thus treated may be
y predicated. Then was proposed the oppo-
ystem ; namely, to engorge the patient with
its, by means of which the poisonous mate-
may be diluted, their action rendered less in-
us, and their elimination promoted by means
skin and kidneys. M. Piorry, the apostle
s doctrine, in his mémoire on "pyohémie,"
æmia, adduced some evidence in its support.
lue promotion of all the depurating functions,
nly those now named, but also those of the
ines and liver, by suitable means, and by
opriate combinations, are important remedies
e second stage of this malady, but in most
more even than these are required.

4. Some writers have supposed that the mor-
aterials which have passed into the blood
be neutralised by disinfectant or similar
s, such as the chlorides ; and in certain forms
may be of service, and may with some reason
sorted to. But upon what rational grounds
epeated emetics, or antimonials, or mercurials
vised, unless upon the pure empiricism which
sed on imputed, but very doubtful success ?
writers have dreaded the prostration of vital
r, and its consequences, in the second stage
lebitis, and have had recourse to tonics,
ially to the preparations of cinchona, to
and various restoratives. The propriety of
practice cannot be doubted, especially if
ed at a sufficiently early period, and if con-
l with means appropriate to existing patho-
l states and to the circumstances of individual

ii. Treatment advised by the Author.—
estion, preliminary to entertaining the sub-
of treating phlebitis, suggests itself, namely,
re any plan by which the disease may be pre-
l ? Phlebitis is most frequently a consequence
nputations and similar operations, and of
tions on the veins themselves. Of these
venesection is the most common efficient
. From long and diversified observation I
onvinced that, when phlebitis follows vene-
n, this operation ought not have been per-
d, the states of the constitution and of the
ation actually not requiring it ; and that
as more especially been the case when it
een repeated more than once, or when the
lar depletion has been carried too far. Most
e fatal cases of amputation result from
itis and its consequences. Now, what are
ircumstances which favour the occurrence
lebitis after amputations ? These are chiefly,
he shock given to the constitution by the
tion ; 2d, The anæmied state of the system,
he exhaustion of vital power in many cases
e time when the operation is performed ;
he collection of purulent matter under the
and bathing the surface of the stump, and
ouths of divided veins ; 4th, The state of the
sphere in hospitals, wards, and places in
the operation is performed and the patient
fined ; 5th, The treatment immediately after
peration ; and 6th, The means used to pro-
insensibility. Each of these requires a few
rks.

(*a*) The shock produced by the opera-
especially when great or prolonged, is not
the result of reduced vital power, but also the cause of coagulation of blood in the veins and of the injurious action of the coagulated blood on the coats of the vein (see Art. Shock). Hence the more severe and prolonged the shock the more likely are these effects to be produced.

45. (*b*) Many cases require amputation, under unfavourable circumstances, and in others it is so long delayed, owing to the fears of the patient, until these circumstances are developed. When the constitutional power and vital resistance of the patient to disease are reduced, and the blood altered by impaired depuration and imperfect sanguification — when organic nervous energy is depressed, and the blood diminished in quantity, in crasis, or in red globules, or impaired in quality — then a predisposition to phlebitis, when the veins are implicated in surgical operations, is thereby produced.

46. (*c*) The collection of purulent matter under the flaps, often favoured by the union of the integuments, acts most injuriously upon the internal coats of the veins ; and it may even be partially absorbed by the mouths of the veins in the surface of the stump, thereby producing pyæmia and its usual results. These effects are the more likely to occur in cases where vital power is greatly reduced, or where the quantity of the blood is much diminished, and the quality much impaired ; and where the patient breathes a close or contaminated atmosphere.

47. (*d*) The injurious influence of a foul air in cases where veins are implicated in surgical operations is sufficiently manifest ; and the frequency of phlebitis and pyæmia in hospitals, both civil and military, from this cause, is often greater than is supposed. I witnessed this influence and its effects in numerous instances soon after the Peace of 1815, both in France and Germany ; and, in many more, neither the cause nor the effect was recognised. The treatment also in these circumstances, and immediately after operations implicating veins, was often injurious and calculated to occasion the mischief which it was intended to prevent. At the period now alluded to, notwithstanding the writings of John Hunter, phlebitis and its consequences were but imperfectly understood. It was not until a few more years had elapsed that the pathology of the disease was fully investigated, and up to a very recent period, and even to the present time, neither the prevention nor the treatment of phlebitis has been satisfactorily illustrated. It has been a much too general practice to have recourse to a too strictly antiphlogistic treatment and regimen after amputations, thereby aiding other causes in producing phlebitis and pyæmia. The extent to which such treatment, however, should be carried, or how far its opposite should be adopted, as well as the means by which constitutional power may be promoted, and vital resistance to the invasion and extension of phlebitis be upheld, must depend upon the circumstances of individual cases and the acumen and experience of the physician.

48. (*e*) The means used to produce anæsthesia during surgical operations, not improbably may favour the occurrence of phlebitis and pyæmia. This topic requires careful examination. A recourse to those means has its advantages and disadvantages. The former are, the greater readiness of the patient to submit to an operation at a time when it is most likely to be successful, and the

feeling in the mind of the surgeon that he is not inflicting suffering. The latter are, the depressing influence of anæsthetics on vital power, the extinction of that amount of pain in operations, which, when not too long protracted, tends to develope a salutary reaction and to favour the prevention of injurious changes after the operation; and, more especially, the alterations produced in the constitution of the blood by the passage of the anæsthetic vapour into it. These disadvantages were urged by me on several occasions immediately after the discovery of the means of producing complete anæsthesia, and subsequent observation has confirmed my opinion respecting them.

49. From the above it will be inferred, that the avoidance, as far as may be, of the several circumstances which favour the production of phlebitis, is of great importance; that all operations implicating veins should be performed in as healthy a state of the system as may be possible; that vital power and resistance should be supported and not depressed; that all contaminating influences should be avoided; that the healthy constitution of the blood ought to be studied before and after such operations, and nothing done to alter it; and that the confidence of the patient in a successful result should be upheld, and roused or increased when depressed. Conformably with these propositions, it will be manifest, that a pure, dry, and temperate atmosphere; perfect repose of a limb or a part in which a vein has been injured or wounded; protection of a wound in a vein from the access of the atmosphere; and a healthy discharge of the digestive and depurating functions, and physical and mental quietude, are amongst the most essential means of preventing phlebitis, and of counteracting or neutralising many of its causes.

50. i. TREATMENT OF THE FIRST OR LOCAL PERIOD OF PHLEBITIS. — This should vary with the causes of the inflammation, with the symptoms complained of, with the habit of body of the patient, with the presumed extent to which the disease has advanced, and with the situation of the inflamed vein. The causes and seat of the inflammation equally forbid general depletion; and, unless in very plethoric or robust subjects, even local depletions are seldom required. Pain and tenderness are rarely removed by them, even in these subjects, and never in persons otherwise circumstanced. Fomentations, especially those usually applied, sometimes assuage the pain, but they favour the extension of the inflammation along the vein, and prevent or diminish the chance of procuring the occlusion of the vein by the production of coagulable lymph in the inflamed part. The *chief objects*, as to the local affection, are, to diminish inflammation and its usual products in the part; to render these products as little injurious as possible by causing occlusion of the vein, and, by these means, to prevent the contamination of the blood and the supervention of the second stage of the disease by the usual exudations which take place into an inflamed vein. The means which are most to be depended upon for the fulfilment of these intentions are generally those which also remove the more distressing local symptoms; and, whilst they thus act, they tend equally to promote the *three objects* now proposed. The local as well as the
constitutional means may be varied to meet
exigencies of particular cases, and the circu
stances just alluded to; but even whilst the
ease is still local, internal remedies should
prescribed, as well as local applications. Th
latter have been, for the cases which have co
under my care since the commencement of
practice, either one or other of the *liniments* p
scribed in the APPENDIX (see Form. 295, 2
297. 300. 307. 311.) applied in the form of
embrocation over the seat of the phlebitis,
means of two or three folds of flannel or
spongeo-piline; or an epithem of spirits of turp
tine, or the embrocation prescribed at p. 1152. of
third volume, applied in the way now stated;
access of air to the wounded vein being assi
ously prevented.

51. Whilst either of these embrocations is be
applied, internal means should be prescri
with due reference to the state of vital power
vascular action, and to existing morbid sensibi
and irritability. Care, however, should be
that the medicines prescribed are not such as
occasion vomiting or excessive action of the bow
as either or both will promote the passage of
products of inflammation into the blood, or r
der these products more likely to pass into
circulation. The medicines prescribed intern
during this period, should have for their m
objects to prevent the extension of inflamma
along the veins, and to assuage pain and irr
bility: the former of these can be attained
by developing vital power and resistance;
the means best calculated to attain this end
be conjoined with those which affect the la
object. With these intentions I have not ur
quently prescribed the following, varying
individual substances with the varying circ
stances of individual cases.

No. 367. ℞ Quinæ Sulphatis; Ferri Sulphatis;
phoræ, āā. gr. xij.: Pilulæ Galbani comp., ℈ij.;
Opii, gr. vj.; (vel Extr. Hyoscyami gr. xviij.); Pulv.
sici, gr. xij.; Bals. Peruviani, q. s. M. Contunde
et divide massam in Pilulas xxx., quarum binæ suma
4tis vel 6tis horis.

No. 368. ℞ Ferri Sulphatis; Quinæ Sulphatis, āā
xv.; Camphoræ, gr. xij.; Extr. Hyoscyami, ʒss.;
Aloës purif. gr. xij.; (vel Pilulæ Aloës cum My
℈j.); Pulv. Capsici, gr. xij.; Olei Cajuputi, q. s.
et contunde bene. Divide massam in Pilulas xxx.
piat æger ij. 4tis vel 6tis horis.

No. 369. ℞ Liquoris Ammoniæ Acet. ℥j.; Spi
Ætheris Nitrici, ℥ss.; Ammoniæ Sesqui-Carbon.
(vel Spirit. Ammoniæ Aromat. ʒijss.); Tinct. Cinc
comp. ʒvj.; Tinct. Serpentariæ, ʒijss.; Tinct. Ca
ʒss.; Infusi Cascarillæ (vel Decocti Cinchonæ
℥viij. Misce. Cochlearia ij. vel iij. larga sumantur qu
vel sextis horis.

No. 370. ℞ Olei Terebinthinæ, ʒijss.; Spiritus Æt
Sulphurici comp. (vel Ætheris Hydrochlorici)
Tinct. Camphoræ comp. ℥ss.; Olei Cajuputi,
Pulv. Tragacanth. comp. ʒiij.; Pulv. Glycyrrh.
Syrupi Rosæ et Syrupi Tolutani, āā. ʒij.;
Cascarillæ (vel Infusi Cinchonæ) ad ℥viij. Mis
Capiat æger Cochlearia ij. vel iij. larga 4tis vel 5tis h

No. 371. ℞ Potassæ Bi-Carbon. ʒij.; Ammoniæ
bonatis, ʒss.; Tinct. Cinchonæ comp. ʒvj.; Tinct.
pentariæ, ʒij.; Tinct. Capsici, ʒss. ad ʒj.; Infusi
Decocti) Cinchonæ ad ℥viij. Fiat mist. cujus cochl
ij. vel iij. larga sumantur ter quaterve in die.

52. An apparently high or tumultuous
cular action, or an open, broad or even boun
state of the pulse, should not deter from a reco
to these or similar means; for these phenon
will much more readily subside under the influ
of these, than of those of an opposite nature;
vascular action is often the greatest and the

tu ultuous, when vital power is most deficient, es cially when any part of the vascular system is flamed. By developing and increasing vital po er by suitable means, in these circumstances, w more readily overcome or appease morbidly in ased vascular action. Although it is not de able to produce much action on the bowels, sti the depurating functions should neither be m ired nor arrested. Hence the remedies may be ombined as in No. 368., in order to prevent th esult; or equal parts of castor oil and oil of tu entine may be taken on the surface of an ar atic water, or these substances, in larger qu tity, may be administered in an enema.

3. During the local limitation or period of he isease the system sympathises with the local mo id action, occasioning much febrile disorder, wh h, although the above means may not for so time either diminish or increase, will not pas into that adynamic condition which readily su venes upon a lowering treatment of phlebitis, ow to the effects of such treatment upon the oc morbid action and to the passage of the infl mmatory products into the blood. If, how- eve notwithstanding the means, local and con- tit onal, now advised, the inflammation of the vei either extends, or produces a puriform fluid, or cachectic habits of body an ichorous or san us exudation, which readily passes into, and con ingles with, and contaminates the blood, the mo strenuous efforts should be made to support vita power and resistance, to counteract or neu- ral the injurious action of the contaminating mat ials, and to remove them from the circulation y ans of the depurating organs.

5 In this, the *second or contaminating* period of disease, the treatment will necessarily vary with he states of the several depurating functions —t hose of the skin, bowels, and kidneys. The exc ions from these must be frequently examined; and e means of cure prescribed appropriately to thei everal conditions. If the urine presents an acid action, the mixture No. 371. last advised may e continued, with or without the addition of he lorate of potass or nitrate of potass or both. f t urine be neutral, or alkaline, or contain he osphates in excess, then the nitro-muriatic acid may be given instead of these and of the alka s contained in that prescription. If the skin e dry, or parched, or hot, the mixture No. 69. will generally increase the cutaneous unc ns, especially if promoted by suitable dilu ts (§ 56.). When it is manifest that neit the hepatic nor the intestinal functions are ficiently discharged, then the pills already pres bed may be given; or pills containing a ull se of calomel and camphor may precede ith them, or the castor oil and turpentine drau t and enema above recommended (§ 52.) If the bowels become inordinately re- axe the tonics already mentioned or others may e c joined with astringents, small and frequent lose of creasote, absorbents and antacids, and vith ncture of opium, or with compound tincture of c phor; or with any of the several remedies advi l for DIARRHŒA OR DYSENTERY (*see those Arti s*), according to the features of the case. It s uld not, however, be overlooked, that re- axa n of the bowels is a mode of vascular dep tion, especially when the hepatic functions are uly performed, and that this relaxation should not be arrested, unless it increase, or reduce the patient; but be moderated only, constitutional power being duly supported by the means already prescribed, aided by suitable nourishment, and by a sufficient supply of wine, at regular intervals.

55. In these and similar cases evincing not only great depression of vital power, but also more or less deficiency in the quantity and quality of the blood, the quinine, or the decoction of cinchona, chalybeate preparations, and other restoratives, may be given in increased or more frequent doses; and wherever pain, oppression, or uneasiness may be manifested, the embrocations advised above should be applied and renewed from time to time. In these and analogous states the tonics will be advantageously conjoined with camphor, ammonia, aromatics, &c., and with opium in moderate doses.

56. The *diet, regimen,* and *beverages,* prescribed for the patient ought to be restorative, and calculated to promote nervous power. Rich wines, brisk, bottled malt liquors, or bitter ales; soda-water or Seltzer-water with wine; the alcaline and chalybeate mineral waters; spruce beer and weak tar-water; Carara or lime water with warm milk, &c., are the beverages which will be found most beneficial. Free ventilation, and a warm, dry, and pure air are also most important aids of medical treatment. In most respects the treatment of the *second stage of phlebitis* is the same as that which is most efficacious for *consecutive abscesses* (see art. ABSCESS, §§ 62. *et seq.*), for the effects of *absorption of morbid matter* from diseased organs and structures (see ABSORPTION, §§ 15. *et seq.*); for *inflammation of the* LYMPHATICS (§ 17. *et seq.*), and for the consequences of animal or food POISONS (§§ 427—456.)

II. STRUCTURAL LESIONS OF VEINS.—CLASSIF. IV. CLASS. III. ORDER (*Author in Preface.*)

57. *a.* Inflammation of veins occasions *redness*, or a reddish brown or violet tint of their coats. But similar changes, usually however of a more uniform character, are often produced in these vessels after death, by the imbibition of the colouring matter of the blood. Indeed, this is the most frequent source of the different shades of colour observed in the veins, these shades varying with the state of the blood, and with the period after death at which the examination had been made. The redness proceeding from this source is much more frequently met with in the veins than in the arteries, evidently owing to the constant presence of blood in the former after death. This change, however, differs, in pervading all the coats of the veins, whereas it is generally confined to the inner membrane of the arteries. Redness, therefore, unaccompanied with other changes, cannot be considered as a proof of disease.

57*. The veins, like other parts of the body, present alterations arising from the secretion of coagulable lymph or albumen. This plastic and organisable matter, in which a number of morbid formations originate, is frequently found in the veins, either extended into membranes or accumulated in amorphous masses. It is always to be viewed, particularly when connected with redness or vascular injection, as a result of the inflammatory act. The experiments which M. GENDRIN instituted upon the veins as well as upon the arteries have illustrated this point.

58. *b. Coagulated lymph* is found — 1st. In the interior of the veins; 2nd, between their coats; and 3rd, on their external surface. When this is considerable, or obliterates the canal of the vessel, it generally becomes partially organised, and is changed to cellular tissue, if the life of the patient continue for some time. When the lymph is secreted in smaller quantity, so as not to interrupt the circulation in the vessel, it generally presents the form of a firm albuminous layer, without any trace of organisation; but in some instances, as pointed out by Ribes, Gendrin, and Andral, it forms a delicate membrane, and presents evident traces of organisation, being traversed by minute vessels. The surface of the vessel opposed to those membranes is sometimes, most commonly in the more recent cases, of a deep red colour; but in other cases, particularly those of older date, it is perfectly colourless. The coagulated albumen thus formed in the interior of the vein may constitute small patches merely, or small circumscribed masses, or a complete continuous layer extending through the whole of one or several vessels. The polypous concretions described by Reil (*Fieberlehre*, bk. ii. pp. 215—297) belong to the second of those varieties.

59. *c. Purulent matter* is frequently found in veins. M. Andral states that coagulable lymph may gradually lose its physical characters, and be insensibly transformed into pus. That this may happen previously to the coagulation of the lymph, is possible; but we have no satisfactory proof of its occurrence, and least of all, after the coagulation of this fluid has taken place. Indeed, it must not be supposed that the purulent matter formed in the veins is generally, or even frequently, produced in this manner. When it is found in the veins, it evidently does not proceed from a transformation of the plastic matter already noticed, but from a modification of the morbid action of the extreme vessels which secreted that matter, and from a change in the vital condition and cohesion of the internal membrane of the vessel; this membrane being somewhat softened, and frequently tumified or thickened. When the purulent matter is formed from the vein itself, it is found — 1st, in the cavity of the vessel; 2nd, infiltrated between its coats, and 3rd, surrounding.

60. The purulent matter formed in the interior of the veins, is, however, more frequently conveyed there from some other part with the blood, than secreted by an inflamed vein. When detected in a vein, it is either pure, or mixed with the blood, or with coagula. When pus is found connected with coagula, it has been, in some cases, external to them, and in others, contained in them. This latter phenomenon has led to some speculation on the part of certain pathologists. M. Andral believes that pus contained within a coagulum has been formed there in consequence of some peculiar modification of the blood itself. But this is merely a supposition, and is opposed by the consideration that the blood-gobule can hardly be changed to a pus-globule, either during or after the coagulation of the blood. It is much more probable that the pus, whether poured into the vessel from its inflamed internal surface, or conveyed from a distant part with the blood, but particularly when it proceeds from the former source, is first form the blood coagulating around it, owing to s obstruction to the circulation in the vessel, o the effect produced by the morbid secretion the fibrine of the blood favouring its coagulati

61. The irritation and inflammation ducing suppuration of veins, arise from vari causes. These are stated when treating of infl mation of these vessels (§§ 6. *et seq.*), where I h shown that inflammation originating in a par a vein may be propagated both towards heart, and in the course of the smaller branc The connexion of redness, thickening, soften &c., of the coats of veins, with the formatio purulent matter in them, has been fully illustr by the researches of Ribes, Davis, Velpe Gendrin, Louis, Arnott, Lee, Tonnelé, Dance; and similar appearances have repeate come before me in the examination of fatal c of puerperal diseases. But pus is often forme the veins, without any change of structure their parietes; particularly in those veins wh arise in parts in a state of suppuration. I h observed in several cases, in which the uteru puerperal patients contained purulent ma either in its cavity or in its sinuses, the ute veins, and some of the veins into which t run, nearly filled with this matter. Similar pearances have been noticed by Dance, Lo and others. Abercrombie and Tonnellé h found pus in the sinuses of the dura mater cases of caries of the bones of the head, Pus has often been found in the veins near eased joints, suppurating fractures, and unhea stumps, by Ribes, Velpeau, and others. Bl chard long ago found pus in the vena cava a case of abscess of the liver. M. Gend found pus in the veins in the vicinity of ulcer the intestines. M. Andral has met with sim appearances. I have stated in the Art Dysentery, that abscess of the liver someti complicating that disease not infrequently ceeds from the absorption of pus from the u rated intestines into the veins, which, circula into the vena porta, excites diffusive or asth inflammatory action, rapidly followed by formation of purulent matter in the substa of the liver. This view is confirmed by the searches of M. Ribes, who has demonstrated t the villi of the intestines are principally c posed of minute branches of veins. M. And found, on the examination of a case of disea intestines and liver, the vena porta and branches lined with a false membrane. W purulent matter is formed in a part, and af wards conveyed into the veins, as in the instan now alluded to, their coats are in some c apparently sound, and in others inflamed or s ened, or their interior is lined with a false me brane, &c. In the latter cases, either the infl matory action has extended itself to the ve from the part primarily diseased, or the mor secretions which have passed into them h irritated and inflamed their internal membra at the same time that they have induced seri changes in the blood and system generally.

62. In asthenic or cachectic states of pl bitis, or when the cause is of a poisonous septic character, the exudation from the inte of the inflamed vein is neither plastic nor pu lent, and is so entirely of an ichorous and liq

re as to mingle readily with the current of circulation, and to rapidly contaminate and on the blood and the soft tissues, and to destroy In such cases discolouring of the inner sur-, and softening and thickening of the coats of vessel affected, with an altered appearance he blood — a dark, semi-coagulated or un-ulated condition of this fluid. In these s the blood is rarely, or if at all, coagulated, ery imperfectly coagulated in the diseased or veins, there is no plastic exudation on the nal surface, and no trace of pus in the vessel. injurious operation of this ichorous exudation celerated by the circumstance of its failing to uce coagulation of blood in the vein; for n the exudation is plastic or purulent a co-um is generally formed by these latter exu-ons; and this coagulum often prevents the nsion of the inflammation and contamination e blood and its consequences, whilst the rous and more liquid exudation hastens both most dangerous or fatal results.

2*. Thus the morbid states of veins may origi- either in themselves or in the parts in which veins commence; but, whether they be thus ary or consecutive affections, they exercise a erful influence on the system, and on distinct ns, both through the medium of the blood, by continuity of tissue.—1st. Purulent matter ted from an inflamed vein, or conveyed into veins from an adjoining part, may mix with blood, occasion febrile symptoms of an amic character, generally with colliquative pirations or diarrhœa, and be thus eliminated the circulation nearly as fast as it passes it, by the several emunctories. 2nd. This er, when once carried into the circulation, be secreted from it into the parenchyma of organ, the cavity of some joint, or even cellular or muscular parts. 3rd. Purulent er circulating in the vessels, whether the pus ules be metamorphosed or no, during their lation, may induce inflammatory irritation, uch a state of the capillaries of an organ or previously disposed to disease, as will be lly followed by the formation of purulent er in such part, or by disorganisation. 4th. mmatory irritation excited in the internal brane of a vein, more especially the asthenic s, may extend in every direction to other s, especially in that of the heart, and thus icate other organs or parts. This diffusive of phlebitis generally occurs in debilitated nhealthy states of the frame, or when the se is consecutive on other maladies, or caused eptic or poisonous agents. 5th. Inflamma- disease of the internal surface of the veins give rise to a secretion varying with the state e vital powers of the system, and this secre-carried along, and mixing with, the circulating ent, will remarkably influence those powers depress or otherwise modify them. 6th. In-mation attacking all the coats of a vein is likely to occur in a healthy body than that ined to the inner surface, and is more com-ly productive of an effusion of coagulable h, which tends to limit the inflammation, to ent the admixture of the products of inflam-on with the blood, and thus to preserve the d from contamination. 7th. This sthenic of inflammation most frequently occasions obstruction and obliteration of veins; and, if the obliteration be seated in large veins, serious local and general effects may result, owing to the mechanical obstacle thereby presented to the circulation.

63. *d. Softening* of the inner membrane of veins is often observed, and is generally conjoined with redness when it is the result of inflammation. Sometimes the softening is so great that the inner surface of the vessel is readily reduced to a pulpy state by gently scraping it with the back of the scalpel.

64. *e. Thickening* of this membrane is often associated with the foregoing changes; it may be either partial or general. In the former case the inner surface of the vessel presents an uneven appearance. But softening and thickening of the inner membrane of the veins are not always connected with redness; this membrane may present either of those alterations, or both of them, accompanied with paleness or with different shades of colour.

65. *f. The valves* of the veins are subject to the same alterations as the inner membrane. They are often deprived of their transparency, thickened, or partially destroyed; presenting the appearance of irregular fringes crossing the cavity of the vessel, and having generally coagulated blood adhering to them.

66. *g. The middle coat* of veins is often *softened*, generally at the same time as the inner. When this is the case, the vessel is torn with great ease. This coat is also subject to *atrophy*. When this exists the vessel presents an extraordinary degree of tenuity. *Hypertrophy* of the middle coat has been minutely described by M. ANDRAL. When this change exists, the coat is more distinctly visible, and its longitudinal fibres more evident. When the hypertrophy is considerable, this coat loses its transparency, acquires a yellowish colour, and becomes, to a certain degree, elastic, so that, when cut across, the vein remains open as an artery, to which it closely approaches in appearance. On minute dissection, however, the middle hypertrophied coat never presents any trace of circular fibres, nor does it possess the same degree of elasticity as the middle coat of arteries. M. ANDRAL states that he once detected, as he believes, muscular fibres in the vena cava inferior, near the heart; the cava was greatly hypertrophied. The hypertrophy in this case developed a structure similar to the natural condition of the vessel in some of the lower animals. In the horse, the structure of the vena cava near the right auricle is evidently muscular.

67. The middle coat, however, may be much thickened without actual hypertrophy or development of its fibres. This may arise from a deposition of fibrinous lymph in its texture, which becomes solidified by the absorption of its serous portion. M. ANDRAL accounts for this change by supposing that a quantity of blood accumulates in its tissue; that the colouring particles are absorbed, and the white fibrine remains behind in a solid form, combined, molecule to molecule, with the coats of the vein, presenting the lardaceous appearance described by authors as a particular tissue; but instead of having recourse to this complex explanation, would it not be preferable to consider this alteration as a result of chronic inflammatory action in the coats of the vein?

68. *h. The external coat* of the veins is subject to the same changes as have been observed in the external coat of Arteries, and which are described in that article (§ 44.) These alterations of both the middle and external coats are commonly seen after chronic phlebitis.

69. *i. Ulceration* and *perforation* of the several coats of the veins are sometimes met with. M. Andral thinks that the latter is more frequently observed than the former. Perforation has been detected in the superior cava, both within and without the pericardium; in the inferior cava; in the vena porta, both within and without the liver; in the splenic vein; in the jugular; in the subclavianæ; in the mesenteric veins, and in the veins of the extremities. The perforation is sometimes seen without any appearance of disease in the vicinity of the coats of the vessel, rupture taking place from external violence or muscular exertion. This form of perforation, or rather *rupture*, is most frequently observed in the vena cava and veins of the internal viscera. Instances of rupture of large veins are numerous. Schenck, Morgagni, De Haen, Doubleday, Groquier, Lovadina, &c., have recorded rupture of the vena cava. Morgagni also found the pulmonary vein ruptured. In the majority of these and other instances, the rupture was occasioned by exertion or external injury. It is probable, however, that the walls of the ruptured vessel had been previously diseased. In cases of perforation the vessel is commonly more or less inflamed, ulcerated, softened, atrophied, &c.; and here, as well as in the case of rupture from exertion or violence, the perforation occurs from within outwards; but the perforation may also proceed in a different direction; viz., from without inwards, as when the vein is seated in diseased parts, as in carcinomatous ulcers of the stomach, or is pressed upon by a tumour.

70. *k. The calibre* of veins may be much altered—may be increased or diminished—especially when their coats are diseased as described, the change of diameter occurring in the parts of their parietes which are affected. (*a.*) *Dilated or varicose veins* present a variety of appearances:—1st, The veins may be simply dilated, in respect either of a whole vein, or of portions of it, without any affection of the capillaries which nourish it, but more frequently with chronic inflammation of its coats: most probably the dilatation is the consequence of inflammatory action, this state disappearing, but the dilatation continuing. 2nd, They may be dilated, either uniformly or at intervals, with thinning of their parietes. 3rd, They may be dilated and their coats thickened, either uniformly or at intervals, the vessel being generally also lengthened and consequently tortuous. 4th, They may be dilated and divided into compartments by the interposition of septa or partitions, between which the blood stagnates or even coagulates. 5th, They may be dilated, divided into compartments, and the dilated portions perforated, so as to allow the blood to pass into the cellular tissue surrounding the vein. M. Andral thinks that the tumours described by the name of *erectile* are in reality nothing more than a cluster of small veins communicating with one another and with the surrounding cellular tissue by the perforations situated as now described.

71. The structure of every variety of hæmorrhoidal tumour may be referred to one or o
of the foregoing varieties of dilatation or var
but these lesions are not confined to the veins
the vicinity of the anus. M. Andral once fo
the external jugular altered in the manner
scribed in the last variety. In some cases
tumours occasioned by dilated veins disapp
spontaneously. When this occurs, the veins
generally obliterated. Some of the above ki
of varix, according to this pathologist, dep
upon increased activity, others upon diminis
activity of the nutritive process. Such, howe
can be rarely the case. They are gener
the results of pressure on the venous trunks
which the varicose veins pour their blood, o
some other obstruction to the circulation thro
the former vessel. In this case the varicose v
are not only greatly dilated and elongated,
their parietes are also hypertrophied.

72. (*b.*) *Contraction* and *obliteration* are, acc
ing to M. Andral, much more common than t
dilatation. These lesions are occasioned,—
by obstruction in the interior of the veins;
by causes seated in their parietes; and 3rd
mechanical compression external to them, g
rally from tumours, &c. The most frequent c
of the obliteration of the canals of veins is
spontaneous coagulation of the blood within
veins. That the blood may coagulate, during
life of the patient, within a vein or portion
vein, and even within the sinuses of the
mater, has been proved by the researches of m
pathologists, particularly by Meckel, Gend
Bouillaud, Ribes, Andral, Cruveilhier,
nott, Reynaud, Rokitansky, myself and ot
It has occurred in several which have come be
me in practice, especially in the advanced st
of low fevers, of acute rheumatism, of puerp
diseases, and in dysentery. It is often difficu
assign the particular cause of the coagula
It is, in some cases, apparently owing to the
state of the vital energies and their effect on
blood. In other cases it is probably occasi
by the morbid state of the valves already
ticed (§ 65.), or to lesion of the internal
rietes of the vessel. Most frequently, howe
it proceeds from coagulable lymph or pus secr
from the internal surface of the vessel; this mo
secretion adhering to the inflamed surface
ducing it, entangling the fibrinous and colou
parts of the blood, and thus forming a coagu
which either partially or entirely obstructs
canal. This coagulum generally varies in col
density, and firmness of adhesion to the side
the vessel; and it increases in bulk until the
sage is entirely obstructed by it. Occasion
the coagulum becomes, in some respects, c
nised. Some of the pathologists whose nam
have just adduced, suppose that these coa
live precisely as the veins in which they
formed, and, like every other part endowed
life, keep up a constant process of nutrition
secretion, and are also liable to become disea

73. The canal of a vein may be altoge
obliterated, and the vessel reduced to a fi
cellular chord. This seems to be effected
similar way to that observed in arteries. Ol
ration of large venous trunks gives rise, as
served in arteries, to a collateral circulation,
up by means either of small veins, or of one v
that has acquired an unusual size. The

r arkable instance of obliteration was observed b M. REYNAUD in the superior vena cava. The v is on the lateral surface of the chest were ren kably enlarged, and anastamosed freely with t epigastric veins, which were also greatly enl ed. The circulation was carried on chiefly b the vena azygos and inferior cava. The cons uences of obstruction and obliteration of veins, e ecially œdema and dropsy, are well known. S eral instructive cases of obliteration of the cav of the vena cava, of the iliac veins, and of t sinuses of the dura mater, are recorded by B RTHOLINUS, RHODIUS, MANTISSA, BONTIUS, A INUS, HALLER, MORGAGNI, HODGSON, BRESC ET, WILSON, TONNELLÉ, REYNAUD, ANDRAL, a ROKITANSKY.

4. *l. Ossific* or *calcareous* formations are rarely m with in the coats of the veins. They have, h ever, been observed by MORGAGNI, WALTER, M RRAY, BAILLIE, and TILORIER, and more re ntly by MACARTNEY, BECLARD, and ANDRAL, ir he femoral and saphena veins. Sometimes th e concretions protrude into the cavity of the v el, either bursting its internal membrane, or ca ying this membrane before them. In either ca they may at last escape into the cavity and lo e there, without any attachment to the sides o he vessel ; for, in the latter case the membr e may contract behind the concretion, formin t first a peduncle attaching it to the vessel, w h at last is ruptured or absorbed.

5. These concretions have received the name of *Phlebolithes* ; they vary from the size of a m t-seed to that of a pea. They have someti s been found in the centres of coagula, w h had evidently been formed around them. T y have been observed by COLUMBUS, WALTER, S MMERING, JOHN, and LANGSTAFF. F. TIEDEM N has described them minutely. Those w h he has observed, as well as those noticed by he pathologists just now named, were formed in e uterine and hæmorrhoidal veins. TIEDEM N and ROKITANSKY state that they are formed of ncentric layers of the phosphate and carbona of lime, sometimes with magnesia, united by al minous matter, around a minute clot or co ulum ; and denies that they are formed in th way which I have just stated (§ 74.) ; and co end that they have been produced by a sort of rystallisation, or deposition, of the earthy pa cles contained in the blood, around a nucleus w h had formed in the nearly stagnant blood in he veins. M. ANDRAL also considers it po ble that they may have been formed in the bl d itself. It is difficult to assign limits to the ra e of possibilities, without relation to the fai of those for whose belief they are adduced ; bu he question is, whether or no these concretions ha ever been actually ascertained to have been for ed in this manner. I believe that no such fac has ever been adduced.

6. *m. Fatty, suety, and atheromatous deposits* ha been found in the parietes of veins, but not ne y so frequently as in the coats of *arteries*, wl e I have first described them (§§ 59, 60.). B RIUS states that he has met with large masses of t in the vena cava, obstructing its canal. I ha sometimes found fatty and suety deposits be een the coats of the vena porta ; and M. A RAL has noticed similar deposits in this vein.

. *n. Tuberculosis* does not occur either in or on the coats of the veins. If any tubercular matter, or substance resembling this matter, be found within the veins, it can proceed only from imbibition or absorption. But before this matter can be imbibed it must be softened, or metamorphosed, and thus have lost the tubercular characters.

78. *o. Cancer* is met with in veins in two ways : — 1st. The walls of a vein may be attacked by a cancerous or carcinomatous growth, penetrated by, involved in, and closed or altered by this growth. The portal, renal, hepatic, and other veins may be thus implicated : — 2nd. The cancerous matter, especially when existing in other parts of the body, may constitute in a large vein, a variously formed mass, attached to the interior of the vessel, that may either partially or entirely fill and obstruct the canal. This cancerous formation obviously arises from the imbibition or absorption of the cancerous matter or cells into the veins, where they attach themselves and collect into masses of various sizes and forms. The œdema and swellings occurring in the last stages of carcinoma are, in some cases, attributable to this formation in the veins, and in others to phlebitis, produced by the imbibition of the cancerous matters.

79. *p. Gaseous fluids* have occasionally been remarked in the veins. In some cases they have proceeded from incipient putrefaction, but in others this could not have been the case. The vapours and gaseous exhalations from blood very recently taken, or at the time of its being taken from veins, and those found in veins after death, have not been sufficiently examined. They manifestly are such as demand a much stricter investigation than they have hitherto received. In cases of surgical operations, when large veins are divided, air not infrequently enters the veins ; and if it rush in suddenly, and in considerable quantity, it is soon followed by death. The experiments of MM. MAJENDIE and PIEDAGNAL have demonstrated this fact conformably with what has occurred during several operations ; but the mode in which this result takes place is not so evident. The air seems to act in deranging and arresting the contractions of the heart, and affecting the actions of the lungs.

80. *q. Entozoa* have been often found in the veins of the lower animals. The strongylus and filaria have been detected in the horse. M. ANDRAL found individuals of the class Nematoidea in the vessels of a porpoise. In one only case he found Acephalocysts (hydatids) in the pulmonary veins.

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Day, p. 335. *et seq. furnishes nothing additional to that contained Paper above referred to.*)

VENEREAL DISEASES. — Gonorr — Syphilis. — Synon. *Gonorrhœa*, *Ble rhagia*, *Phallorrhœa virulenta*; *Lues ve* Fernelius, Boerhaave, Juncker, Astruc, &c *Syphilis*, Sagar, Vogel, Cullen, Pinel, Y Swediaur, &c.;—*Syphilis venerea*, Sauvage *Lues syphilis*, Good; — *Siphilis*, Sprenge *Scabies venerea*, Locher; — *Lues syphilitica*, *bus Neapolitanus*, *Morbus Gallicus*, *Morbus reus*, Auct; — *Lustseuche*, *Venerische Kran* Germ.; *Vérole*, *Vérole commune*, *Grande V* *Maladie Vénérienne*, Fr.; — *Mal Francese* *Venerea*, Ital.; — *Pox*, *French Pox*, *Venerea* *ease*, *Venereal cachexia*.

Classif.—III. Class, I. Order (*Au in Preface.*)

1. Definit. — *Specific inflammations, or rations, or both, affecting primarily the orga generation of both sexes, and very frequentl whole frame, at subsequent and sometimes at r periods, and propagated by contact.*

2. Viewing venereal diseases as consi of two very distinct forms—distinct in their mary character and in their consecutive effe I shall very briefly notice, first, *gonorrhœ blennorrhagia*, or more correctly, *Blennorr specialis*, or *virulenta*, and afterwards *syphili Syphilis venerea*. The relations between two venereal diseases have been for ages discussed by both physicians and surgeons, are not even now entirely disposed of. T however, possess this in common, that they ar marily seated in the sexual organs, with very exceptions; that they generally result from pure sexual connexion, or contact; that they primarily either inflammatory, or ulcerativ both; and that in many instances the fram comes affected or contaminated by them, bu very different forms and grades, and much

requently in the one form than in the other. 'hese constitutional effects render them of equal nportance to the physician and to the surgeon ; nd although both may sometimes require surgical ppliances and aids, still they may be both cured y the prescriptions of the physician only, which lone are appropriate in the consecutive states of iese maladies.

3. I. GONORRHŒA. — SYNON. — *Phallorrhœa, hallorrhœa virulenta, Gonorrhœa virulenta, Blenorrhagia, Blennorrhagia virulenta.*

4. DEFINIT. — *A specific inflammation of an cute form, affecting the mucous surface of the rinary and sexual passages in both sexes, with a opious puriform or muco-purulent discharge, proagated by contact, and in some instances occasiong severe consequences.*

5. i. DESCRIPTION. I have shown, in the article AGINA and VULVA, that those parts are often the eats of a purulent or muco-purulent discharge, hich presents the following states or forms:—1st. *eucorrhœa*, or *Blennorrhagia*, the discharge arising om irritation or inflammatory action, of a nonpecific nature ; 2d. *Acute Gonorrhœa*, or *Blenorrhagia virulenta*, the discharge being the result f a specific inflammation, caused by the contact f this discharge ; and 3d. *Chronic Gonorrhœa*, or *leet ;* the discharge being more mucous or less uriform, and generally consecutive upon the cute form ; and unless when thus related, being istinguished with difficulty from leucorrhœa in ıe female ; its contagious property being doubtıl, unless the morbid matter acts on very predisosed parts. These forms and states of discharge re also met with in males. The *first* variety may e communicated by the female to the male, or to ıe former by the latter, owing to the fact of puriorm discharges, the result of inflammatory irriation of mucous surfaces being capable ofproucing a similar state of morbid action in similar urfaces when these discharges are allowed to reıain in contact with them. This result follows nly in a few cases, and probably only when the ecipient surface is predisposed to the infection. 'hus a non-specific blennorrhagia, caused by exessive sexual intercourse, or by the discharges of ıe female organs, may be distinguished with difculty from gonorrhœa, or acute specific blenorrhagia, and with still greater difficulty from hronic specific blennorrhagia, more especially hen the acute specific disease is not very severe, r when it is a renewed or a repeated attack.

6. *A. Gonorrhœa in the female* has been deribed in the article VAGINA AND VULVA (see § 8. 38.). The *chronic states* of the disease have een noticed by Mr. HOLMES COOTE in his very ble work on the treatment of syphilis. He emarks, “ that *chronic gonorrhœa* is a disease om which the lower order of prostitutes is rarely ee. It exists also among the better class, who ve highly, and drink without scruple. In geeral it disappears when the patient is kept on ıoderate and regular diet, and confined to bed ; but returns upon the least excitement,” &c., and is erpetuated by some internal ulcer or abrasion, notithstanding the treatment, until this latter lesion cured. The irritating discharge often causes an bundant growth of *soft vascular warts*, comıencing at the lower part of the vagina, near the rifice, and extending at the junction of the muous membrane and the skin towards the superior commissure. “The rapidity of this growth is quite striking. When removed by the knife they return within a few weeks, if the irritating discharge be allowed to continue.”

7. Amongst other cases adduced by Mr. H. COOTE, showing that a female suffering from gonorrhœa may remain for months uncured, unless a proper examination be made, and some lesion beyond the reach of ordinary inspection be detected and treated in an effective way, the following deserves a special notice. A young woman was admitted with a large growth of vascular warts from the external organs, and a copious puriform discharge. The usual means were applied, but they increased, and were removed by excision. The discharge, however, continued, a suitable treatment was prescribed, but the warts recommenced their growth, and the patient's general health declined. The os uteri was examined by the speculum, and it was found slightly ulcerated and abraded. Caustic was applied to this part. The discharge rapidly disappeared, the general health improved, and recovery was soon complete. In another case of chronic gonorrhœa, the usual remedies were employed with temporary benefit; but a recurrence of the symptoms invariably succeeded. When examined by the speculum, a large warty growth, soft, red, and vascular, was found two inches and a half from the orifice of the vagina. This growth was two inches in length, and an inch and a quarter across the base, springing from the anterior wall. It was removed by the knife ; immediate relief, and complete recovery soon afterwards ensued.

8. *B. Gonorrhœa in the Male.* This is not only a very painful and troublesome complaint, but, if injudiciously treated, it may induce changes, — or, rather, the treatment improperly adopted may occasion lesions unconnected with the disease, which may embitter, or even shorten the life of the patient. And during a somewhat lengthened period of observation I can assert, that numerous instances have become known to me of attempts made to effect a speedy cure having been followed by the most distressing and dangerous results. The complaint usually commences from three to ten days after morbid contact; and the shorter the period of its incubation the more severe the attack; the stronger dose of the virus hastening the effects. A slight itching is at first felt, then an irritation at the opening of the urethra, and afterwards a smarting pain, more or less severe, upon micturition. The lips of the urethra become tumid; a thin discharge, at first scanty, but soon afterwards more copious and puriform, flows from the passage. The corpus spongiosum urethra becomes thickened and unyielding, owing to inflammatory exudation into it; and when erection of the penis occurs, a bending downwards, or chordee, is produced. Hæmorrhage sometimes takes place during this state and affords partial relief; and occasionally irritation extends from the urethra to the glands of the groin, causing slight swelling, which very rarely goes on to suppuration, unless in scrofulous subjects.

9. A form of gonorrhœa — *gonorrhœa sicca* — is occasionally met with, both in the male and female, and has been described by Mr. ACTON and Dr. DRUITT; in which the mucous membrane of the female organ is red, swollen, and

tender, but free from discharge. In the male there are severe scalding and pain on passing the urine, painful erections, the lips of the urethra being red and swollen. This form of the disease has been called dry clap.

10. *C. Secondary effects and complications or consequences of Gonorrhœa in Females.*—Owing either to neglect, to improper treatment, or to constitutional vice, or to neglect of proper regimen, several very serious consequences ensue upon the gonorrhœal disease. Most of those which occur in the *female* have been noticed in the articles UTERUS AND ITS APPENDAGES (§§ 43. 53. 122. *et seq.*), and VAGINA and VULVA (§§ 8. 13. 38.). These consequences are, chronic gonorrhœa, suppuration or abscesses in the labia, soft vascular warts (§§ 6, 7.), gonorrhœal inflammations of the cervix uteri, extending to the cavity of it and of the uterus along the Fallopian tubes to the ovaries, and even to the peritoneum; and, in rare instances, to the uterine veins. Gonorrhœal ophthalmia, and gonorrhœal rheumatism occur not less frequently in the female than in the male.

11. *D. The complications of gonorrhœa* sometimes observed in males are, 1st, *Balanitis* (from Βαλανος, glans), or *gonorrhœa externa,* is an inflammation of the surface of the glans and inside of the prepuce, with profuse purulent discharge and excoriation of the cuticle. This affection may be a complication of gonorrhœa, or may exist independently of it. In the former case it is produced by the gonorrhœal virus; in the latter by the want of cleanliness, and by the excoriations caused by the secretions of the part, which have become acrid by retention. In these latter cases the excoriations may be mistaken for chancre. 2d, *Phymosis* and *Paraphymosis* occasionally arise, owing to the swelling of the glans and prepuce. Œdema of the prepuce presents a semi-transparent or diaphanous appearance. These states, although often complicating gonorrhœa, not infrequently occur independently of it, especially as a consequence of self-pollution; and in some instances they lead to very serious results. They furnish additional reasons, to others which may be adduced, as to the propriety of circumcision during infancy. 3d, Irritation or inflammation of the lymphatic vessels, extending to the glands of the groin, is a common association of the disease; but the affection of the lymphatics may be so slight as to be imperceptible, although the glands may be much swollen, inflamed, or even suppurate. 4th. The mucous follicles of the urethra may be inflamed and obstructed, and may even suppurate and burst either into the urethra, or externally, or both. In these cases, very serious obstruction to the discharge of urine may occur. 5th. The inflammation may extend along the urethra to the prostate gland and neck of the bladder, and even along the ureters to the kidneys; or it may give rise to acute abscess of the gland and great suffering, especially during micturition, to strictures, &c. 6th. More frequently, inflammation extends along the vas deferens, causing swelling of the epididymis, or swelled testicle.

12. Gonorrhœa is always most severe on its first occurrence, and in young and robust subjects and in the irritable and scrofulous constitutions and habits. In these it is often attended by severe inflammatory fever and disorder of the urinary functions; and it may even prove dangerous to life, by inducing extensive inflammation and a
cesses in the vicinity of the prostate and bladc
"But after repeated attacks the urethra becor
inured to the disease, and each subsequent inf
tion is generally (although not always) atten
with fewer of the symptoms of acute inflammati
In some instances, the constitutional affection
extremely anomalous, and characterised by sev
and continuous rigors," or by slight remittent or
termittent rigors and paroxysms of febrile reacti

13. These complications, and more especia
those about to be noticed, are chiefly to be ascril
to the local and constitutional influence of
virus or infecting agent, an influence manifes
in some cases more prominently than in othe
and not observed in cases of simple urethri
Certain of the above complications are, howev
merely the local extension of the gonorrho
inflammation, often owing to the causes ab
alluded to. Other complications or consequen
of the disease are of a constitutional and v
serious nature. MR. HOLMES COOTE, in a w
published whilst this was being written, corrol
rates the view I have taken in the article VAGI
and VULVA (§§ 8. *et seq.*), as to the specific nat
of gonorrhœa. This very able and rising surge
remarks,—"Is the disease the consequence of t
application of a simple irritating fluid to the m
cous membrane, or is there a morbid poison acti
on the parts locally, and capable of being absor
into the system? I must confess there appears
me to be a most marked difference between sim
urethritis and true gonorrhœa, as we daily see
among those exposed to contagion." Gonorrh
in some cases occasions peculiar secondary aff
tions, which never proceed from simple urethrit
and not only is it occasionally followed by t
local complications just mentioned, but also
one of the very severest forms of inflammation
the conjunctiva (see art. EYE, *Gonorrhœal Infla
mation of*, §§ 56. *et seq.*), by the most severe a
obstinate form of rheumatism (see art. RHEUM
TISM, *gonorrhœal* (§§ 44. 163.), and by a form
papular eruption. The occurrence of purule
ophthalmia, or of rheumatism, or the extensi
of inflammation from the urinary bladder alo
the ureters to the kidneys, is of a most serio
nature, as respects both the immediate effects a
the more remote consequences.

14. ii. TREATMENT. — *A. Of Gonorrhœa in t
Female.* — A copious use of diluents and dem
cents; a farinaceous and vegetable diet; avoidan
of fermented and spirituous liquors, and of salt
provisions; a recourse to alkaline and refrigera
substances in mucilaginous drinks, and repose
a cool couch or mattress, are generally sufficient
remove the severer symptoms in a few day
especially when aided by the following loc
treatment judiciously advised by Dr. DRUITT:
"During the acute stage, rest in the recumbe
posture, fomentations of decoctions of popp
heads with chamomile flowers, frequent ablutio
lubrication with lard or cold cream, and ve
frequent sponging with a weak solution of alu
a piece of lint dipped in which should be insert
between the labia, with laxatives and diaphoretic
are the measures until heat, pain, tenderness, su
side; afterwards injections of nitrate of silve
and sulphate or acetate of zinc should be used,
recommended for the other sex, and they shou
be continued for some time after all discharge h

eased." (DRUITT's *Surgeon Vade-mecum*, &c., . 175.)

15. If the disease become obstinate and *chronic*, ie vagina and cervix uteri should be examined y the aid of the speculum, as the disease may be rolonged by lesions of the cervix or of its canal; id when this is the case, the means advised for such sions, in the article UTERUS (§§ 124, 125.) should e resorted to. In *chronic* cases, the solution of ilphate of alumina, or decoction of oak-bark, or oth conjoined, may be used as a lotion. Copaiba id cubebs may be given thrice daily in a mix-ure with mucilage, the spirits of nitric æther, id either mint-water or camphor julap, in the ironic, as well as in the advanced progress of ore acute cases. In the former, preparations of on, especially the tincture of the sesquichloride iron, or the tincture of the ammonio-chloride ay be preferred. In irritable and sanguine tem-eraments, camphor conjoined with nitrate of otash, with acacia and henbane, is often of much rvice, and may be prescribed in the form either pills of a mixture or draught.

16. *B. Treatment of Gonorrhœa in the Male.*—). Dr. DRUITT has advised, as a *prophylactic eatment*, that a person exposed to the chances infection should wash out the anterior part of e urethra with a syringeful of some astringent tion. I much doubt the complete success of is plan, or of the more usually adopted one of icturating immediately after sexual connection: th plans may, however, be often successful. any fissures or excoriations are perceived they ay be touched with lunar caustic, and dry lint ay be applied.

17. (*b*). *The abortive treatment of gonorrhœa*, an attempt to cut short the attack by means of ong injections, has been advised by some ex-rienced surgeons. Ten grains of nitrate of ver, or four grains of the chloride of zinc, to e ounce of distilled water, have been prescribed th this object, when the disease is only com-encing, and before scalding on micturition is perienced, or when the acute symptoms have ssed. Mr. ACTON employs the nitrate of silver, d has recourse to only one or two injections rformed by himself with due precautions. He ver prescribes this treatment in cases of a first ection; and he states that he has not observed e injurious effects which have been supposed to sult from it. For the modes of using, and the ecautions to be taken when using, this treatment, nust refer the reader to Mr. ACTON's able work. r. HOLMES COOTE considers it not quite free m danger to the urethra; and he remarks that should be remembered that it is in cases where e structures of the urethra are damaged that icture occurs; the usual effects of gonorrhœa, their acutest form, pass away, if not aggravated, thout leaving any structural change. "At the mmencement of the disease large doses of the ctura ferri sesquichloridi, or of the citrate of n and quinine, have been pronounced effectual cutting short the discharge; and such remedies ssess the advantage of inflicting no damage, if y do not produce the anticipated amount of od."

18. (*c*). *In the first or early stage of gonorrhœa* e antiphlogistic diet and regimen should be ictly enforced; and demulcents containing alka-s and refrigerants freely allowed, with the other means already noticed (§§ 14. *et seq.*). Cooling aperients ought to be taken from time to time; walking and horse-exercise should be prohibited, and the patient confined to a cool sofa or mattress. The penis and scrotum should be supported by a suspensory bandage, and be kept constantly wet with tepid or cold water. If the acute symptoms have not appeared, M. RICORD recommends, according to Dr. DRUITT, the following plan, in order to arrest the course of the disease:—"Let the patient inject the urethra regularly once in every four hours with a solution of two grains of nitrate of silver in eight ounces of distilled water; let this be repeated twelve times, desisting, however, sooner if the discharge is rendered thin and bloody, which is the ordinary effect of the nitrate. Then let an injection of the sulphate of zinc be substituted, and be continued until the discharge ceases. At the same time the patient should take a mild aperient, and after it, three times daily, a dose of copaiba or cubebs." He should continue a strictly antiphlogistic regimen for a week or ten days after all trace of the discharge has disappeared. The penis should be wrapped in a piece of rag dipped in water. Dr. DRUITT proceeds to remark, that the "manner of injecting is of no small consequence, as the efficacy of the lotion depends entirely on its application to the whole of the diseased surface; and, as Dr. GRAVES observes, the ordinary opinion that gonorrhœa is limited to the anterior extremity of the urethra is unfounded and mischievous. The patient should be provided with a glass syringe, with a long bulbous extremity, and having filled it, should introduce it for about an inch with his right hand. Then, having encircled the glans penis with his left forefinger and thumb, so as to compress the urethra against the syringe, and prevent any of the fluid from escaping, he should push down the piston with his right forefinger, letting the fluid pass freely into the urethra. The syringe should now be withdrawn, but the orifice should still be compressed, and the fluid be retained for two or three minutes; after which, on removing the finger and thumb, it will be thrown out by the elasticity of the urethra. It is always worth the surgeon's while to *see* that the injection is properly used."

19. (*c.*) *In the second stage* the diet and regimen already advised should be continued. The patient may drink soda-water, barley-water, linseed tea, gum-water, and other mucilaginous fluids, containing alkaline carbonates and sedatives, and the bowels should be kept freely open. If much pain or chordee be complained of, the following pills may be taken night and morning, and the mixture occasionally through the day:—

No. 372. ℞ Camphoræ ℈j; Potassæ Nitratis ʒjss.; Extr. Hyoscyami ʒj.; Mucilag. Acaciæ q. s. Misce et divide in Pilulas xxxvj. Capiat duas vel tres pro dosi.

No. 373. ℞ Potassæ Bi-Carbon ʒjss.; Potassæ Nitratis ʒjss.; Spirit Ætheris Nitrici ℥ss.; Tinct. Hyoscyami ʒij.; Mucilag. Acaciæ ℥jss.; Syrupi Tolutani ℥ss. Mist. Camphoræ ad ℥viij. Misce. Sumantur Cochl. ij. vel iij. ampla ter in die.

No. 374. ℞ Liq. Ammoniæ Acetatis ℥j.; Spiritus Ætheris Nitrici ℥ss.; Potassæ Nitratis ʒjss.; Tinct. Hyoscyami ʒij.; Mucilag. Acaciæ ℥j.—Syrupi Althææ ʒvj.; Mist. Camphoræ ad ℥viij. Misce. Capiat Cochl. ij. vel iij. Larga, 4tis vel 6tis horis.

20. The last of these prescriptions will be found serviceable in the most acute or inflammatory cases, and when the urinary organs become affected. In these cases a number of leeches should

be applied to the perinæum, or above the pubes, or near the groins. In this stage of the disease injections should not be prescribed. For first attacks, and in young, strong, plethoric, or irritable subjects they may be injurious. Refrigerants, diluents, demulcents, alkalies, and sedatives, are then chiefly required.

21. Dr. Druitt advises that the bowels should be opened by a dose of calomel at night, and some castor oil in the morning; and that a grain or half a grain of calomel, and one eighth of a grain of tartar emetic, and ten grains of Dover's powder, should be given every night whilst there is much pain and chordee. As soon as the patient is free from fever, he should take copaiba or cubebs. The former, in capsules, may be given before a meal, as it is then not likely to cause eructations. Mr. Acton prescribes copaiba and cubebs in the following combinations: —

No. 375. ℞ Bals. Copaibæ ʒvj.; Magnesiæ Calcinat. ʒjss.; Extr. Hyoscyami ʒss.; Pulv. Camphoræ ʒj.; Theriacæ ʒiij.; Micæ panis ℥jss. Misce. Fiat Electuarium. Capiat Cochl. j. minimum ter in die.

No. 376. ℞ Pulv. Cubebæ ℥jss.; Bals. Copaibæ ℥ss; Extr. Hyoscyami ʒss.; Magnesiæ Calcin. ʒjss. Pulv. Camphoræ ℈ss.; Theriacæ ℥j. Misce. Fiat Electuarium. Capiat Cochl. j. min. ter in die.

22. The last of these is altered from Mr. Acton's prescription, and the dose of camphor reduced one half. Cubebs, when taken in very large or frequent doses, generally diminishes the discharge, and remarkably relieves the other symptoms in a short time; but when employed alone, the disorder often returns after some time, especially if it be relinquished, or the dose much diminished. Cubebs should therefore be conjoined with copaiba, or other substances, in mucilaginous mixtures; or the tincture of cubebs may be substituted for the powder, as in the following draught: —

No. 377. ℞ Copaibæ ♏xv.; Mucilag. Acaciæ ʒjss.; Pulv. Cubebæ ʒj.; (vel Tincturæ Cubebæ ʒjss.); Spirit Ætheris Nitrici ♏xxv. — Liquoris Potassæ ♏xv. Aquæ Menthæ Piperitæ, et Mist. Camphoræ, āā ʒv. Misce. Fiat Haustus ter in die sumendus.

23. *d.* Several unpleasant *complications* occasionally appear in the course of this stage. Painful *erections* and *chordee* are the most common. They may be treated with tepid or cold application, and by narcotics and refrigerants given internally. Antimonials may be prescribed with small doses of camphor, nitre, and henbane or opium; and a little extract of belladonna, or lint wet with the tincture of belladonna may be applied over the course of the urethra at bed time. *Hæmorrhage* from the urethra often affords relief. If, however, it becomes excessive, it may be readily checked by cold applications, and by pressure. Inflammation of the mucous glands, or in the cellular tissue external to the urethra, may be poulticed; and if *abscesses* form, they should be opened early, or as soon as they obstruct the flow of urine. *Swellings* of the glands in the groin are generally removed by rest, and seldom require the application of leeches.

24. *If Epididymitis*, hernia humoralis, or swelled testicle, supervene, Mr. H. Coote believes "that the best plan is to strap the testicle at once, after the fashion represented in the work of Mr. Acton. A layer of collodion over the strapping is often useful. The relief thus afforded to the patient is surprising, and the swelling will often subside to one half in twenty-four hours. T
application of cold, either by cold lotions or by
careful use of pounded ice and salt in a bladd
tends to relieve pain, subdue the inflammati
and reduce the swelling. When in consequen
of pain this treatment cannot be carried out,
may fall back upon the practice of leeching
testicles, and of administering emetics. Noth
reduces inflammation of these organs m
promptly than this, but the treatment is seve
When induration remains after the acute st
has passed, pressure is more serviceable th
frictions, whether of mercury or of iodine; b
may, however, be employed." (H. Coote,
port, *&c.*, p. 34.)—Since 1824, for the cases
specting which I have been consulted, I h
ordered an emetic, afterwards an aperient, and
mixture (No. 374.) last prescribed; and, two
three days afterwards, full doses of the iodide
potassium in the above alkaline mixture (
373.). Iodine is rarely of use when emplo
externally in this disease.

25. *d. In the third stage*, or when the ac
symptoms have subsided, the injections advised
the first stage may be prescribed. If these
or if the discharge returns, injections with w
solutions of the sulphate or acetate of zinc o
copper, or of the bi-chloride of mercury, and v
the addition of vinum opii, may be employ
These solutions should vary in strength with
circumstances of the case; but if either of th
occasion severe pain, their strength ought to
much reduced.

26. If the disease becomes *chronic*,
passes into *gleet*, a long-continued treatmen
generally required to remove it, however judic
the means may be. The habits of the pat
should be strictly regular and temperate, and
made with venice turpentine, or with tar, or
copaiba and liquorice powder, may be *emplo*
About thirty years ago I *prescribed* magnesia
the preparation of pills with these substances,
they became so hard after a short time as t
often passed from the bowels undissolved.
these fail, camphor, with sulphate of iron, or
sulphate of zinc, kino, or catechu, and small d
of creasote, may be taken in the form of pi
or the tincture of the muriate of iron, with
tincture of quassia or of calumba, may be gi
in any suitable vehicle. If micturition be
quent or painful, or if the urine deposits
mucus, the preparations of buchu, pareira,
uva ursi, are generally indicated. In mos
these cases the cold salt-water douche, or
bath, sea-bathing, regular and generous liv
suitable tonics, and chalybeate mineral wa
will be of essential service. If the disease
remain obstinate, or if involuntary emissions
cur, blisters to the perinæum, the introductio
a bougie, or other means which fall within
province of the surgeon, may be employed.

27. *e.* The *diet*, *regimen*, and *beverages* of
patient during acute, subacute, and chronic go
rhœa, should be strictly enforced. In the *a*
and *subacute* stages, constant repose on a
sofa or bed, and on a hair mattress; a diet
stricted to vegetable or farinaceous food in
moderate quantity; the careful avoidance of ac
exercise, more especially of exercise on h
back, and of heating beverages. The fluids t
should be cooling and demulcent. Weak b

ea, barley-water, weak veal soup, effervescing agnesia-water, or potash or soda-water, &c., may e allowed. In the *chronic stage*, or state of leet, tar-water, spruce-beer, Dantzic spruce, the fusion or decoction of the tops of the spruce-fir, amphor-water, with nitre, &c., may severally be ken. They will tend to promote the effects of e medicines prescribed for this state.

I. Syphilis — *Siphilis, Sprengel and H. Mayo — Lues venerea*, Auct.

28. i. History of. — Medical writings furnish o precise or undoubted accounts of this distemer until the appearance of the epidemic towards he close of the fifteenth century in the south, nd soon afterwards through all, of Europe. n that and the following century, venereal ruptions occurred so commonly after infecon, not only by sexual congress but also by ontact, that the disease was regarded as a conagious malady affecting primarily and chiefly he skin. At the present day, and for a long time ast, these eruptions and the other affections hich sometimes accompany or follow them, are uch less frequent, and appear after a longer eriod from the primary infection than they did ormerly. This circumstance, as well as some ther modifications of the characters of the disemper, as described by the earlier writers, may e referred to the long transmission of the distemer by contagion, the venereal poison having hereby lost something of its original influence, nd to its having, during many ages, been almost xclusively transmitted by the intercourse of the exes, and without general infection, or not by the manations or secretions from the secondary afections, unless under peculiar circumstances ereafter to be noticed (§§ 109. *et seq.*).

28*. As to the long agitated subject relative to the arly history of syphilis, it is quite unnecessary to nter further than to notice a few of the authorities ho have supported opposite opinions regarding . Galesius (*De Podagra et Morbo Gallico*, 4to. on. 1637); Beckett (*Philosoph. Trans.* No. 357. 65.); Plenk (*Beobachtungen, &c.* ii.); Hensler *Geschichte der Lustseuche &c.*, b. i. 1783); lein (*De Morb. vener. curat. in India Orientali*, am. 1795); Stoll (*Prælect.* p. 94.; Thierry, ichter (*Chirurg. Biblioth.* v. i. p. 163.); and any others, have severally contended, but with sufficient evidence, for the existence of syphilis om remote antiquity, but in a sporadic form, efore the discovery of America, and before its ccurrence in an epidemic form at Naples in 495. De Blegney even believed that it was nown to Moses; F. Valesius (*Ann.* iv. p. 57.), at it caused the baldness and ulcerations of the ce ascribed by Tacitus to Tiberius; Lefevre *Hufeland, N. Ann.*, b. i. p. 309.), that it had xisted 800 years before Columbus; Schenck *bservat.* l. vi. 217.), that it had been obrved as far back as 1270); Alcazer (*Haller's iblioth. Med. Pract.* ii. 197.), that it was an cient disease, and that it was epidemic in 1456; chaufus, that it was brought from India into urope by the gipsies; Clavigero (*Storia Antica*, iv. 1781), that it was not imported from merica; and Delius, that it was an ancient alady, but was sporadic, and became epidemic y its complication with camp diseases at the end the fifteenth century.

29. The first author who contended that syphilis was a variety of leprosy was M. Cumanus, in 1495. He considered it identical with the leprosy of Campania, described in the 13th century by Papia of Lombardy. A similar opinion was entertained by S. Aquilanus in 1497, by Camperio, Lange, Biondi, and Dodonæus, early in the 16th century; and was supported by Zacutus Lusitanus, Maynwaring, and Musitanus in the following century.

30. That the distemper was brought from America by the followers of Columbus was asserted by several writers in the commencement of and early in the sixteenth century, especially by N. Poll, L. Schmauss, et U. Ab Hutten, and by many others. This opinion as to its origin was very ably supported by Astruc, and Girtanner (*Abh. von der Lustseuche, &c.*). It was, however, denied by Sanchez (*Abh. Ueber der Ursprung Venussenche, &c.*, Bremen, 1775), who argued that an indigenous malady could hardly be brought to Europe and there become epidemic; by Sarmicuto (*loc. cit.* i. p. 67.); and by Hensler (*Geschichte der Leustseuche die zu Ende dis.* 15. *Jahrh. in Europa Ausbrach.* Altona, 1783). More recently Desruelles (*Op. cit.*) has contended for the antiquity of the disease, and denied the importation of it from America. Desportes (*Hist. de Malad. de St. Dominique*, t. ii. p. 61.), Lagrange, Sloane, and numerous others, however, have shown, that a disease resembling syphilis was prevalent in Hispaniola when visited by the Spaniards, and was brought into Europe by them from 1493 to 1495. Astruc states that in the Neapolitan, or rather in the Spanish army, there were not a few of the soldiers who, returning from the Indies, either in the first voyage with Columbus, in the month of March, 1493, or in the second with A. de Torrez, in the beginning of 1494, or in the third with P. de Margarit, at the end of the same year, were still infected with the venereal disease, or at least had contracted it in Spain, after it had been brought by others into Europe. And therefore it is by no means strange that many of the Neapolitans should be infected with the same distemper, as they served under the same colours, and conversed with the same females who followed the camp. Hence he concludes, that the disease was communicated from the Spaniards to the Neapolitans,— from both to the French,—and from all three to the other European nations, and to most of the people of Asia and Africa; though he believes that, under the torrid zone, there are some countries where it seems to have been a native and an endemial disease. (*De Morbis Veneris*, vol. ii. 4to. Paris, 1740, lib. i. cap. &c.) Sanchez de Ribeiro, in 1765, contended that syphilis originated in Europe, and assumed the epidemic form in 1493. He was the first to shake the belief in the American origin of the malady, and was followed by Hensler, who believed it to have been intimately connected, in origin and nature, with the leprosy of antiquity, which he regarded as the precursor, in western Europe, of syphilis at the end of the 15th century. Richter (*Chirurg. Biblioth.* b. i. p. 163.), however, contends that syphilis was an ancient disease, and was imported into America by the Spaniards. But there is no sufficient evidence of such importation by the Spaniards, whereas evidence is furnished by Astruc

and others, that a similar distemper was prevalent in the West Indies and America amongst the natives when first visited by Columbus, and that they treated it with the same medicines as were found most successful subsequently by the Spaniards and other Europeans. That this distemper existed in America, in Western Africa, and probably also in other inter-tropical countries, before the discovery of America, appears to have been conclusively shown by numerous writers, although in more or less modified forms, according to race, modes of life, and numerous circumstances; and that it still exists in these forms, as a most prevalent and contagious distemper, in these countries, cannot be doubted. It was considered as being not improbable that the milder states of the disease prevalent in some of these countries, and in Hispaniola, when first visited by the Spaniards, assumed in the latter, as well as in other Europeans, a much more severe character, especially when they became associated with scurvy, or with leprosy, then so prevalent in Europe, or with other epidemic or endemic diseases, or when the distemper first infected different races from those in which it had first originated, using different kinds of food, adopting different modes of living, and observing very different social and domestic habits, &c. That the disease is modified by these causes, by climate and by treatment, even at the present day, cannot be disputed, —and hence, most probably, it may have resulted from those distempers, which are denominated syphiloid by several writers, which are characterised by the most prominent features of constitutional syphilis, and which are different forms of syphilitic cachexia, arising out of those circumstances, in connexion with differences of race, with climate, habits of life, modes of communication, &c. (§84. *et seq.*).

31. In addition to these opinions as to the history of syphilis, another had been from an early period entertained by several writers, but had received little attention until it was supported by D. C. G. Gruner, who has inquired into the early history of syphilis with great learning and candour; and has described the symptoms of the disease, as it appeared in Italy in 1493 and 1494, and the ways by which it was propagated. From his account, or rather, according to the authorities he has adduced, it appears that syphilis was then a much more acute, rapid, severe, and complicated distemper, than in modern times; and that it was communicated in its several constitutional forms, not only by sexual intercourse, but also by kissing, by sleeping in the same bed, by contact, especially with parts covered by eruptions, by shaving with the same razor, by drinking from the same vessel, by inhaling the breath of the infected, by the clothes, particularly woollen, of the diseased, and even by contact of any part of the body. The sudden appearance and rapid extension of the malady, the medical men of the day were at a loss to account for. As to the opinion that diseases of the genitals were at all times an occasional or sporadic result of impure sexual connection, Gruner remarks, "Hoc quidem certum ac indubitatum est, homines nunquam sibi temperasse a venere vulgivaga, ideoque ab historicis stupenda narrari exempla, quin sub finem seculi xv increbrescere vitia genitalium venereis similia, sed ea fere leprosa. Hæc vero, nisi de verbis disceptare volumus, ut ferri quidem et defendi possunt, ita etiam corpora fuisse apta ad recipiendam cont gionem affinem satis declarant. Medici enim chirurgi horum temporum bene versati in cog tione morborum cutaneorum, cum maximæ lepr tantum non omnes novitatem morbi mirantur stupent, et similitudine quorundam symptomatu opinantur eam esse lepræ proximam, vel in ea tandem transire; leprosi vero Gallico morbo c reptos cane pejus ac angue fugiunt et proc abesse jubent. Ex hoc, ni omnis fallor, certissi colligitur, fœdum morbum non fuisse omnino eu dem, sed paullo diversum et a causa quadam i solente productum. Quam in venere impura p se latuisse vix affirmandum est." (*Op. cit.* xv.)

32. Gruner contends that the opinion as the introduction of Syphilis in Europe from Am rica cannot be sustained, inasmuch as it cann be shown, that the distemper was in 1493 endem in America in the form in which it existed Italy; that, if the foul ulcers and buboes observ in the latter existed in the former country, th should have been manifest in those aborigin brought to Europe; and that a malady import into Spain by a few individuals from Americ could not in the same year have been transmitt to Italy and there so rapidly spread the devast tion which it was said to have produced. H therefore asserts that the evidences furnished b Fulgosus, Sabellicus, Nauclerus, Leo Afr canus, and others respecting the expulsion of t Moors and Jews from Spain in 1492, and the five preceding years, and the fearful distress and distempers consequent upon this expu sion, are sufficient to account for the appea ance and rapid dissemination of syphilis in Ital and in other countries. These writers state th the disease was brought from Africa into Spai and that, when Ferdinand expelled the Moors an Jews from Spain, from 1487 to 1492, it assume a severe and epidemic form, owing to the di tresses experienced by these emigrants. It is ex pressly stated by Nauclerus, "In itinere abe untium Judæorum triginta millia pestis absumsi Eodem tempore etiam Marrani (Moors) Rom ad portam Appiam morati effecerunt, ut in con tinenter pestis invaserit urbem, mortuique sun quam plurimi ex peste et contagione dictoru Marranorum, de quibus tota urbs impleta est." Gruner therefore infers from these and oth authorities that the diseases to which the genital were liable, owing either to impure connexion o to leprosy or other causes, were developed into pestiferous form by the distresses and other cir cumstances connected with the expulsion an emigration of the Moors and Jews, that the dis temper in this malignant form was disseminate throughout Italy,—the French army which in vaded Italy in 1493, bringing it with them on their return to France, and that it spread rapidl from thence and from Italy to other countries.*

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* As it is manifest, in the present state of our knowledge, that syphilis is caused by a specific poison o contagious agent, originating, as far as we know, in th secretions of the sexual organs, and generally communicating the disease by sexual intercourse, but sometimes also by contact under different circumstances, and in different stages of the malady, and even to the fœtus; that syphilis will not produce gonorrhœa, although bot diseases are often associated; and that gonorrhœa will not give rise to syphilis, although like syphilis it is generally caused by sexual intercourse, but capable of bein propagated by contact in other ways; so it follows, tha conclusions respecting the origin of the one disease can-

33. The question still remains unanswered as o the origination of the syphilitic disease brought by the Moors and Jews from Spain into Italy. It has been, as stated above (§§ 30—32.), acknow-

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ot apply to that of the other. For being thus distinct, lthough sometimes associated, and generally propa- ated in the same way, it is very probable that these dis- empers may have originated in different epochs and in ifferent circumstances. Admitting that syphilis was rought into Italy in 1492 by the Moors and Jews ex- elled from Spain, when it was developed into an epide- ic and an acute distemper either by the sufferings nd other circumstances of these emigrants, or by its eing engrafted on or becoming associated with some ther malady, as leprosy, camp fever, scurvy, &c., accord- ng to the evidence furnished by Gruner; or that sy- hilis was imported in the following year into Europe om Hispaniola, where it had long existed as a specific isease, although manifesting various modifications in s primary and consecutive phenomena both there and ill more remarkably in Europe, still there appears to e no sufficient evidence that *gonorrhœa*, also a specific isease, and known now as such, and existing most fre- uently unconnected with syphilis, either first appeared connexion with this latter distemper, or existed pre- iously to it. It is certain, however, that from an early eriod of the certain history of syphilis, or early in the 5th century, that gonorrhœa was mentioned as a equent complication, or prominent symptom of sy- hilis. It is very difficult to determine anything con- usive as to the origin of virulent or specific gonorrhœa, s most probably a puriform discharge was not an uncom- on result of impure connexion, or of sexual intercourse ith unclean, leprous, or otherwise diseased females in e early and middle ages. The descriptions of disease y most of the writers of these ages, as well as of those of e 15th and 16th centuries, are so vague as to give rise grave doubts as to their precise application, and though some of the accounts given by authors long efore the period at which this distemper was developed Italy seem to apply to gonorrhœa, yet their accounts e not complete in some respects, and fail in mentioning e association of a copious discharge, and of certain her contingent symptoms and consequences of the dis- se, although other symptoms which are certainly cha- cteristic of it are fully stated.

i. *The testimonies* which have been adduced as to the istence of Syphilis in Europe before the discovery of merica have been considered as conclusive by Becket, ensler, Swediaur, B. Bell, Desruelles, and alto- ether insufficient by Astruc and numerous writers in e 16th and 17th centuries. I may notice the follow- g amongst the former:— Gulielmus de Saliceto, in 270, states (in l. i. cap. 42. *De Apostemate in ingui- bus*), "Hæc ægritudo vocatur bubo vel dragoncella guinis vel apostema inguinis * * * * et aliquando m accidit homini in virgâ corruptio propter con- bitum cum fœdâ muliere, aut ob aliam causam. Itaque rruptio multiplicatur et retinetur in virgâ, unde non test natura mundificare virgam aut locum, primò opter multam plicaturam partium illarum et propter rictam viam illius loci, unde redit et regurgitat ma- ria ad locum inguinum propter habilitatem loci illius recipiendum superfluitatem quamlibet, et propter finitatem, quam habent hæc loca ad virgam."—Cap. . "*De Pustulis albis vel rubris, et de Milio et Scissuris, et de Corruptionibus vel hujusmodi, quæ nt in virgâ vel circa præputium propter coitum m fœtidâ muliere, aut cum meretrice, at ab aliâ usâ.*"

Lanfranc, of Milan, in 1290 (*in Artis Completæ Chi- rg.*, tract. iii. doct. ii. cap. 11.), asserts: "Sæpe pro- nire apostema in inguine propter ulcera virgæ et dum, propterea quod locus est descensus humorum ad a loca, et tunc non est ita timendum, propterea quod nire tunc potest sine multâ corporis plenitudine, et sque eo quod decursus humorum maxime ibi fiat." tract. iii. doct. iii. cap. 11., *De Ficu, et Cancro, et lcere in virga virili*, he adds: "Ficus est quædam crescentia, quæ nascitur supra præputium virgæ, et quando super caput, quæ quidem aliquando est mollis, de phlegmaticâ generatâ materiâ; aliquando dura ut Melancholicâ; quæ si corrumpatur, transit in can- um. Cancer fit in virgâ, sicut in aliis diximus fieri embris: ulcera veniunt ex pustulis calidis virgæ su- rvenientibus, quæ postea crepantur; vel ex acutis hu- oribus locum ulcerantibus; vel ex commissione cum dâ muliere, quæ cum ægro talem habente morbum de- vo coierat."

Bernard Gordon, in 1300, Professor of Medicine at ontpelier, remarks (*Lib. Med.* part. vii. cap. 5., *De assionibus Virgæ*):— Passiones virgæsunt multæ, cut sunt apostemata, ulcerationes, cancri, inflatio, lor, pruritus. Causæ sunt exteriores aut interiores. xteriores, sicut casus, percussio, et jacere cum muliere, jus matrix est immunda, plena sanie, aut virulentia, aut ventositate et similibus corruptis. Si autem causa fuerit intrinseca, tunc sunt sicut humores corrupti, et mali descendantes ad virgam, et ad partes inferiores, inducentes prædictus passiones."

John of Gaddesden, in 1310 (*Rosa Anglica, cap. de curâ ulcerum virgæ*) states: "Ulcera virgæ virilis contingunt vel ex coitu cum juvenculâ, vel ex coitu cum menstruatâ, vel ex retentione urinæ et spermatis."

Guido de Cauliaco, of Montpelier, in 1360 (*Chirurg. Mag.* tr. vi. doct. ii. cap. 7.), has a chapter, "de Calefactione et Fœtiditate in virgâ propter decubitum cum mulierâ fœtidâ."

Valescus de Taranta, Professor of Montpelier in 1400 (*Phil.* l. vi. cap. 6., *De Ulceribus et Pustulis virgæ*), describes these as follows: "Causæ possunt esse primitivæ, aut antecedentes, aut conjunctæ. Primitivæ, ut est vulnus, vel attritio, vel coitus cum fœtidâ, vel immundâ, vel cancrosâ muliere; alia causa potest esse portâsse femoralia nigra, fœtida et immunda; alia causa potest esse materia spermatica vel corrupta retenta inter caput virgæ et præputium, vel mali humores ibidem retenti, qui ibi retenti et non evacuati corrumpunt locum, quem tangunt, vel ulcerant." And again towards the end: "Pustulæ virgæ fiunt, si quis coeat cum fœminá habente ulcus in matrice, quæ contagio sitate suâ inficit virgam, et in eâ facit ulcus."

Petrus de Argelata, of Bologna, in 1470 (*Chirurg.* l. ii. tr. xxx. cap. 3. *De Pustulis, quæ adveniunt virgæ propter conversationem cum fœdâ muliere, quæ albæ sunt vel rubræ*) writes: "Ex materiâ venenosâ, quæ retinetur inter præputium et pellem virgæ causantur istæ pustulæ tales per hunc modum, quoniam ex retentione illius materiæ, quæ remanet inter pellem et præputium, ex actione viri cum fœdâ muliere, quæ non respirat putrefit; deinde ille locus denigratur et mortificatur substantia virgæ, quæ restaurationem non recipit, nisi corruptione illâ remotâ, et loco absterso." And then after prescribing certain detergent, styptic lotions, &c., for the cure of those pustules, he thus goes on:—"Unum recordor vobis, quod antequam ista balnea dicta (or lotions) ex vino illo styptico fiant, fiat purgatio, aliter illis bubo superveniret in inguine, quoniam materia quæ venit ad locum illum retropellitur à balneo isto (or rather lotion) et inveniens concavitatem inguinis illic moram facit; quare bubo generatur ad exituram pluries deveniet. Quare purgationem universalem facias; et imperiti medici sperantes indiscretè vel incautelâ non faciunt purgationem, quare duplici modo lucrantur, quoniam de virgâ et bubone. Iterum viri tales debentes materiam venientem ad locum resolvere, quærunt illud saniare ut aliquid lucrentur, et hoc non debet fieri à discreto homine et magistro."

That the above brief notices of ulcers on the penis and buboes in the groins refer to syphilis can hardly be credited, unless consecutive constitutional disease had also been described; but of this latter no evidence is furnished. However, it may be stated by the abettors of the non-mercurial treatment that these sores were actually venereal or syphilitic, no secondary symptoms appearing, owing to the strictly local and non-mercurial treatment adopted for their cure. Among the first writers who described the venereal disease, which appeared at Naples in 1494 or 5, and became epidemic over Italy, and rapidly spread throughout Europe, were Marcellus Cumanus, Nicolaus Leonicenus, and Coradinus Gelinus. Their works on this disease appeared in 1496 and 1497, and were followed by other productions in this latter year, in 1498 and in 1500, and in almost every successive year down to the middle of the 16th century. The writers were chiefly Italians, who describe the symptoms and treatment of the disease, assert it to have been an unknown malady previously to 1495, and speculate variously respecting its prevalence and rapid extension.

From these descriptions it is manifest that the distemper was virulently contagious; that it was communicated not only by sexual intercourse, ulcers appearing on the genitals, and followed rapidly by the most severe constitutional symptoms, &c., but also by contact of any part of the body of those infected, and by fomites, &c. Those who are desirous of becoming acquainted with the early history of this distemper — the most important chronic malady which infects the human frame — will consult with advantage the Collection of early treatises on Lues venerea, formed by Aloysius Luisinus, under the title, *Aphrodisiacus sive de Lue venerea, continens omnia quæcumque de hac re sunt ab omnibus Medicis conscripta*, 2 vols. in fol. Lugd. Bat. 1728. The dates of the first appearance of these treatises are, however, not always given by Lusinius. A *Supplement* to this work has been added in historical order by C. G. Gruner, entitled *Aphrodisiacus sive de Lue venerea: ejus* ledged by many who have visited the West Indies and inter-tropical America, that a syphilitic disease has prevailed from time immemorial in these islands and countries; and writers soon after the discovery of America mentioned the communication of it to the Spaniards, who carried it back with them to Europe. GRUNER states that at first he was inclined to believe this to have been the source from which it had been introduced into Europe; but, upon further investigating the history of the distemper, he was induced to relinquish this opinion in favour of the one he has espoused; but as to the question now at issue, he does not furnish a satisfactory reply further than that it was said by a few writers that the malady had long previously been introduced amongst the Spanish Moors from Africa, or brought from Africa by them. Now there can be no doubt that a syphilitic malady very similar to, or a slight modification only of the syphilis of modern times, was an endemic or indigenous disease in Africa long before the expulsion of the Moors from Spain, and most probably for many ages previously; and it is very probable that the disease existing amongst both Moors and Jews, even to a slight extent, may have been developed into a most prevalent, pestilential, or epidemic condition by the circumstances connected with the emigration, and with the military invasion alluded to (§ 32.). I may refer the reader to what will be stated hereafter (§ 84. *et seq.*), respecting the diseases very closely related to syphilis, or *syphiloid affections*. There can be no doubt of these diseases having prevailed both in Africa and America long before the close of the fifteenth century; and admitting that they had been introduced into Europe by the followers of COLUMBUS, they most probably had been brought into Spain by the Moors and Jews from Africa long before the discovery of America; and, existing among them, had been conveyed into Italy on their expulsion from Spain, shortly before the French invasion.

34. But admitting that *syphilitic diseases* (§ 32.) actually prevailed both in America and in Africa for ages before the discovery of COLUMBUS, it does not follow that the disease brought by his followers from America was the cause of the epidemic syphilis of Italy and other countries in 1493, 4, and 5. Indeed this inference is completely disproved by facts; for, as SPRENGEL has contended, syphilis, according to the testimony of most reputable authors, had appeared early in 1493, and soon afterwards extended to most of Europe, whilst, according to OVIEDO, the most credible of all witnesses on the subject, the fleet of GONSALVO, which conveyed the Spanish soldiers to to Italy, arrived in Messina, on the 26th of May, 1495. Thus the disease was existing two years before the arrival of the Spaniards, and spreading in the army of Charles VIII. of France. That the disease existed in Barcelona in 1494 or 5, appears in a letter published by THIENE, from NICHOLAUS SCYLLATIUS, a physician of Messina, the editor of an edition of the "*Rosa Anglica*," in 1492, and addressed to AMBROSIUS ROXATUS, physician to the Duke of Milan. From

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vestigia in Veterum Auctorum monimentis, et quos A. Luisinus Omisit Scriptores, fol. Jenæ, 1789; and the following work, by the same author, will be perused with some interest: *De Morbo Gallico Scriptores Medici et Historici, partim inediti; accedunt Morbi Gallici Origines Maranicæ, Collegit, edidit, glossario et Indice Auxit.* 8vo. Jenæ, 1793. DANIEL TURNER published an abridgment of the folio volumes of A. LUISINUS, under the following title: — *A Summary of the Ancient Writers on the Venereal Disease, extracted from his two Tomes, revised by* BOERHAAVE, *with Index of those omitted.* 8vo. Lond. 1736.

ii. As the *Identity of syphilis and gonorrhœa*, formerly contended for by some and denied by others, is now satisfactorily disproved, although in the present day most commonly resulting from impure sexual intercourse, it follows, that the evidence furnished respecting the period in which syphilis first appeared in Europe cannot be viewed as comprising also the time when gonorrhœa made its first appearance — or that the proofs as to the historical origination of the one could be extended to, or be considered as conclusive of, the same origination of the other, either as to time or to place. In the earlier histories, however, of cases of syphilis, gonorrhœa was often mentioned as a prominent symptom.

In the *Statutes*, which JANE I., Queen of both the Sicilies, directed to be formed for the regulation of the public stews, established at Avignon in 1347, it is enacted (*Stat.* iv.) as follows: — "The Queen commands that, on every *Saturday* the women in the house be singly examined by the abbess and a surgeon appointed by the Directors, and if any of them has contracted any illness by their whoring, that they be separated from the rest, and not suffered to prostitute themselves, lest the youth who converse should catch their distempers." — This statute may be viewed as applicable to either venereal disease, or to neither; for it has been contended that sexual intercourse with a female during the catamenia, or suffering under leucorrhœa, with a leprous female, during the middle ages, or even in more recent times, when personal cleanliness was not so much attended to as now, would produce a sexual disease capable of propagation. That the malady which the above statute was intended to abate might have been gonorrhœal is not improbable, although no sufficient proof of its existence appears.

Mr. BECKET (*Philosoph. Trans.* No. 357. ann. 1715) has endeavoured to prove that a venereal gonorrhœa was known in England some ages before 1494 under the names of *Ardor*, *Arsura*, *Incendium*, &c., and in English of *Brenning*, or *burning*, and described as an *inward heat* and *excoriation of the urethra*. This affection is treated of by JOHN of GADDESDEN in his *Pract. Med.* seu *Rosa Anglica*, in a chapter "*De Infectione ex Concubitæ cum leproso vel leprosa;*" and he there states: "Illum, qui concubuit cum muliere, cum quâ coivit leprosus, punturas intra carnem et corium, hoc est inter balanum et præputium, et aliquando calefactiones in toto corpore sentire." That this scalding might or might not arise from the cause here stated is equally probable, but it cannot be viewed as a proof of the existence of gonorrhœa, inasmuch as no mention is made of its coexistence with a copious muco-purulent discharge. That the time and the circumstances of the origination of gonorrhœa are not without some interest, will appear from the fact of this complaint being viewed by many recent writers as in no respect different from leucorrhœa, or blennorrhagia, according to modern nomenclature. In Africa, as I was able to learn from Moorish and other native physicians, gonorrhœa was viewed as a distinct disease, although often complicated with the yaws or syphilitic affections and with leprosy, and was viewed with syphilis, as possessing an antiquity as great as that of leprosy (see §§ 84, 85.).

Whether gonorrhœa made its first appearance in Europe at the close of the fifteenth century, or previously to this period, admits not now of satisfactory proof; nor even do we now know at what time it was first viewed as a variety of the venereal disease, or at least intimately connected with syphilis. ASTRUC remarks that all the physicians who lived in the close of the fifteenth and beginning of the sixteenth centuries were unanimous in their opinion that the venereal disease was a new distemper; but they entertained very different notions as to its origin.

The earliest writers believed the malady to have arisen from the influence of the stars, or certain conjunctions of the planets; others that it proceeded from the state of the seasons in connexion with fortuitous circumstances; some that it was an off-shoot of leprosy, or that it arose from the connexion of healthy with leprous persons; a few that it was the result of unnatural or unclean sexual intercourse, or of bestiality; and many that it was indigenous or endemic amongst the natives of Africa and America; but it does not appear to what they attributed the origin of the disease in these countries. (*See the Chapter on syphiloid diseases, or affections closely allied to syphilis.*)

s letter it appears that Scyllatius was in Barlona in 1494, that the distemper was spreading iong all ranks, and was propagated by contact ly, and that it was universally believed to have oceeded from Provence, where it was named e disease of St. Ment. Scyllatius thought it e *sahafathi* of Avicenna; but while he deribes its general characters, he says nothing, as ay be expected from the date of his letter, of American origin.

34.* It is difficult if nòt impossible to deterne accurately either the place or the date of e first appearance of syphilis in Europe. So pidly did it manifest itself in one place after other, that it is impossible to determine the ace in which it was first recognised. Fulgosus tes that it appeared in Italy as early as 1492; tronius, C. Torella, Haschard, Ulrich de utten, and Borgarutius, in 1493; John de go, Massa, Cateneus, Hock, Schmauss, llopius, and many others, in 1494; Brasalus, in 1495; Phrisius, Montesaurus, ainard, Benivenius, and Montanus in 1496; d Fracastorius as early as 1490. It should t be overlooked that these and other authors idently assigned these dates as the times when disease became known to them, or in the aces where they wrote, or they took the dates m the testimony of others. Wherever or ienever it first appeared, it cannot be disputed at it was speedily evinced in the chief cities of irope. That it was seen as early as 1490, acrding to Fracastorius, or 1492, as stated by lgosus, may be inferred from the circumstance its having been mentioned, in the Mansfield ironicle, in the Leising Chronicle, the Leip- Annals, and the Zweifalt Annals, as being ieral in Germany in the summer of 1493; ind it is even said to have prevailed at least ir years in Misnia. It was common in Augne in 1493. It was known in Paris in 1494, d in Augsburg in 1495." It appeared in emmingen, at Nurnberg, and in Edinburgh in 96; and it spread through Bohemia in 1499. has been considered remarkable that the Chroles of Barcelona, Valencia, Murcia, Toledo, ville, Burgos, Guadalaxara, Valladolid, Sevia, and other cities in Spain, have made no ntion of the period at which the disease first peared, and the same is true of the contemporaous annals of Portugal. The opinion which I have pressed (§ 112.), that this distemper is identical h the African Yaws, which is indigenous among negro races, that it spread to the Moors and ws in Northern Africa, and was thence conyed by them into Spain and Portugal ages ore it spread into France and Italy, and there ame epidemic, will account for the first appeare of the distemper in the cities of the Iberian insula not having been mentioned, inasmuch it had become there a well-known malady for s before the end of the 15th century.

35. ii. Description of Primary Syphilitic cers. — These, usually termed *chancres*, are ised by the application of the syphilitic virus, any part—mucous or cutaneous; to the former en entire or otherwise, to the latter also when ire, but much more readily when wounded or aded. Their common *seat* is the genitals; in n, most frequently on the inner surface of the puce, or between the prepuce and corona glandis, and especially in the angle by the side of the frænum. "The *time* at which venereal sores appear, is said to be from the third to the tenth day after infection; but it is more probable, as Ricord observes, that the syphilitic virus operates progressively from the first moment of its application, but that the ulcer is fully formed by the fifth day, although it may not be perceived till later" (Druitt). The average *duration* of a syphilitic ulcer produced by inoculation is, according to Wallace, twenty-five days.

36. Primary syphilitic ulcers present several varieties, which have been arranged by Mr. Henry Lee under the following heads: — 1st, The indurated or Hunterian chancre — a slow, torpid ulcer, encircled by adhesive inflammation; — 2d, The non-indurated, or pustulous, ulcer, marked by early and free suppuration: — 3d, The phagedænic or ulcerative; — and 4th, The sloughing; — 5th, To these I may add, Urethral chancre.

37. 1st, *The indurated or Hunterian chancre* "is generally found on the common integument, or on the glans penis. It may begin either as a pimple, or as a patch of excoriation which heals up, leaving the centre ulcerous." When this ulcer is produced by inoculation, in order to observe accurately its progress, M. Ricord states, that the puncture reddens during the first twenty-four hours; that in the second and third days it swells slightly, and becomes a pimple, surrounded by a red areola; from the third to the fourth day the cuticle is raised into a vesicle by a turbid fluid, with a black spot on its summit caused by the dried blood of the puncture; from the fourth to the fifth day, the morbid fluid increases, and becomes purulent, the vesicle becoming a pustule with a depressed summit. The areola, which had increased, now begins to fade; but the subjacent tissue becomes infiltrated and hardened with lymph." After the sixth day, "if the cuticle and the dried pus which adheres to it be removed, there is found an ulcer, resting on a hardened base; its depth equal to the whole thickness of the true skin, its edges seeming as if cleanly cut out by a punch—its surface covered with a greyish pultaceous matter, and its margin hard, elevated, and of a reddish-brown or violet colour. The ulcer feels to the finger like a little cup of cartilage set in the flesh."

38. 2d. *The suppurating or non-indurated chancre* has been divided into four stages. It is *first* a small itching *pimple or pustule*, and displays when it bursts, *secondly*, a foul *yellowish* or *tawny sore*, with slight swelling and redness, and spreading circularly; it may or may not be covered at first with a dirty brown scab. "In the third stage it throws out indolent fungous granulations (and in this stage is sometimes called the *raised ulcer* of the prepuce), and is usually stationary for a little time, after it has ceased to ulcerate and before it begins to heal. In the *fourth* stage it slowly heals; cicatrisation being preceded by a narrow vascular line. If the ulcer be seated near the frænum it is sure to perforate it."

39. 3dly. *Phagedænic chancres* are very painful and rapid in their progress. Their surface is yellow and dotted with red streaks; their shape irregular, their edges undermined or irregular, and the discharge from them profuse, thin and sanious. The surrounding margin usually appears puffy or

œdematous, generally presenting a low grade of vitality, but sometimes it is firm, and vividly red. These ulcers occasionally eat deeply into the substance of the penis, or undermine the skin extensively; but they generally spread much more widely than deeply, and hence they have been called serpiginous. Sometimes these sores are more irritable than phagedænic, being acutely painful, discharging a thin ichor, having a raised surface of yellowish exudation, but not spreading much although obstinately refusing to heal.

40. 4th. *Sloughing chancres* are most frequently observed in the prepuce and integuments. Other chancres, however, presenting the simple states of inflammation observed in the second variety, may be changed into a gangrenous or sloughing state by local irritation, excessive horse-exercise, by excessive debauchery, intoxication, or whatever depresses or exhausts vital force.

41. 5th. *Urethral chancre.* — The secondary syphilitic symptoms which were formerly attributed to gonorrhœa have been satisfactorily proved by Ricord, but very long believed to proceed from a chancre in the urethra, and the distinct natures of the two venereal diseases thereby determined. The existence of chancre in the urethra may be inferred, if, with many of the symptoms of gonorrhœa, the discharge varies much, sometimes being thin, scanty, and bloody, sometimes thick and profuse; and if there be one painful and indurated spot, not far from the opening of the urethra. But the existence of urethral chancre can be certainly proved only by the ulcer being visible at the orifice, or by inoculation with the matter.

42. Syphilitic Ulcers in the Female may assume the several states described above. They do not commonly cause so much distress as in the male, although there are many exceptions to this rule; but they are always slow in healing, especially when the urine passes over or comes in contact with them. When they are seated high in the vagina, the symptoms produced by them are very equivocal, the discharge not materially differing from that attending other lesions; an examination by the finger or by the speculum being requisite.

43. iii. The Diagnosis of primary Syphilis. — Various affections, described under their appropriate heads, may be mistaken for chancre. These are, 1st. *Gonorrhœa externa*, or *balanitis*, consisting of inflammation of the glans and inside of the prepuce, with profuse purulent discharge and excoriation of the cuticle. It may proceed from gonorrhœal infection, or from neglect of cleanliness, and the acrid secretions of the part, or the unhealthy secretions of the female, especially in a person with a long prepuce; 2d. *minute aphthous-looking points* surrounding the glans; 3d. *Herpes preputialis;* 4th. *Psoriasis præputii;* 5th. *Chronic eczema*, which, however, rarely affects the genitals, unless it be present in other parts; 6th. *Simple excoriations*, from friction or other non-specific causes.

44. It must, however, be admitted, that the characters of primary syphilitic affections are not sufficient to enable us to distinguish them with certainty from the above or similar affections arising from ordinary causes; and that the several varieties of primary syphilis now described afford us no sure grounds for practical distinctions between each other. The only circumstance in which all writers, from Astruc to the pres day, agree, is that ulcers of an obstinate natu attended or followed by induration, are th most likely to be followed by constitutional ease. That the indurated chancre alone characteristic of genuine syphilis, according Hunter, Carmichael, and Evans, cannot n be credited, and would confine syphilis wit very narrow primary limits; for the genu Hunterian chancre is now extremely rare. I vertheless Mr. Henry Lee and Dr. Drui although they divide primary syphilitic ulc into four varieties (§ 36.), state that it see almost certain that it is only after the *Hunter variety* that constitutional symptoms are to dreaded, or preventive treatment required; a that sores of the suppurative, ulcerative, sloughing varieties, and those attended by su purating bubo, do not, as a general rule, aff the constitution.

45. On this fundamental subject, Dr. Coll a most experienced and enlightened surge makes the following remarks: "Although eve surgeon must admit that Mr. Hunter's descripti of a chancre is correct, and drawn from natu still, I believe few will confine this term, or tl of primary venereal sore, to those ulcers or which answer to this description. As the res of long, attentive, and anxious observation, should say that primary venereal ulcers prese an almost endless variety of character. I wou define a primary venereal ulcer to be one whi is remarkably slow in yielding to ordinray, mi local treatment; but which is curable by mercu and which, if not so cured, is likely to be follow in two or three months, by secondary sympton which again are also curable by mercury. then, there be, as I affirm there is, an alm endless variety in chancres, how can we deci on the nature of primary ulcers, so as to pr nounce some to be syphilitic, and others to mere common sores, or simple excoriations? reply, that we are to be guided in our decision observing, first, that many of these suspicious u cerations cannot be referred to any class of co mon ulcers, as they strikingly differ from then and, secondly, by attending to the course whi these take, when not interfered with by any st mulant or caustic application, and when treat only with some mild ointment or cold water. under these circumstances, we find that, after eig or ten days, such ulcers show no disposition to he and if at the same time there be a total absen of any cause, such as defect in the general healt to account for this obstinate condition of tl local disease, we may then pronounce them be syphilitic." (*Op. cit.* p. 75.)

46. *The constitutional effects* of syphilitic i fection are even still more variable and uncerta in their characters than the primary. It is man fest that *bubo* has been considered by many, an more especially by M. Boyer, of too great in portance, for it is certainly not a diagnostic genuine syphilis, nor is it a secondary sympton but merely a local consequence of the prima sore, — the effect of irritation, or of the virus co veyed, to the inguinal glands, by the absorben from the local sore, no constitutional affectio often supervening when it suppurates freel When a patient has a syphilitic sore, which h not been destroyed within five days, he is liab

terwards to these effects which will hereafter be scribed as *secondary* and *tertiary syphilis.* Yet, cording to Mr. Henry Lee and Dr. Druitt, it ems almost certain that it is chiefly after the unterian variety that these effects are to be eaded, and their preventive treatment is re- uired; and that the suppurative, ulcerative, and oughing varieties, and those attended with sup- urating buboes, do not, as a general rule, inflict condary disease. A developed Hunterian ancre, or its cicatrix if hard or red, like the ccine vesicle, affects the constitution, "so that it be cut out or destroyed, the wound will as- me the same character, and require the same nstitutional treatment, as if the malady had not en interfered with." It has also been recently own that repeated syphilitic infection begets a otection against fresh attacks; and that the oduction of additional suppurating syphilitic es not only does not confer any fresh liability secondary symptoms, but seems to diminish at which exists already. Hence it has been posed, as will be shown in the sequel, to ino- late syphilitic and other persons with syphilitic tter, or to *syphilize them*—in order to prevent l to cure this distemper—a subject which will noticed in the sequel.

47. *The marked differences presented by the mary sores and the secondary symptoms of sy- lis,* not only soon after the epidemic appear- e of the distemper in Europe, but also during subsequent prevalence, and in modern times, e been variously explained. Mr. Carmichael ieved, that there were several distinct species venereal poisons, each of which produced a cific primary sore and a specific train of se- dary symptoms; that the Hunterian chancre, example, was followed by an excavated ulcer the tonsils, scaly eruptions on the skin, nodes, But the history of the malady, the diver- ed symptoms which result from either form of nary sore, and various other considerations rant a belief only in one specific virus or poi- , which manifests itself both primarily and con- tionally in varied forms, according to the cir- stances of infection—to the intensity of the nary morbid action, to the tissue with which t virus is brought in contact, and to the tem- p ament, habit of body, diathesis, and sucepti- b y of the person infected. Hence arise differ- e modifications or even varieties of the dis- te per—all resulting from one specific morbid p on. Thus they pass into each other in every p se or grade, without being originally or spe- c ally distinct; and hence the one form or va- ri may prevail in different countries and races, a even in different ages, and under different in- fl nces, and yet give rise to another variety either as form or intensity, when it infects different ra s, diatheses, and constitutions. Even in the sa e country and race, the circumstances and h ts of the infected, especially mental and phy- si distress, prolonged fatigue and exhaustion, d auchery, frequent excesses and intoxication, ne ect of cleanliness, &c., will occasion a much m e intense and intractable disease, than in per- sc differently circumstanced. It was most pro- ba y owing to these influences that the disease w so severe even in its primary symptoms a ngst our troops during the campaigns in Por- tu l and Spain, and so mild among the natives. Owing probably to the differences in race, it presented to my own observation in Africa, different modifications or forms and grades of intensity among the negroes, from those more usually observed in the white races. As to this topic, however, I would suggest a further, and more precise and extended observation, than I was enabled to make. There can be no doubt that in this country various forms of constitutional affection may proceed from the same kind of primary sore.

47*. III. Syphilitic Bubo.—Inflamed and enlarged lymphatic glands, consequent upon a venereal ulcer, arise from the virus contained in, or secreted by this ulcer or chancre. This affection of the inguinal glands may arise from the irritation of, or absorption from, gonorrhœal inflammation of the urethra; but it is not so frequent, nor so severe as when it is caused by chancre. Syphilitic bubo cannot be viewed as an indication of the existence, or even of the commencement of, the secondary or constitutional disease; for the affection of the glands may even, according to the more recent occurrences of the disease, be the means of preventing the constitutional contamination. This, however, was not the case in the earlier histories of the distemper, and more especially after the epidemic prevalences of the disease in the end of the 15th, and during the 16th century.—*a.* The *forms* and *diagnosis* of bubo have been correctly and succinctly given as follows by Dr. Druitt:—1st. *Bubo of the penis* is an inflammation of a lymphatic in the penis, which may be felt like a cord under the integuments, and which passes into abscess in some part of its course. 2d. *Acute bubo* in the groin generally affects one gland, and pursues the course of an acute abscess. The cellular tissue surrounding the gland is the usual seat of suppuration, but there may be also a small abscess in the centre of the gland, caused by the transmission of the poisonous matter, and the pus of this latter is alone capable of producing a chancre by inoculation. 3d. *Chronic or indolent bubo* commonly affects more than one gland. It occurs in weak or scrofulous habits, and especially in persons injured by the improper use of mercury. The glands enlarge slowly, suppuration is protracted and imperfect, and commences at several points. The skin is long in inflaming, and on becoming so, a large tract assumes a dusky bluish tint; the matter extends, and at last large portions of skin perish by ulceration, leaving an extensive sore, that may be months in healing.

48. *b. The diagnosis of syphilitic bubo* requires attention. If one gland only, and that above Poupart's ligament, be affected, it is most probably caused by chancre on the penis, provided there be, or has been one. "But if many glands are swollen, and they are below the level of Poupart's ligament, the swelling is probably caused by some irritation about the foot (or extremity). But the only sure diagnosis of a syphilitic bubo is that, if the matter taken from it be inoculated, it will produce a chancre; or that the sore produced by opening the bubo presents the elevated edges and copper-coloured margin of a chancre." As every bubo is attended by suppuration of the surrounding cellular tissue, the matter taken when first opened may not cause chancre by inoculation. There is no certain proof of a bubo being syphili-

tic unless preceded by chancre, unless a chancre can be produced by inoculation of the discharge, or unless decided secondary symptoms supervene.

49. IV. SECONDARY SYPHILIS. — Constitutional syphilis may occur from a fortnight to three or four months after the primary symptoms. The usual time is five or six or seven weeks. Early in the history of syphilis in Europe, the constitutional affection was much more early than the shortest time now named, and was not infrequently the first produced owing to the readiness with which the contagious principle was imparted and imbibed. Before the appearance of secondary symptoms, the constitution betrays its infection by a variety of *premonitory symptoms*,—by a dispirited and even wan expression, by want of appetite and sleep; by heaviness of the eyes, rheumatic pains, especially during the night, and pallor and loss of flesh; and lastly, by a slight eruptive fever usually of an inflammatory type. Upon these, after a short but variable period, the secondary symptoms supervene, sore throat generally accompanying this fever or soon following it.

50. *The symptoms premonitory* of the secondary or constitutional disease are sufficient evidence of the infection of the body by the primary disease, although those alterations usually termed secondary are not yet developed. The dull, earthy hue of the surface, the loss of bodily and mental vigour; the dryness of the hair, and loss of its smoothness and glossiness, and the giddiness, headache, uneasiness about the neck, or supra-orbital pain, usually on one side, and when the body is recumbent, are amongst the earliest indications of this infection. On these supervene pains about the joints; lassitude of the limbs; enlargement of the posterior cervical glands; loss of the tone, fulness and strength of the pulse; more or less anæmia, and falling out of the hair. The loss of hair indicates an inveterate form of disease, and is often attributed by patients to the use of mercury; but this mineral will not cause *alopecia*, but syphilis will. These symptoms, although not generally recognised as secondary, but they are so nevertheless, and if not arrested by treatment, will soon be followed by those which are more generally described as such.

51. i. SYPHILITIC ERUPTIONS. — *The secondary effects of syphilis* are ultimately developed either on the skin or mucous membrane, especially of the throat, or on both. *A.* The earliest of these to appear is an *exanthematous* or *erythematous eruption*, which may be either attended by fever, as stated above (§ 49.), or entirely independent of fever. This eruption may occur either during the existence of the primary symptoms, or a few weeks after their disappearance. It sometimes assumes the appearance of either measles or scarlatina, and at its commencement is usually of a rose-colour, the surrounding skin being of an unhealthy or dusky hue. The redness disappears on pressure, but returns immediately when pressure is removed. The surface of the body may be covered at once, but more frequently in succession, by this eruption, which soon loses its rosy hue, and daily becomes more and more dusky, until it assumes a coppery and more permanent tint. It is generally unattended by either heat or itching. It generally fades away for a while, and then reappears; and it may thus proceed, with interruptions, for two, six, or twel months, but after a year or two it entirely di away. In half the cases the eruption remai unnoticed, and it very often fades away witho the patient being aware that it ever had ai existence; but some time after another and deeper eruption makes its appearance. This sta of the eruption may be mistaken for pityriasis, this latter for syphilis; but the history of the cas the appearance of the eruption, the absence itching, and the impaired health of the patie will indicate its syphilitic nature.

52. *B.* A more developed form of syphili eruption may appear as *papulæ*, of various siz or as *psoriasis*, in which the skin is raised in co per-coloured blotches, covered by *scales* of hyp trophied cuticle. These eruptions are succeed merely by exfoliations of the cuticle or thin sup ficial scabs. An aggravated state of the fo going begins with an eruption of copper-colou blotches, which become covered with *scales* enlarged cuticle, and form *syphilitic lepra.* Th scales are succeeded by thin scabs, and these, falling off, leave shallow ulcers with copp coloured edges.

53. *C. Vesicular eruptions,* often assumi the form of *rupia*, may occur, appearing at fi as large flattened bullæ, filled with serum, pa ing into a purulent state, and finally drying i thick scabs, under which the skin is ulcerat The ulcers spread under the scabs, and, owing the successive additions of the dried matter they extend, they become remarkably th conical, and resemble limpet shells. The er tion may be distinctly *pustular*, constituting *philitic ecthyma*, the pustules being large prominent, leading to ulcers, with a copp coloured base.

54. *D. Tubercular eruptions*, broad, reddi or copper-coloured, appear on the face, most quently at the alæ of the nose, or on the chee They suppurate slowly, and are succeeded by d irregular ulcers, terminating in puckered ci trices. This eruption, in Dr. DRUITT's opini more properly belongs to the class of terti symptoms, in which mercury is almost inadn sible. This eruption usually appears a very c siderable time from the primary symptoms persons of weak constitution, or who have b broken down by privation, dissipation, or unav ing courses of mercury; it is consequently an favourable form of the disease. "A patch of kind of unhealthy inflammation is apt to form the tongue, and after a time an abscess breaks, closing a ragged excavation, filled with oran coloured sloughs, and exuding a copious fo discharge. If it occur on the palate, a probe detect bare exfoliated bone, which rapidly peris and leaves a hideous chasm."

55. *E. Mucous Tubercles, Condylomata,* — *bercule muqueux, Pustule Plate*, consist of rai patches of skin, with a red and moist surface, mucous membrane. They exude a thin, ac and offensive discharge. They are most quently situated in the vicinity of the genitals in any other place where two surfaces of s come in contact, presenting an excoriated app ance. They constitute a peculiar syphil eruption, and are undoubtedly capable of p ducing constitutional syphilis, generally wit similar eruption, in healthy persons. Ind

uch a result may follow the tubercular or even e pustular forms of secondary syphilis in certain vourable circumstances. (*The several forms of yphilitic eruption are more fully described in the veral articles devoted to diseases of the skin.*)

56. Venereal eruptions are not severally cha- acteristic of any distinct form of syphilis, primary constitutional. Dr. Colles states, — 1st. that e has not been able to trace back particular rms of eruption, to particular forms of primary lcer. 2d. He has not unfrequently observed arieties of eruption existing together in the same erson. 3d. After the removal of the first erup- on by mercury or other means, the second crop ill often prove of a different kind; and 4th. any rm of eruption may be converted, by injudicious eatment, as the excessive use of mercury in bad bits, into one which is most obstinate and severe. his opinion agrees with those of Hennen, Oes- rlan, S. Cooper, Bacot, and others. Mr. abington considers the variety of venereal erup- ns to be so great as to baffle description. He, wever, arranges the more distinct forms under e heads of *Tubercles*, *Lichens*, *Psoriasis* and *pra*, and *Rupia*. The most important practical int, which many writers connect with these dis- ctions into form of eruption, is, that rupia and hyma are met with in a very dangerous general pression of health, requiring the greatest care.

57. F. *The diagnosis of secondary eruptions* is great importance — is sometimes very easy, and casionally very difficult. In all cases the pre- us history of the patient should be inquired o. It is not only necessary to ascertain whe- r or no a chancre has existed, but also the time en it occurred, its situation, and its character. no chancre, but gonorrhœa only, in male or ale, preceded the eruptions, it should be recol- ed that chancre may have escaped the patient's ice, or may have existed in the urethra of the le, or in the vagina or cervix uteri. In these es, caution and further observation are required. ores are admitted, their characters, especially regards induration, are of importance.* A wledge, likewise, of the existence of suppurat- bubo may be useful, for indurated chancre is ly attended by suppurating swelling in the n; and lastly, the existence of any traces of indurated chancre or bubo ought to be ascertained, the denial of the patient not being sufficient.

58. As respects the eruption, M. Ricord remarks that one of the most important characters of it is a total absence of pruritus, whereas itching is a very frequent symptom of the other kinds of eruption. When, however, the syphilitic eruption affects naturally pruriginous regions, as the anus, the genito-crural fold, there may be considerable itching owing to the irritating nature of the secretion. Syphilitic eruptions are generally apyretic and indolent, involving in a short time the whole body, generally by successive instalments. They spread indiscriminately to all parts, and do not affect the face in preference to other parts. They emit no smell, unless there be an exudation of fluid or suppuration. "There is nothing specific in the smell, nor in the colour mentioned by Swediaur, nor the ham-like hue spoken of by Fallopius, which latter has been, with reason, looked upon as an important sign, and an absolute and constant character." Secondary eruptions generally present rounded and well-defined patches, the colour of which may be more or less deep in their centres. They have very little tendency to suppuration; and when matter does form, it is generally small in quantity, and unhealthy in character. The eruptions which do not suppurate, generally disappear in time by resolution or desquamation. The scales in these cases are less brilliant and thinner, dry more quickly, and more frequently furfuraceous than in non-specific affections, and the scales sometimes fall off in large shell-like pieces. The crusts sometimes accumulate in successive layers as in rupia. When, by the falling of the crust, the ulceration underneath becomes apparent, it generally is rounded, its fundus greyish and pultaceous, is surrounded by a darkish areola, with a certain induration in the margins. Phagedena of these ulcerations is rare; but when it does happen, it sometimes extends rapidly. Secondary syphilitic ulcers are preceded either by some eruption, as ecthyma, rupia, papulæ, or tubercles; they rarely follow vesicles or psydraceous pustules. Ricord agrees with Hunter in considering the diagnosis of secondary symptoms as most difficult; for "there is hardly any disorder that has more diseases resembling it in all its forms than the venereal disease."

59. G. *Secondary affection of the scalp* — *Alopecia syphilitica* — is amongst the earliest constitutional disorders consequent upon syphilis. It commences with slight itching, tenderness or soreness of the scalp, attended by rheumatic pains. On examination, no trace of eruption can be detected; but if the patient have suffered within four or eight weeks, from chancre, or if any induration remain in its situation, the tenderness of the scalp will soon be followed by the loss of hair and some one of the affections of the skin, throat, &c. The alopecia commences very gradually. The hair at first becomes dry and crisp, loses its glossy appearance, breaks readily, a brush or comb causing great pain. The hair is often seen broken off close to the scalp, and patches of baldness, or approaching to it, are found here and there. At a more advanced stage the hair comes away with the bulbs in considerable quantity. Pityriasis now becomes troublesome; and various points of the scalp assume a

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Dr. M'Carthy says, "In 123 cases of secondary ptoms, indurated chancre had preceded the eruptions times, and been recognised in the hospital, or the ent recollected having felt it. In one case only the ent could recollect that a clap only had preceded the ylomata which we observed on the patient; but this was attended, he told us, with a bloody discharge, h occurred seven months previous to his admission hospital. In 4 cases we were unable to obtain ac- e recollections on the subject of induration.

The examination of these 123 cases clearly proved to n consequence of the frequent unexpected situation e primary sore, the reason why we daily meet with s which give reason to suppose that secondary sym- ns may arise spontaneously. In 6 cases the sore was d in the urethra, when inoculation enabled us to gnise it three times; in the other cases, the disease, rst concealed from view, ultimately appeared as a hral chancre at the meatus. Four times at the ; once in the nostril; once on the chin; once on ip. Suppose we take these 123 patients, and com- those primary symptoms, for the purpose of at- ting to discover some one character which appears ciently often to enable us to draw a deduction from e find that in *one and all* the inguinal glands have observed enlarged, but suppuration took place only e, and in these the buboes had a scrofulous appear- , and it was not possible by inoculation to obtain the fic pustule." (*Note from* Acton's *op. cit.*, p. 488.)

rosy hue; the rest of the skin generally having a yellowish, unhealthy appearance. Slight febrile symptoms set in, attended often with rose-coloured spots on the abdomen. The patient now frequently complains of rheumatic pains in the joints, with loss of appetite and debility. The loss of hair requires immediate attention, especially when caused by syphilis, as it may be very considerable in a short time, and its growth very uncertain. It should, however, be remarked that if the hair does not fall out at the commencement, it is not very frequently lost in the latter stages of constitutional syphilis.

60. At a more advanced stage, a papular affection of the scalp, commencing with little rose-coloured elevations, attended by itching, is observed. These papulæ, or *lichens*, increase in number, slight pearly-white scales form on their apices, which fall away and are replaced by others. The hair is scurfy, and the papulæ or elevations, at first the size of millet seeds, become large and assume the form of *lepra* or *psoriasis*. When the scales are removed, the skin looks like a recently-blistered surface, and exudes a small quantity of thin pellucid fluid; or it is quite dry. In particular situations, especially behind the ears, in the folds of the neck of stout persons, or those inattentive to cleanliness, those places instead of becoming scaly remain moist, the oozing from them excoriating the surrounding parts, and developing mucous tubercle or condyloma. As the disease of the scalp advances the papulæ or lichen pass into an impetiginous or an eczematous state. In still more advanced stages, ulcerations of a very intractable character, forming tertiary symptoms, form in the spots of impetigo or eczema; and tumours as large as horse-beans form in the scalp, at first unattended by pain or redness. Fluctuation may be detected in them after some time, and when punctured a thin, serous, straw-coloured fluid exudes. If left alone they become painful and red, ulcerate, exposure of the bone ultimately following, and even necrosis, which are now chiefly seen in pathological collections, and but rarely in practice in the present day.

61. *H. Syphilitic Onychia.*—The venereal affections of the skin or scalp may be extended to the nails. In these cases the matrix suffers, and the nail grows thick and nodulated, closely resembling the changes which take place in it from inveterate psoriasis. There is a great similarity between onychia and alopecia. They both depend upon the constitutional infection interfering with the formation or nutrition of these cuticular appendages.

62. ii. Syphilitic Affections of Mucous Surfaces.—*A. Syphilitic Affections of the Throat.* —*a.* The *mildest affection* of this kind is a superficial excoriation of the mucous membrane, most frequently of the tonsils, but not unfrequently also of some other parts of the fauces or mouth, corresponding to psoriasis on the skin. The affected parts are slightly swollen and sore, afterwards red and raw, or covered with a whitish exudation, or with a patch of thickened epithelium. If the disease proceed it will generally be followed by superficial ulceration.

63. *b.* An *excavated ulcer* may follow the foregoing, or may be first to come before the physician, although it may have been a consecutive lesion of the parts. This ulcer appears as if a piece had been scooped out of the tonsil. It surface is foul or yellow, its edges raised an ragged, and swollen. It occasions much less in convenience than its appearance might indicate and there is very little constitutional disturbanc from it, unless it be attended by eruption. As th lesion advances, or swelling increases, the patient speech becomes guttural, and he often complair of pain shooting to the ears, and of partial dea ness.

64. *c. Sloughing ulcer* begins as a sma *aphthous* spot which rapidly ulcerates, and is a tended with great pain and fever. "The surfac of the ulcer is covered with an ashy slough, ar the surrounding membrane is dark, livid, ar swollen. The lingual artery may be opened the spread of the ulceration, and the patient ma die of hæmorrhage, unless the common carotid tied." (Druitt, p. 187.) In some instance especially when mercury has been given in lar quantities for primary symptoms, the affection the throat comes on notwithstanding, and assum a red and sloughy appearance; a piece of t tonsil appears as if punched out, and the ulce rapidly extend in size and depth.

65. The *situation* of the ulcerations, most fi quently of the excavated, is commonly on tl tonsils, on the sides of the tongue, on the upp surface, or on the under surface close to t frænum. Sometimes they are met with on t dorsum of the tongue, here assuming an elevat character, like the condylomata around the an They occasionally attack the palate, pharynx, more rarely, in the posterior and lower part of t pharynx, in which latter situation it occurred ii patient many years ago under my care, ulcerat also having extended to the larynx and termina fatally. Ulcers also form at the corners of mouth, where they may form scabs, or are lia to bleed, when the mouth is fully opened.

66. *B. Syphilitic ulcerations of the nose* *palate* commence with inflammation and ulcerat of the mucous membrane covering the parts, si lar to those of the throat. The ulcerations m proceed until they denude the periosteum, afterwards produce exfoliation of the bones profuse fœtid discharge, and ultimately v marked deformity. Ulceration of the nose ge rally begins with ozæna, or with a sense of pa heat, dryness, and snuffling. But the bones the nose may become otherwise attacked, as sho in the sequel (§ 75.).

67. *C. Syphilitic ulceration of the larynx* chiefly a consequence of the extension of ulce tion from the palate or pharynx. It is char terised by tenderness, slight pain or uneasin referred to the larynx, by huskiness of voi followed by a low whispering, or loss of voi by suffocative cough, and by expectoration o sanguineo-puriform matter. There is great of strength and flesh; and life is often termina by suffocation.

68. *D. Secondary affections of the eyelids* *eyes.*— Not only may inflammation of the be consequent upon *gonorrhœa* (see art. E *gonorrhœal inflammations of*, § 56. *et seq.*), eruptions and affections of the eye-lids and of eyes themselves, chiefly in the form of iritis, appear in the course of secondary or constitutic syphilis. These eruptions often appear on external surface and on the ciliary margins of

ids. In some instances, the corners of the eyeids have a cracked, scaly appearance, resembling a similar alteration more frequently occurring at he angles of the mouth, and, as in this latter state, he eruption is connected with syphilitic affections of either the skin or of the mucous membrane, of he throat, &c., or of both; and it may appear in ny period of the progress of these affections. In ome cases, the conjunctiva is also either partially or extensively implicated. *Syphilitic iritis* is not infrequent; and is fully considered in the article *n the diseases of the* Eye (§ 132. *et seq.*), to which must refer the reader.

69. iii. TERTIARY SYPHILITIC DISEASES.—Certain constitutional effects of syphilis, which more frequently are consecutive of several of those lready mentioned, than associated with them,—lthough such associations, especially in the adanced course of the latter is often observed—ave been classed as *tertiary symptoms* of the disase. They may, however, occur after the removal of the secondary forms of the distemper, or ndependently of these, and at a remote period om the primary symptoms. Under the term *rtiary symptoms* have been arranged *nodes, inammation of the periosteum, exostosis, caries of e bones, tubercles of the sub-cutaneous and subucous tissues, disease of the testes* consequent pon primary or secondary syphilitic disease. hese affections were generally classed with those condary symptoms already noticed. JOHN UNTER first distinguished them by designating em the "*Symptoms of the second period of contutional syphilis*," a designation which many ill agree with me in considering as more approiate than that imposed on them by M. RICORD.

70. Though *tertiary symptoms* generally deend upon chancre, or, in rare cases, upon inction by a secondary disease, they follow the imary symptoms after a much longer interval, d they are seated in other and more deeplyated structures than the secondary. They afct chiefly the sub-mucous and sub-cutaneous llular tissue; the structure of the bones; the rous structures, especially the periosteum; the nts; the testes, and lymphatic system. The philitic poison may even develope disease of e liver, lungs, brain, and heart. Tertiary ections cannot be transmitted from parent to ild—are not hereditary; but they are unubtedly capable of producing a scrofulous diasis in the offspring.

71. *A. Course.*—In the more usual course of disease, tertiary symptoms do not supervene til six, seven, or nine months from the primary, l in some they may be delayed for several, or en as many years. Although these symptoms y be separated with propriety from the second, yet it will very frequently be difficult to draw line of demarcation between them. They y be both so associated, or the one class may s so insensibly into the other as not to admit of inference as to the predominance of the one of symptoms over the other. In the natural urse of syphilis the tertiary form very frequently s appears during the existence of the secondary, the same way as the latter may come on during t of the primary. Under other circumstances, from treatment, careful regimen, &c., the ondary symptoms may have successfully dispeared and returned, and ultimately the tertiary have supervened; and even, although in rare instances, an indurated chancre may have existed, and been apparently cured, yet, after a very considerable lapse of time, tertiary symptoms may appear generally from the influence of causes hereafter to be noticed (§ 109. *et seq.*), at first in a slight form, but with increasing severity, notwithstanding the non-existence of secondary symptoms between the primary and tertiary. During the course of tertiary affections, various *complications* may be developed, not only by the syphilitic poison, but also aided by treatment, by pre-existing tendency to visceral or other diseases; by the causes, influences, and circumstances to which the patient may have been exposed, and by climate, race, occupation, &c.

72. *B. Syphilitic affections of the testes* are generally amongst the earliest of tertiary symptoms to appear, and may occur during the existence of the secondary. They may, however, supervene in five or six months, or not until as many years, from the primary infection. They may appear either alone, or attended by pains in the bones, exostoses or gummata; but they are of rare occurrence in the present state of the distemper. ASTRUC first, and HUNTER, Sir A. COOPER and DUPUYTREN, subsequently, made the distinction between diseased testicle consequent upon syphilis and that following gonorrhœa. Syphilitic disease of the testes may commence in one and extend to both, or it may begin in both at once. Excepting slight nocturnal pains in the loins in some cases, the affection often reaches a considerable height before it is noticed. When the patient's attention is attracted by it, the testes are found heavy, hard, and generally much increased in size, although not always. The disease may run its course without much uneasiness, and hence be neglected, and organic lesions may supervene which cannot be removed. The erections, however, and the venereal desire become, on the full development of the disease, less frequent, and the seminal discharge is diminished. If the disease continue, or be neglected, the testes decrease in size, and ultimately may become atrophied and may even disappear nearly or altogether. These changes are extremely slow, and may continue for several months or even years before the organs are entirely lost. A full description of them will be found in the works of M. RICORD and Mr. ACTON.

73. *C. Small Tumours* are sometimes formed in the *scrotum*, and are described as *tubercles*, or *gummata*, either in connection with disease of the testes or independently of it. They occur as a tertiary symptom in the deep layers of the scrotum, and sometimes implicate the testes, or are mistaken for affections of these organs. They never appear before the fifth or sixth month from infection; but they may occur after many years. They mostly appear as small elastic tumours, and feel as if they were filled with a gummy matter. As they grow they become painful, inflamed, and the skin covering them softens and ulcerates, and a deep ulcer follows a copious puriform discharge. The edges of the sore are undermined, and the adjoining parts are involved in the destruction.

74. *D. Syphilitic disease of the periosteum and bones*, generally commences with tenderness in the situation of the more exposed and superficial bones,

especially in the bones of the nose, in the tibia, ulna, cranial bones, clavicles, &c. The tenderness and pain become aggravated in the evening, last all night, but cease altogether or abate during the day. The pain is followed by oblong swellings or *nodes*, caused by the inflammation of the periosteum, and by the infiltration of lymph and serum. These swellings are tender, and the skin over them is at first pale and moveable. They present to the touch a doughy character, or an obscure sense of fluctuation. Dr. Druitt remarks that, " if the disease is arrested at this stage, it causes merely a superficial deposit of rough porous bone, from the organisation of the lymph effused; or else consolidation of the bone itself, through deposition of fresh osseous matter into its cancelli. If the disease proceed one step further a quantity of glairy serum is effused between the periosteum and bone, producing an exquisitely painful fluctuating tumour. If it advance still further, the bone becomes carious; matter forms between it and the periosteum; extensive exfoliations ensue; the patient suffers severely from the pain and discharge;" and if the disease be seated in the cranium or os frontis — *corona Veneris* — death may ensue from extension of disease to the dura mater, or from protrusion of the brain through the eroded apertures in the skull. Such extreme cases are now very rare, but they were common enough many years ago, and when it was supposed that mercury given in excess was the only cure for the distemper.

75. *E.* Disease of the *bones of the nose* is often amongst the earliest of the tertiary symptoms, but it is of only occasional occurrence, and sometimes not until an advanced period. The nose may become diseased, as stated above (§ 66.), from ulceration of the mucous membrane; but the formation of internal nodes on the palate, vomer, ethmoid, and bones forming the bridge of the nose, may cause these bones to be carious, and probably the spongy structure of these bones may contribute to this even so quickly as it is sometimes observed. In rare cases these bones are nearly destroyed before the nature of the disease becomes apparent. When caries of the os frontis near the roof of the nose takes place the disease may extend to the ethmoid bone, and produce the worst effects. The existence of a deep-seated pain in the palate, and at or near the root of the nose, with or without a fœtid discharge, should always be viewed with suspicion, especially if either primary or secondary symptoms have existed at some previous period, although very remote, and apparently altogether removed. Ozæna may proceed from scrofula, scurvy, or even from chronic cephalic catarrh; but in 99 cases out of 100 it is the result of syphilis in the circumstances just named.

76. *F.* The *joints* are not frequently nor so quickly affected as the bones. Large gummy swellings sometimes, however, form around the ankle, knee, and elbow joints, owing to venereal disease; and in rare cases even the joints themselves. In two instances I was consulted where nearly all these joints were remarkably swollen and diseased, consequently upon other serious syphilitic affections. In a third — that of a late M.P. — amputation of the leg above the knee had been performed by Mr. Dalrymple, of Norwich, and the case subsequently came under my care. The small bones of the extremities may also be sim
larly affected. In venereal diseases of the join
it is difficult to determine, as I have not see
these cases terminate fatally, although they doub
less occasionally do, whether the disease is en
tirely external to the joint itself, or whether th
articulations or the ends of the bones are also im
plicated by the disease. That the cartilages a
sometimes eroded, and even the ends of the bon
or their epiphysis also are affected, may be inferre
not only from the case for which amputation w
performed, but also from what is observed
occur as regards the cartilages and bones of th
nose. These local syphilitic diseases—of the bone
joints, &c. — are generally attended by a slow
syphilitic hectic, and with the several constitution
phenomena described hereafter as the syphilit
cachexia.

77. iv. The Syphilitic Cachexia. — It m
justly be asked, can syphilis so contaminate th
constitution as to give rise to dangerous or ev
fatal results of a different kind, or in addition
those which have been described above as seco
dary and tertiary? To this question I cann
hesitate to answer in the affirmative. These r
sults do not often occur in the present day; a
even the most severe of the tertiary affectio
noticed above, although sometimes terminati
fatally, have not always this issue. In their mo
unfavourable results, it is often difficult to s
how much may be imputed to treatment. B
irrespective of the more severe and dangerous
the affections already mentioned, states of t
system may be induced, attended by marked s
verity or imminent danger, in which none of the
affections had appeared, or, if they have appeare
at some previous periods they had been remov
by medical treatment or regimen. This da
gerous state of constitution — this the most r
mote or advanced of the effects of the syphili
poison — has not been overlooked by previo
writers, more especially by Dr. Colles and M
Ricord.

78. Syphilitic cachexia is generally a cons
quence of a single constitutional contaminati
— *such contamination not occurring twice* — a
is favoured by the following circumstances:
1st, by an originally weak or bad constitutio
by scrofula, scurvy, and a peculiar or vitiat
diathesis, previously to the venereal infection;
2d, by the persistence of certain severe syph
litic symptoms; — 3d, by an ill-timed or bad
managed treatment, and by neglect of treatmen
and 4th, by causes which tend to lower the vi
powers subsequently to infection, — such caus
according to my observation, being excessi
sexual indulgences, masturbation, exposure
cold and moisture, to the continued influen
of malaria, or to noxious exhalations, &c.

79. *The symptoms of syphilitic cachexia* a
not always well defined; for they may be ass
ciated with certain of those already noticed,
they may appear as the sequelæ of some of t
more severe of them, or they occur at periods
remote from them as to occasion grave doubts
their nature and origin. They may, however,
stated to consist chiefly of pallor, sallowness, a
anæmia of the surface, flabbiness of the flesh, em
ciation, debility of both body and mind, vario
anomalous scorbutic or cutaneous appearance
hectic or continued nervous fever, night exace

tions, diarrhœa, sweats, aphonia, and ulti- tely death, arising from some important inter- l organ experiencing disorganisation, to which may, previously or subsequently to the vene- al infection, have become predisposed. Thus e patient may be cut off by extreme anæmia, diarrhœa terminating in ulceration of the intes- es, by affections of the lungs, &c.

80. Sometimes, after the patient has im- oved, under treatment for various secondary tertiary symptoms, in respect both of these mptoms, and of flesh, strength and appear- ce, he begins to exhibit a much less favourable pect. He appears sickly, loses flesh, presents waxen hue, complains of loss of appetite and ength, of want of sleep and of night sweats. any eruptions or other syphilitic symptoms are esent, they may disappear, and yet the general nstitutional cachexia may long remain, or even come more marked; or, if the local symptoms ntinue, they may be slowly deteriorated. Thus bercular eruptions, or pains in the joints and nes may continue in various grades of severity r some years, whilst the constitution is slowly sted, anæmiaed and visibly contaminated. In me cases the local symptoms, in the course of e general breaking down of the frame, are so anged as hardly to be recognised as venereal,— rious local or visceral changes, the consequence iefly of this cachexia, or of the treatment, being veloped, and *masking* the venereal affection and effects. This formerly obtained more remark- ly when the treatment by mercury was carried excess. There can be no doubt, however, that, en independently of this, or of any other treat- ent, the venereal cachexia may terminate fa- lly by calling latent tendencies into action, and developing disease in vital or other internal gans. It may, however, be most manifest in l its indications, even when the local affections e comparatively slight; or, although they have en severe, after they have entirely or almost alto- ther disappeared. The local affections, as well the constitutional contamination are often de- loped, hastened, delayed, or aggravated by a umber of circumstances, influences, and concur- ng or reinforcing *causes* (§ 115. *et seq.*), to which e patient may have been exposed subsequently the period of infection. During syphilitic ectic or cachexia, not only may the contin- encies now alluded to appear, but there are se- ral others which may also supervene; namely, ralysis, epilepsy, hypochondriasis, melancholia, onomania, and even more or less general insa- ty. These disorders of the mind are, however, ldom met with even in the most advanced states constitutional syphilis — the intellect being enerally but little, or not at all, affected to the st.

81. v. *The Diagnosis of constitutional syphilis* often very difficult, more especially when pa- ents deny that they have had any primary symp- ms, or even any suspicious intercourse, or even ny sexual intercourse whatever. These last cir- umstances are, however, very rare, or may even e considered next to impossible. But the rare odes of communicating the distemper, independ- ntly of sexual connection,—much more common in rmer times than now,—should not be forgotten. hese modes will be noticed in the sequel (§ 110. *seq.*). If, however, copper-coloured eruptions, sore throat, loss of hair, enlargement of the glands around the occiput, pains in the joints, periosteum or bones, periosteal nodes on the long and superficial bones, with night pains, a faded, pallid, or waxen and unhealthy look, loss of flesh and strength, be complained of; and more especially if these symptoms follow a somewhat similar succession, and cannot be attributed to locality, diet, regimen, &c., or to any recognised visceral disease, they may be confidently referred to constitutional syphilis. Where, however, neither the above succession of symptoms, nor many of them, appear, the difficulty of diagnosis will be much greater, especially if primary symptoms be not admitted; but, if admitted, there can be no doubt of the nature of the disease, although a long period between the existence of the primary symptoms and the appearance of those which are doubtfully secondary may have intervened. It has been stated above, that the period to which the supervention of secondary and tertiary symptoms upon the primary may extend may be very long — may even extend to several years; but the exact term to which this interval may be extended has not been ascertained. Its duration evidently depends upon a variety of causes and circumstances (§ 115. *et seq.*).

82. vi. Syphilis in Children. — *Syphilis Infantum.* — *Hereditary Syphilis* differs so far from the disease as it occurs in adults, as to induce some writers to doubt its venereal origin. It is certainly the transmission of the constitutional contamination or distemper to the fœtus, during utero-gestation, and not the infection of the fœtus during parturition. The malady may exist at birth, or may not appear for some days or even weeks after birth. It is indicated by copper-coloured spots on the cutaneous surface, especially about the arms, genitals, and mouth, which may go on to ulceration. There are also a peculiar shrill or hoarse voice, excoriations and ulcerations, or an aphthous appearance, at the corners of the mouth, on the tongue, throat, and palate. In more advanced stages, emaciation and a senile appearance of the countenance; snuffling, or obstruction of the nose, enlargement of the glands, general cachexia, terminating in death, if the disease be not early detected and judiciously treated, and even in such favourable circumstances the child may be carried off by some severe complication. In most of the cases of syphilis infantum, the mother has been stated to have infected the fœtus. I believe, however, that the infection has not always proceeded from the mother only. Schenck adduces an instance (*Observ. le vj. no.* 21.) of the infection of the fœtus from the father, the mother being unaffected. It must, however, be admitted that it is very difficult to prove the mother to have been untainted by the distemper, when the father has been affected. Upon the whole it may be generally expected that the fœtus will manifest the disease when the pregnant mother is constitutionally affected; and it is not improbable that the child may be infected by a constitutionally syphilitic father, without the mother having manifested any symptoms of the constitutional or primary distemper. Mauriceau, however, has adduced instances of the child having been free from syphilitic taint, although the mother was affected; and I know cases of the children being free from

syphilitic taint although their fathers were constitutionally affected; but these children presented more or less of the scrofulous diathesis, or died in infancy. "The child may be also affected after birth, by a nurse suffering under syphilitic ulceration of the nipple, or by its mother under the same circumstances, if the disease of her nipple has been derived from a strange child; but no instance is known of a child infecting its own mother, although it will immediately communicate the disease to a strange nurse." The infection of the nurse is manifested by ulceration of the throat, identical with that succeeding primary disease, by cutaneous eruptions, by the formations of excrescences about the pudenda, which are capable of affecting her husband, in whom the infection is likewise followed by constitutional symptoms. Hunter believed that secondary symptoms could no longer infect; but this opinion is disproved by many very experienced writers, and by several instances which have come under my own observation. There can be no doubt that during the 16th and 17th centuries, the communication of the distemper, and even in more recent times, by secondary symptoms was remarkably frequent. This circumstance shows the intimate connection, if not the identity, of syphilis with yaws, sibbens, and some other diseases, which, in this and many other characters, differ in no respects from syphilis, as will be shown in the sequel.

83. Dr. Rizzi, of Milan, has recorded the results of his extensive experience of congenital syphilis, and has confirmed the remarks of Dr. Colles. According to Dr. Rizzi, if a woman contracts syphilitic ulcerations of the breast by suckling an infected infant, mucous tubercles frequently appear on the vulva and about the anus. The syphilis, although secondary, is transmissible by contact, so that an innocent woman may communicate the distemper to her husband. Of this fact the physician should be fully aware. Of 100 persons with chancres on the breast from impure lactation, or in the mouth or throat from contact with an infected infant, 34 had tubercles of the vulva, 19 syphilitic angina, 2 iritis, 14 tubercles of the vulva and angina simultaneously, 5 tubercles of the vulva and others disseminated over different parts of the body, 6 tubercles of the vulva, angina, tubercles of the skin and iritis, and 19 no secondary symptoms. In nurses, as well as in men infected by them, Dr. Rizzi found tubercles the most common form of secondary symptoms, and angina often superadded. Discharges, vegetations, and exostoses were rare, and buboes, when they occurred, consisted only of swelling and tension of the sub-maxillary or axillary glands. (Ranking's *Abstract, &c.* vol. v. p. 250.)

V. Varieties or Modifications of Syphilis, — Syphiloid Diseases.

i. Syphilis Æthiopica.—*Syphilis vel Lues Æthiopica* —*Syphilis Africana* —*Yaws* —*Sibbens* — *Sivvens.*— *Pian, Epian*, Fr.— *Frambœsia.*

84. This distemper has existed in Africa, certainly, for ages before the epidemic outbreak of syphilis in Europe at the end of the 15th century; and, if not identical with, is at least a form or modification of, the disease which existed in the West Indian Islands, when they were discovered by Columbus, and which was considered as intimately resembling, if not the same as, the ej demic syphilis of the 15th and 16th centuries.

85. The African syphilis, or the *yaws*, as coı monly termed, in all respects more closely sembles the earlier manifestations of syphilis Europe than the modern occurrences of this d temper. Indeed the few cases of yaws which saw in Africa in 1817 agreed with the early a counts of syphilis so prevalent in Europe in t 15th and 16th centuries; not only as respect the character and severity of the distemper, b also as regarded the modes of its communicati and the treatment of it found most benefici That the yaws in Africa is identical with the ya or *pian* of the West Indies, is also undoubted; a it is most probable that the identity existed b fore the discovery of America. The descriptio of the disease, as observed in Africa and in t West Indies, agree as closely as the descriptio of any specific disease furnished by different write whether as occurring in Negroes or in Mulatto It is very rarely observed in white persons in m dern times, as it is especially dreaded, and hen avoided by them. That it is also the same disea as the *sibbens* or *sivvens* formerly seen in t west of Scotland, is admitted by those who ha seen both maladies. Dr. Thomson remarks th he possesses the notes of an old physician in J maica, who visited a part of Scotland where t *sibbens* was prevalent; that these notes were ma without any regard to theory; and that his o servations confirm the identity of yaws and sibben (*Edin. Med. and Surg. Journ.* vol. xv. p. 321 and vol. xviii. p. 31.)

86. This complaint is usually preceded b severe pains in the limbs, often resembling tho of rheumatism, which are most severe around t joints. The pains are attended by languor an debility, and often continue for several days wit out any other appearance of disease. These sym toms are generally precursory, and are succeede by more or less fever, sometimes preceded b slight rigors. In many cases, however, the feve is so slight as hardly to be noticed. Generall the patient complains of headache, loss of appe tite, and pains of the back and loins, which ar exacerbated towards evening. These symptom are continued for several days, and are followe by an eruption of pustules, more or less numerou in various parts of the body, but especially upo the face, neck, groins, pudenda, and around th anus, vulva, &c. The eruption of these pustule is not completed over the whole body at one time nor do they appear in any regular succession o the different parts; but while one crop is fallin off, another is making its appearance in othe places. Every fresh eruption of pustules is pre ceded by a slight febrile paroxysm. The pustule are filled with an opaque whitish fluid: they are at their first appearance, not so large as the hea of a small pin; but they grow larger gradually until they attain the size of a sixpence or even o a shilling. When the pustules burst, a thick, viscid matter is discharged, which forms a foul and dense crust or scab upon the surface. The number and size of the pustules is proportioned to the degree of eruptive fever. When the febrile symptoms are slight, there are few pustules, but they are mostly of a larger size than when the complaint is more violent. From the larger pustules red fungous excrescences frequently arise of va-

us magnitudes, from the size of a pea to that of large mulberry, which fruit, owing to their ugh, granulated surfaces, they somewhat re- nble. These fungi, though they rise consider- ly above the surface of the skin, have but a all degree of sensibility. They never suppurate idly, but gradually discharge a sordid glutinous atter, forming an ugly scab round the edges of excrescence, and covering the upper parts of when much elevated, with white sloughs. When ese eruptions appear upon any part of the body vered with hair, the colour of the hair is gra- ally changed from black to white. At the com- ncement of the disease, when there is any doubt the nature of the complaint, the natives open e of the pustules and drop upon it a little of juice of the capsicum: if it be of the yaws ecies, little or no pain is excited.

87. The eruption is more elevated and broader, l more numerous in the face, groins, axilla, ge of the anus, and labia majora, than in any er part of the body. The crops of yaws are ious. In some there is only one copious erup- n, of a healthy nature, with well-defined edges; continues on the skin for a long time, the patient oying his usual health. This is the most fa- urable form, and in the robust and well fed, erminated in seven or nine months. More fre- ently small watery yaws appear, and recede in nonth or so. The patients lose flesh; become hectic, and dropsical; but in these a nourishing t will often in a month or two induce a return he eruption in a more copious and larger form; l several crops of such eruptions may succes- ely appear. When the disease attacks the oat, the soft parts are always lost. If there be y tendency in the constitution to hereditary or eral disease, it is generally excited into action, ecially upon the disappearance of the erup- n; and caries of the bones, disease of the nts, dropsy, &c. supervene. In the successive ptions of yaws, there is often one ulcer which s not heal, but becomes larger than the rest, l if neglected is apt to produce caries of the oining bones. Nocturnal pains, swellings of periosteum, ulcers of the pharynx, &c., gene- y attend the advanced course of the distemper; l are accompanied by chronic hectic, and eral cachexia. If the infection takes place in mouth or lips, ulcerations appear in these parts, extend to the fauces, palate—the bones of the ate and those of the nose becoming impli- ed.

88. *The duration* of the period elapsing from osure to contagion to the commencement of eruptive or febrile symptoms varied in several es, accurately observed by Dr. Thomson, from en to ten weeks. In some cases in which he recourse to inoculation, the eruption appeared seven weeks. The duration of the disease after appearance of the eruption varies from some nths to several years. It depends upon the nplete eruption of the pustules. When the ption is slight, the pustules being few and all, the hectic cachexia and complications perinduced prolong the distemper, and ulti- tely occasion death, the eruption having long viously disappeared.

89. ii. Sibbens or Sivvens. — This form of sy- lis was formerly seen in the south-west of Scot- d, especially in the counties of Ayr, Galloway, and Dumfries, but is now entirely extinct. The descriptions given of it by Adams, Hall, Gilchrist, Hope, Barry, and others, show that this is the same disease as the yaws, and the syphilis epidemic in the 16th century. Indeed, yaws, sibbens, and other forms of syphilis about to be noticed are merely modifications of the same specific distemper, owing to local circumstances, manner and habits of living, &c.; these forms being in no respect different, as to their modes of communication, from the malady of the 15th century. The syphilis of the present day is that form which has become most sensibly modified in the course of ages, but which, under circumstances of neglect, unwholesome living, want of cleanliness, &c. will in most cases assume as virulent and infectious a character as was displayed by it when first disseminated throughout Europe.

90. *Sibbens* shows itself, according to the mode of infection, in modified states, especially at its commencement. Like yaws and other forms of syphilis about to be noticed, it was communicated by sexual intercourse, by mercury, by the common use of the same utensils, of the same bed-clothes, especially when blankets only were slept in, and by want of cleanliness, and by two or more sleeping in the same bed, as not unusual in former and even in recent times. In infants at the breast, and in children, the distemper appeared first in the throat and mouth, with inflammation of the velum palati and adjoining parts, followed by a whitish eschar, or a superficial red ulcer. At the same time white spots, eschars, and small elevations of a pearly or milky colour occurred on the insides of the cheeks, lips, &c., and in these situations, excrescences, or small fleshy growths, resembling a raspberry, which became covered with a scab, were afterwards developed. These excrescences were diagnostic of the malady. This state, when neglected, or occurring in cachectic or debilitated subjects, was followed by destructive ulceration and extension of the mischief to the pharynx, larynx, &c., with loss of the velum palati and affection of the bones of the nose, face, &c.

91. In others, after pains in the joints, bones, and febrile symptoms of varied duration, the disease appeared in the skin, under somewhat different aspects. The whole surface of the body was often spotted with a coppery or dusky-red eruption. In many clusters of pustules broke out, followed by successive desquamations, or scabby eruptions of the scalp, forehead, insides of the thighs, accompanied by little hard tubercles in the skin. In some, tumours resembling furuncles were seen in various parts, and gave rise to ulcers which perforated the integuments. These ulcers were supposed to be produced by the virulent matter of the disease having come in contact with the surface, as when the disease had been caught by sleeping with the infected, or in the same foul blankets as had been used by an infected person. Ultimately soft, spongy, raspberry-like tumours (hence the name *frambœsia*, sibbens, sivvens) broke forth in various parts of the body. Affections of the bones were not observed by some; but Bell and others mention *nodes* and *caries*. The affections of the genitals, when not occurring primarily, owing to the contagion affecting the surface of the body, sometimes appeared consecutively. Different cases presented somewhat different appearances, mani-

festly owing to the parts primarily infected and affected, and to the progress the distemper had made when arrested by treatment. The disease was often fatal in children and infants in whom it had made progress before submitted to treatment.

92. iii. Pian or Epian is the term usually applied to yaws, as observed and described by physicians who have practised in the French West India Islands, and although manifestly the same disease as yaws, and as syphilis at its earliest appearance in Europe, presents a few differences in the character of the eruption, especially, according to the descriptions of these physicians. The patient experiences slight fever, with pains in the limbs and bones, and small red spots on different parts of the body. He loses flesh, and the skin becomes scaly. The intensity of these symptoms slowly decreases, but the eruption is developed, and assumes *three* aspects. The first, or *large pians*, sometimes become as large as the hand, from which fungous excrescences shoot, and a thick sanious matter exudes. The *small pians* are much less in size and more numerous than the former; their excrescences are redder and less fungous. The *red pians* are larger than the latter, but less than the former, of a flesh colour, and are developed slowly and successively; but are accompanied and followed by more serious symptoms than those of the other two varieties, particularly those of the first, which is the mildest.

93. One of the ulcers of pian generally becomes larger than the others, forming a deep ulcer of a bad character, without fungi, discharging much sanious matter. It is aggravated by the usual dressings, and is called the *mother pian*, as a similar large ulcer in yaws is called the *mother yaw*. It is dangerous to dry it up before the general infection is fully manifested. In this variety, as in yaws, if a patient has an ulcer on any part of his body before the infection of pians, the first pustules are developed upon it, and the ulcer often becomes the mother pian. This variety of syphilis, if allowed to proceed, is followed by further alterations. These consist chiefly, 1st, of excrescences on the soles of the feet and palms of the hand, which are tender at first, or before they break, but which, when they break, discharge a purulent matter; 2d, of thickenings of the skin of the soles of the feet and palms of the hand. These are red, painful, tender, and hardened, but without exudation. 3d, of wandering pains in the bones, of the tumefaction of the spongy bones and of the extremities of the long bones, attended by caries, softening, exostosis, &c. This state of the disease, called *bone-evil*, is often attended by the formation of numerous ulcers, by affection of the bones of the face, of the palate, &c.; the patient often being reduced to a horrible state. The chief difference between yaws, pian, and syphilis, in its aggravated state of secondary disease, is in the fungiform aspect of the ulcers in yaws and pian; but this state of the eruption in these affections (*Frambœsia*), is probably to be imputed to the peculiarity of the skin and habit of body of the Negro, in whom this distemper was observed by those who have described it. The following accounts of the occurrence of syphilis as local epidemics are interesting, inasmuch as they exactly agree with the descriptions given of syphilis in the 15th and 16th centuries.

94. iv. Disease of St. Paul's Bay (*Canada Le Mal de Chicot*,—prevailed between the yea 1776 and 1780, not only in this locality, but al in some other parts of Canada. It was describ by Dr. Bowman, who was ordered by the G vernor to investigate the distemper. In childr most frequently the disease commenced with ap thous pustules on the lips, tongue, and inside the mouth. These advanced rapidly, and t tongue, palate, &c., were sometimes nearly d stroyed by them. The whitish puriform matt exuded from them communicated the disease others. Older patients complained of pains the bones, and of slight febrile exacerbatio until eruptions followed by ulcers appeared on t skin, and in the mouth and throat, when the pai abated. These ulcers, according to their situati which depended upon the contact of the vir were followed in many instances by cervic axillary, or inguinal buboes. At a more a vanced stage the body became covered with pr riginous tetters, which soon disappeared. The bon of the nose, palate, cranium, pelvis, and extren ties, were ultimately attacked by nodes, and car The frame appeared altogether contaminated, the functions disordered; and many sunk i state of extreme wretchedness, especially childr the weak, and neglected. Robust persons wi stood the successive complications of the d temper for many years.

95. The inhabitants of the parts where the d ease appeared, stated that it was introduced a extended by sexual intercourse, by contact, a by foul clothing. It spared no one exposed infection, but was most virulent in children. Sw diaur, admitting the imperfections of the descr tion given of the distemper by Dr. Bowm considered that it agreed with the earliest counts of syphilis in the 15th and 16th centur It is also manifestly the same malady as t which was epidemic in 1800, and in following ye until 1809, in districts of *Scherlievo, Gronemi Fiume, &c.*

96. v. The Syphilis of Scherlievo, or epidemic which received this name from its pre lence in this locality. MM. Percy and L rent, state that, in this district and those adjoin it the commission appointed to inquire into nature of the distemper, found more than 13,0 persons infected by it, out of a population 38,000. It reappeared, or became epidemic aga in 1808 and 1809, where it seemed to have b perpetuated by the filth of the lower orders, wh damp cabins were shared with their domestic a mals. The disease usually commenced with la tude of the limbs and pains in the bones, wh increased during the night. The voice beca hoarse, deglutition difficult, and the velum pal uvula, the tongue, and pharynx, red and aphtho Soon after the aphthæ burst and discharged ichorous matter, which eroded the adjoining pa Ulcers afterwards were formed, which exten into each other, creating sores of various dim sions, but always rounded, of an ashy colour, with hard or raised and dark red edges. Th ulcers were seated chiefly in the tonsils, uv velum palati, tongue, and cheeks, and were follo by caries of the bones of the face and nose, the discharge of foul, fœtid pus. The voice more and more changed, and at last lost, fr ulceration extending to the larynx. The exost

al nodes in rare cases vanished along with the ns, as soon as a pustular eruption was evolved the skin.

97. In many cases, after the pains in the bones pustular eruption appeared on the surface, ich M. BOUÉ states to have been announced itching, which disappeared when the eruption was fully out. The pustules were of a ppery colour, round, and of various extent; and peared most frequently on the forehead and ry scalp, on the inner surface of the thighs and remities, and around the anus and genitals. some cases an acrid ichor exuded from them, ich excoriated the skin; in others the discharge ed and formed scabs. The disease often remained stationary in this state for a long time. er the scabs had fallen off, the skin retained rks of a coppery hue, which were removed with iculty.*

98. The disease appeared in some cases with ious sized blotches of a coppery colour, in the tres of which ulcers were formed, from which atter was exuded which formed scabs similar those which covered the pustules. These tches were surrounded by a coppery areola. was remarked that the female genitals were re frequently affected than the male. Dr. MBIERI, among an immense number of cases, nd only one of gonorrhœa, which complicated distemper. The ulcers which often eroded scrotum were consequent upon the general ction. Buboes in the groins, or enlargements ther lymphatic glands, were seldom seen. The les of communicating the malady were the same hose which will appear in the sequel (§ 109. *et* *s*)

99. VI. DIAGNOSIS OF SYPHILIS.—This is often y difficult; for although the distemper has generally presented a modified and milder charac- in modern times, nevertheless cases some- es occur which, owing to neglect, to con- ution and habit of body, to treatment and ner of living, are as virulent as many of those ch were described by writers in the sixteenth ury, or of those which have been termed *sy-* *oid diseases.* It will have been remarked, what I have stated above, that I consider e latter as identical with the early manifest- ns of syphilis in Europe; the differences ally observed being only such as arise from manner of infection—from the exudation from cutaneous and other parts, during the consti- onal disease, having infected these parts in ons with whom these exudations had come in act, and from differences of race and other cir- stances (§ 109. *et seq.*) That the disease assumes fferent character as respects the different races, be expected, in as far as the integuments are erned; for, owing to the structure and vital lition and functions of the skin, and to the enic diathesis of the dark-skinned races, and more particularly of the Negro, syphilis attacks these structures with greater severity than in the white race,—although even in this there are often exceptions,—and assumes in the former the characters described under the head Yaws and other Syphiloid Distempers. As regards the treatment, that found most beneficial in the one is also most beneficial in all the others. I have seen small-pox in the Negro in Africa, and yaws in the same race; and the difference of the former malady in the Negro from that observed in the white race is as great as that of the latter disease is from secondary syphilis in the white. The causes, efficient and concurring, are the same in character; the treatment is also the same; and this being admitted as respects yaws, the inference must necessarily extend to the other modifications of the distemper belonging to this category.

100. *The diagnosis of Constitutional Syphilis*, as it occurs in the present day in the white race, and after the virus has passed through many generations, is often very difficult, even when aided by the history of the case; and this difficulty is increased by the different tissues and parts which are secondarily affected, either singly or conjointly. Mr. HOLMES COOTE has classed the *secondary* effects of syphilis as follows, and to these I may add the *tertiary*:—

101. i. SECONDARY SYMPTOMS OR EFFECTS.— 1. *Cutaneous eruption.*—*a.* Erythema; *b.* Scaly eruption; *c.* Papular eruption; *d.* Pustular eruptions; *e.* Tubercular eruptions.—2. *Mucous tubercles, or condylomata.*—3. *Ulcerations between the toes, Rhagades digitoria.*—4. *Superficial ulcerations of:*—*a.* The meatus auditorius externus; *b.* The navel; *c.* The nose; *d.* The lips and the angles of the mouth.—5. *Syphilitic affections of the tongue.*—*a.* Excoriations of its surface; *b.* Ulcerations, fissures, &c.; *c.* Induration of its substance.—6. *Ulceration of the gums.*—7. *Ulceration of the tonsils—Soft and hard palate.*—Excoriations of these parts without ulceration.—8. *Ulceration of the pharynx.*—9. *Ulceration extending to the rima glottidis.*—10. *Affections of the eye and appendages.*—*a.* Ulceration of the eyelids; *b.* Iritis; *c.* Sclerotitis.—11. *Ulceration of the roots of the nails.*—12. *Alopecia, or baldness.*—13. *Ulceration of the rectum and large intestines.*—Syphilitic dysentery.

102. ii. TERTIARY EFFECTS.—1. *Tubercles or gummata.*—*a.* Of the skin and cellular tissue; *b.* Of those parts passing into phagedenic ulceration; *c.* Of muscular and fibrous structures.—2. *Inflammation of the periosteum.*—3. *Inflammation and enlargement of joints.*—4. *Diseases of the testes.*—*a.* Inflammation and enlargement of one or both testicles; *b.* Atrophy or other structural lesion of the testes.—5. *Inflammation of bone and its effects.*—*a.* Pains in the bones; *b.* Exostoses; *c.* Caries.—6. *Inflammation and structural change of the eyes, eyelids, or lachrymal apparatus.*—7. *Phagedenic ulceration of the scalp.*—*a.* Without disease of the pericranium and subjacent bones; *b.* With disease of these parts.—8. *Phagedenic ulceration of the pharynx.*—*a.* Extending to the larynx, cartilages, trachea, &c.; *b.* extending upwards to the bones of the nose, face, and palate; *c.* extending to and causing caries of the cervical vertebræ.—9. *General syphilitic cachexia.*—*a.* Without any prominent visceral disease; *b.* With prominent disease of the viscus,

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J. BONTIUS (*Medicina Indorum*, 4th Lugd. Bat. 1718) ibes the "*Amboyna Pox*," in terms which are lly applicable to *yaws*, *sibbens*, and other varieties philis, and states that the disease is indigenous to oyna, the Moluccas, and other eastern islands. He that it is identical with constitutional syphilis; but rs from it in being most frequently communicated rwise than by sexual intercourse. He states that remedies employed for its cure, are preparations of ury, of antimony, sarsaparilla, guaiacum, china &c.

as the lungs, &c.; *c.* With paralysis; *d.* With dropsy, &c.

103. It is not to be expected, that the lesions belonging to the *first* or the *second* of these classes of constitutional disease will appear singly. On the contrary, they are generally associated in various forms or groups; affections of the skin being often complicated with those of the throat, tongue, gums, &c. Affections of the joints may be conjoined with inflammation of the periosteum and bones, and with phagedenic ulcerations. Even various tertiary lesions may be accompanied with one or more of those which are secondary; or, more correctly, certain secondary affections, such as those of the skin and throat, may persist, although one or more tertiary alterations are fully developed. Thus, in a case which I saw with Sir B. C. Brodie there were ulcerations of the throat, pharynx, larynx, nodes, pains in the bones, &c., consequent upon syphilitic eruptions and cutaneous ulcerations, which still remained, the pharyngeal ulcerations implicating the cervical vertebræ. The disease in this case was preceded by suppurating buboes. In another case, which I attended with the late Mr. Copland Hutchison, there were extensive ulcerations of the skin; nodes, caries of the bones of the nose and palate, inflammation of both eyes and eyelids, remarkable enlargement of the knee and elbow-joints, phagedenic ulceration of the scalp, and general cachexia. In other cases, in addition to affections of the bones and joints, there were phagedenic ulcerations of the pharynx, with inflammation and necrosis of the palate and nose, enlargement of the bodies of the testicles, and large ulcerating tubercles of the integuments.

104. *The diagnosis of Syphilis* depends chiefly upon the history of the case, especially as respects the existence of primary symptoms of buboes, and exposure to infection by direct or indirect contact, more especially by sexual intercourse, suckling, &c. (See the Causes, § 109. *et seq.*) The *eruptions* in the secondary stage will generally indicate the nature of the malady; but even all that has been stated above (§§ 57. 81.) on this subject may not be sufficient for this purpose, if other particulars be not sufficiently considered. The *colour* of syphilitic eruptions, although generally yellowish or coppery, especially before they ulcerate, may be of a brighter hue, if febrile action be present. In rare cases, the pustular eruptions may very closely resemble the eruption of small-pox; but a few days will disclose the differences. These eruptions and their rapid enlargement and ulceration in the early history of the distemper were very common, and hence the name of *great-pox*, very commonly given to them. Mr. H. Coote very correctly remarks that syphilitic eruptions do not always preserve the same type in the same individual. The scaly and tubercular, or the scaly, papular, and pustular, may be combined in the same case; and a scaly eruption may exist on the trunk and a pustular on the scalp. A scaly eruption often becomes tubercular as the constitutional cachexia advances. Scaly and papular eruptions are often co-existent both terminating in desquamation, leaving copper-coloured stains. Large tubercles of the integument pass into deep, excavated, or phagedenic ulcers, and may be attended by the usual forms of rupia. Syphilitic scaly eruptions are generally circular, and more strictly resemble lepra, t psoriasis. The eruption on the trunk is o different from that on the extremities; on former it is more generally erythematous, papu scaly, and pustular; on the latter it is often tul cular, passing into large and deep ulcers w elevated edges, especially on the lower extremit Rupia, however, may equally affect all parts.

105. Syphilitic erythema usually precedes ot eruptions, but it may continue in the form of red or coppery patches, or co-exist with ot eruptions. The most common eruption is syp litic lepra, the scales of which are dark, and di widely from the silvery scales of lepra vulga This eruption may extend over the whole bo causing the hair to fall off, and affecting the pal of the hands and soles of the feet. It spreads i mucous outlets and canals, into the nasal, bucc anal, vaginal, and others, where it causes ulc fissures, tubercular elevations, excoriations, charges, &c. Lepra syphilitica often attacks excoriates the scrotum, and is frequently atten or followed by foul ulcers between the toes, m cous tubercles about the arms, in the axil groins, or where the transpiration of the surf is allowed to accumulate. The elevation of scales of lepra into copper-coloured tubercles always, according to Mr. H. Coote, associa with impairment of the general health, and is indication, during a mercurial course, that medicine is acting injuriously, that the treatm should be changed, or at least that the pati should be allowed a more generous diet, and moderate amount of stimuli. The cicatrices fr syphilitic sores, it may be remarked, are oft characteristic, being usually rounded, depress of a dull white hue, and irregular on the surfac

106. *The tertiary effects of syphilis* may genera be recognised with greater certainty than the condary. The history of the case, the antecede symptoms and lesions, however remote, and t nature of these as inferred from their charact and succession, are to be taken into account. B there are hardly any of the lesions, which termed tertiary, that may not be inferred to be o of the more remote effects of constitutional syph lis, when viewed and considered with referen merely to its own characters and relations. T mere enumeration (§ 101. *et seq.*) of these effec sufficiently indicates their nature; and are equal the results of neglected or injudiciously treat syphilis, as observed in the present day, and the African yaws as observed by myself a others.

107. VII. The Prognosis of Syphilis manifest depends upon so many circumstances as to be stat with much difficulty, and even with uncertaint It depends not only upon the progress the disten per has made, and upon the effects observed; b also upon the health and constitution of the p tient previously to infection, and at the time of h coming under treatment. Nor should the mo of infection, and the course it has pursued, an its recurrences when the distemper has becom constitutionally chronic, be overlooked. If th patient be young, in previous good health, not exposed to fatigue, cold, or anxiety of min and not given to excesses of any kind, a favou able opinion may be given both in the primar and secondary stages of the distemper. But his health, strength, and constitution be manifestl

aired ; if he be dissipated, exposed to fatigue, irregular in his habits ; and more especially e secondary effects be severe, be complicated, e been rapidly developed, or have reappeared r courses of mercury, or after other judiciously ployed means, an unfavourable or at least a rded diagnosis should be given, the danger of case fully admitted, and due precautions for guidance of the patient fully stated. In most s ulcerations of the pharynx, owing to their osition to extend to important adjoining parts, to become phagedenic, should be viewed unourably, more especially in the circumstances mentioned. The severer kinds of secondary cts should also be much dreaded in infants ; they are always most difficult to remove in ients of all ages when they are produced by the infrequent modes of infection (§ 110. *et seq.*), ich commonly prevailed in the 16th century, y the discharges or exudations of secondary s, either directly or indirectly coming in cont with the naked cutaneous or mucous surfaces.

08. *The tertiary effects* of syphilis are always nded by more or less present or prospective ger. But the imminence of the one, or the ount of the other, will depend upon the extent lesion already produced, upon its complicas and constitutional relations and effects, upon history of the case, and upon the effects of ropriate treatment. When pharyngeal ulcera- has become phagedenic, or has extended to larynx, to the bones of the face, and to the s, the patient is in great danger; and this is re extreme if the cervical vertebræ become licated. The same prognosis may be given if, h general and increasing cachexia, pulmonary, alytic, or dropsical disease supervene, after tinate, prolonged, or even rapid course of the emper; although in some of these cases life y be prolonged for a considerable time under ourable circumstances, and suitable regimen l treatment. In this far-advanced category of rbid results an opinion of the issue will be ed upon experience of the effects of the most uential medicines, upon the local and conutional associations of each case, upon the preus and existing circumstances of the patient, n the history of the malady, and upon the ious influences which have modified its course. respect of the tertiary effects of syphilis, I may e, that an opinion respecting them should alys be given with caution and reservation ; even ough circumstances may not warrant that nion to be unfavourable.

109. VIII. THE EFFICIENT CAUSE OF SYPHILIS, D THE CAUSES AIDING ITS OPERATION.—The mer has been very generally recognised, and its cts admitted ; but all the modes and circumnces of its application and operation have not n sufficiently shown and considered. The latter ve been either overlooked or imperfectly estited, especially as regards the successive changes, moted and brought to maturity, as manifested he secondary and tertiary results of the poison. e *causation* of syphilis has been studied merely m what has been observed in modern times, l from the common way of propagating the emper at the present day. But the more eral way by which this infection was proed soon after its introduction into Europe, and ing its epidemic prevalence, has been altogether overlooked; although, under the circumstances existing in these ages, it may be still propagated in the same ways, and its effects present as severe a character, and the same features as those which distinguished it in former times; and which still distinguish it in that form of the distemper which prevails in Africa, and which prevailed there from immemorial ages before it was introduced into Spain.

110. The contagion of syphilis at the present day, and for many years past, has arisen from sexual intercourse, either the male or the female being the subject of the primary disease. In these cases the infection is produced by the virus, poison, or morbid secretion of the primary sore. This mode is generally admitted, and is now, with very few exceptions, especially in Europe, the common mode, no other being acknowledged by many, the exceptions being altogether ignored. But I have had sufficient reason to conclude, that whenever a secondary venereal ulceration, seated on the integuments, or in the mouth and throat, produces a secretion or discharge, which comes in contact with a mucous surface, or with an abrasion of the cutaneous surface, or is even allowed to remain in contact with an unabraded surface, infection is liable to take place, and that this liability exists both in children and in adults. The communicability of secondary syphilis, especially when the sores have proceeded to secrete or produce a fluid exudation, was a well recognised fact in former times, and has been witnessed by myself during the course of my experience in several instances. It was a recognised fact by Dr. COLLES; and although HUNTER believed that secondary symptoms could no longer infect, Mr. BABINGTON remarks, when commenting on this belief, that "the facts (that they do infect) are so well established, that it is more easy to question the principle than to doubt the facts."

111. Judging from what I have seen in several countries and climates, and in children and adults in this country, I conclude, that the morbid secretion from secondary sores, if allowed to remain in contact with the more susceptible surfaces or parts of a healthy person, will infect that person, provided that he be predisposed to, or susceptible of, the infection ; and that the local contamination, at first confined to, and more particularly and severely affecting, the tissues first infected, will become general, and will the more readily and severely, by means of the secretion from the ulcers or sores produced in the course of the distemper, infect those to whom this secretion is either directly or indirectly applied. This mode of communicating the malady was often observed in all the varieties of it described above as syphiloid diseases, and in the usual manifestations of the malady, from the end of the fifteenth until the close of the seventeenth century, or even later. The extensive prevalence of syphilis during these centuries, although imputed by many, and probably not without reason, first to a leprous diathesis, and afterwards to a scorbutic diathesis, or to a complication of syphilis with leprous or with scorbutic symptoms, may be more correctly accounted for by the facts of the secondary, or early constitutional effects of the malady having become thus virulently contagious, both by this mode of communication, and by its successive propagation in this manner.

112. If we note the habits of the lower classes in those ages, the ready infection and the severity of syphilis are easily explained. As observed in the present day, with respect to yaws in Negroes, the contagion was produced by the secretion from the sores on the cutaneous surface, by mediate or immediate contact, much more frequently than by sexual intercourse. In the lower classes in Europe, in the 15th, 16th, and 17th centuries, the circumstances favouring this mode of communicating the malady were much more remarkable than in the Negro, with whom the disease most probably originated; for amongst this race its antiquity appears to have been the greatest, and by this race the distemper was communicated to the Moors and Jews in the North of Africa, and by them conveyed into the South of Spain, where it existed long before the expulsion of them from the Iberian Peninsula.* The lower classes in Europe during the centuries of the earlier prevalence of syphilis were remarkable for their neglect of cleanliness, for their use of woollen night and day clothes next to the skin; for the habit of two, three, or more sleeping in the same bed, often in a state of nudity; for drinking and eating out of the same vessels, and for these and other social conditions favouring the communication of the disease, in its secondary stage, independently of sexual intercourse.

113. With the progress of civilisation, and with the knowledge acquired of the communication of the distemper by these means, the infection of it otherwise than by sexual intercourse became less frequent; and the virus more generally having to pass through the absorbent system, when the genitals were the seats of primary infection, was either arrested in the course of its constitutional contamination, or rendered more mild, and slower in producing its successive specific effects, than when infection was produced by the virulent secretions from secondary sores applied to parts which more readily admitted of constitutional contamination. The successive propagation of the distemper in this latter mode, and generally without the intermediate interruption and amelioration resulting from the action of the virus on absorbent glands, without the production of buboes — manifestly rendered the malady more rapid and more severe, and was the chief cause of the early prevalence of syphilis being in some respects different from what is observed of it at the present day, but in every respect similar to the varieties mentioned above (§ 84. *et seq.*); many of the influences producing these varieties actually having existed at the time of, and for ages after, the introduction of syphilis into Europe.

114. As observation rendered persons aware of the habits and circumstances causing and favc
ing infection, more especially in the higher cla
of society, these habits were reformed or refrai
from. Persons no longer drunk out of the sa
glass or cup, or slept in a strange bed, without
precaution; and much of the manners of mod
times originated either in precautions against
fection, or in evincing a confidence that no
caution was required. But in whatever man
the infection may be produced, whether by
mary sores on the genitals, where the morbid
cretion was favourably placed to operate its effe
or by the secretions from secondary sores or ulc
in the cutaneous or in the mucous surface, un
circumstances favouring their operation and c
sequent contamination—now occurring very rare
in former ages very frequently — there are a
riety of causes or influences which aid the effici
or exciting cause — the syphilitic poison — in
veloping, hastening, or in aggravating its con
tutional or contaminating effects. These are
diversified and yet so influential, whether act
simply or in combination, as to require a brief
particular notice: and are first *predisposing*, a
next *concurring* and *determining*.

115. *A.* The chief *predisposing causes* of syp
litic infection are infancy, childhood, and ea
age; delicacy of constitution, original or acquire
debility or temporary exhaustion; debauche
fatigue, and irregularities of any kind; and
neglect of all those habits and social observan
which constitute modern civilisation. The p
cautions observed in several cities and pla
against the propagation of the distemper ma
festly tend not only to render it less frequent,
also more mild, than in other countries where
precautions are instituted, especially amongst th
who more commonly are infected by, and w
communicate the malady. But the predispositi
however produced, or in whatever form it m
exist, favours not only the primary infection a
effects, but also the development of the seconda
or constitutional disease, and the tertiary resul
if the morbid procession be not arrested by tre
ment; and, according to the amount of predis
sition, will be the rapidity with which the mor
effects are produced. Doubtless, cases are not i
frequent, which evince no particular predisposi
cause of the infection, or of the rapidity or severi
of the results; but these may be imputed to
diathesis, or some unascertained cause favouri
the operation of the poison, or to susceptibility
infection and contamination inherent in some co
stitutions.

116. That all persons who have not been pr
viously constitutionally infected are liable to s
philis, provided that the virus is applied in sufficie
quantity, or is allowed to remain in contact with
part upon which it is capable of acting, may
inferred; but there is reason to conclude, fro
what has been observed in persons previously i
fected, that a second constitutional infection
syphilis rarely or never takes place, and that su
an occurrence is merely the return, or the re-d
velopment, in a state of active manifestation,
the disease, which had been lurking, in a late
state in the body, and which various influenc
had reproduced independently of any second loc
infection. Whilst, therefore, all previously u
contaminated are liable to syphilis, those wh
have been thus diseased are not liable to a seco

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* Dr. Winterbottom (*An Account of the Native Africans*, see vol. ii. p. 148.) remarks that "the yaws is not mentioned by authors as a disease which occurs in Egypt, though, from the frequent communication of that country with those parts of Africa in which the disease is endemical, we might be led to expect that it would be imported. There is reason, however, to suppose that the yaws does actually appear there, though mistaken for the venereal disease." He proceeds to remark that a Copt, who professed to cure the venereal disease in its advanced states, prescribed "two coffee-cups of flax oil to be taken every morning fasting," directing no regimen further than to keep the patient warm. The pustules and other eruptions he covered with a red earth common in some parts of Egypt. They gradually became dry, and left no mark. At the end of three months a cure was effected. It is further stated, that those persons who have been affected and fully cured have no fear of a second infection.

cstitutional infection, provided that they have bn completely cured; but they are liable to a rrn in an aggravated form of the secondary or tiary disease, if it have not been completely edicated, especially if they are exposed to the cses about to be noticed (§ 117, 118,); or in oer words, that constitutional syphilis when ced renders the body unsusceptible of a second cstitutional infection.

17. *B.* Several causes favour, 1st, the development of the constitutional disease from the lal infection or primary sores; — and 2d, the aravation and local manifestations of the syphili contamination, when it is not completely renved, but remains lurking in a more or less latent fn, in the body. The most remarkable features o constitutional syphilis are the severe and even dgerous developments sometimes assumed by it ar it has remained for several, or even for many, yrs latent in the frame. These cases present two dculties — first, to estimate the influence of the pon in affecting the vital cohesion and conditions ohe tissues in so permanent a manner as to rder them liable to ulterior changes and disorgisation after very remote periods; — and *second*, tecognise the effects of constitutional remedies un these vital conditions and consecutive cnges, and to determine how much of these effs may be imputed to the operation of the means eployed, and to the efforts of nature, or of the vl resistance opposed to successive changes. It impossible for these difficulties to be overcome whout a satisfactory knowledge of the various cumstances which thus tend to develop the cstitutional infection, and to aggravate this infion into dangerous local disease.

18. Observation satisfactorily and extensively cducted will demonstrate that all depressing infnces acting upon the body after infection has bn produced will favour the supervention of the sondary upon the primary disease; and will en more remarkably develop the latent constitonal taint or contamination, wherever it exists, in active disease and disorganisation. Amongst the aiding and determining causes may be mentied, anxiety of mind and fears of the conseqnces of infection; fatigue, debauchery, drunkeess, venereal excesses, unwholesome and ifficient food; want of sleep and sufficient rep; excessive exertion, exposure to extreme rges of temperature; moist states of the atmosere; and exposure to malaria in any form, more ecially to miasmatous exhalations in hot counts. While these causes aid the constitutional iction in accelerating the changes resulting in lal disorganisation, they also counteract the vl resistance opposed to these results, and throw dn the barrier which the vital force raises for t protection of the organisation.

19. *C. Infection of the fœtus by one or both pars.* — *Congenital syphilis*, or the direct transmsion of syphilis to the unborn fœtus, is a subject o onsiderable interest. That the syphilitic taint is ore frequently in the father than in the mother aears manifest; but it is not so evident that the dase is conveyed directly from the father by mns of the seminal fluid to the ovum, for the faer may first infect the mother, the disease being arwards communicated by her to the fœtus. Sondary syphilis, however, being a constitutional tat, like other constitutional taints, it may be transmitted to the offspring from either parent, in a more or less modified form. There can be no doubt also that secondary syphilis may be communicated to married women by their husbands without pregnancy having taken place; or even to them or to any one else by close contact, independently of sexual intercourse, when the circumstances stated above (§ 112.) favour the infection.

120. Dr. Porter mentions the case of a lady, who had become pregnant three months before the father's first contraction of syphilis; and whose fœtus died within a week from birth of unmistakable lues. The circulation of the mother had therefore been poisoned at a considerable time subsequently to impregnation, although the father had never a sore capable of furnishing a drop of matter, and the mother never a symptom of any description, until an eruption appeared a few days before her delivery. Dr. Porter believes, "that the semen of a diseased man deposited in the vagina of a healthy woman, by being absorbed, may contaminate that woman without the necessary occurrence of a chancre or any open sore secreting matter in either the man or the woman." Mr. Holmes Coote very correctly remarks (and his remarks bear out my own observations in a variety of cases) that "when the mother has once been infected with the syphilitic poison it becomes extremely difficult, if not impossible, to say when the taint will become extinct. The immediate effect, as regards the fœtus, is to cause its death *in utero*. As the poison becomes less virulent, the child is born with the disease and perishes in a few days or weeks. Then comes a class of cases in which the characteristic eruptions break out some weeks or even months after birth; but the exact limits of these periods have not been, and perhaps cannot be, accurately ascertained. In illustration of these remarks, I refer to the two following cases. In the first a respectable woman is infected by her husband. She is delivered consecutively of three dead children. At the expiration of thirteen years she gives birth to a living child which is covered by the usual eruptions shortly afterwards. In the second, a fine healthy-looking young woman is infected by her husband a few weeks after marriage. She is delivered of a dead child; after which she does not again become pregnant. But, eight years having passed, she suffers in her own person from the original taint." (*Op. Cit.* p. 129.)

121. Whilst I was physician to the Infirmary for Children, cases illustrative of the above remarks, as well as of the following statements, were occasionally brought under my observation. — 1st. That an infected mother may not communicate the disease to her infant. 2d. That an infected mother is very liable to transmit the distemper to the fœtus or infant. 3d. That the mother has been infected several, or even for many years, has given birth to one or more dead children, and has had at last a living child, which soon after birth presented the syphilitic cachexia, with anæmia, copper-coloured lepra, and ulcerations of the nose, mouth, anus, or genitals. 4th. The mother has had syphilis communicated to her by her husband; and the disease has disappeared, but she has been delivered of dead children; and after a number of years from the infection by her husband, the distemper has appeared in the throat and bones of the palate, or in other parts. 5th. The mother

has been the subject of syphilitic eruptions, &c., has been apparently cured; but after many years has had a return of secondary symptoms, and been pregnant, either in the interval or at a later period. The child when born, has been, and has continued in good health for several months or years, but has presented secondary symptoms subsequently. 6th. A woman has been the subject of secondary syphilis — of syphilitic eruptions, &c., and has communicated the distemper to the child given to her to nurse. 7th. Secondary syphilis in a child has been communicated to another child with which it has slept, the severer forms of secondary disease resulting. 8th. Secondary syphilis in a child has been by it communicated to its nurse, who has soon afterwards experienced the characteristic syphilitic eruptions, sore throat, alopecia, and other still more severe affections. 9th. A healthy woman has suckled, even for a few times, a syphilitic infant, and the secondary disease has been communicated to this woman, by this infant; she afterwards has suckled her own infant and given it the distemper.

122. These statements have been fully confirmed by my experience at the institution mentioned above, and in private as well as in gratuitous practice, during a number of years, and will readily be admitted by other experienced physicians. Indeed, they are fully confirmed by the writings of Dr. Colles, Mr. H. Coote, and by nearly all the old writers on syphilis. Dr. Colles remarks that the child may be infected after birth by a nurse suffering syphilitic ulceration of the nipple, or by its mother under the same circumstances, if the disease of her nipple has been derived from a strange child; but that no instance is known of a child infecting its own mother, although it will immediately communicate the malady to a strange nurse. The infection of the nurse by a diseased infant manifests itself by syphilitic affections which cannot be distinguished from that succeeding primary disease — by ulcerations of the throat, &c., by cutaneous eruptions, and by the formation of moist excrescences about the pudenda, which are capable of infecting her husband, in whom they are likewise followed by constitutional effects. In him the ulceration of the throat has not the same venereal character; it is superficial, and its surface is covered with patches of whitish lymph. Dr. Colles believes that the disease may be further imparted to other members of the family by contact, the use of the same utensils, &c., for it is remarkable, he adds, that its contagious property increases as it extends further from its source. Its symptoms, he states, bear an exact resemblance to each other in different individuals; and in this third remove from the source of contagion, it is permanently fixed in the parts it first seizes, and is of a much milder nature. If we compare the histories of the manifestations of syphilis in different ages, as furnished us by the most trustworthy writers down to Oesterlen, Wallace, and to still more recent authors, we are compelled to conclude that syphilis is one specific malady, that it presents various modifications resulting from modes of infection, race, treatment, and other influences; all its varieties being traceable to one stock or source.

123. *D*. Inferences. — As the result of observation and research, I conclude, — 1st. That syphilis, in the various forms and modifications
has presented in different ages and localities,
derived from, and hence originally identical wit
the indigenous yaws of the native Africans. — 2
That this identity or derivation is proved by t
characters of both forms of disease, by modes
infection or contamination, by the susceptibili
and unsusceptibility of both, as shown by inocul
tion*, and by the same treatment being appr
priate to both.—3d. That the indigenous Afric
or Ethiopic syphilis was communicated to t
Moors and Jews in the north of Africa, and then
conveyed into Spain, and probably also into Fran
and the north of Italy, even before the discove
of America.—4th. That the distemper was fu
ther diffused and rendered epidemic or pestilenti
by the expulsion of the Moors and Jews fro
Spain by Ferdinand, towards the end of the 15
century, and by the distresses consequent up
this act; the miseries and the horrible sufferin
resulting from it, as well as the diseases diffus
by it, being recorded by contemporary writers.
5th. That this occurrence shortly preceding t
invasion of Italy by Charles VIII. of Franc
by augmenting the sufferings and distresses of t
inhabitants, increased the spread of the malad
and rendered it at the same time more virule
acute, and fatal.—6th. That the diffusion, severit
and the infectious character of the malady we
promoted by the distresses then prevalent in tho
countries, and for many years afterwards, by t
prevalence of a leprous, or of a scorbutic diathe
in many, and by the habits and social conditio
of communities, in those ages and countries.—7
That there is sufficient evidence to conclude, th
the disease existed as now stated, and had be
propagated extensively, before the connate malad
the *yaws*, or *pian*, or *epian*, which was said to ha
existed in America when discovered by Columb
could have been conveyed by his followers in
Europe.—8th. That the manifestations of the d
temper, usually described as varieties of it, —
yaws, epian, or as syphiloid diseases, or as pseud
syphilis †; the chief of which are noticed abo
(§ 84. *et seq.*), are merely modifications of t
malady resulting from modes or sources of infe
tion, race, social conditions and habits, food a
regimen, neglect of cleanliness, treatment, &c.,
already insisted upon (§ 111. *et seq.*).—9th. Th
whatever lowers the vital forces of the econom
and more especially a combination of causes p
ducing this effect, will favour the infection of s
philis, the development of the constitutional co
tamination, and the outbreak of the distemp
when it lurks in the body.—10th. That the pare

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* The yaws are inoculated at an early age in ma
places in Africa, in order to prevent subsequent infe
tion; and syphilisation is now practised in some plac
in Europe to prevent infection, as well as to produce
permanent cure of constitutional syphilis (see syp
lisation in the sequel).

† Sydenham believed the yaws to be the same disea
as syphilis. The writer of the article "*Epian*," in
"*Encyclopédie Méthodique*," has classed it, the yaws, a
venereal disease as the same maladies. "*Epian*. N
que les naturels de Sainte-Dominique donnoient à la
role, qu'on croit avoir été endémique dans cette île. Qu
ques-uns ont cru que c'étoit un caractère de maladie p
grave et plus facheux encore que la vérole; mais il
actuellement prouvé, que c'est la même maladie que
François ont appellé mal de Naples, et les Italiens m
François, chacun s'empressant de désavouer l'origi
d'un mal aussi honteux, et accusant ses voisins d'
avoir propagé la contagion." (*Tome* vii. p. 2.)

ted by syphilis will often, but not always, communicate the disease in a more or less severe constitutional form, with marked local affections, to the fœtus — with a severity often sufficient to destroy the life of the fœtus, either previously to or soon after parturition; and that, in many cases where the venereal taint has not been congenital, scrofulous diathesis or more manifest tubercular disease will result. (See §§ 82, *et seq.*) — 11th. That many of the circumstances and social habits which have been shown above to have favoured the dissemination and severity of syphilis for ages, after it was introduced into Europe, now no longer exist, excepting in limited localities; but when they have existed in more modern times, the distemper has presented a severity, and other characteristics displayed by it in former ages.—12th. That there is reason to believe that the disease existed in China from time immemorial, or at least ages before the period at which it became epidemic in Europe; but the extent, or the form, of its prevalence in that country at the present day I have not the means of knowing.* — 13th. That inoculation, as practised for ages on children by the negroes on the Gold Coast, for the prevention of yaws, and as lately had recourse to on the Continent against syphilis (see *Syphilisation*, §§ 15 *et seq.*), may be expected to lead to some important results.

123.* IX. TREATMENT.—i. HISTORY OF. — It would appear, from the earliest writings respecting the discovery of America, that the disease existing in Hispaniola, when discovered by the Spaniards, was a variety of syphilis, if not the same distemper, or the same as the yaws existing at the same time, and for centuries previously, in Africa (see §§ 84, *et seq.*); that this disease was treated successfully by the natives of Hispaniola by the decoction of guaiacum; and consequently that guaiacum was employed by the Spaniards who had there contracted the disease. We accordingly find many of the early writers on syphilis, especially from the commencement to the middle of the sixteenth century, as DE HUTTEN, DELGADO, FERRO, POLL, ZENE, GALLUS, MICHEL, RYFF, BONCOSSUS, HUSCHARDI, &c., recommend guaiacum for its cure. Although a very few writers mention, towards the close of this century, mercury as a remedy for syphilis, yet it was not until the middle of the seventeenth century (1649) that BONNJONNIER asserted that this malady could be cured by mercury alone. Some years afterwards MENDE (1668) and VON HAMMON (1674) proposed the question, whether or no mercury should be preferred to guaiacum in the treatment of syphilis? Since then, and especially from the commencement of the eighteenth century until the beginning of the nineteenth, mercury has been the almost universal remedy for this distemper; and corrosive sublimate was the most employed preparation of it; more than one hundred writers (117), during the eighteenth century, alone recommending it. CIEZA and BLANCARD prescribed sarsaparilla; the former stating that this medicine was adopted by the native Peruvians for the cure of syphilis, as it prevailed among them; and numerous Spanish and Portuguese writers in the sixteenth and seventeenth centuries employed it, in conjunction with guaiacum and sassafras; this combination being very generally resorted to as a part of the treatment of syphilitic cachexia down to the present day.

124. Early in the eighteenth century, WILLOUGHBY (*Salivation shown to be of no use or efficacy in the cure of the Venereal Disease*, 4to. Lond. 1723) contended against the practice of salivation, then so generally adopted; and in 1779, COCKBURN affirmed that all venereal ulcers will heal under a local treatment merely; and that mercury should be resorted to only when constitutional symptoms appear. Early in the present century several army surgeons, probably instructed by their observations in Spain and Portugal, where the practice followed before the general introduction of mercury still lingered, proclaimed the treatment of syphilis without mercury; and from 1820 to 1830, experiments were made in the Hospitals of Sweden — a country where scientific progress is always in advance — and in Hamburgh, on the non-mercurial treatment of this distemper. In the present day there can be no doubt of the success of this treatment in the majority of cases; and that the worst states of the disease — the most prolonged and most dangerous forms — have been those, for which mercury had been most abundantly employed at an early stage, and the most copious salivation produced and continued for the longest periods.

125. In the summer of 1825 the iodide of potassium was first prescribed by me for the cure of secondary and tertiary syphilis, and the prescriptions were then prepared by Mr. MORSON, the well-known operative chemist, who also about the same time prepared for me an iodide of sulphur, in order to employ it in similar cases; but I soon relinquished the internal use of the latter for the former, as being, even in small doses, too irritating to the digestive mucous surface. In the following year, I had recourse, in the case of E. L., Esq., M.P., to the use of iodine. This case, the nature and history of which was well known to Mr. C. BEEVOR, of Upper Harley Street, had been treated unsuccessfully by mercury in every conceivable form and combination; and when it came under my care I viewed the severe symptoms, which were seated chiefly in the large joints, as the result of the combined effects of syphilis and mercury. Iodine was had recourse to successfully in this case. The correspondence between this gentleman and myself respecting the treatment during his absence from London is still preserved by me in proof of the early and successful employment of iodine and its preparations for secondary and tertiary syphilis.

126. Since 1825 I have prescribed these preparations, whenever I have been consulted in cases of this nature; but in some, and in certain stages and states of the disease, they have failed, as in two instances which lately came before me,

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* My relative, Mr. POTTINGER, who passed some time in China, informed me that syphilis appeared to be a disease of great antiquity in that country; and that the primary sores caught by Europeans from Chinese females generally assumed a phagedænic or sloughing character. The constitutional affection rarely occurred. He states in answer to my inquiries, that the disease appeared indigenous to the country; that secondary symptoms are not more frequent among Europeans in China than elsewhere; that the phagedænic form of chancre was very common, but the round indurated ulcer was often met with, and was extremely obstinate; that as the phagedænic sore progressed towards a cure, much hardness appeared about its edges; and that it was often necessary to make the gums slightly tender in order to heal it up completely.

and which I remitted to the care of Mr. H. Lee, for the employment of his plan of mercurial fumigation. Most of the severe and dangerous cases of syphilis which I have had an opportunity of witnessing have been reduced to this state by an excessive or an improper use of mercury; and it has been more especially in those cases that the use of iodine, especially the iodide of potassium has been most successful. The worst symptoms which have been too frequently ascribed to local manifestations of syphilis, especially affections of the periosteum, bones, &c., have been demonstrated to me to have been the results of excessive doses of calomel alone, very commonly given in hot countries, during the early part of the present century, for the cure of fevers. At one period it was attempted to bring the system under the influence of mercury in these maladies, but the practice very generally failed; and in some of these cases, in which recovery took place, disease of the periosteum was the result.*

127. ii. Treatment of Primary Syphilis — *A*. The *intensions* of cure in this stage of syphilis are, — 1st. To destroy the poisonous ulcer, and heal the part as soon as possible,— and 2d. To prevent the contamination of the constitution. The *first intension* is best accomplished by touching the sore with nitric acid, nitrate of silver, or any other escharotic. The penis may afterwards be wrapped in a rag dipped in warm water. An aperient may also be given, and rest and low diet enjoined. If the sore have lasted above a week, it may still be expedient to destroy it; but there will not be the security against constitutional contamination, which an earlier recourse to these means might afford. When, however, the chancre consists of a well-marked indurated lump, or when the penis is swollen and inflamed, the patient feverish, or when there is swelling or tenderness in the groin, then the above local treatment is no longer applicable; and mild liquid applications, consisting of the black wash, lotions containing tannin or catechu, or of other substances capable of decomposing the contaminating secretions, may be prescribed to the affected parts. If there be much irritation, the penis should be enveloped in a poultice, or in a fomentation of boiled camomile flowers and poppy heads, and the patient kept in bed. If induration exist, an ointment with calomel may be applied. "Afterwards, during the indolent and granulating stages, the sores may be treated with a astringent lotion, and be touched occasiona with nitrate of silver, or sulphate of coppe (Druitt.)

128. *B*. The *prevention of the constitutio contamination of syphilis* was formerly attempt by a recourse to mercury contemporaneously w the treatment of the primary sores, the bel being general that where this object was attained by means of this substance, the dise would infallibly proceed from bad to worse. H however, the malady been studied with a d reference to its origin and to its treatment, dur the earlier periods of its history, as well as to treatment of the connate malady, of which I h contended that it is merely an extension modification, a different method of cure wo have been instituted; and a recourse to merc would have been either reserved, or entered u in such a manner, and with such precautions would have secured successful results. The r dern opinion, however, is, that every case primary syphilis *may be* treated without mercu that the too profuse administration of it m render the disease infinitely worse; that there many cases which do not admit of it at all; that in the right cases the moderate and judici use of mercury removes the existing sympto and renders the patient far less liable to lapse.

129. Mercury is either not required or admissible under the following circumstances "When the primary sore has been destroyed, has healed within seven days from its commen ment; when it is much inflamed, irritable, slou ing, or phagedænic; when the patient is feve and irritable; when a bubo is present; when health or constitution has suffered from attack syphilis or the use of mercury; when mercur known to cause rapid salivation, or to occas loss of flesh, sore throat, night sweats, or m curial erethism; and when scrofulous disease manifestly pronounced, or when tubercular c sumption is fully developed. If there be mor these contra-indications, and more especiall the sore be indurated, mercury may be giv not because absolutely necessary to a cure, because it has been proved by experience hasten the cure of the primary, and to les the chance of secondary symptoms." (Drui

130. But, as Mr. H. Coote has justly sta "every form of primary syphilitic disease ma followed by constitutional affections, the na and the duration of which no one can predica whether the treatment be mercurial or non-m curial. The want of fixed opinions as to treatment of the disease displays itself in all countries of Europe; and although it ca much uncertainty and distrust of the use of re dies, the injurious recourse to the excessive us mercury, so common in former times, is no lo adopted. The most important question, howeve the frequency of constitutional disease after prim syphilis, when treated with, or without mercu for the primary affection is, in by far the gre number of cases, an evil of comparatively magnitude. Secondary syphilis, when once tablished, is a disease of which no one can for the termination. Its various phases, their cession and complication, are almost beyond reach of our knowledge, and often out of

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* The following interesting case illustrates this fact: it occurred more recently than the period above referred to. Some years ago, a gentleman trading to the west coast of Africa was attacked by fever, and was treated by calomel given in scruple doses every three or four hours. He recovered from the fever, and returned to England. I was called to see him soon afterwards, and found him completely hemiplegic, with two large swellings of the pericranium. Having heard the account of his case, that he had never any venereal symptom, primary or secondary, that he had taken an excessive quantity of calomel during the attack of fever, I inferred that a tumour of the dura mater, as well as of the pericranium, had resulted from the calomel, and now pressed upon the brain. The iodide of potassium was therefore prescribed, and he rapidly recovered the use of his side, the paralysis disappearing with the subsidence of the pericranial tumours. He has continued in good health up to this time.

Whilst this was passing through the press I was called to a lady similarly affected to the above case, after the prolonged use of mercury for hepatic disease. The iodide of potassium has already been very beneficial to her, but sufficient time is not yet elapsed to show the full results.

here of treatment. Dr. Hennen treated 105 ses of primary sores without mercury; secondary mptoms followed in eleven instances, and all ese were cured without mercury, excepting one stinate case. In the report of the Army Me- al Department from December 1816 to De- mber 1818, 1863 cases of primary chancre ere cured without mercury out of 1940 cases, nety-six having had secondary symptoms; the erage time required for their cure being twenty- e days, when bubo did not exist; and forty-five ys when bubo was present. The average time the cure of secondary symptoms without mer- ry was from twenty-eight to forty-five days. the above period, 2827 cases of primary affec- n were treated with mercury; secondary sym- ms occurred in fifty-one of them. The average e for the cure of primary symptoms without bo was thirty-three days; with bubo, fifty ys; and for the cure of secondary symptoms, ty-five days. Of two cases treated by Mr. EEN without mercury, buboes occurred in teen cases, six only suppurated; and consti- ional disease, preceded by febrile symptoms, lowed in nine cases.

131. From these data, it will be seen that the ance of advantages is not much in favour of rcury; and yet there are a few cases which nnot be cured, or at least not so soon or cer- ly cured, without this mineral, when used in a icious manner. The opinions of some of the est recent writers as to the use of mercury for mary syphilis appears to accord with those of Lee, Druitt, and Acton; and upon the whole h the results of my own experience, which ees also with the following remarks by Mr. LMES Coote: "I am far," he states, "from dervaluing mercury as a remedy in syphilis; on contrary, it is the most certain and powerful edy we possess; but it requires to be admin- red with caution. The best method of securing atient against the invasion of secondary sym- ms is by destroying the primary sore, when ll and manageable, by caustic; next, by ling the primary sore when that measure is racticable, as quickly as possible, without de- ent to the patient's health. If we salivate a ent in whom a small superficial sore is running usual brief course of two or three weeks, we tively do the man an injury. But if indura- should occur, either in the base of the sore as the indurated chancre, or in the cicatrix, a rse of mercury, judiciously administered, is luable." The rules which should guide the tment of chancres, are,—1st, to destroy, as dly as possible, the syphilitic virus, by ap- ng the nitrate of silver, the strong nitric , or the acid nitrate of mercury, or the nna paste, to the sore when it is small, and ading, but without induration;—2d, For sores ch are not indurated, spread feebly, and v signs of incipient granulation, the adminis- on of mercury is injurious, as retarding the ing process, and not protecting the patient secondary symptoms;—3d. When indu- n exists in the slightest degree in or around sore; when the chancre continues to spread kly, or when, after seven days, it shows no osition to heal, then mercury is required;— Mercury is either inadmissible, or not re- ed, or even dangerous, for phagedænic and sloughing chancres, and in the other circumstances above noticed (§§ 129.);—5th. The longer a syphilitic sore continues unhealed and secreting the contaminating matter, the greater the risk of constitutional infection;—6th. The more robust the constitution, and the more perfect the general health, the risk of secondary symptoms from primary sores appears diminished: but this vital resistance to contamination should not prevent the early cure of chancre, more especially when it is indurated, nor prevent a recourse to mercury if the sore has been neglected or of long continuance.

132. Having determined, after due consideration, to have recourse to mercury, the selection of the preparation and mode of exhibiting it require some attention. The preparations which are most suited to the primary disease, when there is no bubo, are the hydrargyrum cum creta and calomel, and in some cases the pilula hydrarg. chloridi composita. The other preparations of mercury, especially the mercurial ointments and the bichloride are more beneficial in other states of the distemper. The dose, and frequency of exhibiting the hydrarg. cum creta or calomel, require no remarks. They should be regulated according to the state of the patient, and their effects upon the bowels. Calomel generally requires to be conjoined with small doses of opium, or with the pilula saponis composita, but in this latter combination the dose of calomel should be much increased. The object is to produce a slight soreness and sponginess of the gums, with a very slight salivation when indurated chancre exists, and to continue it for four or five weeks, preferring in the latter case the longer period. The dose of the medicine should be regulated according to its effects. During this course, the regimen of the patient should in part depend upon his state of health when commencing it. He should live regularly but not too low. If he be in ill health in other respects, the treatment, and regimen, and diet suited to his state should be prescribed. In general, excesses in food and wine should be avoided, and whatever is calculated to disorder his digestive and biliary organs. The clothing should be warm; and fatigue, cold, wet, the morning and night air ought to be carefully avoided. If, notwithstanding this attention to health, and to the prevention of disorder, any of the indications described, when treating of the injurious effects of mercury, make their appearance, the means recommended for their removal, in the articles Erythism, Mercurial, and Poisons (§§ 562, *et seq.*), should be employed.

133. C. *Gangrenous chancre*, when it occurs in strong, sanguine, plethoric, or healthy persons, is usually the result of excessive inflammatory action, and requires large vascular depletions, free purging, and afterwards opium conjoined with salines, antimonials, &c. Locally, poppy fomentations, poultices with balsam of Peru, or with turpentine, after the nitric acid lotion, will detach the sloughs. If the ulcer which remains is healthy, and heals, there is no need of mercury; but if it ulcerates, independently of the state of the general health, or if secondary symptoms appear, mercurials should be directed. *Sloughing*, *gangrene*, and *phagedæna* of venereal sores are, however, most frequently consequences of an exhausted or broken-down constitution, from intemperance or other

causes. In such cases, the application of opiate and camphorated lotions to the sore, of strong nitric acid, if it spread; and opium and camphor, or ammonia, the fixed alkalies and tonics taken internally, aided by a generous diet, beef-tea, wine, &c., are indispensable.

134. *D. Phymosis* is sometimes caused either by *balanitis*, or by one or more ulcers under the prepuce. In these cases there is more or less discharge. A chancre is often detected by local hardness and tenderness. If the prepuce be elongated, and cannot be retracted, circumcision may be advisable; but generally it will be sufficient to split the prepuce so as to enable the parts underneath to receive due attention, and the treatment which the character and progress of ulceration may require. The frænum is not unfrequently perforated by a chancre; and it then requires to be divided. In the circumstances now stated, the duration of the chancre, and the confinement of the secretion under the prepuce increases the risk of constitutional contamination, and requires, unless in very recent cases, a recourse to mercury. A chancre in the urethra requires astringent injections, preferably such as contain the bi-chloride of mercury, and a course of this mineral if not contra-indicated by the state of the patient.

135. iii. The non-mercurial Treatment of primary syphilis may be adopted in the circumstances above stated (§§ 131, 132.), or even in others where it may be considered prudent or advisable to have recourse to means which will improve the general health, and enable the constitution to resist the invasion of the poisonous virus. If there be debility or impairment of the digestive and assimilating functions, tonics, the chalybeates; the preparations of cinchona, or of sarsaparilla, or of guaiacum; cod-liver oil, simple or medicated; the compound decoction of sarsaparilla, with or without iodide of potassium and liquor potassæ, will be found the most deserving of confidence, especially if prescribed appropriately to the circumstances of the case, and if the patient live regularly, and avoid intemperance of all kinds, and all causes of vital exhaustion. (§ 118.)

136. iv. Treatment of Bubo.—Mr. H. Coote states that he knows of no relation between the occurrence of bubo and the frequency of secondary syphilis; and he believes the idea that a copious suppuration from the groin eliminates the venereal poison to be unfounded. "When swelling of the glands occurs in conjunction with primary syphilis, or is supposed to depend upon the syphilitic poison, mercurial frictions are directed upon the thighs, that the mineral may pass through the enlarged parts." In more chronic enlargements, the swelling may be covered by a plaster of the unguentum hydrargyri, or of the unguentum ammoniaci cum hydrargyro. "Leeches are not often required to an inflamed bubo, but they may sometimes be applied with advantage." The existence of suppuration should not suggest an early recourse to the lancet, as absorption often takes place after the skin has become red or even thin. Absorption of the matter from suppurating buboes does not add, in Mr. H. Coote's opinion, to the patient's danger of secondary syphilis. An opening, when required in a suppurating bubo, should always be made in the long axis of the thigh. If any burrowing of matter occur, particularly in scrofulous persons, who are most liable to buboe tonics, with a restorative and digestible nourishin diet, are required.

137. The treatment advised by Dr. Drui and Mr. H. Lee, for bubo is very different fro that now stated. The former writer remarks th the first indication is to produce resolution of *acu* bubo—"by rest, aperient and saline remedies, lo diet, leeches and fomentations. The applicatio to the chancres must be soothing, and mercury, being administered, should be at once given u As soon as the tenderness is relieved, pressure l means of a compress and bandage, or by placi a weight on the part as the patient lies in bed, useful. Even if matter does form and does n seem inclined to come to the surface, the iodi paint, cold lotions, aperients, tonics, and pressu will sometimes cause it to be absorbed. But if increases, and the skin becomes inflamed a shining, a puncture should be made, and the ca be treated as any other acute abscess." The ch circumstance deserving notice in this quotation the abandonment of mercury if it have been a ready prescribed. My observation in former da has induced me to agree with Mr. H. Coote in recourse to mercurial inunctions on the thighs, they produce "a complete effect upon the co stitution, and may be used with advantage in ca of chronic bubo, combined or not with prima disease." Suppurating buboes, or solid inguir swellings, will often disappear under this tre ment, which, to be effectual, he advises to be do in the following way:—"The patient sitting l fore the fire, should rub on the skin at the in part of the thighs a drachm of the strong merc rial ointment every night, or every night a morning. He should slip on a pair of draw and go into bed, that the absorption of all th which stains the skin may go on. The pati should not be allowed to wash the part except intervals, to prevent the skin from being chafe The introduction of a drachm or two of mercur ointment into the axillæ when in bed will genera produce the mercurial action when it is requi in other circumstances.

138. In cases of *indolent bubo*, the indication to improve the general health, by sarsaparil tonics, and the other means advised above (§ 135 For these, change of air, sea voyaging, remo to a warm and dry locality, and digestible fo are the most beneficial means of cure. The lo use of iodine is sometimes of service both in th and in the chronic enlargements of the ingui glands, but it is not so beneficial as the inter use of the preparations of this substance, whi when used internally, should be combined w either the liquor potassæ, or with either of carbonates of potash, and be prescribed with ot suitable medicines. If *sinuses* form, or if *slou ing* or *phagedæna* occur, or if the ulcers beco *irritable* or much inflamed, the means suitable the case, both internal and external, should employed.

139. v. Treatment of Constitutional Syp lis. — *A. Of secondary affections.* It has b contended by some recent writers and stated ab (§ 46.), that the simple and phagedænic so are rarely followed by constitutional syphi whereas the indurated chancre rarely if ever f to be succeeded by the secondary disease. I H. Coote disputes these positions, and conclu

at secondary symptoms in large proportion sue after every variety of simple and non- durated chancre. After primary phagedæna, too, condary symptoms may be dreaded, and no pse of time seems to render the patient's con- tution free, the secondary disease partaking of e character of the primary sore. "If a person ere to have a well-marked phagedænic ulcer, I ould not guarantee his not suffering phagedænic ceration of the throat after an interval of ten ars, or even more." Mr. COOTE adds, that no one ho has primary syphilis in any or in its slightest rm can be safely guaranteed from the occurrence constitutional disease; but if six months elapse er the healing of the primary sore, the patient maining well, the chances are greatly in his fa- ur that he will escape any further disease. An ception, however, must be made in the case of imary phagedæna.

140. It is often necessary to disabuse the patient's nd of the belief that the syphilitic poison may destroyed by some specific, which will enable n to revert to his former habits. All, however, at can be done, is to combat the disease as it pears, and to point out those modes of living ich may prevent, although they cannot procure mplete security from the constitutional infection, certainly remove the contamination when it has eady been produced. Much depends upon the tient himself, in respect of the amount of protec- n which may be afforded him. For anxiety of nd, gloomy ideas, and all irregularities and ex- sses, and the other concurring causes mentioned ove (§§115—118.), will perpetuate the constitu- nal contamination, and develope its local mani- tations, and induce a state of syphilitic cachexia.

141. If venereal eruptions, sore throat, &c., be hered in, as they often are, by febrile or inflam- tory symptoms, aperients, salines, and antimonial phoretics will be of service. The diet should restricted, the patient confined to the house, d the warm bath often resorted to. "When e febrile state has vanished, if the patient has ver taken a course of mercury — or if he have en subjected to an imperfect course of it for e primary symptoms — and his constitution is und, he may take mercury as already di- cted. If under its use, the strength and gene- appearance are improved, so much the better; t if the patient gets thinner, weaker, and hag- rd, and suffers from chills and feverishness, or is ulcers become irritable and phagedænic, it ist be given up. The mercurial vapour bath, the corrosive sublimate in very small doses, and t carried to the extent of affecting the mouth, ll often be of great service when the full course the mineral is inapplicable." (DRUITT. *Op.* p. 189.) The numerous authorities in favour the bichloride *, and my own experience of its effects, have rendered me partial to the adoption of it, in preference to other preparations, when a recourse to mercury should be had.

142. The iodide of potassium is often of great service, especially when a recourse to mercury is considered inexpedient or improper (§ 129.); or after mercurial remedies have been prescribed without a satisfactory result, or when they appear to have been injurious. It is in these latter circumstances, and especially where a protracted course, or a too liberal exhibition of this mineral, has been directed, without avail, that the preparations of iodine, especially the iodide of potassium, in due solution and combination, according to my observation, have been most beneficial.

143. The preparations of sarsaparilla, especially the compound decoction, are always productive of great benefit. They may be prescribed either subsequently to a course of mercury or of iodine; or the bichloride of mercury, or the iodide of potassium may be taken with the compound decoction of sarzæ, or with the fluid extract or syrup. In some states of secondary syphilis, the muriate or the nitrate of ammonia may be taken in tonic and aromatic infusions, in as large doses as will not offend the stomach; or the nitro-muriatic acids may be tried, either in weak dilutions or in the infusions just mentioned. But in most cases of secondary syphilis, characterised by much debility and loss of flesh, or by anæmia, few means are so generally useful as a prolonged course of the bichloride of mercury in the tincture, or compound tincture of cinchona, in the proportion of half a grain or a grain to the ounce of the tincture, a drachm, or a drachm and a half being taken twice or thrice daily in a little water, according to the circumstances of the case. When the throat, palate, or other parts of the mucous surfaces are much affected, this combination, or the bichloride in the syrup or fluid extract of sarzæ, aided by gargles containing the bichloride, or by mercurial fumigation, is very frequently efficacious.

144. In cases of indurated chancre of considerable duration, in most cases of secondary syphilis, and generally in tertiary syphilis, analyses of the blood demonstrate a great diminution of red corpuscles, an increased amount of albumen, the fibrin not being materially altered in quantity. These results should not be overlooked, as they indicate the propriety of caution in the exhibition of mercury, and of selecting the mode of exhibiting it now advised; or of adopting the preparations of iodine, and especially the iodide of iron, prescribing it in the syrup of sarsaparilla.

145. During the treatment of constitutional syphilis it should always be kept in recollection, that whatever depresses the vital force, or impairs the general health, favours the developement of the syphilitic contamination and its external or local manifestations: and that, if the remedies resorted to produce these effects upon the constitutional energies, they will very probably prove more injurious, than beneficial. Hence the remedies should be so combined, exhibited, and alternated; and so aided by a regulated diet, and by a

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Dr. DZONDI, Professor at Halle, prescribes the hloride as follows: — ℞. hydrarg. bichloridi gr. xij.; ve in aquæ distillatæ q. s. et adde micæ panis, et sac- ıri albi, ââ, q. s. ut fiant pilulæ cc., sing. gr. j. The ls are to be rolled in powdered Canella bark; and on first day four pills are to be taken ($\frac{1}{5}$ of a grain); on second day none; on the third day six pills; on the rth none; on the fifth eight pills; on the sixth none; the seventh day ten pills, and so on, until the twenty- enth day, when thirty pills are to be taken ($1\frac{1}{2}$ grain). e treatment is then complete; but in some instances severe secondary symptoms they are to be carried en further. The pills may be taken on a full meal. saparilla is also to be taken during the course, or even erwards. Also animal food is to be reduced to one half the usual quantity; and pork and bacon avoided. The cold night and morning air, and cold and wet are to be shunned. I have been consulted by patients for whom this treatment has been adopted; but the cases have been too few to admit of an opinion respecting it. It is merely a modification of the well-known treatment advised by VAN SWIETEN.

healthy, temperate, or warm and dry atmosphere, as to promote the constitutional powers; improvement in the healthy appearance of the patient generally indicating the success of the medicine employed.

146. *B. The local treatment* of secondary syphilis consists chiefly of warm, vapour, or sulphur baths, for the eruptions; of the application of lotions of corrosive sublimate, or ointments containing the unguentum hydrarg. nitratis, or the unguent. hydr. præcipitati albi, especially when the eruptions are severe, or are leprous or tubercular. If itching or irritation be experienced, lotions or frequent sponging the parts with a saturated solution of the biborate of soda in any emollient fluid will generally be of much service. Dr. DRUITT states that "for the common excoriated sore throat, any soothing detergent gargle will do. When there are ulcers, it is advisable to use gargles of corrosive sublimate; and when the ulcers are indolent they may be touched with the linimentum æruginis. Mercurial fumigation is also occasionally of benefit. It is effected by putting a scruple of red sulphuret, or of the common black oxide, or twice the quantity of mercury with chalk, on a heated iron, in a proper apparatus, and inhaling the vapour, — a heated penny piece in a tea-cup will answer the purpose.* When a foul ulcer is
seated in the velum, or roof of the mouth,
pharynx, or alæ nasi, an attempt may be mad
check its ravages, by destroying its surface
edges with acid nitrate of mercury." (*Op. cit*
190.). The ulcerations at the roots of the n
or between the toes, are cured by the inte
administration of mercury, and the applicatio
a solution of nitrate of silver,—from four to
grains to the ounce of distilled water. W
the hair falls off the scalp, the hair should be k
short, and the dilute ointments, just mentio
applied, or the means resorted to which are
vised in the article on the HAIR (§§ 32, *et seq.*

147. Mr. H. COOTE remarks that the comn
warm bath effects but little in comparison v
the Turkish bath, which is admirably suited
the chronic stages of secondary syphilitic er
tions*, and which may now be procured in L
don. Extremes, or even alternations, of tempe
ture should be avoided; and the regimen and
should be regulated according to the habit
body, the usual modes of living, and the pec
arities of the case, avoiding too great abstine
on the one hand, and too full living on the oth
moderation in all things being always
served.

148. vi. THE TREATMENT OF TERTIARY SYP
LIS.—In this state of constitutional contaminati
mercury, if exhibited at all, should be prescri
with great caution, and it ought not to be given i
have been previously resorted to, either in prolon
courses, in large quantity, or in such a man
as to occasion copious salivation, or any of the m
unpleasant effects, described in the article POIS
(§§ 562, *et seq.*). But if the patient have not
recourse to this mineral in any form, if none of
more severe tertiary affections exist, the bichlor
of mercury may be prescribed in full and incre
ing doses in the compound decoction of sarsapari
upon a full meal, or as advised by VAN SWIET
or mercurial fumigations may be resorted to. I
if a manifest improvement in health, and in
local affection, in a reasonably sufficient time
not observed, or if there be any aggravation
symptoms from this treatment, the iodide of pot
sium should be substituted, and given in doses
three grains thrice daily, increasing them to fi
grains conjoined with the liquor potassæ, or w

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* Mr. HENRY LEE has given (*Transact. of Med. Chirurg. Society of London*, vol. xxxix. p. 339.) the following directions as to the use of mercurial fumigations: —

"Finding from experience that it was the light-coloured oxide alone which volatilized, and produced its effects upon the patient's constitution, and having reason to believe that the light colour depended upon the presence of calomel, I performed a series of experiments with calomel alone, or mixed in a certain proportion with the grey oxide. The general result of these experiments has been, to satisfy me that, for the purposes of mercurial fumigation, five or ten grains of calomel alone is, in ordinary cases, quite sufficient; and that when the grey oxide is used, the admixture of a few grains of calomel will facilitate its sublimation and insure its medicinal action."

"Upon making comparative trials with calomel alone and combined with steam, it was found to act more certainly and with greater irregularity in the latter case.

"The plan which I have adopted is very simple. Two small lamps are procured in which the methylated spirit (much cheaper than spirits of wine) is used; over the first lamp is a thin metallic plate, upon which the ten grains of calomel are placed; over the second lamp is a small cup of hot water. A small cane-bottomed chair is placed over the lamps, and the patient sits upon it. He is then enveloped, chair and all, in a blanket; at the expiration of a quarter of an hour or twenty minutes he rolls himself up in the blanket and goes to bed.

"For patients to whom it may not be convenient to procure the spirit lamps, the mode of proceeding may be varied as follows: The patient is directed to heat a thick tile in the fire; this is then put into a night stool, and a gallipot full of warm water placed upon one corner of it. The calomel powder is then sprinkled over the rest of the tile, and the patient sits over it, being enveloped, as before, in a blanket. This mode of applying the vapour is very convenient in cases of affections, either primary or secondary, of the generative organs. It is not necessary in either case that the patient should breathe the mercurial fumes. It is remarkable how soon the patients' systems are brought under the influence of the mercury by this simple means; and, according to my experience, how effectually it acts in cases both of primary and secondary syphilis. Its great advantage, however, consists in the very little constitutional disturbance produced, and in the avoidance of those symptoms of irritation and debility, both mental and physical, which the prolonged internal use of mercury is so apt to occasion. The mercurial action, when the medicine is introduced through the skin, may be continued for nearly any length of time that may be necessary; and may be repeated as often as may be convenient, without injuring the patient's constitution.

"The small quantity of calomel which it is requisite to use at each fumigation, is probably one reason why mercury in this form may be used with such comparative impunity."

* Mr. COOTE describes this bath as follows: — T
clothes having been removed, and a suitable bathi
dress supplied, the bather is conducted into a heat
apartment, where he is allowed to sit and accustom hi
self to the increase of temperature. During this ti
the body becomes covered with a tolerably profuse p
spiration. Next he is conducted to another apartme
where there is a higher degree of heat (115° F.), and t
atmosphere is charged with watery vapour. There
reclines on a heated marble slab, and undergoes a sl
process of shampooing. The quantity of cuticle t
peels off surprises one who has not witnessed the proce
but the skin is left in a cleaner state than perhaps it h
been in for years. After the movements of the lim
have been tested in a variety of ways, the bather is co
ducted to a recess, in which is a fountain with hot a
cold water, where he may apply soap and hot water
his taste dictates, or have the process performed by
attendant. A feeling of langour, not by any means u
pleasant, supervenes, which renders a short period
repose on a couch agreeable. This process removes
large quantity of cuticle from the integument, causes t
blood to circulate through the minute capillaries, a
brings into activity the sudoriparous and sebaceo
glands. We may, I presume, infer that without t
proper performance of these functions, the skin is not
a healthy state; and that any morbid condition, such
lepra or lichen, would be materially benefited by rousi
them into activity." (*Op. cit.* p. 108.)

ther of the carbonates. In cases where mercuals have been freely employed, and especially here there is reason to infer that the affections of ie periosteum or bones has been caused or aggraated by these medicines, or where there is doubt hether or no any of the tertiary affections have een caused as much by mercury as by the dismper, the decided use of the iodides of the fixed lkalies is generally the most beneficial. In cases anifesting more or less anæmia (See §§ 143, 44.), the courses of iodides, and still more those mercury, should be followed by a course of the odide of iron taken in syrup of sarsaparilla.

149. If the periosteum or bones be diseased, ill greater caution in having recourse to mercury required, although in strong constitutions, and here mercury has not been previously given, ll doses of calomel and opium, or of these with mphor, will often initiate the treatment with enefit, and they may be continued or modified as ng as they continue of service, and afterwards e iodide may be prescribed, increasing the doses ntil success result from it. I have generally escribed this medicine in the following comnations.

No. 378. ℞ Potassii Iodidi ℈j. ad ℈ij.; — Liquoris otassæ ʒij. (vel Potassæ Bi-carb. ʒij.); — Tinct. Auntii (vel Cascarillæ) ʒvj.;—Extr-fluidi Sarzæ ℥jss;—fusi Gentianæ Comp. ad ℥viij. *M.* Fiat Mist. cujus apiat Cochl. ij. vel iij. larga, ter in die in aquæ cyatho nplo.

150. It will generally be of service to take the dide in weak solutions, even when it is prescribed the largest doses. If it relax the bowels, a few drops tinctura opii, or a little tinctura camph. comp. ay be added to each dose: or, the iodide and e alkalies may be taken in the compound decocn of sarsaparilla, to which a tonic or aromatic ncture, or an opiate, may be added, according to rcumstances. When this remedy succeeds in moving the venereal affection, it should be conued for some weeks afterwards, gradually diinishing the dose. In some cases it causes itation of the mucous surface of the throat, nosls, and eyes, with a copious defluxion, or pains the region of the stomach, or irregular febrile mptoms. These disorders are observed espeally when the iodide has been given in too large ses, or uncombined with the carbonate or solun of potash. When taken thus uncombined, e acid in the stomach decomposes the iodide and e free iodine irritates the mucous surfaces.

151. In cases of ulceration of the pharynx, or rynx, or of disease of the bones, of the palate nose, mercurial fumigations may be first tried, if ercury has not been already employed; but care ould be had not to allow it to affect the mouth. rsaparilla, with a cautious use of the iodide of possium and sedatives; the application of a strong lution of the nitrate of silver, or of the bichloride mercury to the ulcerated surface, and of terebininate embrocations to the throat externally, are ten beneficial. Gargles containing either the chloride or the iodine, neither of these substances ing in such quantity as to occasion much irrition of the throat, may also be tried. In all ese the utmost attention and care are required. hen tuberculated or other eruptions assume the aracters of open sores or ulcers, the simple or mpound tincture of iodine will be most advangeously applied to them, in modes and in degrees dilution varying with their appearances.

152. When nodes are formed, the pain and consequences which often result, require iodine, alkalies, sarsaparilla, and opiates, with light nutritious diet, residence in a warm and dry air, and blisters over the affected parts. The blisters often should be repeated, in order to prevent, by the external discharge, the inflammation from extending to, or disorganising the osseous structure. If mercury have not been employed, the blistered surface may be dressed with strong mercurial ointment, and either with opium, or morphia; and the diet and regimen duly regulated, with strict reference to the several peculiarities of the case, to the extent to which the general contamination and cachexia may have advanced, and to the state of the local affections.

153. vii SYPHILIS IN INFANTS AND CHILDREN. — The treatment should be directed not merely to the infant or child, when the state of either admits of any hope from treatment, but more especially to the parents. For these as well as for the child, a mercurial course, if not previously had recourse to, should be prescribed: and in the majority of cases, the bichloride of mercury, exhibited as above (§§ 141.) or combined with either of the tinctures of cinchona, will be found the most efficacious. Subsequently the iodide of potassium or iodide of iron and the preparations of sarsaparilla may be employed, according to the peculiarities of the case, more especially if anæmia be very manifest. It has been recommended for children to rub ten grains of mercurial ointment daily into the axilla or soles of the feet, or to administer half a grain or a grain of hydrargyrum cum creta every night until the symptoms disappear. But the disease is not so completely eradicated by these means as by a judicious exhibition and management of the bichloride, especially when followed by the means just named, varying the dose, and the vehicle in which it is prescribed, with the age and circumstances of the case.

154. X. SYPHILISATION, *or the inoculation of syphilis*, has recently attracted attention not only as a cure, but as a prevention of any future occurrence, of the distemper.—i. HISTORY.—M. AUZIAS TURENNE first proposed this startling mode of treating and of preventing syphilis in 1850, by bringing it before the French Academy of Medicine. This young physician commenced, about 1844, a series of experiments with the view of testing JOHN HUNTER's doctrine of the non-communicability of syphilis to the lower animals. After many experiments and some failures, he succeeded in producing in monkeys, inoculated with chancre-matter, a true chancre, and the disease thus communicated to them was transferred to rabbits, cats, and horses. "The malady was again returned by inoculation from these to the human species, the first trials in this regard having been made by Dr. ROBERT WELTZ, of Wurzburg, on his own person. On four separate occasions Dr. WELTZ succeeded in producing an unmistakeable chancre on his own person, by inoculation from animals, and this was acknowledged even by RICORD."

155. This discovery, as stated by Dr. RADCLIFFE, issued in one more surprising still, upon which the process of syphilisation is founded, namely, the strange and curative change of the disease when the inoculations are often repeated

in the same individual. Experimenting upon apes, it was found that the artificial ulcers regularly diminished in size and virulency, in proportion as the inoculations were multiplied, until at length the virus ceased to take effect. The system seemed to become protected, as in ordinary inoculation and vaccination, and a state or diathesis was produced, in which the body was no longer capable of being affected by syphilis; and the process by which this is accomplished is that to which the name *syphilisation* belongs. This result, also, is all the more surprising because reiterated inoculations were evidently essential to it, for only once inoculated and then left to themselves, the poor apes speedily perished with all the signs of the syphilitic cachexy. Having satisfied himself of the reality of these results, M. Auzias Turenne then proceeded to enquire whether man was capable of syphilisation. He had many ardent followers, who eagerly submitted to the experiment, and who shortly seemed to furnish evidence in the affirmative.*

156. This pretension excited great opposition, particularly in the Académie de Médecine. In other quarters, however, the impression was more favourable. At Turin, M. Casimiro Sperino, the chief surgeon in the Syphilicoma, or Syphilitic Hospital of that city, at once took up the new views, and put them to the test on a large scale. He was favourably inclined towards them, he tells us, for several reasons. He had observed that severe inguinal buboes are more apt to follow small and insignificant chancres, which heal in a few days, than those which are large and obstinate; that the constitutional symptoms held an almost inverse relation to the severity and continuance of the local disease; and that he had known many prostitutes, whose constitutions had never been sensibly affected, who had had chancres for years, either constantly open, or closed only to open again immediately. He had repeatedly satisfied himself that foul buboes were more prone to heal in those cases in which their syphilitic character had been tested, after Ricord's plan, by inoculations on the surrounding skin.

157. The subjects of M. Sperino's experiments were fifty-two hospital patients, all prostitutes, and all suffering from aggravated forms of primary or secondary syphilis. The virus was taken from the person syphilised, or from a comrade—from the first, if possible—and always from a growing ulcer. The inoculations were repeated once or twice a week in three or four distinct places, usually in the abdomen. The time required for the establishment of the artificial chancres was from two to three days. The effects of the second inoculations were less serious than the first, of the third, than the second, of the fourth than the third, and so on until the virus ceased to produce any effect whatever; contemporaneously with which epoch, all former ulcers had healed, and buboes, recent nodular enlargement of bones, and cutaneous stains or blotches had either disappeared, or were in rap process of disappearance. The virus, also, whi made no impression at this time, was found to r tain all its virulence when tried upon an unpr tected person.

158. Since this time M. Sperino has shorten the intervals between the several inoculatio and has increased the number of punctures each operation to twelve, sixteen, or twenty, a with the effect (he tells us) of expediting the p cess, and of ensuring a slighter form of artific chancre. He has also subjected his syphilis patients to a course of bathing in the sulphureo waters of Acqui, which waters are notorious their power of bringing out secondary sympto in the subjects of syphilis, and he has found the to resist this test as well as that of inoculation.

159. Such are the main particulars of these fift two cases, as gathered from M. Sperino's comm nication to the Academy of Medicine and Surge at Turin. No other treatment was employe They are said to have been without exception an aggravated character, and without any spo taneous tendency to heal. For a month befo the institution of the experiments they had be purposely left without any treatment, and duri this period they had retrograded.

160. An account of Dr. Sperino's proceedin was given by Dr. Radclife (in Ranking's *A stract of the Medical Sciences*, vol. xvi. p. 333 and M. Turenne's experiments were noticed Dr. de Meric (*Lancet*, July, 1853, p. 203.) befo Dr. Sperino's work had appeared. The subje has been very recently brought before the profe sion in an able article on syphilisation in t "*British and Foreign Medico-Chirurgical Review* (No. xxxvii. p. 410.), in which the subsequent e perience of Dr. Sperino in Turin, of Profess Boeck in Christiana, of Dr. Danielsen in Berge and of Dr. Carlsson in Stockholm, during sev ral years has been given. These enlightened me professors and physicians to hospitals in citi where medical science is in its highest state rational cultivation, instead of declaiming again the doctrine promulgated by M. A. Turenn have been engaged in a series of careful expe ments and observations to determine its tru or its fallacy. Experiment and careful observ tion can alone decide this question, which is one the greatest importance in practical medicine.

161. Dr. Sperino's observations were confirme by similar results obtained by Dr. Gamberini Bologna, and by Dr. Gulligo at Florence. I 1853, Dr. Sperino published a detailed accou of ninety-six cases of syphilisation. Of these nin six cases, fifty-three were of primary syphilis, an forty-three of the constitutional disease. Fifty of t cases of primary syphilis were cured, two failed, an one was not treated by syphilisation alone. "(the forty-three cases of constitutional affectio twenty-six were treated by syphilisation alone, an seventeen by this method, in conjunction with me cury or iodine. Twenty-five of the twenty-six the first category are said to have been cured. I only two cases of the primary disease did any co stitutional symptoms appear, and these sympton rapidly yielded under a continuance of the syph lisation. No relapse has yet taken place in an case. Many of these cases were of very seve character, and were such as were not likely have healed spontaneously; while the numero

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* In Dr. Winterbottom's work on the native Africans already referred to, it is stated, on the authority of Mr. Edwards the author of the "*History of the West Indies*," that the natives of the Gold Coast of Africa give their children the *yaws* by *inoculation*; and that they perform the operation by making an incision in the thigh, and inserting some of the matter from the sores of the yaws. By this means the infants or children have the disease slightly and recovered speedily; whereas, by becoming infected at a later time of life, it is much more severe, and "gets into the bone." (Vol. ii. p. 156.)

culations that were required, produced no ious effects, except in one or two instances a ght tendency to form phagedænic sores."

162. Dr. Boeck of Christiania, in 1853, published, the seventh volume of the Norwegian Medical urnal, the results of a few experiments he had en made on syphilisation. Since then he has closely estigated the subject, and has extended the actice to infants at the breast. The same plan of atment has also been pursued by Dr. Danielsen the hospital at Bergen. When the writer of the view above referred to (§§ 160.) re-visited this spital in July 1856, he was assured by this ysician "that he fully coincided with the views Dr. Boeck, and that the results obtained in rgen by syphilisation were as successful as se recorded by the latter at Christiana." The putation, talents, and high position of those phyians in Norway are unquestionable.

163. Dr. Boeck states that all the cases which he ated by syphilisation, laboured under constitunal syphilis, in its most varied stages and forms. me of those cases had previously undergone ery mode of treatment that science could devise, ile others had had no treatment at all. He ught it of great importance to collect observans from both classes of cases. If syphilisation not had recourse to till all other remedies have en tried, it is difficult to form a correct estimate its powers; for under such circumstances, as r. Boeck justly remarks, we can hardly know hat symptoms belong to syphilis, and what to e medicines administered; and particularly to ercury. He states, that cases which have underne a mercurial treatment, persons of an inflamatory diathesis, habitual spirit drinkers, and eakly constitutions, should not be subjected to is treatment. In these cases the artificial chanes may take on a malignant action. "The wels should be regulated, and the digestive gans brought into good order; but it is not cessary to enforce any strict rule of diet. In e hospitals of Bergen and Christiana, the ordiry full diet was always allowed." Dr. Sperino d Dr. Boeck mention the readiness with which tients submitted to, and even sought for, the ode of cure which they had seen so successful th their fellow-sufferers.

164. ii. Modes of Inoculation. — M. A. Tuenne at first kept up a succession of single chanes; while Sperino made three or four separate oculations at once, and repeated these two or ree times in the week. After having in this way ached twenty-four or thirty inoculations in all, found that the chancres last produced were ceedingly small, and he then diminished the inrvals, and made more inoculations at each sitng. He found that the first chancres were eper, larger, and more inflamed than those hich succeeded them: and that by diminishing e intervals and increasing the number of inocutions the earliest chancres visibly diminished, d were less painful and inflamed. After a large umber of inoculations which did not appear sucessful, he returned to his former plan of inocuting for six to ten chancres at a sitting. "While ese chancres are progressing, it is not advisable inoculate afresh, nor should this be done until e former chancres are developed. Should the hancres be developed too freely and threaten acve inflammation, or to extend as phagedænic sores, he checks their progress by inoculating afresh at shorter intervals."

165. The practice of Dr. Boeck differs little from that of Sperino. He inoculates for two chancres only every six days, because he found from experience that it required about five days to produce induration in a chancre, although he does not consider this latter circumstance absolutely essential. He subsequently shortened his intervals to three days, and increased the inoculations to eight or ten. Less time is thus required to produce immunity; but Dr. Boeck is distrustful of pushing cases too rapidly through their course of syphilisation. With regard to the parts of the body selected by these physicians for inoculation, Sperino preferred the lower regions of the abdomen, Dr. Boeck the arms and thighs.

166. The conclusions drawn by Dr. Boeck from the eighty-four cases of syphilisation, which he has treated up to March, 1856, are,—1st, That in all cases, without exception, immunity to the venereal virus is obtained sooner or later by inoculation of this poison; 2d, That the symptoms of syphilis present at the commencement of syphilisation disappear during the employment of this mode of treatment; 3d, That the general health does not suffer in the least from syphilisation — on the contrary, if the patient has been in weak health before inoculation, he most materially improves in strength and appearance during the process. These propositions are conceded as undoubted facts by Dr. Boeck's colleagues, by Dr. Sperino, by M. A. Turenne, by Danielsen, by Dr. Carlsson, and by Dr. Stenberg of Stockholm.

167. *The time required to produce immunity* from syphilis by syphilisation depends upon the various strength of the virus, upon the rapidity or otherwise with which the inoculations succeed each other, upon the number of the chancres produced, and upon the idiosyncrasy of the patient. Dr. Boeck states that, "the attaining to immunity depends upon the length of the intervals between each inoculation — the more frequent the inoculation the more rapidly does it ensue. If there were sufficient virus to be obtained, we might, if we chose, inoculate every day; but if, as is generally the rule, we keep to obtaining the virus from the most recent inoculation, we cannot easily do this. From my own experience, I would say that the matter obtained in a pustule of only one day's growth is generally capable of being inoculated; but I have also seen that pustules of three days' growth produced no effect; while three days later, the matter taken from them was decidedly contagious." (p. 196.)

168. Granting that *immunity* is really produced from the disease, the question follows, Is it merely from the existing disease, or from any subsequent infection? and if from subsequent infection, is the immunity produced for a time only, becoming impaired gradually, and ultimately lost after an indefinite time; or is it continued through life, a diathesis being imparted by it, rendering the frame insusceptible of the syphilitic infection? That the immunity is at least, for a time, is shown by the fact of the last inoculation having failed to take effect, however virulent the matter employed. Dr. Boeck is of opinion that persons who have reached perfect immunity to inoculation in the course of syphilisation are insured against contracting syphilis for all the rest of their

lives; but the lapse of time since the first employment of this practice admits not of any conclusive evidence of the fact.

169. Of forty-two cases of constitutional syphilis, where no mercury had been previously used, *not one* had exhibited any relapse up to the commencement of 1856, and many of these had been for three years or more without requiring any treatment whatsoever. Of the twenty-one cases recorded in Dr. Boeck's first work, six had been treated without mercury, and in all these syphilisation dispersed the symptoms, which have never returned. The average duration of the treatment in these six cases was six months and two days, the average number of chancres were 322. In a second class of cases, in which the constitutional symptoms were chiefly confined to the skin and mucous membranes, but which had all taken more or less mercury, the average duration of treatment was six months and twenty-four days, the average number of chancres being 432; two thirds of the number being, however, very small and transient. In the third category of cases, in which the constitutional disease was very inveterate, all of which had been subjected to mercurial treatment, some repeatedly, the average duration of treatment was seven months and twenty-four days, the average of chancres 570.

170. The increase in both of the last categories of cases in the number of chancres, and in the length of time required to complete the cure, is ascribed by Dr. Boeck to the previous administration of mercury. It is, however, probable, as he observes, that another circumstance may have retarded the cure, viz., that the syphilitic virus may have undergone a material change during the many years it had been resident in the system. The more inveterate, and especially the tuberculo-serpiginous forms were found to be extremely rebellious to treatment, and some of them were not cured when immunity was reached. It was necessary then to have recourse to iodine, upon the exhibition of which all symptoms rapidly disappeared, though previous to syphilisation both mercury and iodine had proved inefficacious.

171. Dr. Boeck suspects that in those very obstinate cases an union of the syphilitic with mercurial poison has taken place. In most instances this union seems to be dissolved by syphilisation, and then iodine, which had before been ineffectual against the united poisons, acts readily on the mercury, and eradicates it from the system. During the two years elapsed from the publication of his first work, he had treated sixty-three cases by syphilisation, and of these thirty-six had never taken mercury. In the twenty-seven cases, for which mercury had been given, he invariably found the cure more difficult, and in some cases impossible without the aid of iodine. Where mercury has not been employed, he is decidedly in favour of syphilisation, for, as far as can be ascertained from the forty-two cases of this character thus treated, no relapse had occurred up to the present period. A great objection to syphilisation is the length of time required for its complete performance. In the Christiana hospital, the average duration of the mercurial cure is three months and a half, while syphilisation averages a full half year. If, however, the latter be not liable to relapse — at least in non-mercurialised cases — it is preferable even if it required a much longer period. It is doubtful whether it be possible to syphilise, so as to c
permanently, by matter taken from one sou
alone; for Dr. Boeck met with cases where co
plete immunity existed to the matter taken fr
one source; but upon obtaining fresh virus fr
other persons, the inoculations succeeded perfec
again. However, he has been able, in some
stances, to effect a complete and permanent c
with matter from one source alone.

172. I have given this account of syphilisation
it is hardly known in this country. It is mani
that it could not be rationally submitted to, but
a cure of the distemper, and not by a healthy p
son to prevent the infection of it. If, however
be found to be by further experience, not only
permanent cure, but also a permanent preventi
it will establish for itself a reputation not possess
by any other means; for none besides, howe
judiciously administered, has been found c
stantly and permanently curative,—has proved
remedy under all circumstances, and for the fut
duration of life in all cases.

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ERTIGO. Syn. — *Vertigo* (from *verto*, I turn round); *περιστροφὴ, σκότωμα.* *Vertige*, Fr.; *der Schwindel*, Germ. *Giddiness, dizziness, swimming in the head.*

Classif. — IV. Class. III. Order (*Author*).

1. Defin. — *A transitory erroneous perception, a sense of general whirling or turning round, th difficulty of standing, or a feeling of impend- g sinking or falling.*

2. *Vertigo* has been noticed by Hippocrates, alen, Aretæus, and other ancient writers; ıd, by these, as well as by modern wri- rs, it has been viewed chiefly as a symptom many diseases, and in some, but in much rarer ses, as the chief or only apparent disorder. hat it is as much a primary affection, on some casions, as headach, or several other disorders, ay be admitted, although it may be shown, if e pathogeny of the affection be duly considered, at it is commonly owing to previous disorder of e organic nervous influence endowing the brain, to the state of the capillary circulation in this gan, or not improbably to both in various de- ees. In the great majority of cases, however, is merely a symptom, either of a very early, or a more or less advanced stage of some malady, ery often of some disease which has not fully eclared itself, or which still remains latent or ıperfectly developed, or of extreme debility, or protracted indigestion, &c.

3. I. Description. — Vertigo occurs as an lusion, or a transitory erroneous perception of ɔjects, although quiescent, in a state of more or ss rapid motion, usually in that of gyration or hirling round; but also not infrequently with ther a descending or ascending movement, or ith a sense of sinking. In the more extreme ises, or when caused by ebriety, these sensations e often present in a greater or less degree, though the eyes at the time are quite shut. In ɪme instances the objects which thus appear in otion are also changed in colour — are either ariegated or obscured. Vertigo may be ex- erienced only when assuming the erect posture, in cases of fever, extreme debility, &c.; but it ıay also be felt whilst recumbent in bed, objects resenting not only a rotatory, but also an ascending ıotion, with a feeling of sinking, and sometimes so with noises in the ears. In this latter form it ıould be viewed as a most serious symptom, specially when occurring in malignant or pes- lential maladies, or when these are prevalent, or the course of organic disease of the brain. In ıany instances, vertigo precedes, or is followed y, severe paroxysms of retchings or of vomitings. his sequence is commonly observed in pestilential holera, in sea-sickness, in fits of drunkenness, fter ingestion of the sedative or depressing and ritating poisons, and especially after the im- roper or inordinate use of tobacco. In all cases f vertigo, walking or even standing is difficult or npossible; and from a dread of falling, objects are laid hold of for support. Vertigo may be only temporary and quickly evanescent, or it may continue for a considerable time. It is more rarely continued or prolonged. It is often evanescent, but marked, when it occurs as a prelude of syncope, or of fully developed disease of the brain, as epilepsy, paralysis, or apoplexy. It often precedes amentia and other states of insanity. Swift was very subject to vertigo at different periods of his life, and more especially before the loss of his powerful mental faculties. It is more prolonged or continued when it is a symptom of either active or passive congestion of the cerebral vessels, or of anæmia of the brain, or of the vascular system generally. When vertigo occurs as a severe or acute paroxysm, it may gradually pass into the epileptic state; the extreme giddiness, after several occurrences of the seizure, being attended by a temporary loss of consciousness, and ultimately by convulsions and all the phenomena of a complete epileptic attack.

4. The more continued or prolonged states of vertigo are generally referrible to the following pathological conditions: — 1st, To determination of blood to the brain; 2d, to congestion of blood in the cerebral vessels, owing to impeded return of blood or retarded circulation through the heart; 3d, to lesions of the cerebral arteries, and softening of the structure of the brain; 4th, to general or local, momentary or prolonged, anæmia, or insufficient supply or circulation of blood in the brain. In these states, however, one or other of the primary changes already assigned as characterising the more evanescent states of the affection (§§ 3.) are also present. In either of these forms, or owing to either of their pathological states, vertigo may manifest certain grades, either of which only may be complained of, or all of which may supervene in succession, either very slowly and imperceptibly, or more or less rapidly. These states or grades are usually described as — 1st, confusion, unsteadiness, or indistinctness of perception; — 2d, dizziness or fear of falling; — 3d, giddiness, with incapacity of progression; — and 4th, swimming in the head, or complete vertigo, with an incapability of standing.

5. i. *The occasional exciting causes* of vertigo are very different, or even opposite in different cases. Whatever determines the blood inordinately to the brain, as, long and intense thought and reflection,—or prevents or impedes the return of blood from this quarter, as, cinctures, of the neck, &c.; and whatever promotes a rapid return of blood from the brain, as, suddenly assuming the erect from the recumbent posture, long abstinence, inanition, and, in short, whatever occasions too great fulness, on the one hand, or too great a deficiency of blood in the brain on the other, will, in weak, susceptible, or predisposed persons, give rise to this state of morbid perception.

6. Vertigo is most frequent in persons of advanced age, in hysterical females, in persons who are bald, especially on exposure to cold, or in cold seasons and in variable weather; in those liable to hæmorrhoids, epistaxis, or other hæmorrhages, especially when these are suppressed, and in crowded and close apartments; in females during prolonged lactation; in persons addicted to excessive sexual intercourse, or to the vice of

masturbation; and in those who indulge in too much sleep or who lie too long in bed, or who live irregularly as to diet and regimen.

7. The more *common causes* of vertigo are obviously those which produce the diseases of which vertigo is a more or less prominent symptom; whilst those occurrences of it which assume more of a primary or idiopathic form, are referable entirely to whatever occasions the pathological states of which it is a chief manifestation. Thus, if it be imputed to vascular determination to, or congestion of blood in, the brain, the numerous remote and efficient causes of these conditions should be ascertained, as indicating the only obvious means of removing the affection. If it be chronic, protracted, or of frequent recurrence, the temperature of the scalp, the state of the arterial and venous circulation in the neck, temples, &c., the circulation through the heart; the functions of the stomach, bowels, and kidneys, &c., severally require examination, especially with reference to excessive or to deficient fulness of blood in the vessels of the brain. The causes of these very opposite conditions are generally manifest, on due investigation; but these conditions are commonly attended by others of not less importance, namely, by excited, or by depressed vital power — by the latter especially. This association of disordered circulation with depressed vital power obtains in most cases of this affection, whether protracted or evanescent; and, in febrile diseases, the blood is also more or less altered, although not in a manifest degree at an early stage of these diseases. The impairment or depression of vital power is especially evinced by the organic nervous system, through the media of the several organs which this system endows, and more particularly of the digestive, assimilating, and generative organs. Impairment of the former, and exhaustion from abuse of the latter, are among the most efficient sources of this affection, in its more chronic forms. When it proceeds from this last source, the disorder is often most protracted, and most difficult to cure, for the cause generally continues; and it not infrequently assumes a recurrent or periodic form, and even ultimately, but gradually, passes into fully developed epilepsy, or the worst forms of hysteria. Of these results I have seen several instances in both sexes, in the course of my practice.

8. ii. The chief *states and associations* of Vertigo may be enumerated as follows, with reference to their causes: — 1st, *Vertigo nervosa:* nervous, hysterical, epileptical, or hypochondriacal vertigo. 2d, *Vertigo traumatica,* from injury, concussion, &c., of the brain. 3d, *Vertigo plethorica,* from determination of blood to, or inflammation or active congestion of, the brain. 4th, *Vertigo toxicata,* from poisons, especially sedative and narcotic poisons, and from poisonous fish, meats, &c. (See Art. Poisons.) 5th, *Vertigo febrilis,* in the invasion and progress of most fevers, especially when the organic nervous force is depressed, and the blood contaminated. 6th, *Vertigo gastrica vel Stomachica,* from gastro-bilious disorder; such disorder, however, often being, as well as the vertigo, merely symptomatic of disease of the brain. 7th, *Vertigo exsanguinea,* from an insufficient supply of blood to the brain, or from general anæmia, or unequal distribution of blood. 8th, *Vertigo cardiaca,* from disease of the heart impeding the
return of blood from the brain. 9th, *Vertigo*
thritica, from misplaced or retro-cedent go
10th, *Vertigo rheumatica,* from rheumatism
the membranes of the brain, or of the peric
nium. 11th, *Vertigo accidentalis vel fugax,* fro
various odours or smells, especially in certa
idiosyncrasies, or from various causes, often of
indefinite or not very manifest nature.

9. iii. *The diagnosis* and *morbid relations of Ve*
tigo. — The nature of the affection is genera
manifest from the account given by the patient
of his sensations. It may, however, in the mo
sudden attacks, be mistaken for a slight seizure
either apoplexy or epilepsy. From both these
may be readily distinguished by the loss of co
sciousness, which does not occur in vertig
When fits of vertigo are likely to pass into ep
lepsy, a momentary loss of recollection or co
sciousness then generally characterises the
The difficulty in the diagnosis respects chiefly t
pathological condition of which vertigo is a ch
or related manifestation—as regards the states
organic nervous or vital power, and of vascul
action or congestion in the brain—as to the affe
tion being a precursor of a febrile or exanth
matous disease, or a symptom of disordered
gestive function, or of misplaced gout, or of mo
serious disease, or of structural lesion of the ne
vous masses within the cranium. This, the mo
important diagnosis of vertigo, entirely depen
upon the peculiarities of individual cases; up
the age and previous diseases of the patient; up
the recognised and presumed causes of the affe
tion; upon the states of organic, nervous, or co
stitutional power, and of local and general va
cular action, and upon the phenomena observe
and the symptoms ascertained, during the disord
It must be apparent from this, that the knowledg
acumen, and experience of the physician, will
called into requisition in most cases of vertig
and his success in their treatment will altogeth
depend upon the pathological inferences he ma
form.

10. There are other circumstances than t
above to which attention should be directed; an
amongst these the probable existing morbid stat
causing this affection at different periods of li
may be noticed. If the disorder occurs soo
after, or even several years after, puberty — an
if the patient be thin, pallid, or anæmied, and
incapable of directing his eyes firmly on the perso
addressing him, impaired nervous power, ver
probably occasioned by masturbation, may be in
ferred. If the affection occur in mature or ad
vanced age, although it may proceed from disord
of the digestive organs, it may, as well as suc
disorder, be much more likely a prominent sym
ptom of disordered circulation in the brain, cause
either by atheromatous, fatty, ossific, or othe
changes in the coats of the arteries, or by diseas
of the heart, of its valves, or even by organi
lesion of the intimate structure, or by more man
fest alterations of the brain, either consequen
upon one or other of these morbid conditions
the vessels, or taking place independently of them
I have seen cases where this affection has bee
produced by these several lesions, by scrofulou
tubercular, cancerous, or other formations in th
membranes or substance of the brain, and by im
peded return of blood from the head. In a remark
able case of colloid cancer of the mamma, unde

y care a few years ago, that was seen by Dr.
amsbotham and Mr. Fergusson, the cancerous
ease ultimately invaded the brain, occasioning,
a considerable period, constant vertigo, and ul-
iately general paralysis and coma. The connec-
n also of vertigo with the gouty diathesis, and
e occurrence of it as a form of misplaced gout,
ould not be overlooked when it affects persons
mature or advanced age, especially when the
act nature of the affection is clinically investi-
ted. The connection of this affection also with
chectic states of the system, with imperfect
cretion and depuration of the blood, and with
ordered function or organic lesions of the kid-
ys, but still more intimately with organic
ions of the heart, its orifices, or of its valves,
mands due consideration. Several instances of
ronic vertigo have come before me which had
en referred to cerebral disease, but which, upon
scultation of the heart, were found to depend
on impeded return of blood from the head,
ing to interrupted circulation through the heart.

11. II. The Prognosis of vertigo should be al-
ys given with caution, and often with much re-
vation. In some cases, especially in early or
ddle age, when the affection is slight, and de-
nds chiefly on disorder of the digestive organs,
the organic nervous system, a favourable
inion may generally be given, unless there be
isons to infer that it is a precursor of fever of
exanthematous or any other form; and then
e result will entirely depend upon the consecu-
e disease. Whenever the affection occurs
ddenly or in fits, then its passage into fully de-
loped epilepsy should be dreaded, however ju-
ious the treatment may be, more especially if
ere be any reason to infer that it is caused by
isturbation, or by excessive venereal indulgences.
this causation and transition of vertigo, many
ses have come under my observation, not only
early and middle, but also in far advanced age.
this last period of life, as well as in middle and
ature age, vertigo, in any of its grades, should
ways be dreaded and viewed as a precursor of a
ore serious or dangerous attack. In these cases
e symptoms connected with the organs contained
thin the cranium should be carefully observed,
pecially the several senses; the temperature of
e scalp, the state of the pulse in the carotids;
e action, rhythm, and sounds of the heart, and
e appearance of the veins of the head and neck,
d an opinion be given conformably with the
idence furnished by these sources, the juvantia
d lædentia being also taken into due consider-
ion.

12. III. The Treatment should be based upon
e inferences arrived at as to the causes and
thological states of vertigo. — (*a.*) If the causes
ferred be such as reduce organic, nervous, or
nstitutional power, and if they are of such a
ture as are likely to convert the disorder into
her hysterical or epileptical seizures, as certain
the causes above noticed (§§ 6, *et seq.*), a resto-
tive, antispasmodic, or tonic treatment, such as
e preparation of valerian, assafœtida, zinc, &c.,
d-liver oil, oxyde of silver, &c., ought to be
escribed; and if there be any indications at the
me time of local or general anæmia, chaly-
ates, either alone or in addition to these means,
e also required. In cases of this description,
well as in those indicating a tendency to assume either an hysterical or epileptic character, I have found the tincture of sumbul, either alone or conjoined with other medicines of a tonic or antispasmodic nature, of great service in several cases. In these also I have prescribed the cotyledon umbilicus, but not with so marked benefit as I expected, although it also was sometimes very beneficial.

13. (*b.*) In persons who are liable to vertigo from prolonged or profound thought and reflection (§ 5.), and especially if the scalp be hot and vascular determination to the brain, as evinced by the action of the carotids, be excessive, cooling applications to the brain, local depletions, internal and external derivations, purgatives, a regulated diet, and, above all, the avoidance of the cause, change of air, of scene, and of habits, travelling, voyaging, &c., and relaxing amusements, or agreeable and slight occupations merely, are the means upon which the chief reliance should be placed.

14. (*c.*) In persons of a full habit of body, in those who live luxuriously, or even moderately, and who take little exercise, the temperature of the scalp, the pulsation of the carotids, or the action or sound of the heart, indicating local or general plethora, or impeded return of blood from the head, the occurrence of vertigo should be viewed in a very serious manner, and local depletions, derivations, both external and internal, purgatives, setons, or issues, spare diet, and regular exercise in the open air are generally beneficial. Other means in addition to these may be resorted to; but they must be left to the judgment of the physician, who will prescribe them appropriately to the features characterising individual cases. Emetics, the application of cold to the head, the restoration of suppressed hæmorrhages, bleeding from the nostrils, and venæsection, were the chief means recommended by Aretæus for vertigo, and they are indicated in the circumstances just now mentioned; but emetics should follow, not precede, the other means when cerebral or general vascular plethora is present.

15. (*d.*) In cachectic habits of body, in cases manifestly depending upon disorder of the digestive organs, and when the temperature of the scalp, and the local and general states of the circulation and of vascular action, present no contra-indication of the propriety of the practice, the treatment of vertigo may be initiated by the exhibition of an emetic. When this affection is indicative of the commencement of fever, or of one of the exanthemata, and is attended by lassitude, pains in the back or limbs, or by chills or shivering, this practice is then also productive of benefit; but ipecacuanha or sulphate of zinc should be preferred to antimony, as an emetic; or, if this last be prescribed, it will be advantageously conjoined with a warm, aromatic, or antispasmodic medicine, such as Cayenne, ginger, &c.; but it ought not to be repeated oftener than once. Vertigo in the gouty diathesis requires, in the first instance, cholagogue purgatives followed by alkalies, magnesia, sulphur, and other vascular depurants, which increase the functions of the kidneys, skin, and digestive mucous surface. In all cases of vertigo unconnected with the invasion of either of the forms of fever, the previous habits, modes of living, and disorders of the pa-

tient should be ascertained, and a more or less complete change of these habits be insisted upon, as far as his age and other circumstances may render the change advisable.

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VOICE AND SPEECH — Disorders of.—

1. Voice and speech are functions by means of which the human species claims and maintains an ascendency over all animated nature. The more perfect animals, including the winged creation, possess the power of emitting vocal sounds, which admit of such changes in power, modulation, and character, as convey intimations to individuals of their own genus or species of danger, of pleasure, of sources of nourishment, of desire, and even of affection. The practised ear can recognise, in nearly all animals which emit sounds, variations in cadence, character, and power, which are known by the same species as announcements of the presence of objects of prey and subsistence, of sources of danger, of the loss of offspring or objects of affection, and of danger, suffering, or distress. And it is by no means improbable, that the sounds characteristic of individual species, even of the lowest capable of emitting them, are so modulated as to convey to one another t various instincts and suggestions, which seaso localities, and external circumstances and infl ences, may excite; the sounds thus modulated l coming known, as regards each species, as a d tinct, but limited language, although unknow unless in its more manifest and prominent chara ters, to man.

2. The sounds produced by the organs, wonderfully and beautifully provided for them, the human species, are the chief means of dev loping the mental faculties, of exercising domini over the rest of the animal creation, and of a quiring and of exerting power over those r quiring guidance or governance. The soun produced by the human organs of vocalisati and articulation are the manifestations furnish to the species of the finest sentiments, of t deepest as well as the highest states of feeling, the most profound and abstract results of thoug and the wisest and best revelations of ment reflection and of human reason. But consider philosophically, they are studies rather for tl physiologist than for the pathologist. To tl latter, however, the more strictly philosophic consideration of human sounds, as manifested the modulated voice and in speech, becomes necessary introduction to an intimate knowled of the several modes in which both voice an speech are disordered, or more or less impede or even lost. For these preliminary sources knowledge the reader is referred to the rece writings of Müller, Carpenter, Todd ar Bowman, Bishop and Willis, which are in tl hands of most medical men.

3. Vocal sounds and articulate speech language are two distinct functions; and althoug the latter proceeds from the former, an addition apparatus is required for its production. Th instrument of vocal sound, the larynx, is distin and appropriate to this purpose, and is calculate by its mechanism to produce the several grade and modulations of voice; but, although th independent, the vocal sounds cannot be modifie into articulate speech, or even into a near ap proach to articulation, without the aid of the *ora cavity*, more especially of the *tongue*. Henc there may be vocal sound without speech; bu this latter cannot be produced without the former and hence both may be separately or even con jointly disordered, or even lost. But, althoug speech may be altogether lost, a vocal sound ca hardly be quite lost whilst respiration is performed unless in complete syncope, catalepsy, apoplexy in the coma of fever, and in other occasions o loss of sensibility and consciousness; for even i these states, unless in profound syncope and cata lepsy, a simple or low respiratory sound may stil be emitted.

4. I. Voice is produced, according to Mr Bishop, by the conformation of the vocal appa ratus, which combines the properties of a stretche chord, a membranous pipe with a column of ai vibrating in it, and a reed, and is the perfect type of which these instruments are only imperfec adaptations. Dr. Carpenter states, "that th sound is the result of the vibrations of the voca ligaments, which take place according to the sam laws with those of metallic or other elastic tongues and that the pitch of the notes is chiefly governe by the tension of these laminæ." However, th

arious tones, modulations, &c. of the voice may e explained, or referred severally to the especial r combined movements and actions of the dif- erent parts constituting the vocal apparatus by hysiological writers, it must be manifest that a ealthy condition of the vocal chords and liga- ents, of the cartilages, of the muscles which ove them, and of all the parts both above and elow the larynx, as well as of the larynx itself, nd the mucous membrane covering it and its vici- ity, and even of the velum palati also, is neces- ry to the production of the human voice in its tural and perfect state; and consequently that is function, capable of the utmost perfection, the greatest range in power and modulation, d of astonishing improvement as regards these, careful and scientific cultivation, depends upon perfect condition of these several parts, disorder structural lesion of any one of them affecting e voice in a more or less remarkable manner.

APHONIA.—LOSS OF VOICE.—SYN. — 'Αφωνία (from α priv. and Φωνὴ, voice). — *Aphonia*, Vogel, Sagar, Cullen. — *Dysphonia*, Good. — *Raucedo paralytica*, Darwin. — *Perte de la Voix*, Fr.—*Die Stimmlosigheit, Aphonie*, Germ.

CLASSIF. IV. CLASS. II. ORDER. (*See Preface.*)

5. DEFINIT.—*More or less impairment or complete s of the power of emitting vocal sound, owing either functional disorder or to structural lesion.*

6. The voice may be impaired in every degree m the slightest catarrhal form to the most com- te loss from organic change. The impairment loss may be either temporary or permanent. e slightest as well as the less permanent apho- often proceeds from functional disorder, espe- lly from extreme nervousness, fright, fear, and steria; but it also is frequently caused by arrhal congestion of the mucous membrane of larynx and of the subjacent cellular tissue, l by temporary impediment to the movements the vocal chords from this cause, or from in- mmation and its results implicating for a time of the parts of the vocal apparatus. In the re strictly nervous states of aphonia there is no nifest lesion of structure, the nerves supplying laryngeal muscles and chords having become a time incapable of conveying the dictates of ition to these parts, unless volition be most rgetically exerted.

7. *A.* FUNCTIONAL APHONIA occurs chiefly in icate, nervous, or hysterical females, and much re rarely in similarly constituted males. In the mer sex it is most frequent about and subse- ently to the period of puberty, and during the amenial epoch of life; in the latter chiefly be- e the period of puberty, and only in very e cases, and when occasioned by fear or fright, l it is then of short duration only.

8. *Hysterical Aphonia* may be viewed as one the forms of functional paralysis, which not requently complicates disorder of the female ans, such disorder being generally either not erwise manifested, or latent, or masked by some er affection. In most cases it is easy to dis- guish the hysterical from all other forms of onia; other allied symptoms, the previous tory of the case, the state of the uterine func- s, the moral affections, impressions, and sen- ents, which may have preceded the loss, &c., erally indicating its nature. It should not be erlooked that, in hysterical females, more especially in those most subject to uterine or sexual irritation, aphonia is sometimes *feigned*. In rare instances, also, it may be difficult to determine whether or no it is hysterical or owing to structural disease in or near to the base of the brain; and this difficulty is increased, 1st, by the absence of other hysterical symptoms, and, 2dly, by the presence of other states of cerebral paralysis, the catamenial functions or organs having been previously disordered. I was recently called in consultation to a delicate nervous female, aged 18, who had menstruated irregularly and scantily, and was seized with incomplete hemiplegia and complete loss of voice; the muscles of the face not being affected. In this case it was difficult at first to determine whether the aphonia was hysterical or owing to some lesion within the cranium, causing also the hemiplegic affection. Their history and progress, however, generally elucidate the nature of these cases.

9. *B.* STRUCTURAL APHONIA is caused, *firstly*, by changes implicating one or more of the parts composing, or in the immediate vicinity of, the vocal apparatus; and, *secondly*, by lesions at the origin or in the course of the nerves distributed to the laryngeal muscles and vocal chords. The slighter or more incomplete forms of aphonia are those of a catarrhal nature, arising from more or less congestion and tumefaction of the mucous and submucous tissues of the larynx and adjoining parts. Severer cases of aphonia are often occasioned by serous infiltration into the submucous tissue, with or without inflammation of the mucous membrane of the larynx and of its vicinity, in the direction either of the fauces or of the trachea, or of both. This serous infiltration may be slight, and continue only during the catarrhal attack, or it may be so very considerable as to nearly suppress the voice altogether and cause suffocation, as observed in *œdema* of the glottis and epiglottis. Aphonia from this and other affections of the vocal apparatus is fully considered in the articles LARYNX and TRACHEA, where the lesions which affect the voice are described, and the treatment appropriate to each pointed out. The voice may also be affected in different degrees by inflammatory affections of the fauces, pharynx, and tonsils, by tumours in these situations, or by morbid growths pressing upon or implicating the larynx or trachea, by aneurisms, and most frequently by chronic laryngitis and its consequences, especially thickening, ulceration, &c., arising either primarily or consecutively of acute laryngitis, or of tubercular disease of the lungs, or of syphilitic infection. All these are fully discussed in the articles now referred to; but in all the voice is affected rather than the power of articulation, which is perfect as far as the production of vocal sound admits; for the affections of the larynx in such cases are rarely associated with any interruption to the movements of the tongue and of the parietes of the oral cavity, by means of which articulation or speech is performed.

10. II. DEFECTUS LOQUELÆ, SYN.; — *Alalia*, Frank.; — *Loquela Abolita*, Auct. Var.; — *Mutitas*, Sauvages, Macbride, &c.; — *Sprachlosigkeit, Stummheit*, Germ.; — *Loss of Speech.*

11. *Voice*, as stated above, is produced by the *larynx*, its modulations into musical sounds being

effected by means of this organ aided by the epiglottis and adjoining parts. *Speech* is the modification of the voice, or sounds emitted by the larynx, by the organs or parts intervening between it and the os externum. It is obvious that, to produce articulate sounds, forming language, the movements of the tongue, fauces, and connected parts must be complete; and that these should be in a healthy condition to render articulation perfect. The tones of the voice, and articulate speech, cannot be produced in childhood, when the sense of hearing is completely lost in early infancy, or in the fœtal state; and as long as the sense of *hearing* continues lost, *dumbness* is the result; for the sense required to modify and adjust vocal sounds does not exist.* *Voice,* especially in its healthy and cultivated states, and in its modulations into music, is capable of expressing the several emotions of mind, in a more remarkable degree and manner than articulate speech; but *speech* or language has a much greater, more varied, and more extensive power of addressing, informing, and enriching the intellect, of furnishing definite ideas of objects, properties, actions, &c., and of conveying the results of reflection and of rational deductions. The vocal organ, aided by the movements of the tongue and parts composing the oral cavity, is adapted for, and in health is capable of, forming a number of simple sounds, which are readily combined into groups forming words. Dr. CARPENTER justly remarks, that the number of combinations which can be thus produced is so inexhaustible that every language has its own peculiar series; no difficulty being found in forming new ones to express new ideas. There is much diversity in different languages, even with regard to the use of the simplest of these combinations; some of them are more easy of formation than others, and these accordingly enter into the composition of all languages; whilst, of the more difficult ones, some are employed in one language, some in another; no one language possessing them all, or using them to any co-ordinate extent.

12. The mechanism producing vocal sounds being complicated, and actuated in its individual parts and in its combined movements by volition, and by the states of vital force, as influenced by health, constitution, and disease, and adjusted by the sense of hearing, it necessarily follows that the faculty of speech, in whatever language, will be modified, altered, interrupted, impeded, and even altogether lost, in numerous modes, so as not only to furnish most import
indications of disease of the slightest as well as
the most dangerous nature. The articulate sour
which have become familiar to the ear, are oft
remembered as long as the appearance of t
person by whom they were furnished; and t
person, even after many years, is often recogni
by his voice and speech before he is seen. De
lity weakens the articulating power, or the stren
of articulate sound; but disease may alter it m
remarkably, different maladies affecting it in
rious ways. When the voice is altered, or lost
disease, the speech is then necessarily simila
circumstanced, as already stated (§§ 5. *et se*
But speech is more especially affected as a p
cursor, or as a symptom, of apoplexy and para
sis; and, when so affected, it indicates the m
serious results at a period, which, although ind
nite, may generally be viewed as comparativ
short. In cases where speech is altogether l
especially at an advanced age, or is so nearly l
as hardly to be understood, or when the sou
are mostly inarticulate, if no apoplectic or pa
lytic seizure have preceded or accompanied t
loss, then either of these seizures may be expec
before a long time elapse, unless the time be
ferred by treatment, and diet, and regimen;
more frequently, notwithstanding these means
prevention (see arts. APOPLEXY and PARALYSI

13. *Loss of speech,* whether complete or
complete, is generally to be imputed to structu
disease, wounds, or fractures, implicating eit
parts within the cranium, or the nerves in t
course to the organs of articulation. Cases of l
of speech, consequent upon apoplexy, or as
ciated with other paralytic states, are very frequ
and are by no means rare as a precursor of a d
gerous apoplectic or paralytic attack. When t
present, as the only apparent ailment, the resul
not the less to be dreaded. In several cases,
which I have been consulted in the course of
practice, speech was so completely lost, that
articulate sound was produced, the simple vow
sound *a* and *o* being only omitted, and yet non
the organic, or of the cerebro-spinal functions,
none of the senses, evinced any disorder. In
these, an apoplectic, hemiplegic, or more gen
paralytic seizure supervened generally in a
weeks or months, owing to the development
latent pre-existing organic lesion. Whenev
therefore, the faculty of speech becomes impair
or is lost by persons who had previously posses
this faculty in a healthy state, more especiall
this change occur in mature, middle, or advan
age, it should be viewed as a form of local or p
tial paralysis, which is generally followed, at
very remote period, by a very dangerous form
apoplectic, or of more general paralytic seizure

14. III. IMPEDIMENTS OF SPEECH — HESI
TIONS OF SPEECH — STAMMERING — STUTTERI
— This affection is generally functional, or o
nervous nature; and may present several for
These are usually observed in childhood and
early life; whilst incomplete or complete
of speech, briefly considered above (§§ 13.
seq.), is the consequence of structural lesion o
injury, and is a form of paralysis of a most d
gerous nature. Hesitations in articulating soun
or a momentary impediment in uttering cert
words or letters, or a stammering, or repetition
certain consonants, are generally observed fr

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* The nicest modifications and adjustments of the actions of the muscles of the larynx, and of the several parts of the fauces and oral cavity, are requisite to the production of determinate tones, accents, and speech; and these actions are ordinarily adjusted and modified by the sense of hearing. Hence a fine or educated ear in music is of great advantage in singing and in the pronunciation of languages. This adjustment, being learned in the first instance under the guidance of the sounds actually produced and heard, is subsequently effected voluntarily, in accordance with the mental conception — or inward sensation — of the tone or sound uttered, which conception cannot be formed unless the sense of hearing has previously brought similar tones to the mind. Hence it is that persons who are born, or become, quite *deaf* before articulate speech is formed or attempted, are also *dumb*. They have no malformation, no paralysis of any part of the organs of voice and speech; but they cannot utter distinct musical tones or articulate speech, because they have not the guiding conception or sensation of the nature and character of these sounds, furnished by the sense of hearing.

nfancy or childhood, but they may increase or iminish, or even disappear as age advances. They nay continue during a long life, or they may occur nly occasionally. In this latter case, they are nduced or aggravated by fear, anxiety, and varius mental emotions. They cannot be mistaken or impairment or loss of the previously healthy ower of articulation, which, as stated above § 13.), proceeds from slowly-formed organic sions implicating the origins or course of the losso-pharyngeal nerves; and which occurs uner different circumstances, and is attended and llowed by very different phenomena and conseuences.

15. The muscles employed in the production definite vocal sounds and of articulate speech, eing actuated by volition conveyed from the brain these muscles by means of the nerves proceedg from the former to the latter, it necessarily llows that both voice and speech depend on the pability of the brain to generate or exert volion, and of the nerves to convey this act to the uscles. Thus speech, as well as voice, requires r its perfection a due exertion, and a healthy ansmission of volition, by means of the nerves, the apparatus destined to its production; and, volition be feebly exerted, or imperfectly transitted to the muscles concerned in articulation, rious imperfections of these functions will result. ut the complete performance of both voice and eech depends also upon the healthy functions the lungs and respiratory passages, these funcns being modulations of expiration by means of e larynx, tongue, fauces, oral cavity, and lips.

16. Thus it is apparent, as remarked by Mr. SHOP, that "the mechanism provided for the oduction of speech comprehends a large assemage of organs. The most simple vocal sounds quire the combined action of the lungs, windpe, larynx, and respiratory muscles; and for ticulate language, an additional set of organs ust be called into play, namely, the pharynx, rd and soft palates, uvula, tongue, teeth, lips, d nostrils."

17. It is justly observed by Dr. CARPENTER at, "great as is the number of muscles employed the production of definite vocal sounds, the mber is much greater for those of articulate nguage; and the varieties of combination which are continually forming unconsciously to ourlves, would not be suspected, without a minute alysis of the separate actions. Thus, when we ter the explosive sounds (explosive consonants), check the passage of air through the posterior res, in the very act of articulating the letter; d yet this important movement commonly passes observed. We must regard the power of formg the several articulate sounds and their simple mbination, as so far resulting from intuition, at it can in general be more readily acquired early practice than other actions of the same mplexity; but we find that, among different ces of men, there exist tendencies to the proction of different sounds, which, though doubtss influenced in great degree by early habit nce we find that children, when first learning speak, form their habits of vocalisation in great gree in accordance with the examples amidst hich they are placed), are certainly also depennt in part upon congenital constitution, as we en see in the case of children among ourselves, who grow up with certain peculiarities of pronunciation, not thus derived from imitation, of which they do not seem able to divest themselves."

18. I must refer the reader to Mr. BISHOP for a notice of mechanical contrivances for the production of vocal sounds; but these can never sufficiently illustrate the intonations of voice or the production of articulate speech, or even satisfactorily show what it is that constitutes the essential character or distinction between the vowels, and on what part of the mechanism of the voice the vowel-sounds depend. These sounds, as well as those of the consonants, are formed by so slight changes in the relative position of the several parts of the complex organs of voice and speech, varying in accent and intonation so remarkably with the language, &c., as hardly to admit of any estimate. Mr. BISHOP observes that, "in the application of the theory of vowel-sounds to the mechanism of the human voice and speech, there are two hypotheses which would equally satisfy the conditions for their production artificially. The first is, that the glottis produces the primary, and the *air* in the pharynx, mouth, and nostrils, the secondary or vowel-quality pulsations. The second is, that the glottis produces the primary, and the *membranes* of the pharynx, mouth, and nostrils, produce the secondary pulsations of the air." Dr. THOMAS YOUNG observes, in respect of the first of these, that the "reflection of the sound from the various parts of the cavity of the mouth and nostrils, *mixing* at various intervals with the portions of vibrations directly proceeding from the larynx, must, according to *the temporary form of the parts*, variously affect the laws of the motion of the air in such vibration."

19. As to the second view, Mr. BISHOP remarks that, "we know by experience that the breath passing through the glottis is thrown into a certain state of vibration, and reaches the cavity of the mouth, which is already so disposed as to present a proper extent of its own membranes to the action of the breath. By these means the membranes are also made to vibrate, and these latter vibrations, coexisting with the original vibrations of the glottis, may generate the vocal sounds." Now the chief objections which may be offered to this view are, that the surfaces of parts, over which the vibrations of air from the glottis pass, are not membranous or are not membranes capable of vibration, but are surfaces constantly changing their configurations by means of the muscles by which they and the subjacent parts are actuated, the vibrations of air thrown out by the glottis being modified or changed by the alteration in the configuration of these surfaces — of the surfaces of those parts between the glottis and the external features — so as to produce the different vowel-sounds, and to pass from one simple vowel-sound to another. Without attempting to proceed further in the consideration of the other simple sounds, or of the physiology of voice and speech, my limits oblige me briefly to notice the more practical part of this subject.

20. Very great ignorance, some mischief, and no little discredit to medical science, have been displayed by the energetic proceedings of some surgeons who have either written upon *stammering* and *stuttering*, or who have officiously meddled with, and injuriously operated upon, certain parts which are in no way implicated in the dis-

order under consideration. It has been supposed by these meddlers, with surpassing profundity, that these momentary or temporary affections arise from some lesion of the muscles of the tongue, or of the frænum linguæ, or of the velum palati, or of the uvula, or even of the tonsils, each acting on his own peculiar inspiration— with a success properly exposed by Mr. Bishop, and sufficiently manifested to my own observation. It must be very demonstrative of the progress of surgical science to see one surgeon "dividing the muscles of the tongue at its root, cutting at the same time through the linguales, the genio-hyo-glossi, and stylo-glossi muscles, with thin blood-vessels and nerves; or cutting a transverse wedge-shaped slice out of the dorsum of the tongue!" Or another surgeon extirpating the tonsils, which may affect the pitch and the quality of the voice, but which can have nothing to do with stammering! Or a third surgeon, cutting off the uvula, which is unconcerned in articulation! Now these pleasant operations have all been done, and may be done again and again under the seductive and perfectly safe (?) influence of chloroform, but what are the results? Let the victims articulate the answer, if they can intelligibly — for I have seen some of them who found this very difficult. For, as I have already noticed in another place, both the uvula and the tonsils perform functions necessary to the perfection of both voice and speech; and if these be removed, the pharynx and glottis are insufficiently lubricated, and are liable to experience, in consequence, more or less irritation, often passing into chronic inflammatory action, as have been demonstrated by cases which have come under my observation, and in which these parts had been extirpated. In other cases, where these effects have not appeared, or where the speech has been without huskiness, or any lesion of distinct articulation, the voice has been so much injured as to prevent attempts to sing.

21. There are several *conditions* which combine to produce stammering, each being more or less concerned in the morbid effect. The *first* is imperfect vocalisation, or an insufficient expiration owing generally to an imperfect respiration or to the lungs having been nearly emptied of their due quantity of air at the moment of articulation; — the *second* is an insufficient force of volition, by which the act of articulation is attempted; the *third* is, generally owing to the foregoing, a want of synchronous and appropriate action of one or more of the parts concerned in the production of voice and speech; and *fourth*, an irregular or spasmodic action of some of the muscles engaged in articulation. This last state is generally also a consequence of attempts at articulation being made either without sufficient force of volition, or without due vocalisation, or during an insufficient expiration from defect of air. It follows from the above, that the chief source of stammering is to be referred to the nervous centres — more especially to the seats of volition and emotion, and to the functional condition of the medulla oblongata.

22. Dr. Carpenter has justly remarked the analogy between stammering and chorea, the former being sometimes one of the modes in which the disordered condition of the nervous system in chorea manifests itself. "The slightest disturbance of the feelings is sufficient in most stammerers to induce a complete perturbation the vocal powers; the very fear that stammeri will occur, particularly under circumstanc which render it peculiarly annoying, is often suf cient to bring it on in a predisposed subject; a the tendency to consensual imitation sometim occasions stammering in individuals (especia children) who never show the slightest tenden to it except when they witness the difficulty others."

23. That one or more of the *four conditic* which I have stated to be chiefly concerned the production of stammering actually exists, w appear from what is observed as to the manner which timidity, fear, and anxiety affect th conditions, and, by thus affecting them, produ in many persons either stammering or stutterin although they are not subject to these disorders articulation in other circumstances. On this to Mr. Bishop very correctly remarks:—"The en tions which arise in a person when he is about address an audience, are often so overpoweri that the voice loses its natural volume, becon tremulous, and sometimes inaudible, the respi tory functions are irregular, the flow of ideas impeded, and the articulating organs perform th office so imperfectly, that he who is genera ready and fluent in conversation, hesitates, sta mers, and cannot utter a single connected se tence. Now if persons, who at other times ha a perfect voluntary control over the organs voice and speech, partially lose it under the c cumstances just mentioned, *à fortiori* those w have at all times an imperfect control over th articulation will, in similar states of feeling, f their powers paralysed, and their speech m than usually defective."

24. But it is chiefly in childhood and boyho when the sensibility and the emotional suscep bility are greatest,— whilst the due co-ordinat of those movements of the parts which contrib to correct articulation is either being formed, is in the course of developement, or only recen perfected,—that stammering either commences is chiefly manifested. At these ages, and m especially in those children in whom the facu of speech is slowly developed, or appears onl a later period than usual, the emotions are m likely to disturb the force of volition, and, w this disturbance, the normal exercise of the tellectual, the respiratory, the vocal, and the a culating functions.

25. Whatever may be the cause or nature the changes in the brain corresponding to several emotions, they are propagated to the n dulla oblongata, and influence the action of respiratory and the motor nerves of the fa throat, and tongue, as well as other nerves, a through them the muscles they supply. T emotions may thus occasion irregular actions the parts concerned in articulation: 1st, causing a momentary spasm or closure of glottis, and thereby arresting all vocal soun 2d, by causing irregular action, or by closing isthmus of the fauces and obstructing the p nunciation of letters and syllables which be with *guttural letters;* 3d, by the irregular spasmodic motion of the tongue, the dorsum this organ being carried backwards, or broug into contact with the palate, thereby affecting *lingua-dentals, lingua-palatals,* and *lingua-pala*

sals, and syllables or words commencing with
ese letters; and 4th, by closing the lips and
sterior nares, by affecting the pronunciation of
e *labials*, and even also of all the other letters.
n acute and experienced observer may readily
tect the particular cause of obstruction,—whe-
er the glottis, fauces, the dorsum or tip of the
ngue, or lips.

26. IV. The Treatment of stammering must be
sed upon the result of observation as to the seat
difficulty, or obstruction in the organs of articu-
tion. Dr. Arnott proposes that all the words
ould be connected by a vocal intonation, in
ch a manner that there shall never be an entire
ppage of the breath. But the difficulty is often
the commencement of a word or sentence, espe-
lly when the glottis is spasmodically or irregu-
ly affected; and, as Müller contends, this
n cannot do all that is required, as the impedi-
ent often occurs in the middle of words, although
may afford some benefit. The most important
medial means is that much insisted upon by Dr.
arpenter, and this is to study carefully the
echanism of the articulation of the difficult let-
s, and to practise their pronunciation, repeatedly,
wly, and analytically. "The patient would at
st do well to practise sentences from which the
plosive consonants are omitted; his chief diffi-
lty, arising from the spasmodic suspension of
e expiratory movement, being thus avoided.
ving mastered these, he may pass on to others,
which the difficult letters are sparingly intro-
ced; and may finally accustom himself to the
e of ordinary language. One of the chief points
be aimed at is to make the patient feel that he
s command over his muscles of articulation; and
s is best done by gradually leading him from
at he finds he *can* do, to that which he fears he
nnot" (*op. cit.* p. 771.).

27. The circumstance of stammerers being
en able to *sing* their words better than to speak
m, has been explained by the supposition that,
singing, the glottis is kept open, so that there
less liability to its spasmodic action; but, in
ging, the velum palati, and the other parts con-
ned in articulation, are also much less liable to
egular or spasmodic action, they being brought
s into action than in articulation. The differ-
ce may, however, as Dr. Carpenter supposes,
due to the direction of the attention rather to
muscles of the larynx than to those of the
uth. One of the most obvious and important
jects in the treatment of stammering is the pre-
ntion of any emotional disturbance during the
of speech; "and this requires the exercise of
voluntary powers over the direction of the
ughts, in the following modes: — 1st, To *re-*
ce mental emotion, by a daily, hourly habit of
stracting the mind from the subject of stammer-
, both while speaking, and at other times; —
, To *avoid exciting* mental emotion by attempt-
unnecessarily to read or speak, when the indi-
lual is conscious that he shall not be able to
form these actions without great distress; —
, To *elude* mental emotion, by taking advantage
any little artifice to escape from stammering, so
g as the artifice continues to be a successful
e." Having mastered the articulation of the
ficult letters, and of the words containing them,
d having thus avoided or overcome mental
otion, the patient should practise reading and
speaking aloud, slowly, and with due enunciation and intonation, and with a full and free respiration, never allowing the lungs to become too far exhausted of air. Due attention should also be paid to the digestive and excreting functions, and to the improvement of the organic nervous force and of the mental powers, by air, exercise, medical treatment, and diet. Frequent declamation, and reading or reciting aloud such passages as interest the mental emotions, should be practised as soon as the patient has acquired a complete command over his articulation and over the difficulties which mental emotions have occasioned him.

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VOMITING AND RETCHING.

—SYNON.—'Εμεσία, Hipp. — *Vomitus, Vomitio, Vomitium, Vomitum, Evomitio, Emesis vomitio, Vomituritio, Emesia*, Auct. Var.: —*Hyperemesia*, Swediaur; —*Palmus vomitus*, Young. — *Emesis Vomitus*, Good; — *Erbrechen*, Germ.; — *Vomissement*, Fr.; — *Vomito*, Ital. and Span.; — *Puking, Spewing.* — RETCHING. — *Vomendi conamen inane*, — *Subversio stomachi*; — *Dysemesia, Ægritudo ventriculi*: — *Ayant envie de vomir*, Fr. — *Sich Worgen*, Germ.

CLASSIF. — PATHOLOGY — SYMPTOMATOLOGY AND THERAPEUTICS.[*] (*See Preface.*)

1. DEFINIT.—*The rejection of the contents of the stomach, with or without retchings, genera*
symptomatic of visceral or of constitutional d
eases, but sometimes occurring independently of the
or of any serious derangement:—RETCHING *is*
ineffectual effort to reject the contents of the stomac
or painful contractile efforts, either before
stomach is evacuated, or afterwards, and when
stomach is empty.

2. *Vomitings and Retchings* are subjects of gr
interest:—1st, As symptoms of disease;—2d,
a therapeutical indication;—and 3d, as a pror
nent manifestation, if not a primary or idiopatl
state, of serious disorder.—The *first* of these
considered in the article on SYMPTOMATOLO
(§§ 130, *et seq.*), as well as in the history of t
several forms of disease: the *second* is partia
noticed under the head of THERAPEUTICS (§§ 4
43, and 56.), and in the *eighth class*, and the *th*
order of THERAPEUTICAL AGENTS.—Before, the
fore, I proceed briefly to consider vomiting as
chief and prominent affection, requiring to
palliated or allayed, I shall notice the circu
stances which appear mainly to require the ar
ficial production of vomiting.

3. I. VOMITING AS A THERAPEUTICAL INDIC
TION AND AGENT has not, in the article just n
referred to, owing to the scope and object of tl
article, been considered so fully as its importan
demands. It is more especially required wh
poisonous or injurious substances have been tak
into the stomach; or when the stomach is ov
loaded by food or drink to an hurtful amount, mo
particularly when either or both threaten to
casion apoplexy, or any other seizure, or wh
these attacks actually result from these causes.
all such cases, the selection of the emetic shou
be suitable to the cause and nature of the e
produced; and always be so energetic as to p
duce a rapid and full effect.

4. *a.* Diseases of the *respiratory passages*, especia
those attended by spasm, by suffocation, difficu
of breathing, by difficult expectoration, &c., a

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[*] *The mechanism of vomiting* has been a subject of discussion with both physiologists and pathologists. Three principal opinions have been entertained on this subject. MAGENDIE was of opinion that the stomach was passive in the act, and that the contraction of the diaphragm and abdominal muscles on that organ is the sole cause of the phenomenon. "This view was adopted by RICHERAND, ROSTAN, and PIEDAGNEL; while MARQUAIS, MAINGAULT, PORTAL, TANTINI, GRAVES, STOKES, and HALL have embraced more or less contrary opinions." MAINGAULT attributed vomiting exclusively to a gradual anti-peristaltic movement and contraction of the stomach. PORTAL concluded that this act takes place during expiration, consequently during relaxation of the diaphragm. That vomiting may take place without the action of the diaphragm, is shown by a case observed by Drs. STOKES and GRAVES, where vomiting was a principal symptom, but the stomach was found situated above the diaphragm. In a case recorded by M. LEPINE (*Bullet. de l'Acad. Roy. de Méd.*, 1844), in which the abdominal parietes having been accidentally laid open in the human subject, and the stomach having wholly protruded itself, it was seen to contract itself forcibly and repeatedly, until, by its own efforts, it had expelled all its contents except gases. The relaxation of the cardiac sphincter is essential to the act of vomiting, for its fibres can resist, by their contraction, the combined force of the expulsor muscles. The *retchings* or fruitless efforts at vomiting are owing to the contractions of the cardiac sphincter. Vomiting, like other efforts at expulsion of the contents of the natural cavities, is performed by the muscles of expiration, and whilst the diaphragm is relaxed and pressed up upon the lungs by the action of the abdominal muscles.

The immediate causes, or the physiological pathology of vomiting, may be stated under the following head:
1st, The contact of irritating, poisonous, or unwholeso
substances irritate the ganglial nerves supplying t
villous coat of the stomach, and affect the cæliac gangli
and adjoining plexus. The morbid impression or irrit
tion is conveyed to the roots of the spinal nerves a
chord by the ramifications of the ganglial nerves to the
parts, and is reflected thence, by the motor nerves of e
piration, to the abdominal muscles, by what I term
a "*reflex sympathy*," and Dr. MARSHALL HALL lo
subsequently designated a "*reflex function.*" — 2d, Ir
tations, &c., affecting other parts of the body (as stat
§§ 18. *et seq.*), are propagated to the splanchnic gangl
and plexuses to the stomach, and through them to t
spinal chord, and are reflected, in a similar manner,
by the motor nerves chiefly of expiration, — to t
abdominal and expiratory muscles. The vomiting whi
thus occurs I have denominated from reflex sympath
because it is only occasional or contingent, and not
constant or necessary an effect as to warrant the appe
lation of a function. — 3d, Impressions made on t
senses, or violent emotions, may, through the mediu
of the pneumo-gastric nerves, affect the ganglial centre
and either through these latter affect, also, in the w
above stated, the spinal chord and motor nerves, &c.,
be more directly propagated to both the splanchnic a
spinal nerves. — 4th, Sea-sickness and vomiting cann
be referred to either of the above categories. Th
proceed from an impression of an irritating or depressi
character — the latter more particularly — made prim
rily on the semilunar and other splanchnic ganglia a
plexuses, and propagated on the one hand to the gangli
nerves of the stomach, and on the other to the ramific
tions of these nerves to the spinal nerves and chor
thereby occasioning contractions of the stomach simu
taneously with contractions of the muscles supplied
the motor expiratory nerves.

enerally much benefited by a suitable emetic and
ee vomiting. Croup, hooping-cough, asthmatic
izures, spasm of the larynx, and laryngitis, con-
estion of the lungs, bronchitis, and bronchial ca-
rrh, are severally relieved by emetics. In most
these, ipecacuanha, in a full dose, is the best
metic; but when there is fever or inflammatory
ction, the potassio-tartrate of antimony may be
iven, but if it fail of producing vomiting in a
ort time, a full dose of ipecacuanha should be
xhibited. The sulphate of zinc and ipecacuanha,
onjoined with capsicum or other warm spices,
e most useful when vomiting is indicated during
ates of vital depression or exhaustion; and in
ses of poisoning by sedatives, narcotics, &c.

5. *b.* The *invasion of fevers*, continued or exanthe-
atous, is often most satisfactorily treated by an
tive emetic; and, as well as in affections of the
spiratory passages and organs, the good effect is
hanced by the free promotion of vomiting, and
exhibiting warm diluents, especially the warm
fusion of camomile flowers, or demulcents.—*Agues*
d other *periodic fevers*, especially *remittent*,
stric, and *bilious fevers*, are also much benefited
initiating the treatment by an active emetic,
d by promoting its effects by these means. An-
eriodic and febrifuge remedies, and chologogue
rgatives exert a more certain effect when they
e preceded by free vomiting, artificially pro-
ced.

6. *c.* Various *disorders of the digestive canal* are
ost beneficially treated by procuring free vo-
iting at the commencement of the disorder or of
e treatment. The several forms of *Cynanche* or
gina, especially when they embarrass respira-
n or deglutition, often require a recourse to
etics. In the more malignant states of Cy-
nche, or those characterising *Scarlet fever*, the
lphate of zinc, or ipecacuanha, conjoined with
psicum or other spices, and promoted by the
coction of senegæ, and by tonics, stimulants,
mphor, ammonia, &c. should be preferred to
hers.

7. *d.* Some forms of *indigestion*, or those arising
om accumulations of mucous sordes, or cru-
ties, and torpid states of the biliary formations,
indicated by a foul or loaded tongue, and by
orbid appearances of the evacuations, are often
e most successfully treated by commencing with
ipecacuanha emetic. All forms of *dysentery*,
flammatory or sthenic, adynamic or asthenic,
ute or chronic, endemic or epidemic, simple
complicated, hepatic or scorbutic, derive be-
fit from free and copious vomiting, especially
en produced and promoted by means suited
the peculiarities of individual cases. Ipeca-
anha is, however, the emetic which is most
nerally applicable to dysenteric affections; and
xt to it the sulphate of zinc. After a free ef-
t has been procured by means of ipecacuanha,
is medicine, — so valuable in *dysenteries* and
ronic diarrhœas, may be continued subsequently,
as large doses as the stomach may tolerate,
t preferably in the form of pill, combined with
propriate remedies — narcotics, aromatics, to-
cs, &c.

8. *e.* *Hypochondriasis* and *Melancholia* are some-
nes relieved for a time by an energetic emetic,
diciously selected and exhibited. But it ought,
order to be of service, to be followed by medi-
nes calculated to promote the secretions and excretions, and to impart tone and energy to the organic nervous system and to the organs which it actuates, by exercise, change of air and locality, and by travelling and occupations which both employ and interest the mind.

9. II. Vomiting and Retching as prominent Affections, or States or Symptoms of Disease. — Retching or vomiting may be the most remarkable and distressing symptoms, owing — 1st, To injurious or poisonous ingesta. — 2d, To severe constitutional disease, as at the invasion, or in the course, of severe exanthematous or continued fevers, or of pestilential maladies; — 3d, To severe functional disorder or irritation, or structural disease of the stomach itself; — and 4th, To sympathy with disease or irritation in some allied or more or less distant organ. The presence of either vomiting or retching, or of both, necessarily induces the physician to inquire, — 1st, As to the exciting causes, manifest or presumed; and 2dly, As to the pathological states to which either or both may be referred.

10. *A.* When a physician is called to a person who has previously enjoyed good health, or who has not complained in such a manner as to indicate a liability to an attack of vomiting or retching, then he should suspect the nature of the *ingesta* as having produced it, and inquire as to the food or drink, or other matters which the patient may have taken; and the matters ejected from the stomach should all be preserved for future examination, if circumstances should arise to require such examination. Where neither food nor drink is the cause, then poisonous matters taken voluntarily or accidentally, or given by others, ought to be suspected, and be carefully and artfully ascertained, and the matters rejected from the stomach carefully preserved and examined by a competent person. If poisonous substances have been taken or given, or are manifested by the character of the vomiting, by the allied symptoms, or by the state of the vomited matters, or by their presence in these matters, the antidotes and other means of treatment described with reference to the individual poisons (*see that article*) will be required.

11. *B.* When the vomitings or retchings are not caused by the ingesta, their *pathological relations* must then receive the necessary attention. In infants and children, as well also in adults, these affections may proceed from hot seasons, owing to bilious or gastric disorder; from a bilio-gastric, continued, or remittent fever; from the invasion of exanthematous fevers, especially scarlet fever and small-pox; and, in the former class of patients, more frequently than in the latter; from disease of the brain or of its membranes. They may be the invasion of the usual forms of cholera, or of gastro-bilious disorder, during summer and autumn; or the very prominent and urgent symptoms of pestilential cholera; or, in warm climates, of hæmagastric or yellow fever. In these climates, also, they may usher in remittent or other fevers and maladies; and in all these, although most severe and even dangerous, as well as the most prominent, manifestations of disease, they are very far from being the disease itself, or even the greatest part of it.

12. *C.* Severe functional disorder, local or constitutional, will occasion vomitings or retchings, as that following dissipation or drunkenness

(§ 5.), and that occurring at the commencement of the fevers, and pestilential maladies already noticed; but the most distressing attacks of retching and vomiting are often caused by the *motions of vessels at sea*, and by *organic lesions of the stomach itself*. Of the former, a more particular notice will be taken in the sequel under the head of Sea-sickness, or *vomiting and retching during voyaging by sea*; and as to the latter causes, viz. inflammation and structural changes of the Stomach (§§ 22—95.), the symptoms now being considered, when arising from these lesions, are duly noticed at that place. To what I have there stated, and to the article on the pathology of the Digestive Canal (§§ 37—43.), I must refer the reader. But there are other remarks which may be adduced at this place calculated farther to elucidate the history of vomiting.

13. i. Vomiting and Retching from Organic Lesions *seated in, or implicating, the stomach*. — These lesions have been described at the places now referred to; and, amongst these, *ulcerative perforation of the stomach*, either commencing in this viscus, or extending to it from structural changes in adjoining parts, has occupied a conspicuous rank. These perforations may give rise, owing to previous agglutination or adhesion of the opposite serous surfaces, to communications — 1st, Between the stomach and the substance and vessels and ducts of the liver, owing most frequently to abscess in the latter viscus; — 2d, Between the stomach and the pleural cavities and lungs; — 3d, Between the stomach and pericardium; — 4th, Between the stomach and vena cavæ; — 5th, Between this organ and portal vein; —6th, Between the stomach and external surface of the abdomen; — 7th, Between this viscus and the gall-bladder; — 8th, Between the stomach, gall-bladder, and duodenum; — 9th, Between the stomach and duodenum; — 10th, Between the stomach and some part of the small intestines; — 11th, Between the stomach and colon; — 12th, Between the stomach and peritoneal cavity. Other fistulous communications between parts of the digestive canal and other viscera are met with on rare occasions, and are occasionally attended by vomiting; but they are noticed in their appropriate places. Of the several kinds of perforated communications between the stomach and other viscera now enumerated, the *first* is most commonly the result of abscess in the liver; although it may arise otherwise in rare instances, as in a case which came under my care where the perforation of the stomach extended far into the substance of the liver. The *second* is also most frequently the result of an abscess opening into the stomach. The *third*, *fourth*, *fifth*, and *sixth*, almost in all cases, are referable to perforating ulceration, cancerous or simple, commencing in the stomach. The *seventh* and *eighth* forms of fistulous communication are most commonly caused by large gall-stones in the gall-bladder. The *ninth*, *tenth*, and *eleventh* most frequently proceed from cancerous or simple ulceration commencing in the stomach or pylorus. The last of these lesions are caused chiefly by the absence of adhesion of the opposite peritoneal surfaces, which adhesion takes place in the others, although it is weaker, or more readily separated, in the cancerous or malignant, than in the simple, forms of ulceration. Of these forms of fistulous communications between the stomach and other viscera *gastro-colic fistula* is probably the most frequent This form has been ably described by Drs. Brinton and Murchison, and references have been given by them to interesting cases, published in medical journals, and to preparations contained in the principal pathological collections.

14. ii. Vomiting from Gastro-Intestinal Fistula. — The *vomiting* caused by an *abscess* in the liver, or by abscess from diseased vertebræ opening into the stomach, or by a communication with *purulent collections* in the pleura or lungs, o in any other situation, may be recognised by the history of the case, and by the purulent character of the rejected matters. When occasioned by *cancerous ulceration*, or *growths*, the vomitings, with the antecedent and attendant symptoms, are described at the places above referred to. But when perforation of the stomach, either from these lesions, or from other ulcerative processes, take place, then the vomitings frequently assume distinctive characters, which indicate the nature o the mischief. In cases of *gastro-colic fistula* the matters vomited very frequently indicate, or a least render probable, the existence of lesion from either cancerous or simple ulceration. In a very able memoir on this subject, Dr. Murchison ha adduced 33 cases, of which 21 were caused by cancer, and 9 or 10 from simple ulceration. A to these he remarks, "that the proportion of case resulting from cancer is more than double tha from simple ulceration; and, as simple ulcer o the stomach is about five times as common as cancer, Dr. Brinton was not far wrong when h conjectured, 'that its proportion in the malignant disease is at least thrice (and probably six to ten times) as great as in the ulcer.' This accounts for the fact that some pathologists, as Rokitansky and Bock, speak of it as a result of cancer of th stomach, but make no mention of it under th head of simple ulcer.'" Had Dr. Murchison consulted what I have stated on this subjec in the article Stomach, and in the chapter on "*Ulceration and Perforation of the Stomach,*" he would not have asserted that pathologist "make no mention of it (gastro-colic fistula) under the head of simple ulcer." This may be true as respects the foreign pathologists whom he ha referred to; but if he will turn to p. 919. of th *third volume* of this work he will find, amongs other remarks, pertinent to this subject, the following: — "The ulceration may be *cicatrised*, a shown in the article just now referred to, (§ 39. or it may proceed onwards after adhesions hav been formed between the opposite portions of th peritoneal membrane, and thus the ulceration may proceed not only to perforation of the stomach but also to perforation of a contiguous portion o the digestive canal, as the colon, or to more o less ulceration and perforation of another organ: and I proceed to further illustrate the subject and, in the following paragraphs, to describe th commencement and course of ulceration and perforation of the stomach, the several varieties they present, and the symptoms which they occasion.

15. This greater rarity of gastro-colic fistula as a sequela of simple ulcer, may, according to Dr. Murchison, "depend on three causes: — viz., the fact, that simple ulcer is much more rarely met with in that part of the stomach nearest the colon — the great curvature (in 5 only

220 cases); and that there is a greater ten- ncy in cancer to contract adhesion to neigh- uring parts before perforation; while, at the ne time, the cementing matter is of a less per- nent quality than the lymph thrown out in the inity of a simple ulcer." The absolute fre- ency of gastro-colic fistula, as a sequela of *cancer* the stomach, can only be approximated. Dit- ich observed this lesion in 6 out of 160 cases, in 3·75 per cent.; Dr. Brinton in 11 out of 7 cases collected by him, or in 2·17 per cent. at the ulceration generally commences in the mach, I have shown in the places above re- red to, but I have admitted that it may origi- te in the colon or other parts, and extend by rforation into the stomach. The cases recorded Dr. Murchison fully illustrate this inference. e remarks that, "Out of the thirty-three cases, ere is every reason to believe that the disease mmenced in the stomach in twenty-six; in four ses there are not sufficient data for forming an inion on the point; and in three only does the ease appear to have been most advanced in the lon after death." In cases where tubercular sease or abscess finds its way into the stomach into both stomach and colon, as in very rare stances, when this result has occurred from dis- se of the kidney or the gall-bladder, the course the alteration is manifest.

16. iii. The Diagnosis *of gastro-intestinal*, or *stro-colic fistula*, depends chiefly on the charac- rs of the matters thrown off the stomach. This pic is partly discussed, especially as respects the tecedent and many of the existing symptoms, the articles referred to above; but those phe- mena which indicate the presence of this fis- la have not been so fully described. *Vomiting* always present, although it sometimes recurs ly at intervals. It is often preceded, and at- nded, by fœtid eructations, or by bilious, dark, grumous matters in the ejected fluids. When ere is a free communication between the sto- ach and intestine, the vomited matters generally e more or less fæcal. But where the fistula is ng or circuitous, vomiting of fæcal matters may t, or only occasionally, be observed. Dr. Mur- hison remarks that out of nineteen cases in hich the history was clear, fæcal vomiting was served in eleven, and fœtid — perhaps fæcal — in three; and he draws the following conclu- ons: — "1. Fæcal vomiting is probably present all cases in which the opening (except this e very minute) is situated in the fundus, or reat curvature, of the stomach, and may also be resent when the disease is in the pylorus. 2. In l cases in which food is vomited the opening is t or near the pylorus, so as to preclude the pas- age of food." In cases of cancer of the pylorus r duodenum, vomiting may be less after the for- ation of the fistula than before, as the food in e former case may pass into the intestine, into hich the fistula opens.

17. Where gastro-intestinal or colic fistula ex- sts there may be present eructations with a fæcal dour, as well as fæcal vomitings; or there may e only fœtid eructations. Next to fæcal vo- niting, the presence of indigested food in the tools is an important indication of gastro-intesti- al fistula. I have long supposed that at least ome of the cases of *lientery*, amongst the many hich came before me at the Infirmary for Children, were actually instances of this form of fistula. As the disease advances, as it usually does, to a fatal issue in the course of several days, (although it is sometimes prolonged to some weeks or even months, with intervals of partial ease,) diarrhœa with indigested matters in the stools soon after they had been taken, or an occasional recurrence of costiveness, emaciation, anæmia, general cachexia, or yellowness of the body, as described in the articles already referred to, are commonly observed.

18. III. Vomiting and Retching from Sympathetic Irritation. — Irritability of the stomach, so great as to be attended by vomiting or retching, on receiving all, or most kinds of food or drink into the stomach, is often occasioned by vascular erythism, inflammation, or organic alterations of an adjoining or even of a distant organ or part. The vascular excitement of, and determination of blood to the uterus during *pregnancy*, and the death of the fœtus in utero in the advanced months of gestation, are often productive of vomitings or retchings; and organic and inflammatory diseases of the uterine organs frequently occasion the same symptoms, especially in delicate and susceptible females, or when those diseases are of an acute or severe kind. As may be readily inferred, inflammations and organic lesions of any of the allied or adjoining viscera very often are productive of vomiting, the rejected matters consisting, as in the preceding diseases, chiefly of the ingesta, and of watery, ropy, and mucous fluids, sometimes coloured with bile, unless when congestion, inflammation or abscess, may give rise to the discharge of blood or purulent matter from the stomach, or from adjoining parts, communicating with the stomach. Enlargements, morbid growths, or other lesions, in the liver, spleen, pancreas, mesentery, omentum; disease of the diaphragm, or of the gall-bladder and ducts; misplaced or suppressed or retrocedent gout; suppression of urine, or retention of this excretion, verminous diseases, &c., severally occasion vomitings when they reach an advanced stage of development.

19. In some serious organic diseases of the brain, vomitings sometimes occur, and occasion, in both children and adults, in the latter especially, much difficulty in determining the true cause and morbid relations of this symptom, which, however, may be readily ascertained in most instances from the history of the case, and by estimating the succession and grouping of the accompanying phenomena. Diseases of the stomach itself, especially of the pylorus, duodenum, and of the intestines, particularly of the small, of the liver and gall-bladder — more especially when the concave surface of the liver is much affected — and of the kidneys, are frequently attended by vomiting: and when gall-stones irritate the gall-bladder or ducts, or are passing along the latter, the vomitings and pain are then very distressing. The irritation of calculi in the kidneys, or in their pelves, or when calculi are passing along the ureters, produces the same distressing symptoms; but the most urgent and dangerous vomitings occur in obstructions of the bowels, especially of the small intestines, from internal or external strangulation, from intus-susceptions, from inflammations, or from

various mechanical or structural causes of intestinal obstruction, as shown in various places (*see Arts.* Colic and Ileus, Concretions, Biliary and Intestinal, &c.); more particularly when the vomitings are attended by fœtid eructations, and when the vomited matters present a fœtid or fæcal odour, or a more unmistakable fæcal character. In all cases of obstruction, and irritation, of any of the ducts and canals within the abdomen, especially when the obstruction is caused mechanically or by a solid body, the sympathetic occurrence of vomiting is generally very urgent and distressing, although often presenting intervals of comparative ease. In all cases of vomiting and retching, the history of the case should be ascertained as fully as possible.

20. Besides these more strictly local diseases, which are attended by vomitings and retchings, there are several constitutional maladies, especially those adverted to above (§§ 18, 19.), in which these symptoms are of a most prominent character, and proceed from contamination of the blood, acting both on the frame generally and upon the stomach and its allied viscera in particular. No doubt that in all these maladies, whether the choleric and hæmagastric pestilences, or the contamination occasioning malignant puerperal fevers, or that arising from poisoned wounds, inoculation, &c., the morbid impression is primarily and energetically made upon the organic nervous system, the retching and vomiting often following closely upon it; but nevertheless, this impression being made, the alteration produced in the blood aids it, and promotes both by increasing the depression of the organic nervous force, and by irritating the stomach and adjoining parts, thereby rendering the vomitings of a more serious, dangerous, or obstinate character, as evinced in these maladies.

21. IV. Vomiting and Retching from Sea-Sickness are common to all persons soon after they feel the motions of vessels on the sea, if they have not acquired an immunity from this suffering by habit.

22. i. Description.—In some, vomiting is preceded by a prolonged nausea, with extreme prostration, faintness, vertigo, and apathy. In others, vomiting takes place more or less quickly, after nausea is first felt; and in many the nausea and distressing retchings, with headache, vertigo, and prostration, continue or return at shorter or longer intervals after the stomach has been completely evacuated, but only if the motion of the vessel continues. When the retchings continue or return after free vomiting, a ropy mucous fluid, mixed with more or less bile, is evacuated, owing to the emulgent operation of the retchings on the liver, gall-bladder, and ducts, thereby producing a favourable influence on certain diseases noticed hereafter (§ 25.).

23. The severity and duration of sea-sickness depend much upon the susceptibility of the individual; and the extent of motion to which he is subjected; and, although generally all persons are liable to sea-sickness on first going to sea, yet its severity and continuance are great in proportion to weakness and delicacy of constitution. Usually, however, the sickness either subsides or ceases altogether in a few days; and in previously healthy persons it is followed by a good or craving appetite, and a return of health, although the cause of the suffering may continue. Many persons who, from frequent or prolonged voyaging, have become exempt from sea-sicknes at least whilst at sea, experience a recurrence o it when they return to sea, after having passed considerable time on land; but it is usually o short duration, or slight in these persons. Sea sickness occurring during a short passage, as i crossing the Channel, immediately ceases wit the stillness of the vessel, or on landing, vertig only remaining for a time. Some delicate persons who are very susceptible of sea-sickness, are als liable to nausea and vomiting from the motion o a carriage, especially while they remain inside, bu escape from the sickness when they ride outside.

24. ii. Prognosis.—Sea-sickness, although mentally and physically most depressing, and althoug both vomitings and retchings are most severe, i generally unattended by danger, and it ver rarely terminates fatally. When this event take place, it is more the consequence of the continue nausea, and of the loathing of all kinds of ingesta, owing to their inducing retchings, and o the resulting inanition, exhaustion and fatal sinking, than of any alteration of structure, or contingent lesion, produced by the severity of th retchings. In all cases, where this species o sufferings is prolonged by severe weather, and susceptibility or peculiarity of constitution, mor or less debility, exhaustion, inanition, anæmi and loss of flesh are observed; but generally, as soon as the cause ceases, or even considerably subsides, as on the occurrence of fair weathe after storms, or on landing, these effects soo disappear, and are often followed by restore health, or even by an improved state of health owing to the circumstance noticed above (§ 2.).

25. iii. The nature of Sea-sickness has been a subject of frequent discussion. The brain, the heart, and the cerebro-spinal nervous system generally, have been severally referred to as the seat of this distressing disorder. That these are more or less affected during its continuance — that the brain and nervous system are impaired in volition and in the vigorous discharge of all their functions, mental and physical, cannot be doubted; and that the heart acts feebly, although sometimes rapidly, but without tone or vigour, is equally manifest, until the retchings and vomitings occasion more or less reaction, accompanied with perspiration, which varies with the severity of the sickness, and the constitution of the patient. But the affection of these — of the cerebro-spinal nervous system and of the vascular and muscular systems, with the organs and parts more immediately concerned in the act of retching — is the necessary result of the effect produced by the motion of the vessel upon the semilunar and allied ganglia, and the viscera they endow with the organic nervous force. This effect continues until retching and vomiting supervene and occasion more or less reaction according to the constitutional powers of the sufferer. That the primary influence of the vessel's motion on the semilunar and allied ganglia is depressing may be inferred from the distressing sense of sinking referred to the epigastric region, and from the general physical and mental prostration preceding the retchings. That vomiting and retching, each varying in grade and character, follow very powerful depressing influences, is shown by the effects of most sedative and exhausting agents

whether poisonous, morbid, or infectious —which
t more especially or immediately on organs or
rfaces endowed by the organic nervous force.
may therefore be inferred, that the vital de-
ession produced by the vessel's motion is the
ief cause of the sickness and vomiting, the
itation caused by matters contained in the
omach during this depression merely aiding in
veloping the retching and vomiting, this act
nd the evacuation of the stomach affording a
ght temporary relief, the depression and sick-
ss still continuing more or less, or for a period,
cording to the continuance of the cause, and to
e constitution and predisposition of the sufferer.

26. iv. The Remedial Influence of Sea-sick-
ess is sometimes remarkable in several diseases,
ore especially when the sickness is attended by
ee vomiting, the appetite returning afterwards,
nd when the patient does not suffer inordinately,
when the suffering is not long continued. In
vere *hooping cough*, especially in persons near or
ıst puberty, and even in infants and children,
a-sickness is often of marked advantage. In
is complaint, the patient, sufficiently protected
om exposure or weather, may be placed in a
wing or sailing boat, when much swell of the
a is observed, and carried out to sea, until
omiting takes place, when a return to land may
e directed. In other cases and circumstances, a
ort voyage in sailing vessels furnishing the re-
uisite accommodations, may be taken with be-
efit. A similar advantage may accrue in cases
f *tubercular consumption*, as I have shown in
at article (§ 420.); in *hæmoptysis;* in spas-
odic *asthma;* in *chronic bronchitis;* probably in
me cases of *chronic diarrhœa* and of *dysentery*,
hen suitable accommodations are afforded, and
torpid states of the liver, &c. In these cases,
e influence of nausea in lowering vascular action
nd removing spasm, and the action of retching
nd vomiting in emulging the biliary apparatus
§ 21.), and in evacuating mucous accumulations
the bronchi, are of essential service. By this
ction also congestions of the lungs and liver are
emoved, or are aided in their removal, and a
ealthy secretion of bile promoted — circum-
ances of great importance in several pulmonary,
iliary, hypochondriacal, gastric and intestinal dis-
ases.

27. V. The Retchings and Vomitings which
ay be viewed as idiopathic or primary, and
hich are not necessarily connected with inflam-
ation or structural disease of the stomach and
llied viscera, although they ultimately, by per-
stence in their cause, become thus associated,
re those which take place in the morning, and
hich either recur frequently or habitually, and
hich the patient generally removes for the time
ith a glass of brandy, or of brandy and water,
r of some other favourite liquor. In these cases,
orning sickness is the result of exhaustion from
revious over stimulation, and for a time is
erely functional, but sooner or later it becomes
ore and more structural. The same form of
ckness often follows in the morning heavy sup-
ers, either with or without excessive drinking.
he circumstance of a person complaining of
ckness or vomiting habitually or frequently in
e morning, and more especially if he have
ecourse to spirits to remove it, before any food
an be taken, is most positive evidence of such person being an incurable drunkard, although he may never have been intoxicated.* The form of disorder may be considered as allied to *vomiting from sea-sickness* (§§ 21. *et seq.*), the most idiopathic form of vomiting.

28. When the functions of the stomach are exhausted by the excessive excitements of intoxication, or by the irritation of indigestible or unwholesome food, and more especially by the ingestion of substances which readily enter into the acetous, the lactic, or the vinous fermentations, when received in the weak and exhausted stomach, then pain, vomiting or eructations are produced by the gaseous products, by the acidity, and by the various irritating matters and combinations, resulting from the fermenting substances, which, if they fail in undergoing these processes during the imperfect digestion, experience putrefactive changes, and occasion the same, or even more serious and more obstinate disease.

29. When the digestive processes are impaired or exhausted, owing to general debility (*see that article*, § 15. *et seq.*), or to inordinate muscular or mental exertions, or to local or constitutional disease, the articles of food most prone to undergo fermentation, as bulky vegetables, raw fruits, fermented bread and liquors, &c., produce an increase of disorder, by the fermentation which ensues, and the frequent repetition of such disorder at last passes into more serious disease, which is characterised by recurrences of retching and vomiting, and by gastrodynia, whenever such

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* The following cases will illustrate this. A young man in a large wine merchant's house, and having free access to extensive wine vaults, was seized, after habitual sickness and vomiting in the morning, with most violent pain in all the smaller joints, and especially in the wrists and ankles. He came under my care, when he confessed, that sickness and vomiting every morning upon getting out of bed had continued for three or four years; that it was instantly cured by a glass of brandy, but that he could take little or no breakfast. As soon as he returned to business in the morning, he continued drinking at intervals sherry or port wine or brandy, as either came in his way, and he thus took from two to three bottles of wine, besides brandy every day, unless Sunday, when his supply was not so liberal. He recovered his health, relinquished this habit, and he has for very many years been sober and temperate. He never evinced any symptom of disease of the stomach or liver, and he is the only instance I can recollect of a complete reformation from drunkenness.

A cook in my family was always sick and retching in the morning, and could take no breakfast. Her principal meal was supper; soon after which she retired into her own room, and nothing was known of her until she had partly recovered from her sickness and resumed her morning duties. Upon hearing this I became alarmed at the probable consequences of her after-supper indulgence, and means were devised to prevent her apartment from being fastened on the inside, and then she was there found drunk. These cases are not of infrequent occurrence; but in some instances vomiting is only occasionally present, chiefly in the morning; a chronic diarrhœa, sometimes passing to a fatal dysentery, with diseased liver, taking its place.

Several cases of very young persons, mostly females, who have died from the excessive use of spirituous liquors have been brought under my notice. These were characterised by habitual sickness and retchings in the morning, which were allayed by the accustomed stimulus or by strong tea, but followed, after a longer or shorter period, by enlarged and fatty liver; or by emaciation, chronic diarrhœa or dysentery, with ulcerated bowels; or by the most violent pains in the extremities, of a mixed neuralgic and gouty or rheumatic character, terminating in several of the cases before the age of twenty. In one fatal case, at the age of 17, the growth was remarkably stunted owing to this vice, all the others who had commenced it at an early age being very much under size. In this instance the fatty liver filled almost the whole abdomen, and descended deep into the pelvis, and produced an abdominal enlargement as great as the full period of pregnancy.

disease is aggravated by the ingestion, or commixture of fermentative substances. The connection of fermentation in the stomach with indigestion and vomiting, has been well discussed by Dr. Turnbull, and although the doctrine of fermentation has been pushed too far by him, there can be no doubt of the importance of giving due consideration to changes of this nature, which certainly take place in the digestive canal, when the nature, the quantity, and the admixture of indigestible, saccharine, and putrescent substances are taken into the stomach during functional or structural lesions of the digestive organs. Persons addicted to the excessive use of intoxicating liquors, experience more or less fermentation in the stomach after the excitement caused by these liquors has subsided; and the products of the fermentation, acting on the exhausted organ, frequently produce that amount of irritation, which is manifested by nausea, retchings, vomitings and gastrodynia, and which the drunkard relieves by a recourse to the accustomed stimulus.

30. VI. Vomiting attended by the discharge of the Sarcina Ventriculi. — In 1842 Professor Goodsir described this remarkable production, and since that time many cases of this kind have occurred, most of which have been either observed or referred to by Dr. Turnbull, of Liverpool. I have not observed more than three instances of this production in the substances vomited since attention was first directed to it, and these occurred in cases of organic disease of the stomach, in which the fermentative and putrefactive processes appeared to have been readily produced. The writer just mentioned has noticed thirty cases of *sarcina ventriculi* recorded by various authors, and has himself observed six. Of these eighteen had terminated fatally. He arranges these cases in four groups: — "1. Cases in which ulcers or cicatrices arising from them, or some other non-malignant disease of the stomach, obstructed the pyloric orifice. — 2. Cases of cancerous disease contracting the pylorus. — 3. Cases in which there was no disease of the stomach itself, but displacement or some other condition obstructing the pylorus. — 4. Cases in which the disorder may have been functional, recovery having taken place more or less perfectly." The analysis of these cases furnishes the following: — the disease is more common in males than in females, in the proportion of twenty-four to ten, and between the ages of thirty and fifty. Of the three cases which I saw two occurred in confirmed drunkards between forty and fifty-five years of age. In all the cases, vomiting was the prominent symptom; flatulent distension, offensive eructations, pain in the stomach, costiveness, emaciation, and anæmia being also present. According to Dr. Turnbull, the sensation of "something alive in the stomach," was also experienced, but this was not remarked in any of the cases for which I was consulted. Dr. B. Jones found the urine alkaline, and this excretion has, in some instances, contained oxalate of lime and sugar.

31. VII. Treatment. — i. Treatment of Symptomatic Vomiting and Retching. — It is manifest that the treatment of retching and vomiting can only be successfully accomplished by a strict examination of the history of each case, and of its causes, extrinsic and intrinsic; and by ascertaining the particular category of causes to which each individua case should be referred — whether the vomitin has been occasioned — 1st, By the ingestion o an injurious or poisonous substance (see Poisons); — 2nd, Or by the invasion or accession o a febrile, exanthematous or pestilential malady — 3rd, Or by disease of the stomach or bowels or of some adjoining organ or part; — 4th, Or b sympathy with the irritation or structural lesion of a more remote organ; — 5th, Or lastly, by th abuse of intoxicating or stimulating liquors.

32. *A.* If the vomiting be caused by poisonou ingesta, it is obvious that the means advised in such cases in the article now referred to are required, conformably with the evidence obtained as to the nature of the poisonous substance which has been taken. To this extensive subject I can add nothing to what I have adduced in the article Poisons.

33. *B.* If there appear any reason to ascribe the vomiting to the invasion of an exanthematous, infectious or pestilential malady, especially when any such is prevalent or epidemic in the same locality, or when the vomiting is associated with shivering or any of the other symptoms of the invasion of any of these maladies, then the treatment advised for the accession of such malady ought to be adopted. (*See the treatment recommended on the accession of the* Choleric, *and* Hæmagastric Pestilences *of* Scarlet Fever, Small-pox, *&c.*)

34. It should, however, be recollected, that the vomitings accompanying marked vital depression, especially those occurring in, or characterising pestilential and malignant maladies, and in animal or fish poisons, and in contaminated states of the blood, admit not of being cured, or even mitigated, by depressing or sedative remedies, whether narcotic or anodyne, unless exhibited in small doses, and conjoined with stimulants, aromatics, and cordials. Opium, morphia, and their preparations, hydrocyanic acid, chloroform and hydrochloric æther, will produce little benefit unless they be given in the manner now stated. In these cases, opium and hydrochloric æther, when judiciously combined with other means, will sometimes be of service, but the hot spices, warm stimulants and cordials, prescribed in large doses, according to the malignancy of the case will be found the most efficacious. Thus large quantities of capsicum, brandy, and of other powerful stimulants, have been retained by the stomach in malignant and pestilential maladies, whilst sedatives and narcotics have been instantly rejected by it; and even the spirits of turpentine have been retained, both in these maladies and in the last stage of low fevers, as well as in similar states of disease, especially when the blood is contaminated and vital depression is extreme. I have seen these effects in numerous instances, since 1817, when I first employed these substances in the hæmagastric pestilence or yellow fever. In all these diseases the usual means of allaying vomiting had failed, and increased the vital depression, the sense of sinking and mental apathy, and therewith the vomiting; which symptoms generally terminated in a fatal pumping up, or rejection of the contents of the stomach, without retchings, but often with singultus, when sedatives and narcotics were employed.

35. *C.* It is obvious that the vomitings and tchings caused by inflammatory and organic sions of the stomach and allied viscera, can be layed only by means which will remove or leviate the disease of which the vomitings are erely a symptom. In the less severe of these, temporary aid may be obtained from the use of ydrocyanic acid, from opiates given with eaginous demulcents and nitrate of potash, or e muriate of ammonia in very small doses, and om external derivatives. But creosote and the ore heating substances, often of service in the pposite states of vomiting, are seldom of service these. In cases of intestinal disease, the rearks now made are equally applicable; and here strangulation or obstruction from any cause ist in, or otherwise implicate, the intestinal nal, the removal of it is essential to the reoval of the vomiting. (*See Arts.* Colic and Ileus, oncretions, Biliary and Intestinal, Diestive Canal, Stomach, and Intestines, Inlammation and Organic Lesions, &c.)

36. *D.* The retchings or vomitings caused by ritation, inflammation, and organic lesions of istant organs require careful examination and iscrimination: and, although these sympathetic omitings are often allayed, especially by demulents conjoined with refrigerants and sedatives, r with hydrocyanic acid, or creosote, opiates, c., yet the treatment should be mainly directed the particular disease, or structural lesion, of hich vomiting is a distressing symptom, whether be seated in the brain, in the kidneys, uterus, r other part. When the irritating cause is a lculus, or concretion in the gall-ducts or bladder, or in the urinary apparatus, the means dvised for these, under their respective heads, nd warm anodyne fomentations, tepid or warm aths, are those which are most appropriate, alhough these may be conjoined, or alternated, with hose which are most serviceable in allaying the omiting (§ 34.). — Creosote is often of much enefit, when the stomach itself and its allied iscera are free from inflammatory and organic isease, and when the retchings are purely symathetic; but it soon fails as a palliative when e primary or chief disease has not received ue attention, or when it remains unsubdued. Moreover, creosote, when given in too large or frequent doses, is apt to increase inflammatory action hen it exists, especially if it be of a sthenic or hlegmonous character. When the vomiting is ttended by manifest asthenia, or vital depression r exhaustion, creosote, as well as stimulants, aroatics and cordials are frequently very beneficial.

37. *E. The vomitings, &c. attending pregnancy,* specially in the earlier months of this process, will ften be palliated or prevented by the above eans — by the combination of the alkaline or arthy carbons with infusions of calumba, cascailla, and with tinctures of the same tonics, and ith the addition of hydrocyanic acid, or small oses of opium, or of chlorodyne. In this class f cases, fermentation often accompanies the symathetic irritability of the stomach, and developes his latter state into the act of retching or vomiting. n the more obstinate and severe cases, or when hese means prove inefficacious, then creosote in ill or in mixture, combined, according to circumtances, with opiates, alkalies, &c. should be precribed.

38. ii. Treatment of Sea-Sickness. — This is a very hopeless subject, yet it is nevertheless one which should not be abandoned, for with care and judgment sea-sickness may be more or less alleviated and its duration abridged. The usual means employed for it are seldom of service and often tend to prolong the nausea, without ultimately preventing the vomiting. It is generally preferable, when the sufferer is young or even moderately strong, to partake of such food and drink as he may prefer, thereby to prevent ineffective retchings; and when free vomiting is accomplished, to take small and frequent doses of a suitable anodyne, in small quantities of fluid. Substances of large bulk, or even in moderate quantity, or gaseous fluids, by distending or filling the stomach, generally bring back the retching and vomiting. During the nausea, or even after it is moderated, the stomach is quite incapable of digesting alimentary substances; therefore their presence in the stomach acts only as an irritant of the weak and susceptible organ, and in a short time brings back the sickness and vomiting. Having, therefore, promoted a free evacuation of the stomach, in the way now advised, small doses, often repeated, of either hydrocyanic acid, or tincture of opium, or chlorodyne, or of chloroform, or of hydrochloric æther, may be given in small quantities of a demulcent mixture, which may be made agreeable by the addition of a few drops of an aromatic cordial. Creosote has been recommended, but its odour is disagreeable to many persons; but, when prescribed for sea-sickness either in the form of pill, or in a demulcent mixture, it should be given in small doses, or not exceeding half a minim for a dose, which may be repeated according to its operation. The demulcent and anodyne medicines may be given in any of the mint waters, especially when the patient is distressed by flatulence and eructations, and any cordial or aromatic may be added if sinking at the epigastrium or vital depression be experienced.

39. Females and delicate persons, subject to sea-sickness, should retire to their cabins immediately on embarking, if the voyage be likely to be longer than a few hours, or to continue during the night. Unless the sufferer be weak, or extremely depressed by the sickness, retchings and vomitings, it is generally preferable for him to keep up and struggle against his enemy, as he will be the more likely to overcome ultimately, and to shorten the duration of the attack. If he have any return of appetite after vomiting, it should be indulged in great moderation, the food being the most digestible within his reach; if sickness and vomiting recur, they will generally be of short duration, and be followed by a return of appetite, which, if prudently indulged, will be generally followed by health. This plan is to be preferred if a long voyage, or one beyond three or four days be anticipated; for, by that time, or not much longer, the evil will cure itself. It is only for the more severe cases, or in short voyages, or for delicate females and weak persons, that the medical treatment advised above (§§ 38.) is either much required, or particularly appropriate.

40. iii. Treatment of Retchings and Vomitings caused by Drunkenness and by Fermenting Ingesta. — The drunkard generally knows well how to remove the morning effects

of his previous indulgence, and he finds the recurrence to his accustomed liquor, or to one still more energetic, to be the most efficacious remedy. But he counts not the ultimate cost, viz., according to the nature of the liquor indulged in, organic disease of the stomach, pylorus, liver, &c.; or chronic diarrhœa, or dysentery, delirium tremens, &c., often complicated with the foregoing. Safer remedies for retchings and vomitings consequent upon DRUNKENNESS are the aërated waters, the compound decoction of aloes with cinnamon water, creosote in pills or in mucilaginous mixtures, and the means advised in the article now mentioned (§§ 15. *et seq.*). When the vomitings are of daily recurrence, it is evident that the only permanent cure is to subject the patient to such restraint as may be legally permitted, seeing that he is incapable of restraining himself. This is, however, one of those forms of moral degradation, against which the laws have no provision, and for which medical aid is rarely of any avail, especially as regards prevention or permanent cure —

> "Hic cum hominibus, non cum Diis agitur."

41. Vomitings caused by *excessive fermentation* in the stomach, are generally allayed by medicines which either arrest or neutralise the process, or develope the vital force of the organ, or allay excessive irritability of it, or which operate in more than one of these modes. The sulphite of soda, the alkaline carbonates, the carbonates of magnesia or of lime, calcined magnesia, the citrate of magnesia, the subnitrate of bismuth, the bi-borate of soda, are severally of use in these cases, especially when prescribed in conjunction with tonics, stimulants, and anodynes, and sometimes with narcotics. As the fermentation and the vomitings are generally attended by impaired organic nervous force, as well as by irritation of the digestive mucous surface, tonics and stimulants are required for the former morbid condition, whilst anodynes, especially hydrocyanic acid, or small doses of opium, or of opiate preparations, or of the lupulus, or of hyoscyamus, are appropriate for the latter. In many instances, in addition to a frequent recourse to certain of the above, in varying combinations, other substances which are calculated to remove irritation and to check fermentation, and at the same time to promote a healthy secretion from the stomach, liver, and duodenum, may be given from time to time. Of these the most beneficial are Hydrargyrum cum cretâ, the pilula hydrargyri, and calomel, and these, according to circumstances, may be given in full doses with opium, creosote, the preparations of hop, &c. Small doses of the nitrate of potash, or of the hydrochlorate of ammonia, given with hydrochloric æther, in mint water, &c., are also beneficial in these cases.

42. In all cases of *retching and vomiting*, referable either to the *abuse of intoxicating liquors*, or to *extreme dyspepsia attended by vomitings*, or to *gastric fermentation*, or to *pregnancy*, attention should not be directed alone to the morbid condition of the stomach, for the vomitings or retchings will not be permanently removed, or they will be liable to recur after a time, if the biliary and gastro-intestinal secretions and excretions be not duly promoted. In all such cases, therefore, having palliated the vomitings, a moderate action should be kept up on the bilio-intestinal functions; and the means which I have most frequently employed have been the hydrarg. cum cretâ, or blu pill, or Plummer's pill with soap taken at bed time, once or twice in the week, and the following draught early on alternate mornings, or ever morning, or at bed-time : —

No. 379. ℞ Potassæ Bi-carb. gr. xij. ad xviij. ; — Ammoniæ Carbonatis, gr. vj. ; — Tinct. Sennæ Comp. — Tinct. Cardamom. Comp., āā. ʒj. ; — Infusi Senn Comp. ℥ss. ; — Infusi Gentianæ Comp. ad ℥jss. Misc et sit Haustus.

To this draught may be added, according t the peculiarities of the case, a dose either of hydrocyanic acid, or of the extract of taraxacum.

43. iv. VOMITINGS ATTENDED BY THE REJECTION OF THE SARCINA VENTRICULI, are generally the result of protracted indigestion, attended either wit fermentation, or with organic disease, malignant o otherwise, of the STOMACH or pylorus (§§ 80. *et seq.*) In the majority of these cases the means alread advised may first be employed, and if these fai as they often will in this form of complaint, othe more energetic medicines should be prescribed generally in efficient combinations, viz. campho creosote, and small doses of opium, made int pills, with any suitable powder, and with eithe common tar (pix liquida), or the balsam of Peru These having been taken for a time, the exhibitio of tonics with alkalies, or alkaline carbonates an hydrocyanic acid; or of the sulphites, or th pyroxilic spirit, or limewater, or the chlorides may be tried, conjoined with preparations o either cinchona or cascarilla bark, or with an infusion or decoction of cedar or pomegranate bark.

44. v. DIET IN CASES LIABLE TO VOMITINGS &c.—*Vomitings*, when palliated or removed, present the greatest difficulties as to the selection o alimentary substances. As a general rule, all such as are liable to readily undergo any of the fermentative processes should be avoided. But most alimentary substances undergo one or othe of these processes, whether of an acid, or of putrefactive, or of a saccharine nature, when mixed with the morbid secretion of the stomach, and when the organic nervous force of this organ is much impaired. Still there are aliments which are much less prone to undergo these changes than others, although much depends upon the peculiar idiosyncracy of the patient. Frequently the food which the patient most desires in these cases, or for which he feels a relish, will be found the most easily digested or retained. Substances which readily undergo fermentation, as fermented new bread, vegetables, raw fruit, the ingestion o varieties of food, and fermenting liquors should be avoided. In this subject, however, I can add nothing to what I have advanced in the article on INDIGESTION. (See §§ 55. *et seq.*)

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WORMS — Vermes — Vermination — Entozoa

(from ἐντὸς, within; and ζῶον, an animal). Σκωλήκωσις, ἕλμινς vel ἕλμυνς, Gr.;—'Ελμινθολογία, Ramsay; *Verminatio*, Pliny; *Helminthia*, Good; *Helminthologia*, *Helminthiasis*, Swediaur; *Parasitismus intestinalis*, Young; —*Vers*, Fr.; — *Würmer*, *Wurmsucht*, Germ.; —*Vermi*, Ital.; — *Worms*, *Invermination*, *Intestinal Worms*, *Animal Parasites*.

Classif.—I. Class, I. Order. (*See Preface.*)

1. Defin.—*Animal parasites are independent organised beings, descended from peculiar animal parents, which require, in order that they may be enabled to complete their development, growth, or reproduction, to take up abode either constantly or temporarily in or upon a second animal organism of a different kind, from which they also derive their nourishment. Human parasites are those which select the human body as this second organism.*

2. The above *definition* is a modification of that given by Dr. Küchenmeister, in the very able translation of his work *On Animal and Vegetable Parasites*, by Dr. Lankester. Leuckart (*Parasiten und Parasitismus*, in Vierordt's *Archiv*, 1852) remarks, that whenever "an animal is too small and too imperfectly armed to overcome and destroy another living being, upon which its instincts direct it to seek for nourishment, it must be contented with robbing it, by feasting upon its blood, juices, and solid parts." As respects the human body especially, it would be more correct to state, that, whenever the vital force of this body is reduced by disease, inanition, and exhaustion, it is then exposed to the invasion of those parasites which are peculiar to it; and that these parasites are developed and multiplied with a rapidity generally in proportion to the diminution of vital force or of vital resistance to their invasion and multiplication. The only animal parasites which appear in or upon the human body, belong to the classes of insects and worms, and probably also to the infusoria.' "As far as we know, these parasites of man are not subject to the attacks of secondary parasites." Many of them are common to man and other mammalia, whilst others are peculiar to him.

3. It has been very justly remarked by Dr. Lankester, in his excellent and instructive preface to the work just referred to, that the study of animal parasites involves questions of the highest scientific and practical interest, and that it teaches that, though scientific theories may sometimes be barren of immediate practical results, they cannot fail to free the mind from prejudices which lead to erroneous practice, and even to disastrous results. On this ground, therefore, he refers to some apparently of the least practical topics, with the hope of assisting the reader to understand those generalisations which the subject of animal parasites involves. But however barren the consideration of the generation and reproduction of organic beings may at first sight appear to be, it is of the utmost importance in respect of its ultimate or practical results; and Dr. Lankester has done medical men a great service in furnishing them with a succinct and correct summary of the results of the recent researches of Dr. Küchenmeister and others as to this subject, especially as regards the history of the human *entozoa*. Dr. Lankester justly remarks, that, although it was easy to account for the existence of intestinal worms, by referring it to the ingestion of their eggs, yet a difficulty presented itself regarding hydatids, which evidently had an independent animal existence. Hydatids exhibited no sexes, they produced no eggs, and readily supported the theory of "spontaneous, or equivocal generation." Even as this theory was driven successively from every other part of the animal and vegetable kingdoms, it "found a refuge amongst the strange and paradoxical creatures imbedded in the tissues of man and other animals, far removed from any external influences." The time has, however, at length arrived, when it can be demonstrated, that the cystic worm is no longer to be regarded as the result of a "fortuitous concourse of atoms," but that it is the offspring of the tape worm, undergoing one stage of its growth, through which it must pass before it can attain to the more dignified development of its parent. In

many cases the cystic worm has the power of developing, at this stage of its growth, a large number of creatures resembling itself, and these have, each of them, the power of developing themselves into tape worms. "The cystic worm — let it be an *Echinococcus* — has originated from the egg of a tape worm, the embryo of which has found its way from the stomach and intestines, through their walls, into the tissues of the body. This worm consists of a vesicle or bag, to which is attached a head, called the 'scolex.'* In *Cysticercus*, the hydatid of the pig, there is but one scolex, but in *Echinococcus* there are many scolices. Now this scolex, or scolex-head, as it is sometimes called, is the stock or germ — the head — from which all the segments of a tape worm proceed. The cyst of *Echinococcus*, then, has the power of producing a large number of these heads, each of which may grow into a tape worm. The cyst — the original cyst of the worm — is, in the language of Steenstrup, 'a nurse.' Kückenmeister and the Germans call it a mother cyst. But this cyst will produce not only scolex-heads, but other cysts like itself, These are 'daughter cysts;' and these secondary cysts will also produce scolex-heads. They are also 'nurses;' and in virtue of their existence the mother cyst becomes, in the language of Steenstrup, a 'parent nurse.' The second cyst may contain, as it frequently does in the *Echinococcus altriciparicns* of Kückenmeister, a third cyst — a 'grand-daughter cyst,' which is also a 'nurse,' and thus on." (Lankester, *in Preface to his Trans. of* Kückenmeister, *&c.*)

4. Neither these cysts nor scolex-heads have any sex. Nor do they acquire sexuality as long as they remain in the flesh in the hydatid condition; and to this state of the worm Professor Huxley applies the term "*agamozoid*." In order to acquire the conditions necessary to the development of sexual organs, the cystic form of the worm must be swallowed by another animal. "The scolex-head then becomes, in its turn, truly a 'nurse,' and this of a most prolific kind; for, the cyst below being displaced, the numerous segments ('proglottides,' as they have been called) begin to make their appearance. The conditions are now such, that sexes appear; each segment is merely a capsule containing a male and female generative apparatus, and nothing else. Eggs, the result of the union of sperm-cells and germ-cells, are now produced in myriads. These pass into the external world, and, being swallowed and digested, set free the embryos, which again become cystic, as above described." (*Op. cit.* p. xiii.)

5. These phenomena are not peculiar to *entozoa*. Steenstrup observed them in the *medusæ*, the claviform polypes, the salpæ, and the trematode entozoa. Professor Owen has also adduced similar cases, in the exposition of his views on "Parthenogenesis," or the successive production of procreating individuals from one ovum, or asexual reproduction. Not only are there some among tl lowest animals, in various stages of developmer capable of producing buds, or individuals lil themselves, without sexual union, and embry bearing eggs, but there are also amongst the *art culata*, both in the *crustacea* and *insects*, femal producing eggs, which proceed to the developme of perfect animals without any sexual intercours or union of sperm cells and germ-cells. Such phenomenon is so opposed to the general opinic as to the necessity of sexual intercourse for tl development of the embryo in the higher animal that many have not hesitated to express their di belief in it. Dr. Lankester thus expresses hin self respecting it: — "Regarding, however, tl phenomena of reproduction from the point view afforded us by the *entozoa* and other forn of lower animals, we must receive the facts i both cases equally cautiously, and judge accor ing to the evidence. Von Siebold, in his work c 'True Parthenogenesis,' affords good evidence f believing that the queen bee deposits two kinds eggs, the one of which has come under the i fluence of the sperm-cells of the male, and tl other not. A very curious point in this history the fact, that whilst both eggs produce youn bees, the impregnated eggs produce worker female bees, whilst the unimpregnated eggs pr duce male or drone bees. In a recent commu nication to the Royal Society, Mr. Lubbock ha shown that species of the entomostraceous crusta ceous genus *Daphnia* produce living young in a respects like their parents, without any sexu intercourse. It would appear, then, that up a high as the most developed forms of articulat animals, we have evidence that there is no rea difference between the functions of reproductio and generation."* (*Op. cit.* p. xiv.)

6. I. The Origin of Animal Parasites, mor especially of the worms which often infest th human body, has long been a subject of specula tion among naturalists and physicians. One clas of writers believed that these parasites — at leas many of them — originated in the endowment of animal molecules with vitality from the parent body favoured by certain states of the vital forces of tha

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* The word "Scolex" — *σχώληξ*, Wurm, or Spulwurm, Germ. — or round worm, was employed by Müller to designate, generically, imperfectly developed forms of tape worm. "The head was the most characteristic part of these creatures, and gradually the term 'scolex' was applied to the heads of all forms of cystic or tape worms. The term *scolex* has now no generic signification, as the creatures to which it was applied were immature forms of other genera." — (Lankester, *in Preface, &c.*)

* Dr. Lankester, for the better understanding o these and other general remarks he has offered, has sub joined the following diagram: —

GENESIS.

Growth. *Reproduction.* *Generation.*

Homogenesis.
(*Reproductive force acting through similar cells.*)
It is represented in —
A. Plants, by Phytoids.
  1. Isophytoids.
    Buds.
  2. Allophytoids.
    Bulbilli.
    Bulbs.
    Sporules, &c.
B. Animals, by Zooids.
  1. Isozooids.
    Gems or buds.
  2. Allozooids.
    "Nurses" (Steenstrup)
    "Agamazooids" (Huxley),
    "Virgin Aphides" (Owen).
    "Agamic eggs" (Lubbock).
    "Drone bees" (Siebold).

Heterogenesis.
(*Reproductive force actin through dissimilar cells sperm-cells and germ cells.*)
It is represented in —
A. Plants, by
  1. Gynophytoids.
    Female flowers.
    Pistillidia, &c.
  2. Androphytoids.
    Male flowers.
    Antheridia, &c.
  3. Androgynophytoids.
    Hermaphrodite flowers.
B. In Animals, by
  1. Gynozooids.
    Females.
  2. Androzooids.
    Males.
  3. Androgynozooids.
    Hermaphrodites.

ly, the states originating their organization also
moting their growth and propagation. Since the
gress of microscopic research consequent upon
improvement of our instruments, this doctrine,
ich till then had been gaining ground, has re-
ved a signal overthrow, chiefly at the hands of
rman helminthologists. Von Siebold, one of
most recent and of the ablest of these, remarks
this topic, " that he has gradually arrived at
conclusion, that these parasites do not originate
'equivocal generation' from substances of a
imilar nature; and physicians and naturalists
ught themselves justified in assuming that the
asitic worms in the intestines of men and ani-
ls owed their origin to ill-digested nutriment,
that they were developed in the most widely
erent organs from corrupt juices. They took
r granted, that certain morbid processes in any
an were competent to give rise to parasites,
uming that the elementary constituents of an
an affected by disease, separated themselves
n their natural connection, and not perishing,
transforming themselves into independent or-
isms, became parasites. It was certainly more
venient thus to speculate, than to endeavour
ttain, by patient researches and careful expe-
ents, a secure insight into the hidden workings
ature. It was by the latter method that the
herto unanticipated development of the sexual
aratus was discovered in many parasites, such
round worms, thread worms, tape worms, and
es, in which such an immense mass of eggs
young can be generated, that it seems unne-
sary to look further for their origin. As to
e worms, it is well known that a single indi-
ual is often composed of many hundred joints.
ch joint is capable of laying many hundred
, so that the number of the progeny of a single
e worm is enormous. Dr. Eschricht of Co-
hagen (*Das Physische Leben in Popularen*
trägen; Berlin, 1852; pp. 112. 115.) pos-
es a tape worm expelled by a patient of his,
ich consists of 1000 joints; and some of the
its contain more than 1000 ova. According
his writer, a careful examination of the repro-
tive organs of a female *Ascaris lumbricoides*
ws the number of ova to be innumerable."
on Siebold, *Op. cit.* p. 4.)

7. The precise mode in which such an immense
od of these parasites make their way into the
erior of animals was long imperfectly under-
od. It was, however, ultimately ascertained
t intestinal worms undertake emigrations in
er to reach that animal whose organs are fitted
nature for their habitation. Von Siebold
tes that the young of the tape worm (which
abits the intestine of the higher animals only),
eave the place where they were brought forth,
laid as eggs (that is to say, they emerge from
intestine of their parent's host), and seek an
portunity to enter into the intestine of some
er creature. It is easy to convince oneself of
emigration of the tape worm, by examining
excrement of animals infested by them, at
se times of the year at which they attain their
ual maturity. We then observe that some-
ies single joints, or connected series of joints,
l of ova, sometimes immense masses of the ova,
passed with the fæces. The same thing holds
od with regard to the ova of the *Distomata* that
est the livers of our ruminating animals; their eggs, after they have been transferred from the liver to the gall-ducts, being washed out with the bile into the intestine, and evacuated with the dung. These emigrations of the young of the intestinal worms benefit not only the creatures they infest, but themselves. There are many kinds of intestinal worms in whose eggs the embryo is never hatched, if they remain in the place where they have been laid."

8. The description (German like) given of the accidental, but frequent, ingestion or passage of the ova of parasites into other animals, and the dignifying of this passage into an emigration, as if it were an act of instinct, imparts an air of imagination to what is nevertheless the fact of the frequency of this passage, and of its consequences. This writer states that these parasites " must wander to some other place in order to develope their young, or to allow of the escape of the young already developed in them. These young must then either wait for, or seek, an animal to lodge in, having entered into which, they are capable of attaining sexual maturity. By such emigrations the infested animals are at the same time freed from guests whose increase would be both troublesome and prejudicial. For example, what would happen if the millions of eggs that a single round worm or tape worm can produce were developed and generated in the same intestine in which they were laid? Would not the intestine, after the young had attained their full growth, and brought forth others in their turn, become at last so choked up as to disable this part of the digestive apparatus, so that the whole organism of the unhappy animal must perish along with his parasites." (*Op. cit.* p. 5.)

9. These emigrations and immigrations of the young of intestinal worms, or in less imaginative language, this discharge and passage of their ova from and into other creatures, are very important, though long an unregarded part of the history of their propagation; and numerous facts have been discovered showing that the origin of intestinal worms in the viscera of animals can be readily accounted for according to natural laws, without recurring to the mysterious hypothesis of " equivocal generation." An important circumstance favourable to the preservation and passage of the ova of parasites into animals in which they become developed, is the hardness of the shells which envelope them. Owing to this the germ or embryo of many of them are protected from external injury, and their vitality preserved for many months, and until circumstances admit of their development. After leaving the dwellings of their parents the ova pass into privies, drains, dust-heaps, &c., where, surrounded by more or less moisture, and subjected to various grades of temperature, and contained in manures, and spread on fields and meadows, they are, either in the state of ova or in that of more advanced development, taken with various articles of food into other animals, or they are washed by rains into streams or brooks, and are swallowed in the drink. Many of the young intestinal worms, according to Von Siebold, more or less developed, but still enclosed in their egg-shells, remain quite inactive in their passive emigrations, and it is of course a mere chance whether they reach their goal or not. The young of others, having left their egg-shells, may take a more active share in the process, creeping out of their holes and

corners in wet weather, or in damp mornings, upon plants or grass, and enter animals suited for their habitation and development with the food. By preventing sheep from being driven out in the morning till the dew is off the grass, or from grazing in wet swampy pastures, these animals are so far protected from *Strongyli* and *Distomata*. The origin of the thread worm, known as the *Filaria insectorum*, that lives in the bodies of adult and larval insects, could not be accounted for, and was referred to equivocal generation; especially as they contained no trace of sexual organs. But Von Siebold ascertained that they were not true *Filariæ*, but belonged to the peculiar family of thread worms, comprising the genera *Gordius* and *Mermis;* and that these parasites wander away when full grown, boring their way from within through any soft part of the body of their host, and thus creeping out. "These parasites do not emigrate because they are uneasy, or because the caterpillar is sickly, but from that same internal necessity which constrains the horse-fly to leave the stomach and intestine of the horse where he has been reared; or which moves the larva of the gad-fly to work its way out of the boils on the skin of oxen. The larvæ of both these insects creep out in order to become chrysalises, and thence to proceed to their higher and sexual condition." Now this desire to emigrate is implanted in very many parasitic insect larvæ, and the perfect full-grown, but sexless thread worms of insects, are in like manner moved by this desire to wander out of their previous homes in order to enter upon a new period in their lives, which ends in the development of their sexual organs.

10. As some kinds of parasites that have emigrated are never met with below a certain size, so some kinds that have already made their way into the interior of animals are not to be found under a certain size. It is known that many parasites do not enter into the animals in which they are to pass through their further stages of growth, until they have attained a certain degree of development elsewhere. This is particularly the case with such intestinal worms as remain parasitic in the last stage of their existence, viz., that of sexual maturity, whilst the *Gordiaceæ* quit their parasitical life, in order to become sexually mature away from the animal they have infested. During these early wanderings, the worms in question, Von Siebold remarks, commonly undergo a change of form, often accompanied by other phenomena of so highly remarkable and abnormal a character, as to render their metamorphosis or phases of existence almost incomprehensible. By degrees a mass of observations of remarkable metamorphoses of intestinal worms accumulated and formed a complete chaos of seemingly irregular phenomena, until the Danish naturalist, Steenstrup, succeeded in evolving a certain order out of this confusion, by the discovery therein of a hidden underlying law of nature, by which all the phenomena that had seemed so devoid of plan could be reduced to order. He named this law the "*Alternation of Generations*," and advanced two points of difference between it and *metamorphosis;* the first is, that the young of those animals which come under the former term are not only unlike their parent at first, but remain so; the second distinction is, that this young generation, so dissimilar to the parent animal, brings forth new creatures, which either themselves or their descendants revert to original form of the first parent. Whereas, simple metamorphosis, the dissimilar young p by gradual changes into the likeness of the par animal, and until this metamorphosis is comp are incapable of generation. Thus in the alter tion of generation the parent animal produces similar young, which Steenstrup terms "*nurs* whose descendants only take her form. "A m important circumstance which characterises th *nurses* or '*Agamozooids*' physiologically is, they bring forth young without themselves p sessing any real sexual apparatus. Those agar zooids, in fact, multiply by division, by external internal gemmation; they develope within th bodies germs which become new creatures. these germs do not deserve the title of eggs, no the place where they are developed to be cal an ovarium, since the germs which Von Siebo distinguishes by the name of 'sporulæ,' are only devoid of the ordinary constituents of ovum, a vitelline membrane, yolk, germinal v cle, and so-called germinal spot; but the furt development of the germ-body is not preceded those conditions which are essential to the devel ment of true ova within an ovarium. The or in which, in certain agamozooids, the '*gemmæ*' formed, cannot therefore be properly termed ovarium, and I shall distinguish it by the name '*sporularium.*' No 'nurses' present any sex distinctions, and hence their method of multipli tion and propagation, which takes place by me of sporulæ formed within sporularia, or by o nary budding, or by division, must be arran amidst the modes of asexual reproduction." (V Siebold, *Op. cit.* p. 13, 14.) I must refer reader to what this writer further remarks on topic of alternation of generation, especially a occurs among the *Trematoda* and *Cercariæ*.

11. From his researches, Von Siebold infers t certain sexually matured Trematoda — *Mono mum, Distomum* — generate young within th sexual organs, which are not developed into sex individuals similar to their parents in form structure; but that each embryo is converted i an animal of remarkably different form — int *Cercaria*-sac, which has the nature of a sexl nurse, since without possessing sexual organs nevertheless generates young *Cercariæ*. Th *Cercariæ* again differ from their parents, gradually become sexually perfect, and in fo and structure take the likeness of their gra parents. If we follow these *Trematoda*, which subject to the alternation of generations, in th wanderings, we shall find that they meet w many obstacles to the completion of their devel mental course, which is the entering into viscera of an animal in which they can beco sexually developed. The destruction of the vari forms of *Trematoda* by the untoward circumstan to which they are liable, is compensated by the f that they are furnished by the alternation generations with the means of greatly multiply the various developmental stages of their desce ants; a sufficient number of individuals alw remaining out of the numerous young of the nu and larvæ, which achieve the propagation of t species.

12. The history of the *Cercariæ* explains m phenomena erroneously interpreted by the supp ers of the doctrine of equivocal generation. It

icult to understand how living entozoa could
e originated in the viscera of animals, sometimes
rgans deeply seated or cut off from all external
mmunication, and could there propagate their
d; the mode of origin—by equivocal generation
assumed for them, apparently accounting for
circumstance of these entozoa being unpro-
ed with sexual organs. Frequently also, young
imperfectly developed intestinal worms were
with in the substance of organs, and were at-
uted to equivocal generation, "though in
lity these *entozoa* were in the act either of emi-
ting, or immigrating, or else were tarrying
il the creature they infested should be swal-
ed by some other animal, when the passive
nigration for which they waited would take
e. Many wandering parasites are unresist-
y suffered to bore their way into and remain
he organs of animals, whilst certain kinds are
pped by becoming enclosed in a coagulable
ph thrown out by the organs they traverse."
re are two kinds of cysts connected with para-
worms: in the one the cyst is thrown out by
parasite itself, as in the case of the *Cercariæ;*
he other, the organ in which the encysted pa-
tes lie embedded furnishes the walls of the
. In such cysts or capsules are found the
t diverse kinds of intestinal worms, whose fur-
course may be very various. "Many of the
ysted young of intestinal worms experience
urther change, but only remain for a longer
horter period until such time as they may,
ther with their host, pass into the intestine of
e animal of prey suitable for their future de-
pment. To this kind belong the Cercariæ
ady mentioned. There is also a small, im-
ectly developed, round worm, hitherto always
neously described as a perfect intestinal worm,
er the name of *Trichina spiralis,* which re-
ns a long time in its cyst without either growing
eveloping sexual organs. This minute Trichina
alis is met with not only in the substance of
muscles of man, but also in the pleura and
toneum of the most widely different kinds of
ebrate animals, enclosed in oval capsules
ut a quarter of a line in length." After a
ain time of confinement is allotted to this little
m, and its deliverance not effected, it dies and
ergoes a process of calcareous degeneration,
form being altered or entirely destroyed. Other
ysted intestinal worms succeed in obtaining
rishment through the walls of their prison,
thus go on growing. Those, however, which
intended by nature to attain their sexual ma-
ty only in the digestive organs of certain ani-
s, cannot arrive at this condition in their cysts,
must, notwithstanding their further growth,
in the attainment of the power of sexual pro-
ation, until the animal they inhabit is devoured
the predaceous creature whose intestine is
e fitted to allow of the passage of these asexual
stinal worms into the last stage of their develop-
t. (Von Siebold.)

3. From what has been stated we gather that
e young intestinal worms which are developed
distance from the nidus of their parents suc-
d, in the end, in reaching those situations where
y may repeat the part of their progenitors, and
roduce their kind. The embryo parasites that
e only just left their eggs disperse in all di-
tions, so that they may immigrate into other animals, whenever an opportunity offers. Many thousands of these embryos of necessity never attain their object, owing to the numerous casualties they are liable to. However we may accept the facts displayed in the researches of Von Siebold and others, it by no means follows, that the emigration or immigration of these parasitic animals is the result, as they suppose, of instinct. The parasite having arrived at the full stage of sexual development produces numerous ova, many of which necessarily are so circumstanced, by situation, dissemination, &c., as to admit of their passage through the different phases and metamorphoses of evolution and development: but that these changes, and the emigrations resulting from the circumstances common to all or most of them, admit of the inference that instinct has any thing to do with the phenomena; or that their temporary or continued residences, their journeys or passages from one place or animal to another—their migrations, &c., proceed from their possession of this endowment or principle, or that their migrations and residences are otherwise than altogether *passive,* cannot be received or credited without further evidence. But, after thus stating a disbelief of the instinctive faculties of these parasites, the facts connected with their propagation and evolution become practically of importance.

14. Instead of viewing the migrations of the embryo or young parasites as passive, and the accidents connected therewith as equally so, Von Siebold considers the former as altogether instinctive, and the latter as stray migrations. But, whilst altogether disbelieving that instinct has any thing to do with the matter, this writer's views deserve consideration. The point of most importance, he remarks, is "that these embryos should select, as their temporary residence, such creatures as will be consumed by those animals, whose intestines served their parents as a habitation and birthplace for their young. But many of these young, immigrated, intestinal worms will die without reaching the last stage of their development, in consequence of their host and involuntary carrier escaping from his natural enemies. Again, many embryos will be led *astray* by the migratory impulse (?), and pass into animals which never become the prey of those whose digestive canal is their goal." The embryos which thus "fail in their object," are here viewed as "*strayed* parasites;" and Von Siebold remarks that "the *Trichina spiralis,* which is found in human beings, and which must be regarded as an encysted sexless nematoid worm, can hardly have found its way into the muscular structure of man, except by having gone astray: so also the *Cysticercus cellulosæ,* which not unfrequently appears in the muscles and other organs of man, and which is an asexual tænioid agamozooid. The *Cysticercus cellulosæ* changes to a sexual tape worm in the intestinal canal of certain mammals; the *Trichina spiralis,* after transportation to another and more favourable situation, will also become sexually developed." Many of the young of the intestinal worms, which only attain the last stage of their development in the digestive canal of the *vertebrata,* are said, by this writer, to pass, in the course of their wanderings, into the wrong organs [their instincts, I may infer, have not yet been fully developed or perfected!]; for instance, into

the muscular substance, the liver, or the peritoneum; here they remain undeveloped, whilst other individuals of the same brood, which have found their way into the intestines of the same animals, arrive at maturity. "The *Triænophorus nodulosus*, infesting fishes, offers an example of this, developing into a long sexually mature tape worm, in the intestines of pikes and perch, whilst, at the same time, these fishes often harbour other tape worms, which are, however, always sexless, in cysts in their liver. These last must certainly be also regarded as strayed parasites."

15. Von Siebold believes that, in the bodies of vertebrate animals, the small embryos of intestinal worms bore their ways not unfrequently through the walls of the bloodvessels, and fall into the current of the circulation, and are carried thus to distant parts. Embryos of intestinal worms, to which the term of hæmatozoa has been given, have often been discovered in the blood of birds, reptiles, and fishes. These hæmatozoa never increase in size, nor become further developed in the blood, but often stick in the small bloodvessels of organs, which afford a more congenial soil for their further growth; and hence appear, on some occasions, worms in the brain, in the spinal marrow, and in the eyeball of man and animals. The *Cysticercus cellulosæ*, the *Cœnurus cerebralis*, and the *Echinococcus hominis* and *veterinorum* have been occasionally found in these situations, and have served as an argument for the doctrine of equivocal generation. "With the migrations and alternation of generation amongst the intestinal worms, two other phenomena are connected, which were formerly quite unnoticed, but which now have been generally observed. In the vicinity of those sexually perfect intestinal worms which, in their wanderings, are subject to the alternation of generations, only eggs, or recently hatched embryos, are met with; but the further stages of development are always wanting, since they first make their appearance after the emigration of the young to other places. Further, many of these intestinal worms, taken whilst in the act of migrating, are never found below a certain size, since they do not commence their wanderings, either as nurses or larvæ, until they have already reached a certain stage of their development." (*Op. cit.* p. 30.) Would it not be more correct to view these evolutions of parasites from germs and ova, and their passages, or passive migrations, during their development, as accidents connected with the numbers generated, and with the locations and transitions of the embryos; their development and sexual perfection being results of favourable circumstances which happen only to a few of the many generated; instead of viewing these migrations and their consequences as events produced by the instinctive endowment which Von Siebold has conferred on these parasites? Whilst the possession of this endowment by these animals may be disputed, the facts adduced by this writer, respecting their origin, development, and alternation of generations, are more deserving belief and consideration.

16. II. The Classifications of Intestinal Worms have been so numerous and so different the one from the other, that an attempt to place them before the reader would not be consistent with my limits and with expectations of utility. Recent researches, also, have thrown doubts o the principles by which the older arrangemen were guided; and the *orders*, *genera*, and *speci* of *Entozoa*, which have been found in the anim kingdom, are so numerous as to prevent even brief notice of them at this place. I must, ther fore, refer the reader to the more recent wor enumerated in the Bibliography, and especial to those of Dr. Joy and M. Felix Dujardi Dr. Küchenmeister has given a classification animal and vegetable parasites, which, as far as refers to the *human Entozoa*, I shall, with son alterations, adopt.

17. I. Class, Infusoria. — II. Class, Ve mes, Helminthia. i. Order, Platyelmia. Sub-order, *Cestoidea*. (*a*) Genus, Bothriocephal (*b*) Genus, Tænia. *B*. Sub-order, *Trematoda* *Trematoidea*. (*a*) Genus, Monostoma. (*b*) Genu Distoma. — ii. Order, Nematelmia. *A*. Trich cephalus dispar, Trichina spiralis. *B*. Oxyu vermicularis. *C*. Strongylus gigas, S. long vaginatus. *D*. Ancylostomum duodenale. Ascaris lumbricoides.

18. 1st Class.—The Infusoria *are destitute high organisation. They are simple, vitalised, me branous structures, which live by mere endosmo* The *vibriones*, the *bursariæ*, *monades*, and *bodon* "are a peculiar attribute of fermenting and p trefying fœtid animal substances, or always pr suppose a half-dead soil, and do not derive th nourishment so much from living substances from matters which the living body has expelle or are in the course of expelling as foreign to i they are properly only to be regarded as indirect parasitic upon the human body." Ficinus fou sluggish bean-shaped Infusoria $\frac{1}{1000}$—$\frac{1}{1500}$ of inch, and sometimes double this size, and of globular form, in the perspiration of the feet, the places where the epidermis was thrown off, well as on the moist folds of the skin in you children; and others have met with them in p rulent and foul secretions from the vagina, ureth bladder, putrescible urine, &c.

19. i. *Trichomonas* (Dujardin). *T. vagin lis.* — "*Corpus nodulosum, gelatinosum, lacteu cauda brevis; flagellum corpore triplo longi Motus vacillans. Longit.* $\frac{1}{222}$." This paras occurs only in women with gonorrhœal discharg or with an abundant vaginal secretion contain mucous and pus globules, and never in a healt vaginal secretion. Kölliker and Scanzoni fou it in the vaginal — never in the cervical — sec tion of both pregnant and unimpregnated wome especially in the creamy and acid secretion, som times in the neutral, but never in the alkali Owing to its resemblance to the mucous corpuscl it has been confounded with them. The body this parasite is 0·01—0·018 millim. in length; t flagellum, 0·028—0·08 millim. in length; furnished with 4—8 short cilia, in continual mov ment, which facilitate its recognition. The ca bility of infection by these Infusoria has not be determined, although very probable.

20. ii. *Denticola hominis* (Ficinus). "*Gen valde dubiosum*" (Küchenmeister). — This rasite, according to Ficinus, is an aciliated In sorium, with the mouth on the ventral surface, a probably furnished with a carapace, resembli the *paramecia* and *kolpodæ*; but he considers more allied to the *monodes* and *vibriones*. T genus he believes to be numerous; and he inf

at every mammal has its peculiar species. Dogs d horses, he says, next to man, exhibit these In- soria in abundance. He states that he found em especially in the interstices of the molars; ore rarely on the mucous membrane of the outh, scarcely in the saliva; but most abun- ntly where the teeth have been neglected, and hollow teeth. They adhere, form filaments, d advance between the teeth and gums, pushing tween the roots of the former and the latter, stroying their union. These effects are, how- er, prevented and remedied by the usual opera- ns on the teeth, and by aromatic, tonic, astrin- nt, and antiseptic dentifrices.

21. 2nd Class. — *a.* Vermes, Helmintha, are the greatest importance to both the patholo- st and the practical physician. The para- es belonging to this *class* are destitute of many the organs possessed by the higher animals. hey have no distinct respiratory organ; the ygen necessary to their existence can only be ken up in their fluid food. Hence they are en- led to exist within the human body, either in its osed or open cavities, or in its tissues. "They nstitute the true Entozoa, and furnish no repre- ntatives to the series of human *Epizoa*, although me of them may be destined, in the course of eir development, to pass a portion of their lives water, or perhaps (as in the case of the *Cerca- æ*) as Epizoa upon other animals. Sexual organs ay always be detected in those specimens of these imals which have attained their last grade of velopment." The senses of sight, smell, and ste are wanting in all these parasites, but their nse of touch appears to be highly developed. he intestinal canal is wanting in the *Cestoidea*. In e *Trematoda* it forms a cæcal canal, in which the outh also performs the functions of the anus; hilst in the *Nematoidea* it becomes a complete imentary canal, with a mouth, œsophagus, sto- ach, intestine, and anus. In the tissues of the *estoidea* is a tendency to the formation of an en- elope of a calcareous nature, which is wanting in e *Trematoda* and *Nematoidea*. These three kinds true Helmintha are characterised — 1st, By a eneral *sense of touch*; — 2d, By a *vascular sys- m*, of four longitudinal lateral canals in the *estoidea*, and of a fine network of vessels in the *rematoda*, which are less distinctly marked in the *ematoidea*; — 3d, By a *muscular system*, com- osed of transverse and muscular fibres, without ansverse striæ; — 4th, By the *structure of the idermis*, which consists of a homogeneous finely hecked substance, closely approaching the cha- cter of chitine; — 5th, By the *property of giving a strongly refractive, albuminous substance*, in eaginous drops, when in contact with water; — nd 6th, By *their scarcely effecting their develop- ent without a passive and active migration of their nbryos and immature young*.

22. *b.* As to the last of these characters, Küchen- eister, more rationally than was stated, as shown bove, by Von Siebold, remarks that "this *mi- ration* itself is passive during the embryonal state, nd as long as the embryos are still enclosed in e egg-shells or envelopes, during which period ey usually emigrate once, passively, into the xternal world, generally with the excrements of e hosts of their parents; and then again, pas- vely in general, into the intestinal canal of the nimal, in which they are to acquire a higher development. From the latter moment commences their active migration, by which they seek the situations, usually external to the intestinal canal, in which they are to undergo their metamorphosis into the next higher step or steps of development, which is generally accompanied by an encysting process. Finally, as a general rule, at least as regards the trematoda and cestoid worms, they must afterwards migrate, passively, once more into the intestine of the animal in which they are to attain maturity; that is to say, they must pass with the food of their new and final host into its intestine." (*Op. cit.* p. 4.)

23. *c. General pathology* shows that the worms cannot effect their active migration without causing some irritation of the regions through which they pass, whether this migration is performed by the youngest brood, as is usually the case, or by the more or less mature animal, as rarely occurs, and chiefly among the *Nematoidea*. The passive migration of all immature parasites into the human intestine takes place without any perceptible morbid phenomena.

24. *d.* The *general prognosis* of this class of parasites may be stated as follows: — 1st, The young animals engaged in their migration are the most dangerous; — 2d, Next to these, the migrating mature individuals, which inhabit the intestinal canal, produce the most dangerous symptoms; — 3d, The animals which reside in cysts or closed cavities can become dangerous only when they attain an enormous size; but, when small, they may be present without doing any mischief; — 4th, Most of the mature individuals are more accessible to curative means, than those of lower stages, especially those which live outside the intestinal canal.

25. *e.* The *principles of treatment for the Helmintha* are — 1st, The destruction or removal of the mature worms, and of their progeny; — 2nd, The observation of a rational prophylaxis, founded on the modes of life and migrations of the immature individuals; on the constitution and circumstances, and the habits and modes of life, of people subject to these parasites; and on a knowledge of the nature and peculiarities of the situations in which these plagues are endemic.

26. III. The animals of which I have now to treat belong to the *first sub-class* of Diesing—*Helmintha achæthelminthica: animalia evertebrata, inarticulata (i. e., extremitatibus articulis nullis prædita), nunc mollia, aut elastica, ebranchiata, setis retractilibus nullis.* I have, following Vogt, Virchow, and Küchenmeister, divided this class into two divisions — i. *Platyelmia*, flat worms; and ii. *Nematelmia*, round or thread worms; and again dividing the first section or order into — 1st, The *Cestoidea*, Vogt; the *Cephalocotylea*, Diesing; or the *Platyelmia colonias exhibentia*, or flat-worm colonies, of Küchenmeister; — and 2nd, The *Trematoidea*, Vogt; *Myzelmintha*, Diesing; or *Platyelmia isolata*, isolated flat-worms, Kuch.

27. i. Order, Platyelmia. — *Entozoa solitaria aut composita, androgyna. Corpus depressum vel teretiusculum, molle, organis ad fixandum aptis præditum. Anus nullus; canalis cibarius aut divisus (rarissime simplex), aut nullus. Cavitas corporis non distincta. Metamorphosis in plerisque; larvæ gemmiparæ aut sporaliparæ.* (Leuckart.)

28. *A.* Sub-order, Cestoidea. — *Cephaloco-*

tylea, Diesing; *Platyelmia composita, aut colonias exhibentia*, Plattwurm-Colonien, or flat-worm colonies, Küchenmeister; *Bandwürmer*, tape-worms—*Animalia tomotoca, per longum plerumque tempus larvæ nutrici juncta et una cum ea corpus elongatum, articulatum, polymorphum formantia. Larva* (Scolex, *vulgo caput*) *pyriformis, foveis aut osculis suctoriis quatuor vel duobus instructa, sæpissime unciata.* Proles sexualis (Proglottides, *vulgo articuli*) *organis externis destituta, embryones uncinulis armatos gignentes. Canalis cibarius nullus.* (Leuckart.) — *Quinque variæ inveniuntur in iis metamorphoses:*—1. *Animal maturum* (*Proglottis*); 2. *Embryones uncinulati* (Grand-nurse, *Grossamme*); 3. *Scolex passivam vitam agens sub forma vermis cystici seu Cysticerca, sub forma Platycerca, et sub forma Acerca*; 4. *Scolex activam vitam agens* (Nurse, *Amme*); 5. *Strobila.*

29. It is only recently that the *cystici*, or *hydatids*, have been shown to be only a stage in the development of the *Tæniæ*, and not to be a distinct family among the *Helmintha.* Hippocrates, Aristotle, and many anatomists and physicians up to the times of Redi and Hartmann—in 1683-5 — regarded the *Cysticerci* as hydatids; but the distinct animal nature of these was not recognised until the work of Redi appeared; and not fully established until the researches of Tyson were communicated to the Royal Society in 1691. (*Philosoph. Trans.* No. 193. p. 506.) Pallas, in 1766, stated that all cystic worms are forms of tape worms, and belong to a single species — "*Tænia hydatigena*, cystic tape worm," — which only presents some differences, especially in the caudal vesicle, according to the animal it inhabits. But neither Tyson nor Pallas, by the terms *Tænia hydatigena*, or *Lumbricus hydropicus*, given by them to cystic worms, expressed any opinion as to the genesis of these worms, or their derivation from ordinary tape worms. Goeze, in 1780, and Wagler, advanced but little the views of Tyson; and, although the subject of cystic worms was considered by Zeder and Rudolphi, it made no progress in their hands. At last, in 1842, Steenstrup's theory of the alternation of generations made its way, he believing that the cystic worms were early steps in the development of Helmintha, which were unknown to him. In 1845, in consequence of Steenstrup's discovery, Dujardin first asserted that the cystic worms were undeveloped animal forms, and young states of tape worms; and that they were produced from those germs of tape worms which, instead of the intestine, had got into the parenchyma of the body of their host, and under the influence of this unusual dwelling-place, had advanced to the abnormal state of development which is called a "cystic worm." Simultaneously, Von Siebold, in Germany, expressed the same opinion with Dujardin in France. At first, however, Von Siebold inclined towards Steenstrup's view, and said: — "In its form, its suckers, and its circlet of hooks, the head of the asexual cystic worms possesses such a striking similarity to the heads of certain tape worms, that one is tempted to believe that the cystic worms are nothing else than *undeveloped* and *larvæ-form* tape worms." He subsequently, nevertheless, arrived "at the most decided conviction that the *cystic worms are strayed tape worms which have remained undeveloped and become degenerated*, and of which the body grew out in the foreign soil into a vesicle, witho developing sexual organs."

30. In 1850, Van Beneden, the Belgian zo logist, declared the vesicular worms to be larv like, or young states (*scolices*) of *Tæniæ*, and co pared them with the larvæ of *Tetrarhynch* According to him, the head of the tape wo (*scolex*) is produced from the egg of the ta worm. If an egg of a tape worm reaches t intestinal canal of an animal in which it may further developed without interruption, the joint mature tape worm (*strobila*) immediately gro from the egg in uninterrupted succession; but i does not reach an intestine of this kind, a long or shorter period of rest ensues in the furt development as soon as it has arrived at the evol tion of the head of the tape worm (*scolex*); this case the anterior part of the head sinks in its inflated hinder part, and it becomes a *Cys cercus*, or a cysticercal animal form. Küche meister, however, finds two errors in this inf ence. 1st, It is not proved that a tape worm c pass through all the phases of its development the intestines of its host; and 2nd, And just little as the caudal vesicle is produced sub quently by dropsical degeneration (Dujard and Von Siebold), does the ready-formed he sink into its inflated hind part, in order to beco a *Cysticercus.*

31. As Goeze had suggested in 1780, K chenmeister, in 1851, administered various c tic worms to different animals. For this purp the latter selected the *Cysticercus pisiformis* the rabbit, and also the *C. fasciolaris*, and ga the former to the dog and the latter to the c and in the intestines of both these animals "succeeded in rearing tæniæ rapidly approachi maturity." From these experiments he mak certain deductions, of which the following a the most interesting: — 1. The caudal vesi occurs in all individuals of all species of cyst worms, even though they live in the most vario zones and different animals. 2. The univers loss of the caudal vesicle has its analogue in t metamorphosis of many animals. 3. All cys worms, in the earliest period of their existenc have the head constantly inverted towards t caudal vesicle. 4. The state of rest in which t cystic worms must live in the interior of th caudal vesicle, in order to their developme would be inconceivable, if they had to colle the nutritive fluid for themselves, and did not co tain it in them. 5. The cystic worms are n strayed dropsical tape-worm nurses, but tape-wor larvæ furnished with a provisional organ (caud vesicle), probably being a reservoir of nouris ment, and incapable of sexual multiplication, f which there is neither room nor sufficient nutriti material. 6. The cystic worms constitute a n cessary step in the development of the *Tæni* 7. We cannot speak of dropsy or degeneratio and not even of straying, because we do not y clearly perceive how the brood could get to t dwelling-place of the cystic worm. And *Cysticerci*, when transferred to the intestines other animals, do not become developed in jointed tape worms, unless the species of *Cys cercus* is suited to the intestines of particul animals; thus, the *Cysticercus pisiformis* was n developed in the intestines of the cat, but it w fully developed in those of the dog. Küche

ister asserts that all eminent German zoolo- ts now agree with him in believing "that every stode worm, and not merely the *Tæniæ*, pass ough a cysticercal state; that the cysticercal va lives in various parenchymatous organs, and free *scolex* (*strobila*) usually in the intestine of lifferent host; and lastly, that the tape-worm ad (*scolex*) is produced in the interior of the evious embryonic body (*i.e.* the caudal vesicle), d remains enveloped by this until it gains the uation for which it is ultimately destined."

32. But to place beyond all doubt that the stic worms were necessary steps in the develop- nt of *Tæniæ*, it was also requisite to prove their duction from the embryos of the tape-worm ood. "It is true that the six characteristic bryonal hooklets have not yet been detected on true vesicular worms, but we shall shortly that the laws of analogy, as well as experi- nt, afford us a glance into this process." After rious experiments, Küchenmeister proceeds to te that he resolved to resume those experiments th the *Tænia Cœnurus* in order to obtain the markable phenomena of the vertigo in sheep. the 15th of May, 1853, he obtained the *cystic enuri*; on the 25th of July mature proglottides the *Tænia* were passed by the dog, to which *Cœnuri* were administered; and these, in ler to make the experiment under the most favourable circumstances, were administered to erfectly healthy two-year-old wether, a descrip- n of sheep which are usually free from *Cœnuri.* the 10th of August the sheep was vertiginous; d on the 13th it was necessary to kill the ani- l; and in the brain he found fifteen young sicles of *Cœnurus*, partly on the surface of the ain, which was reddened by inflammation, partly the substance of the brain, and even in the ntricles. In January, 1854, six lambs were l with *Tænia Cœnurus.* Of these, five became rtiginous in about eleven days. Leuckart fed, October, 1853, a colony of white mice with *enia crassicollis.* In January, 1854, he exa- ned his mice, and found them infested by cystic rms. Küchenmeister subsequently proved at, by the administration of mature species of *enia*, as far as they were accessible to him, to itable animals, only the cystic worms belonging these species can be reared; but not any kind cystic worm at pleasure. From the concord- t experiments of Haubner, Leuckart, Van eneden, Möller, and himself, Küchenmeister nsiders that this much is established:—

33. "1. Mature *Tæniæ* have hitherto been ared successfully from all vesicular worms ad- inistered when a suitable host was selected; thus, om *Cysticercus pisiformis* the *Tænia serrata vera* as obtained; from *Cyst. tenuicollis*, the *Tænia Cyst. tenuicolli;* and from *Cœnurus cerebralis*, e *Tænia Cœnurus*;—all three in the intestine of dog: from *Cyst. fasciolaris*, the *Tænia crassi- llis*, in the intestine of the cat: from *Cysticercus llulosæ*, the *Tænia solium*, in the human intes- ne: from *Echinococcus veterinorum* (*Scolicipariens* Kuchenmeister), a *Tænia Echinococcus*, in e intestine of a dog: and from *Cysticercus longi- llis Hyperdæi*, the *Tænia crassiceps*, Rud., in e intestine of the dog (Leuckart)."

34. "2. From the eggs of *Tænia solium* in gs, from those of *T. Cœnurus* in sheep and ttle, of *T. serrata vera* in rabbits, of *T. crassicollis* in rats and mice, of *T. ex Cysticerco tenuicolli* in sheep and lambs, the corresponding vesicular worms have been reared. The experiments with the eggs of the *Tænia* of *Echinococcus* have hitherto remained unsuccessful."

35. Up to a recent period it was the most general opinion, still entertained by some, that the tape worm (tape-worm chain) was a simple animal, with numerous segments. Nevertheless, some older physicians correctly perceived that tapeworms were not simple, but compound animals. By many, the several segments of *Tæniæ* were regarded as separate worms; and what Dujardin has recently called *proglottides* are described by them in the human tape worms as "*Vermes cucurbitini.*" At the same time they fell into the great error of not regarding this chain as produced by a successive formation of joints placed one behind the other from the head, but expressed the remarkable opinion that the tape worm was produced by the adhesion of the individual "*Vermes cucurbitini*" one after the other, by which means the many-jointed body was formed. The opinion that the tape worm was a compound animal—an animal composition—was first expressed by Leuckart. Soon afterwards, Eschricht and Steenstrup expressed this opinion more strongly, and Van Beneden proved it, after Dujardin had described the segments of tape worms which occur isolated, as peculiar animals, under the name of *proglottis.*

36. i. *The mature animal, or Proglottis.*—"From the moment that the hindmost segment or segments of a tape-worm colony has become so far developed as to contain the six-hooked brood ready formed and enclosed in the egg-capsules, this segment seeks to break loose, either by itself or in company with several others, in order to continue an independent existence, either in the same place (the intestine of its previous host), or in a different one (in the external world). All this varies according to the species. In *Tænia*, *Tetrarhynchus*, &c., each joint usually breaks loose; in *Bothriocephalus*, a series of joints." In those in which no regular formation of segments exists, no single proglottides or segments can break loose, but only single brood-places, or fragments of the body of the cestode worm with such brood-places; or the eggs must escape singly. The proglottides have for the most part a flat quadrangular form, very similar to the *Trematoda*, and usually a white or yellowish, rarely a reddish or brownish colour; they have neither mouth, anus, nor intestine. "As the eggs possess a much greater diameter than the vagina, they cannot pass through this, but can only escape out of the proglottis, when the vagina acquires a larger opening, by tearing, &c. This takes place sometimes even in the intestine of the first host, and the eggs escape separately into the outer world with the excrements, which then appear as if sprinkled with fine white sand; or immediately without the intestine, where the progress of the proglottis is seen indicated by a white milky streak. Sometimes the proglottis does not burst in either of the above-mentioned places, but gets uninjured into the intestine of a new host, in which case it distributes its brood only after it has been destroyed by digestion. According as the eggs reach the intestine of their host in this way separately, or inclosed in the proglottis, and there-

fore in a mass, solitary or numerous specimens of a cystic, or of the analogous state, are produced within one and the same host." The proglottides thus perform an *active* migration from the intestine of their previous host, and are *passively* or contingently transferred into the intestinal canal of a new host. With the dissemination of their brood, their function ceases.

37. ii. *The six-hooked brood, enclosed in separate egg-capsules.*—These are called eggs, although their development differs greatly from that of ordinary eggs. The embryos enclosed in the egg-shells are globular naked vesicles, unlike their parents; the smallest of them measure only 0·022 mill., and the largest, 0·05. They are destitute of any organs, possess an epidermis with a double outline, and usually bear six, but in the *Tetrarhynchi* only four, very small microscopic hooklets on their anterior extremity, so that they carry their destination, that of boring forward through the tissues, as it were, written on their foreheads. The bodies of these small but very dangerous vesicles, whether armed or unarmed, are always capable of motion. The embryos which are destined to migrate into cold-blooded animals are much larger, possess larger hooks, and exhibit distinct movements in the usual temperature of a room. Those destined for warm-blooded animals are much smaller, with smaller hooklets, and exhibit distinct movements only about the temperature of the stomach. (KÜCH.)

38. iii. *The destiny of the six-hooked brood when set free.*—*A. What is the fate of this brood until it reaches its settled dwelling-place external to the intestinal canal?*—As soon as the embryo becomes free in any part of the digestive canal of an animal which suits it, according to VAN BENEDEN, it brings together the central pair of its embryonal hooklets like a wedge, and at the same time, by thrusting and twisting, begins to force them forwards. Having in this way made a little progress, it assists itself further with the two lateral pairs of hooklets. KÜCHENMEISTER supposes that, having thus penetrated into the tissues, they pass into the blood-vessels, and thus they are conveyed either into the liver by the *vena porta*, and remain fixed in the finest ramifications of the blood-vessels, or into the brain, or into other parts. The migration of the young of the *Cestoidea* to the places where we meet with them as vesicular worms, or in analogous states, takes place in the following way:—

39. 1st. A portion of the six-hooked brood, in all species of *Cestoidea* may reach their dwelling-place directly and by active migration, by boring their way. 2nd. Others, by an uncertain duration of this migration, reach the vessels of the new host, penetrate these, and are conveyed with the blood to the smallest ramifications, where they (*a.*) either become developed in these ramifications, the walls of the vessel becoming their envelopes; or (*b.*) they migrate passively into the neighbouring tissues, after the rupture of the walls of the vessels, in consequence of the swelling of the embryo; or (*c.*) after being detained in these ramifications they enter anew upon an active migration, passing into the tissues by means of their booklets, and increasing in size.

40. *B. What further takes place with the embryos when they have come to rest in their new dwelling-places? The third stage of the development of the Cestoidea,* consists of the called vesicular worms and their analog asexual forms, "which, in accordance with alteration which the embryonal vesicle und goes in the different species of tape worms, a with the different animals infested by them, m be divided into *cysticercal* (vesicular worm *platycercal* (forms with a flat, inarticulate, ta like appendage), and *acercal* (or tail-less), forn It is a common peculiarity of all the three for here mentioned, *that they are cestode-heads p duced from the embryonal vesicle, which occur s in the interior of the embryonal vesicle, or upon in a state of rest.* We may therefore best co prehend this stage under the name of *resting s lices.*" The metamorphosis or transition of embryos to the resting, and usually *cysticer* scolices, may be stated as follows:—

41. 1st. "The embryo, still furnished with six hooklets, begins to swell by the reception fluid (liquid nourishment), which is secreted fro the place in which it has established itself: this at first a fluid similar to protoplasm, but aft the formation of the enveloping cyst, or after t cessation of inflammation, when the creature liv free in the interior of serous cavities, it does n agree so much in its composition with the seru of the blood as with the ordinary products of t secretion of serous membranes." (LUSCHKA.)

42. 2nd. As soon as the embryo has in th way rather rapidly enlarged to a certain size, ar arrived at a state of repose, the round vesicle th formed, when it does not project freely into serous cavity, and has not fallen into one, su rounds itself with an envelope, which protects and assists it in procuring repose. These env loping cysts constitute an absolutely new form tion, which is analogous to serous membrane and which constantly increases in size with t growth of the young cestode vesicle. Whe however, the brood of a cestoid worm gets freel into serous cavities, it either never attains to th formation of an enveloping cyst, or does so at rather late period, and at a time when the youn embryo has become a vesicle of very conside able size, and often exhibits the Tænia head in a advanced state of development. In places whe the young cystic worm again falls into repose, fresh exudation of plastic matter adapted to th formation of cysts takes place, the walls of th cyst being rich in blood-vessels. (KÜCHEN.)

43. 3rd. By the reception of the secretion the serous membranes, the young cestoid vesic swells up. At its anterior end, and at the poin where the six embryonal hooklets are situate, funnel-shaped pit is at first formed, and this gra dually penetrates more deeply into the paren chyma of the embryonal body. In the botto of this pit the first traces of the head appea whilst the lateral walls of the depression becom converted into the body—the central body—o the future cystic worm, and the remaining portio of the embryonal vesicle, which is not inverted or not implicated in the metamorphosis, become the so-called caudal vesicle. This inversion an first formation of the head most frequently com mence at the anterior surface of the vesicle, an are seen distinctly in the cestodes of *Arion empiri corum*, for in these the six small hooks are place in pairs at the point of transition of the centra body into the caudal vesicle of the worm. Th

ntral body and the head are always developed the interior of the embryonal vesicle, and dur- the whole period of the vesicular state the ad always has its apex directed towards the udal vesicle, even when the central body, which closes the head in the form of a hollow canal, s not sufficient room in the embryonal vesicle, it is pushed out of it. (KÜCHEN.)

44. 4th. From the experiments of HAUBNER, ÜCHENMEISTER, LEUCKART, ROLL, VAN BENE-N, ESCHRICHT, &c., with the various *Tæniæ* hich pass through a vesicular condition, the llowing appears:— According to LEUCKART, at ast in experiments with *T. serrata*, we find enty-four hours after administration the six-oked embryos in the blood of the large abdo-inal veins, especially the vena porta; and on e fourth day, in the livers of rabbits to which ey have been administered, small, white, clear sicles of 0·3 millim. in diameter, but rapidly creasing in size, which, on the sixth, are already mill. in diameter. In *T. serrata* the actual nbryo, after the lapse of fourteen days, mea-res 1·5 millim.; in *Cœnurus*, it is about the ze of a grain of millet at this period. The nall vesicle (the worm), after it has begun to ow clear, acquires, in its interior, numerous rge clear enucleate vesicles, which, according LEUCKART, are similar to sarcode drops. In e parenchyma we recognise a cortical layer, hich becomes thinner, and the cells of which e converted into muscular envelopes by fibre-rmation, and a medullary layer, in which elastic sicles or cells occur in great quantity. From e appearance of the medullary substance, the owth of the little worm, which is capable of otion even before the muscular layer is deve-ped, advances with rapidity. Even in the first rtnight, and shortly afterwards, the form of the oung cestoid worm varies according to the ecies. Some, such as the younger *Cœnuri* and *ystic. cellulosæ, tenuicollis*, and *fasciolaris*, are herical; others, such as *Cystic. pisiformis*, and robably also *Cystic. longicollis* and *fistularis*, are val. Many of those seated upon the surface of rgans, projecting into closed serous cavities, vander for a time in the organ, and finally fall nto these cavities; the oval forms appearing to vander more than the round ones. About four-een days after administration, the above changes ake place almost universally and in all places. But those individuals which have not found a ituation favourable to their development undergo retrograde metamorphosis, passing "to the state f caseous, granular, or atheromatose masses, in which we may seek in vain for any remains of the embryo, although this certainly is present. Many cases of miliary tubercular disease of particular organs may indeed consist of nothing else than the dead, fatty, and calcified young of worms."

45. 5th. In the third or fourth week, when the young brood of *Cysticercus pisiformis* measures about 2 millim., and that of the *Cœnurus* is of the size of a pin's head, we may see, according to LEUCKART, beneath the epidermis a layer of muscular fibres. Then follows a fatty structure, and then the medullary substance. At the point where the head is to be formed, a *turbidity* is produced by the aggregation of small nucleated cells, in the interstice between the muscular and medullary layers. This is the first foundation of the head of the tape worm. Opposite to this turbidity a pit is observed externally, the inner wall of which is formed by the inverted epidermis, and which passes through nearly the whole depth of the globular foundation of the head; this latter appearing like a peg attached to the inner wall of the worm. In the central mass of the head, especially in its upper half, calcareous deposits appear, at first sparingly. Two or four vessels are also observed rising in a tortuous form through the upper part of the lobe, and passing over on the external sac-like envelopes. The vesicle now becomes larger and clearer, and the medullary layer, pushed against its peripheric layers, grows thicker, whilst vessels and calcareous corpuscles make their appearance, especially in the anterior part of the body, between the muscular and epidermic layers, but not in the former, in some cases before, in others after, the formation of the cephalic process. From the time when this process commences, the caudal vesicle ceases its activity in the true *Cysticerci*; its functions are then only passive, serving as a reservoir of nutriment, or as a protection to the head, which requires repose for its further development, and preserving sufficient room for this end. I cannot follow the descriptions of KÜCHENMEISTER and other helminthologists further, as respects the development of the head and its hooklets, &c., but must refer the reader to Dr. LANKESTER's translation of the work of the former, and to the other works referred to in the Bibliography. I may, however, notice the following conclusions of this observer:—

46. 6th. In the progress of the metamorphosis of the six-hooked cestoid brood into scolices, it has been shown that a portion of the *Tæniæ* pass through a true *cysticercal* (bladder-worm) state, whilst the other part, without ever arriving at this state, furnish exactly the same structure (cestoid heads—scolices). This latter part KÜCHENMEISTER has divided into *platycercal* and *acercal* forms. (*a.*) True *Cysticerci* occur only in warm-blooded animals, especially mammalia; and cysticercoid forms principally in cold-blooded animals. (*b.*) The eggs of all *Tæniæ* which pass a cysticercal stage are distinguished by the small size of the embryo, and its six hooks, and by their brown hard shell beset with asperities. The eggs of the *Tæniæ* with only a cysticercoid phase of development have softer, colourless, transparent shells, are much larger, and contain a much larger embryo, furnished with larger hooks. (*c.*) *Tæniæ* with a cysticercal phase of development, are inferior to the platycercal and acercal forms in regard to the length and cylindrical form of the rostellum. (*d.*) *Tæniæ* with a cysticercal stage possess during this a highly developed *receptaculum capitis*, which forms a part of the future neck, in which, as long as this stage lasts, the head is introverted. The allied platycercal and acercal forms are destitute of the accumulation of fluid, and of the *receptaculum*. (*e.*) If the six-hook cestoid brood gets into animals which are not suitable to it, or into such organs in an animal otherwise suitable, it is destroyed in a very short time, even in the few first days of its immigration; the form of miliary tubercular disease of the organ may thus have frequently occurred. This may be demonstrated by administering mature proglottides to various animals. (*f.*) A great

number of the cestoid embryos which become developed to the scolex state die, and are destroyed either by a natural or a pathological death. We only know that their life may extend even to several years; but inflammatory processes and alterations of the secretions extending to them from the organs they inhabit, may destroy them more or less rapidly, and change them into masses consisting of cholesterine, calcareous, fatty, suety, and similar substances.

47. iv. *The Scolex passing into activity.* — On this topic I must refer chiefly to recent writers, more especially to Küchenmeister, and notice merely a few of the more prominent parts of their descriptions. As a general proposition, it is inferred *"that the animal infested by cystic worms is usually the source of food, or the prey, of that infested by tape worms."* The host of the cystic worm is devoured by a carnivorous predaceous animal, and by this means the cystic worm arrives, together with his previous host, in the stomach of the carnivorous animal. During the process of digestion, the enveloping cysts in which the cystic worms were enclosed, or, if the animal lived free in cavities, these latter, perhaps both, are digested, or opened previously by the teeth of their devourer, when the cystic worm escapes into the cavity of the stomach. Here the worm extends itself; its caudal vesicle collapses. On the caudal vesicle and the middle of the body of the cystic worm digestion begins to act perceptibly. The body at the same time elongates and extends itself, but the head and the short neck are still inverted, as during the cysticercal state. But now the head and neck extend themselves. The head, the hooks still exhibiting the position of cysticercal existence, their apices being directed backwards towards the suckers, and their shafts towards the apex of the head, draws itself, as it were, outwards through the neck, by turning itself inside out. As a matter of course, the whole worm is thus turned inside out; and the margins of the head and neck which were previously turned in, become the free outer sides of the worm. A portion of the *receptaculum capitis* is then cast off, with the body and the caudal vesicle, and a portion wraps itself into the funnel-shaped constriction of the young *Tænia.*

48. At various times, sooner or later, according to the evolution and age of the cystic worm, the formation of segments commences and with this, consequently, this stage of development is concluded. It should be recollected that *Tæniæ* cannot be reared from such scolices as do not exhibit perfectly developed hooks. They die immediately. The first transformation of all cystic worms introduced into the intestines of a warm-blooded animal takes place in the same way; but the process stops before the commencement of segmentation, in those cases in which the intestine of the animal in which the vesicular worm has arrived is unfavourable for it and its future development. Thus circumstanced, it lasts but for a short time, no trace of it remaining a fortnight after. The transformation of the platycercal forms into mature Cestoidea takes place exactly like that of the cysticercal forms: in the acercal forms no casting off of a portion of the former embryonal vesicle takes place, but the whole of it is retained, and the formation of segments commences immediately upon it. It still remains to consider—*How the scolex, after entering upon its activity, beco converted into a tape-worm colony—Strobila.*

49. v. *The Strobila, or the so-called tape-w colony.* — "Immediately after the healing of cicatrix on the neck and on the former *recepta lum capitis,* there commences between the p terior end of the head and this cicatrix a budd forth of the body, produced without sexual pro gation, and which becomes constricted into s ments by transverse furrows or wrinkles. By constant production of new masses on this pla that previously formed is continually pusl further back, so that this cicatrix is at last remo to a considerable distance (varying according to species) from the head. During this time individual segments increase, and grow in the sa ratio as their removal from the head: they at t same time acquire sexual organs, male and fema in each segment, and which are very rarely, a probably never wanting in the colony. Final when they have attained a sufficient size and m turity, they produce the embryos (§§ 41,2.), a last of all cast themselves free in the form of t proglottides (§ 36.). If we were to give a d finition of the strobila — it is a series of joints, individuals, which are formed from the acti scolex in the space between the part of the latt that must be called the head proper, and its cic trised extremity, by a sexual reproduction; whi are in direct union with the scolex, and whic when examined from the anterior to the posteri present *asexual* segments, half and fully form *sexual* segments, and segments engaged in sexu retrogression, the last of which have become tru independent individuals." (Küchenmeister, *O cit.* pp. 84-5.) Thus we have seen how the se ments with their ova and embryonic structure are developed; and, when they have become th hindmost of the colony, cast themselves loose.

50. My limits admit not of a full *description the minute structure* of the fully developed *Tænia* It will be found in the work just quoted. I may however, briefly state that no digestive apparatu has been found in these animals. Most writer assert that up to this time no *nerves* have been detected in them; but Huxley states that a singl *ganglion* is situated in the axis of the head, an that it sends off nerves to the suckers in som *Tæniæ.* The most important points are the dissemination of *calcareous corpuscles* in their structure and the formation of *circulating vessels.* With the development of the scolex it was seen that a union of four principal lateral vessels takes place in the head, and that smaller branches are given off from these trunks. These vessels probably open outwards near the *receptaculum capitis* or neck, or about the situation of segmental production; but the ultimate structure, connection, and termination of these vessels have not been precisely determined. The *muscles* consist of transverse and longitudinal fibres, which may be recognised most readily in the neck. The *suckers,* peculiarly muscular parts, present radiate fibres uniting in the middle of the sucker, under which lies a layer of circular fibres, and the *rostellum* It has not been ascertained whether or no muscular fibres run to the hooklets of the embryo. The *hooks* of the *Tæniæ* appear to ride upon the skin or integument, or in slight impressions. The movements of the hooks seem to be produced by changes in parts of the head, particularly of the rostellum. The *sexual organs,*

male and female, exist in each segment, in ch numerous eggs are produced. A very ute description of these organs, — the penis, es, vagina, uterus, &c. — is given by KÜCHEN-STER.*

1. THE CESTOIDEA, or Cestode worms, occur nan either in the mature state, and then in the stines only (*Bothriocephalus latus, Tænia me-anellata, Tænia nana*); or in the larva or ex state (*Cysticercus visceralis* seu *tenuicollis, inococcus veterinorum*, seu *scolicipariens*, and *E. inis* seu *altriciparieus*); or lastly, in all wn stages of development (*Tænia solium* and *ticercus cellulosæ*).

52. Genus 1. BOTHRIOCEPHALUS = DIBO-IUM.—This division is abundantly represented redaceous fishes, more sparingly in piscivorous ls, especially the marine *Raptores*, and rarely few mammalia. Of the Terrestrial mammalia abiting inland places, man only harbours *Bo-iocephali*. KÜCHENMEISTER defines this *genus*,† and the *species* here to be considered, as subjoined*, and gives the following as the *synonymes* of the species, *Bothriocephalus latus* or *Dibothrium latum; Tænia lata, T. grisea, T. vulgaris, T. membranacea, T. dentata, T. inermis; Ténie à anneaux courts, T. large, T. à épine; Lindwurm, Baandwurm, Buendelorm*: the tape worm, jointed worm, the short-jointed worm.

53. i. GENERAL DESCRIPTION.—*The colour of the living worm* is bluish white. Specimens preserved in spirits change greatly in colour. The *active scolex*, or head, is obtusely conical. The two lateral pits (analogues of the sucking discs of *Tæniæ*) are fissuriform, and appear, like the sucking discs on the feet of flies, rather to effect adhesion than to draw nourishment, which is probably introduced through the entire skin. The *neck* is more distinct in young than in old specimens, the transverse wrinkling, *i.e.* segmentation, commencing immediately behind the head. The *strobila*, or jointed body, presents a ventral surface, on which the sexual apparatus opens, the opposite being the dorsal surface. Each segment has four margins —two free lateral margins, slightly undulated, and an anterior and posterior margin, articulated with the upper and lower segments in the colony. The form varies according to the preponderating contraction of the longitudinal or transverse fibres, the breadth, however, being much greater than the length—as three to one. In the central line the segments are thicker (up to 1‴) and darker; the lateral margins flatter and whiter. The *vascular system* consists of lateral longitudinal cords, which contain a limpid fluid. A respiratory system and organs of sense are wanting. The *sexual organs* generally are single in each segment, but they are sometimes double.

54. *A. The ova and embryos.*—The former exhibit an external hard brittle shell, which often breaks so as to represent operculated ova, like those of the *Trematoda*. From the opercular opening a limpid vesicle emerges, in which, however, KÜCHENMEISTER did not find the six hooklets which VON SIEBOLD considers similar to those in the circlets of the *Tæniæ*. Possibly a part of the eggs of the *Bothriocephali* are not produced with undeveloped embryos, so that the latter are perfectly formed only when free in nature, as the eggs of the *Ascarides*. The *resting scolex* exists in the fishes, especially marine fishes. In these certain cestode worms live, having a band-like, inarticulate appendage, but exhibiting no commencement of sexual development. These become converted into mature *Bothriocephali* in the intestines of higher fishes, or of the marine birds of prey.

The developmental history of the *Cestoidea* may be erstood, if considered as follows: —

i. *The mature sexual animal*, which is produced by xual gemmation, separates from the colony as soon t has attained its majority, migrates actively from intestinal canal of its host into free nature, and nce passively into the stomach of another usually bivorous animal. It bears within it —

ii. The *grand-nurses* or *embryos* produced by sexu-and perhaps by asexual, reproduction, furnished with r or six hooks, which are destined to enter passively the stomach of a herbivore, and thence to migrate ough the body of the latter, either actively, or by the ervention of the vessels, active — passive — actively. he asexual propagation of the brood in the *Cestoidea* rendered improbable even by the fact that, in the ole developmental series of these *Cestoidea*, a sexually ture animal has never been met with.)

iii. The *resting scolex* (nurse), produced by asexual nmation in and by the large six-hooked embryo, still cealed within this embryonal vesicle, or lying beside nclosed in peculiar cysts, or in closed serous cavities. its non-gemmiparous part the embryonal vesicle ac-res, according to the species of cestoid worm, and ording to the different hosts (cold or warm-blooded), netimes the form of a globular vesicle, sometimes that a flat band-like strip, and sometimes is only just suffi-nt to cover the scolex, lying quite close upon it, when eally forms nothing but a *receptaculum capitis.* Thus obtain three forms allied to each other in their degree development: the *cysticercal* forms (*Vermes cystici*, luding *Cœnuri* and *Echinococci*); the *platycercal* milar to Stein's cestoid worm of *Tenebrio molitor*, d Von Siebold's from *Arion empiricorum*); and the *ercal* (certain embryos of *Tetrarhynchi*). Every one these is a normal form; even the cysticercal forms are ither morbidly degenerate, nor become dropsical, nor ayed.

"iv. The resting scolex, transferred into the intestine an animal, becomes converted into the *scolex passing to activity*. The latter is distinguished from the resting olex by the extension of the entire body, by the altered sition of the adherent apparatus (suckers and hooks), the attachment in the intestinal canal, and in the cys-cal and platycercal forms, by the casting off of the rren portion of the embryonal vesicle, and the forma-n of a cicatrix on this spot. In the acercal forms no-ing is cast off, nor is there a cicatrix formation.

"v. The *strobila* = equal the tape-worm colony, bud-ng immediately from the scolex, which has become tive by asexual propagation (gemmation), is more or s distinctly jointed, and becomes sexually mature pos-riorly. Its last segments, which are cast off, and lead independent existence, are called *proglottides* (i.), d bear within them the embryos produced by sexual production (ii.)." (KÜCHENMEISTER, *Transl. by* Dr. ANKESTER, pp. 93, 94.)

† "*Cestoidea*, 2 *osculis suctoriis, aut* 2 *foveis margi-libus, oblongis aut longitudinalibus oppositis instructa. pite subtetragono, depresso, articulato plerumque, ermi. Pori genitales omnium articulorum in linea ediana animalis et in ejus superficie abdominali siti.* olices *extra tubum intestinalem in cystidibus peculia-bus ad vermium platycercorum modum, aut in tubo testinali animalium minorum aquaticorum statu im-aturo viventes;* Strobilæ *in tubo intestinali animalium aquaticorum rapacium, avium maritimarum et mammalium viventes*; Proglottides *veræ interdum absunt, interdum adsunt, sæpissime in longa articulorum serie conjunctæ dehiscentes.* Embryones *sex hamulis armati; ovulorum testæ sæpissime coloratæ.*

* "i. BOTHRIOCEPHALUS LATUS = DIBOTHRIUM LATUM. —*Caput oblongum, inerme*, 2 *bothriis-foveis marginalibus, formam rimæ aut fissuræ* (*fente*) *adoptantibus; collum subnullum; articuli numero circa* 2000, *maturi omnino latiores* (*ad* 27 *millim.*), *quam longi, socialiter decedentes; pori genitales in linea mediana siti, masculus major et superior, ex quo penis lævis et brevis prominet, femineus minor, posterior inferiorque.* Scolex *quiescens ignotus*; scolex *activus cum strobila in hominis tubum intestinalem incolens, longitudinem* 7-8 *ulnarum, secundum Dujardinum ad* 20 '*metres*' (?) *exhibet.*

"Embryones 6 *uncinulis* (?) *armati, in ovulis* 0·028—32 *mill. longis et* 0·002 *mill. latis, ellipticis, flavo-fuscis, operculo dehiscentibus inclusi.*"—KÜCHENMEISTER.

Whether the cestode worms are developed in the intestines of fishes in which they are found, or are conveyed there in one or other of the animals on which these fishes feed, in which they had been converted into scolices, after the animal had swallowed the eggs of the mature *Bothriocephali*, is still undecided. Probably the ova and scolices are developed as already described (§§ 37—47.). As the host of the *Cysticercus* is devoured by an animal, in the intestine of which the scolex, being set free, immediately developes itself.

55. *B.* We have no data as to the production of the *Bothriocephalus latus* in man. This worm has been found in the cat, but is extremely rare in all terrestrial animals. The cat has evidently obtained it from the intestines of fishes, which in sea-ports, and on the sea-coasts, are left in large quantities, and are used as manures. It is difficult, notwithstanding, to account for the presence of this animal in man. The ova from the proglottides of this worm may, however, be introduced into the human intestines by means of vegetables, where the intestines of fish have been used as manures, or where they have been conveyed in sewage water. The passive migration of the embryo into the intestine of another animal, and its conversion in this intestine into an asexual band-like scolex, is much more probable than the development of all the grades in the same intestine, on account of the dissimilarity existing between the embryo and its parent.

56. *C. The Physiological relations of Bothriocephalus* are chiefly its weaker vital manifestations, and the smaller number and less perfect development of its sucking organs, than those of the *Tæniæ*, which explain its easier expulsion from the intestines. The power of imbibing fluids by the bodies of the *Bothriocephali*, and all *Cestoidea*, has been proved by ESCHRICHT and others. Transudation takes place in small, pellucid, oleaginous drops (sarcode). Whilst the *Nematoda* and *Echinorhynchi* swell up by imbibition, the *Cestoidea*, owing to an abundant exudation, experience only a slight swelling from imbibition. Whole series of segments of the *Bothriocephali* pass off spontaneously, but never single segments, as in the *Tæniæ*. The duration of the life of the former is not known. More than one or two worms of this genus are rarely found in the same intestine, and their length seldom exceeds twenty feet.

57. Genus 2. TÆNIA.*—i. TÆNIA SOLIUM, *and its Scolex-nurse = Cysticercus cellulosæ.*

SYNONYMES.—Ταινίαι, Aristotle; πλατεῖα ἕλμινς, Hippocrates; *Lumbricus latus*, Pliny; *Ta solium*, Linnæus et Auct. permulti; *T. cucu tina*, Pallas, Goeze, &c.; *T. vulgaris*, Wern *T. dentata*, Gmelin, Nicolai; *T. osculis ma nalibus solitariis*, Bradley; *T. armata huma* Brera; *T. lata*, Reinlein; *T. fenestrata*, D Chiaje; *T. stigmatibus lateralibus*, Bonnet; *secunda*, Plater; *T. solitaria*, Leske; *T. artic demittens*, Dionis; *Halysis solium*, Zeder; *P tastoma coarctata*, Virey; *Vermis cucurbitin* Plater: Kürbiswurm, Kürbisformiger; bewaffna Bandewurm; Kettenwurm, *Germ.*;—Ténie longs anneaux; T. sans épines; T. de la secor espèce; le solitaire; ver solitaire; T. bandele &c. The following names are also given it, common with *Bothriocephalus latus* and *Tæ mediocanelluta*: le ver plat, Bandelorm, ta worm, jointed worm.

58. *Tænia solium* presents *five steps* of develc ment. 1st, *The sexual animal—Proglottis*; 2 The *grand-nurse—Six-hooked embryo.* 3rd, T *resting Scolex—Cysticercus cellulosæ*, in the pare chyma, areolar tissue, and cavities of the bod 4th, The *active Scolex-nurse*, that is the *Cysticerc cellulosæ*, which will become a *Tænia solium* the intestines; and 5th, the *Strobila*, the series segments of *Tænia solium* produced by gemmati from the fourth step.

59. *A.* THE MATURE TÆNIA.—The nan *Tænia solium* is incorrectly applied to this worn inasmuch as frequently two or three occur in t same person. Dr. PFAFF has seen seven expelle KÜCHENMEISTER ten, HELLER thirty, and KLE FELD counted forty expelled from one patient.

60. (*a.*) *The Strobila.*—The *head*, althoug varying somewhat in size, is seldom larger th the head of a common pin. It is of a blackis brown colour, especially around the base of t short rostellum, and in the sacs around the ba of the hooks, and in and around the sucking disc The *hook-sacs*, as well as the hooks, are placed i

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* "Second Order (KÜCHENMEISTER), TÆNIÆ.—*Caput subglobosum aut tetragonum; acetabulis osculis suctoriis* 4, *rarissime* 6, *muscularibus, orbicularibus, symmetrice oppositis, valde contractilibus; rostello imperforato, retractili, in scolicibus quiescentibus inverso, in activis s. Tæniis maturis propulso, hamulorum simplici, duplici, aut multiplici corona armato; corpore plerumque albo, plano, depresso, bilaterale aut triquetro, articulato* (Strobila); *articulis maturis androgynis, aut non sexualibus* (?), *sponte et alio post alium dehiscentibus, Trematode cuidam similibus* (Proglottides); *systemate vasculoso perclaro; poris genitalibus lateralibus, plerumque alternantibus, masculo majore et anteriore, femineo minore et posteriore; genitalibus perfectis.* Scolices *quiescentes et immaturi formam cysti-, platy-, aut acercam ineuntes.* Scolices *activi cum strobila longitudine et latitudine valde variantes.* Embryones 6 *hamunculis armati, parvuli, pervivaces*; *ovula in illis qui formam cysticercam ineunt, minima, pileata, flavescentia, in ceteris majora, læviora et clariora.*"

I. TÆNIÆ WHICH OCCUR IN MAN IN THE MATURE STATE. i. "Tænia solium, and its scolex nurse = *Cysticercus cellulosæ.*—Tænia matura = *Scolex activus cum strobila: longit.* 4—5 *metres* = 6—8 *ulnarum, latit. ad* 13 *millim.* Caput = *scolex sensu strictiore, breve, antrorsum pla num*, 0·56—0·75—1·0 *mill. lat., acetabulis validis, prom nentibus* 0·192 — 231′′′ = 0·434—0·521 *mill. long., et* 0·18 — 224′′′ = 0.410 — 0·505 *mill. lat.; rostello parvulo* 0· *mill. ad latera nigrescente; hamulorum* 22, 24, 28, 3 *plerumque* 26, *duplice ordine, longit.* 0·167 *quoad majore* 0·11 *mill., quoad minores hamulos* (*secund.* Leuckart 0·18 *et* 0·12 *secund. meas mensuras, ungue et styl hamulorum ex longit. fere similibus, formâ hamulorun omnino vastâ; loculis hamulorum perclaris, nigres centibus; collo perparvo, fere nullo; corpore antror sum maxime attenuato, deorsum ad* 10 — 14 *mill. lat articulato, poris genitalibus alternantibus, interdun irregulariter; utero ramis* 6 — 10 — 13, *irregularite alternantibus, denuo ramificatis instructo; corporibu calcareis in capite rarioribus* (0·004′′′ = 0·009 *mill. long et lat.*), *in corpore crebrioribus et majoribus* (0·005′′′ = 0·012 *mill.*) Proglottides *ad* 16 *mill. longæ et ad* 6 *latæ ad inferiorem partem crassiores, margine magis toros et angulis magis prominentibus, quam ad superioren partem, ut in aliis Tæniis, ovulis* 0·016′′′ = 0·036 *mill long.*, 0·016′′′ — 19′′′ = 0·036 *mill. lat.; testâ ovulorun crassiore* (0·0063 *mill.*). Embryonibus 6 *hamulis ornatis* 0·028 — 0·032 *mill. long. et lat., migratione indigentibus.*

"Habitat.—*Solitarie aut sodaliter* (*ad* 40 *usque*) *in tubo intestinali hominis, inque terris diversissimis; vi in Cane domestico.*

"Scolex *quiescens = Cysticercus cellulosæ, vesic caudali haud magnâ* (*ubi plurimum* 15 *mill. in diametro*) *transverse ellipticâ; corpore inverso, transverse rugato,* 8 — 10 *mill. longo. In tubum intestinalem translatas intra* 3 *menses maturescit. Habitat in telâ cellulosâ totius corporis et nonnullis corporis cavitatibus clausis* (*oculis, cerebro, &c.*) *imprimis in homine, Sue scrofâ domesticâ, rarius ferâ, Simiâ, Cervo, Capreolo, Cane domestico* (*Arachnoid. et muscul.*) *valde dubiosus in peritoneo Canis domestici et Muris Ratti. Per injuriam a nonnullis* Cœnurus cerebralis hominis *nominatus.*"—KÜCHENMEISTER.

ouble circular series. The one series does not
erially differ from the other. As in all the
iæ, the points and spines of all the hooks fall
he same circle, or in two circles lying close
ether, the number and position of the hooks
esponding with the sacs, and varying from
o 28. The *sucking discs* are nearly circular, or
ewhat oval, and surrounded by a circular col-
ral branch of the longitudinal canals, by which
rt of vascular net is formed. Close behind the
king discs, and near the head, the *vessels* collect
our main branches, which are united quite at
front of the head by a common transverse
nch, thicker than they. In the vessels of
ious *Cestoidea*, Virchow, Wagener, and others,
e seen a sort of ciliary epithelium projecting
them, and moving in the fluid. The *calcareous*
uscles reach about to the middle of the sucking
s. They are few and small on the head. The
der neck, of about 6‴ in length, exhibits no
es of transverse striæ or segmentation. The
careous corpuscles are somewhat more abun-
t, and also larger than in the head. Behind the
k commences the true jointed body of the
nia, in which Küchenmeister counted 825
ments in one specimen ten feet two inches in
gth. The proportionate size of the segments
dually increases posteriorly, or as they depart
m the head—in length from $\frac{1}{12}'''$ to $7'''$. In this
ecies, as in all *Cestoidea*, contact with water
uses the emission of Dujardin's sarcode, in olea-
ous drops. The *sexual organs* appear from
out the 280th to the 300th segment, and on-
rds, from the head, in the median line of the
stoidea, at first as a simple brownish-yellow
nal, with short lateral off-shoots, towards which
o transverse slightly coloured lines (seminal
rd and vagina) run from the sides. The alter-
ting *pori genitales* first appear about the 317th
gment, and become distinct in the 350th. The
xual organs are more and more developed from
e 350th to the 600th segment, where ova com-
ence, which become mature from the 650th to
e 700th segments. Both male and female
gans generally exist in the same segment, and
e minutely described by Küchenmeister. Each
nt when divided presents, 1st, *Epidermis* of a
itinous structure, without calcareous corpuscles;
d, *Longitudinal fibres*, with calcareous corpus-
es; 3rd, *Transverse fibres*, with few calcareous
rpuscles; 4th, Sexual organs.

61. *B.* Scolex of Tænia solium.—*Cysti-
rcus cellulosæ*. The former is identical with the
tter, as proved by the identity of the head in
oth; by the general and particular circumstances
nder which *T. solium* occurs, and by converting,
y experiments in feeding, *Cysticercus cellulosæ*
to *Tænia solium*, and the eggs of the latter into
ysticercus cellulosæ.

62. (*a.*) *The ordinary habitation of the Cysticercus
llulosæ* is the flesh of the pig; and *Tænia solium*
almost entirely unknown where the use of this
esh is avoided, as amongst the Jews and Moham-
edans, who strictly adhere to their religious pre-
epts. On the other hand, *Tænia solium* is
bundant wherever the breeding of pigs occurs, as
Poland, Hungary, Pomerania, Thuringia, Eng-
and, &c., "and especially among those engaged
trades which bring them in contact with raw
ork, and therefore with raw *Cysticerci*, as butchers,
ooks, sausage-makers." Küchenmeister found *Cysticerci* in the water used in washing sausages. The direct proof of the identity of this cystic worm and *Tænia solium* is shown by the following *experiment upon a murderer condemned to death.* Exactly 72, 60, 36, 24, and 12 hours before his execution, 12, 18, 15, 12, and 18 specimens of *Cysticercus cellulosæ* were administered to him partly in rice or vermicelli soup of a blood heat, and partly in blood-puddings. The *Cysticerci* had already lain seventy-two hours in a cellar before Küchenmeister discovered them. The last administered had consequently lain about 130 hours out of the living organism, and he hardly believes that those *Cysticerci* which had lain more than eighty hours were still capable of development, any more than he can believe this to be the case with the *Cysticerci* contained in smoked sausages and hams. On dissection forty-eight hours after execution, he found ten young *Tæniæ*, of which six were deprived of their hooks, but four distinctly showed the hooks of *T. solium.* The little *Tæniæ* were 4—8 millim. in length, and had attached themselves by their hooks and proboscis to the intestine, and possessed a small band-like appendage, 2—5 millim. long. The preceding experiment is proof of the conversion of the cystic worms into *Tæniæ* in the human intestine, and also of the mode of infection. Küchenmeister is convinced that the scolex of a *Tænia* retains its power of development in its dead host only as long as no putridity occurs.

63. (*b.*) The further proof of the identity of *T. solium* and *Cysticercus cellulosæ* is derived from the structure of the head of the latter. "This cystic worm, like all others, forms a vesicle the size of a pea or very small bean, with a little white head in its interior, from which the true scolex may be evolved by pressure. This scolex bears a head with four, and sometimes six, sucking discs (the latter especially in the human brain), round which the vascular system runs, and collects into two longitudinal canals on each side. The short rostellum bears from twenty-two to twenty-eight hooks, placed in a double crown. Besides these, the head exhibits a sparing brownish-yellow, or blackish-brown pigment," and five sacs round the stems of the hooks. The neck is very short, poor in calcareous corpuscles, opaque, and colourless; the body is wrinkled, abounds with calcareous corpuscles, and the head is inverted into it as long as the caudal vesicle is alive and uninjured. After the death of the worm the head becomes everted. (See also § 46. *et seq.*)

64. (*c.*) *Proofs of the conversion of the six-hooked embryos enclosed in the eggs of Tænia solium into Cysticercus cellulosæ.*—Küchenmeister, in 1851, expressed the opinion that the pig infects itself with *Cysticercus cellulosæ* when it meets with the eggs and proglottides of *Tænia solium* upon the pastures; and in 1853 Van Beneden administered *T. solium* to two pigs, and thereby rendered one pig measly. The following year Küchenmeister fed three sucking-pigs, on the 7th, 24th, and 26th of June and 2d of July, with segments of tape worms, partly given off spontaneously and partly artificially expelled. On the 13th of July they were again fed with artificially expelled segments. "One of the pigs was killed on the 26th of July, and exhibited young *Cysticerci* corresponding with the days of administration, of which the largest individuals formed vesicles of the size of a hemp-seed, with a central turbidity, i.e. the

commencement of a head. The second pig was killed on the 9th of August, when thousands of *Cysticerci* were found in all parts of the body; the largest individuals were as large as peas, and exhibited a distinct head, whilst the smallest were only of the size of a hemp-seed. The third pig, which was killed on the 23rd of August, was uniformly set, throughout all parts of the body, with *Cysticerci* of various degrees of growth and development. The largest were almost perfectly developed; others resembled those last described. He undertook the examination of a weighed piece of the flesh, and found 133 *Cysticerci cellulosæ* in 4½ drachms of it. If we calculate from this quantity the number of *Cysticerci* which would have existed in 1 stone, or one-fifth cwt. of the pork, we obtain the great number of 88,000 individuals in this weight. A fourth pig of the same litter, to whom no *Tæniæ* had been administered, exhibited no traces of *Cysticerci* on dissection." (KÜCHENMEISTER, *Op. cit.* 121, 21.)

65. LEUCKART repeated and confirmed the above experiment, and recognised, in the mode in which *Cysticercus cellulosæ* is developed from the embryo of *T. solium*, exactly the same type as that above described as the type of the formation of the so-called *Cysticerci* in general. It may, however, be noted, that this worm acquires the vesicular form, and becomes covered with a vascular net, rather early, and at a time when no trace of the head can be observed. The first appearance of the head commences in *Cyst. cellulosæ* soon after the seventh week, at which time the embryo is about 2·5 millim. in diameter.

66. (*d.*) *The Scolex of Tænia solium, Cysticercus cellulosæ*, has hitherto been found in the most various muscles; in the *muscles* of the heart, in the *cellular tissue*, in the *brain*, and in the *eye* of man. In these it acquires various forms and sizes, according to the space afforded for its development. In the ventricles of the brain and eye, its caudal vesicle attains even the size of a walnut, and remarkable forms. The size and form of the *Cysticercus* are determined chiefly by excess of nourishment, and by softness, looseness, and other properties of the tissues in which it occurs. The form is not material, the nature of the worm is the same.

67. (*e.*) The *symptoms* it produces differ with its seat or position. It is almost harmless in the *subcutaneous cellular tissue*. In *muscles* it often occasions but little inconvenience. In the *muscles of the heart*, however, it may cause softening and other organic lesions. But its situation in the deeper muscles, even in the muscles of the heart, admits not of diagnosis. The situation of this *Cysticercus* in the *eye* is very important.—*a.* It has been found *between the conjunctiva* and the *sclerotica*, where it is of least serious occurrence, as it may easily be removed by operation, as in cases recorded by HÖRING, ESTLIN, BAUM, and others. —*b.* In the *anterior chamber*. It was first seen in the living subject by SÖMMERING and SCHOTT; and in the *posterior chamber* by VON GRAEFE. — *c.* In the *vitreous humour* by the last-named writer and others.—*d.* In the *retina* and under the *retina*, in very rare cases. In these latter situations this cystic worm has been detected during life chiefly by means of the ocular speculum of HELMHOLTZ. In most of these cases, partial or complete loss of sight by the affected eye, squinting, movements of the worm, infla mation of the structures, followed by partial d organisation, and a greenish tint of the vitreo humour, were the symptoms chiefly observe In rare instances only were tape worms prese or *Cysticercus* present in other parts of the boc —*e. Cysticercus cellulosæ in the human brain* s dom occurs, and as seldom can be recognis during life, unless, conjoined with cerebral sym toms, vertigo, &c.—*f. Cysticerci* are observed other parts of the body, or *Tænia solium* h existed at an earlier period of the life of the patie

68. ii. TÆNIA MEDIOCANELLATA[*] (KÜCHENMEI TER).—DESCRIPTION. (*a.*) The epidermis of t animal is distinct, soft, consisting of delicate d cussating lines, without calcareous corpuscle Underneath are longitudinal fibres, runnir through the whole body of the animal; thes as well as the next layer of transverse fibres, co tain the calcareous corpuscles embedded in ther The size of the sucking discs, which are qui black, gives the head of this *Tænia* a considerab bulk. Transverse vessels run through the spac between the sucking discs, and from these branch runs to and around the discs, until th four longitudinal vessels are developed from ther in the neck; these vessels becoming thicker a the segments increase in size. The segment which have a great tendency to increase i breadth, are at first 1 millim. in length, and abou three in breadth. Afterwards, also, the breadt predominates over the length for a considerabl space. But this proportion does not continu downwards, and segments of 1—1½ in. of lengt and only 3—4 lines in breadth are met with. Tha the last segments or proglottides have a tendenc to pass away without fæces is beyond a doubt but this also takes place with *T. solium*, althoug more rarely. The segments usually pass whe the patient is standing, and passing along th thighs, occasion a moist and cool sensation, an are found creeping over the surface.

69. (*b.*) This *Tænia*, when artificially expelled breaks off close to the neck. After the lapse o about ten weeks from this expulsion, a fresh passage of proglottides takes place. From the spontaneous passage of these without fæces it may be inferred that the reproduction and growth of the segments are extremely rapid, and that the anima must be more injurious to its host than *T. solium.*

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[*] "Tænia matura.—*Species longissima* (*ad* 12—14 *ulnas longa*), *latissima, crassissima.* Capite *inermi, permagno, ad* 2 *millim. lat., valde nigrescente; acetabulis* 4 *permagnis* (*ad* 0·367‴ = 0·829 *millim. long. et* 0·259‴ = 0·711 *millim. usque lat.*).

"Systemate vasculoso: *in capite simpliciore, quam in* T. solium; Corpore calcar.: *ad* 0·012 *millim. in capite, ad* 0·018 *millim. in articulis magnis, magisque numerosis, quam in* T. solium. Rostellum *nullum.* Collum *perbreve, sed distinctius, quam in* T. solium. Articuli *posteriores latissimi, ad* 17 *millim. lat. et ad* 9—14 *millim. long. crassi;* poris genitalibus *irregulariter alternantibus.* Proglottides *permagnæ et pervicaces, sæpissime sponte et sine fæcibus humanis ex ano demissæ, ægrotumque valde perturbantes; in maxima sua extensione* 25—30 *millim. long. et ad* 7 *millim. lat.*

"Uterus *permultos ramos* (*ex utroque latere usque ad* 30) *in margine libero clavæformes, non amplius dentritice, ad summum bifurcatim divisos, inter se parallelos.* Ovula *magis ovalia, læviora, et clariora, quam in* T. solium, *ad* 0·036 *millim. longa et* 0·028—33 *lata.* Testâ *crassa uti in* T. solium. Embryones 0·028—32 *millim. longi,* 0·023—26 *lati.*

"Scolex *quiescens ignotus. Fortasse in sue aut bove, fortasse in animal. inferior. ordinum.*" — KÜCHENMEISTER.

CHENMEISTER mentions a case in which the nber of proglottides, which passed almost daily, ounted, in the aggregate, to upwards of 100 in 80 days; and that in the course of this e 1¼ foot of tape worm was passed and regene- ed each day. The internal irritation of the tum and anus, produced by these segments en forcing their passage, and the unpleasant mminess they occasion, especially by the depo- on of their eggs, which often also occurs at this e, and which appear like to a white moist sand, very distressing to the patient. In the case t referred to, from 5—15 proglottides passed ly from the patient with the fæces; and as se immediately laid their eggs, the fæces looked f sprinkled with white sand.

0. (*c.*) The *Scolex* is unknown. In Dresden it not be rare, as this *Tænia* is not uncommon re. It is not improbable that the cystic worm onging to this species may occasionally occur ongst the specimens pronounced to be *Cysticer- cellulosæ*. This point might have been deter- ned by feeding pigs with the eggs of this *Tænia*. intelligent patient, from whom KÜCHENMEIS- expelled this *Tænia* by means of his prepara- of the extract of pomegranate root, states that had observed his tænia soon after dining fre- ently, at an eating house, on raw beef steaks green salad and radishes. The scolex was her seated in the beef, or in mollusca in the ad or on the radishes. "The *embryos* resemble size and structure those of *T. solium*. Their grations are unknown." Its *habitat* appears to in Europe and Africa.

71. VARIETY* *from the Cape of Good Hope.* A number of segments of this *Tænia* were ex- led by pomegranate bark, and like *T. medio- ellata* were very difficult of expulsion. They re destitute of head and neck. Its total length st be at least 6—10 yards. Its segments are y thick, white, and fat; in the mature state re than one inch in length, and 3—5''' in adth, and extremely massive. They are dis- guished by having a longitudinal ridge along whole of the mature and immature segments. is *Tænia* is rich in cholesterine. Mr. ROSE, who t the segments to KÜCHENMEISTER, states that migrations of the six-hooked embryos and the lices are unknown, that it is impossible that latter should live in the flesh of pigs, as the rm was obtained from a Hottentot, and the ttentots, like the Jews and Mohammedans, eat pork. A thick *Tænia* occurs in Abyssinia, ong Mohammedan inhabitants. The Hottentots obably brought this tape worm with them from Caffre wars, in which they enjoyed themselves ongst the cattle of the Caffres. The *scolex* obably lives in their cattle and sheep. May t the scolex have been a *Cysticercus tenui- lis?*

72. iii. TÆNIA NANA † (BILHARZ; VON SIEBOLD).—This small filiform *Tænia* has broad and perfectly developed segments, and a large quadrangular head, at the angles of which the round sucking discs are placed upon globular elevations. The head is flat in front, and gradually diminishes in breadth, and passes into a long slender neck, which is followed by segments which become broader, until at last the hinder segments are three or four times the width of the head. These *Tæniæ* occupy only a limited space of the ilium. The *ova* are globular. The six hooklets of the embryo *Teniæ* are distinctly seen in the fresh ova. From the number of the *Tæniæ* found, and their very small size, KÜCHENMEISTER has believed this worm to be a *Tænia echinococcus.*

73. iv. SYMPTOMS AND DIAGNOSIS OF THE MATURE CESTOIDEA OCCURRING IN THE HUMAN INTESTINE, OF BOTH BOTHRIOCEPHALI AND TÆNIÆ.—KÜCHENMEISTER remarks that the stronger the patient is, the less the irritability of his system, the more regular his appetite and food, the fuller and richer his nourishment, the fresher his colour, the less he is inclined to diarrhœa, to anæmia, and chlorotic symptoms, the less does he complain of tape worm. According to most writers, chlorotic or anæmic symptoms are increased by the great appetite of the tape worm for proteinic substances, calcareous salts, and fat; and according to the degree of the symptoms are also the complaints of the patient. SEEGER gives the following statement of the frequency of particular symptoms in 100 cases of tape worm:—In 68 instances nervous affections and general or partial convulsions occurred,—epilepsy, hysteria, abdominal spasms, convulsive cough, dyspnœa, melancholy, and hypochondriasis. In 49 cases nausea, with faintness and vomitings, was present; in 42, various pains in the abdomen; in 33, disordered digestion and irregular states of the evacuations; in 31, irregular appetite and voracity; in 19, habitual or periodical hemicrania; in 17, sudden colic; in 16, sensations of undulatory movements in the abdomen up to the chest; in 15, vertigo, delusions of the senses and defects of speech; and in 11, shifting pains in various parts. These *symptoms* are deceptive; many of them will be often experienced after the worm has been completely expelled; and even viewed in connection with the patient's habits, occupations, and residence in a locality in which the *Cestoidea* are known to be prevalent, are not of themselves diagnostic of the existence of tape worm. It is only by the discharge of segments of the worm, that the nature of the disease can be satisfactorily recognised. The passage of the segments *per anum*, either with the fæces, especially when there is diarrhœa, or without this accompaniment, is the most frequent. The discharge of them by the mouth is extremely rare, and can occur only when there is violent vomiting, and when there is dangerous obstruction of the bowels. The passage of them through the intestines into the peritoneal cavity, or into the urinary bladder, or through fistulæ opening on the surface of the body, can occur only when ulceration of the intestines has been followed by perforation and a fistulous com-

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* "*Nihil notum, nisi* Strobilæ *pars posterior. Articuli r totum corpus, cristâ longitudinali præditi, crassi, longi. Pori genitales marginales alternantes.* Uterus ovula *simillima illis* Tæniæ mediocanellatæ. *Veri- millimum est, strobilam mihi notam proliferatam esse a* æniæ mediocanellatæ *scolice quodam* 6 *osculis ornato.*" KÜCHENMEISTER.

† "Corpus *filiforme, depressum;* Caput *antice obtu- um, collum versus sensim attenuatum, acetabulis sub- obosis, rostello pyriformi uncinulorum bifidorum corona rmatum. Articuli transversi; cirri unilaterales, ovula globosa; testa lævi simplici* (?) *instructa* $\frac{1}{100}$''' *magna. Longitudo totalis* 6 — 10'''. *Patria Ægyptus, in hominis intestino tenui semel reperta numero permagno.*"—KÜCHENMEISTER.

munication in either of these directions, or after wounds penetrating into the bowels. These several ways by which segments of tape worm were passed externally were known to the older writers, and were ascribed by them to the mechanical or perforating action of the worm. But it is singular, that, whenever ulceration and perforation of the bowels occur coincidently with the presence of worms, an instinctive desire of the latter to escape from the bowel, through either the morbid opening or the natural passages, is observed.

74. v. IMMATURE TÆNIÆ FOUND IN THE HUMAN BODY EXTERNALLY TO, BUT NOT WITHIN, THE INTESTINES. — *These form the* CYSTICI and ACEPHALOCYSTIDES *of older writers.* The CYSTICERCUS CELLULOSÆ, being identical with *Tænia solium*, has been noticed when treating of that tape worm (§ 62, *et seq.*). I shall only briefly notice the other Immature Tæniæ occasionally found in the human body externally to the intestines.

75. *A.* CYSTICERCUS TENUICOLLIS (ESCHRICHT), CYSTICERCUS VISCERALIS (AUCT.).—As the *mature Tænia*, of this cystic worm is not found in man, but chiefly in the dog and wolf (*Tænia marginata*), I shall not occupy any part of my limited space by describing it, but refer the reader to Dr. LANKESTER's translation of KÜCHENMEISTER's work (p. 178.).

76. (*a.*) The *Scolex or immature state*[*] of this *Tænia*, however, being sometimes formed in man, especially in former times, requires a brief notice at this place; it forms the *Cysticercus tenuicollis* of recent writers, and the *C. visceralis hominis* of earlier authors. The rarity of this scolex in human subjects in modern times has induced VIRCHOW and DIESING to doubt its occurrence, whilst ESCHRICHT has proved its rare appearance in man, especially in the liver.

77. (*b.*) The *structure of this Cystic worm* is rendered remarkable by its frequently enormous caudal vesicle, which in animals may attain the size of a child's head, by the concentric wrinkles or rings, visible externally, which pass round the worm, and which are crossed by very fine longitudinal striæ, so that, when it is laid upon a plate, and held on the same plane with the eye, the animal has a finely chequered appearance. In the dead *Cysticercus tenuicollis*, incrusted with calcareous matter, these concentric rings may be recognised, and the calcareous deposit often forms a plaster-like cast of the form and structure of the cystic worm. The parietes, also, when a transverse section of the dead *Cysticercus* is made, present a structure consisting of concentric strata, analogous to that of the *Echinococci*. Here, however, it is so extremely fine and delicate, that there is great trouble in detecting it.

78. *B.* ECHINOCOCCI.— Some naturalists admit only of one species or variety of *Echinococcus*, others of two, and others of even a greater number. VON SIEBOLD divides this species into *E. hominis* and *E. veterinorum*; but, from t accounts of various writers, both varieties ha been found in the human subject.

79. 1st Var. ECHINOCOCCUS SCOLICIPARIEN — *Echinococcus veterinorum*, of authors.

SYNON.:—*Tænia visceralis granulosa*, GÖZ *T. granulosa*, GMELIN; *Vesicaria granulos* SCHRANK; *Hydatis erratica*, BLUMENBAC *Polycephalus hominis*, GÖZE; *Pol. granulos* ZEDER; *Pol. Echinococcus*, ZEDER; *Echinococc veterinorum*, RUDOLPHI; *Echin. giraffæ*, GERVAI *Echin. simiæ*, RUDOLPHI, aliique; *Echin. gran losus*, RUDOLPHI; *Echin. infusorius*, LEUCKAR *Echin. polymorphus*, DIESING; *Echin. scolic pariens*, KÜCHENMEISTER.

80. (*a.*) The *mature Tænia* has hitherto not bee found in the human subject. VON SIEBOLD in 185 and KÜCHENMEISTER in 1854, bred this *Tænia* b giving *Echinococci* to dogs. The description the subjoined definition gives all that is require to be known of it; but the *eggs* and *six-hooke embryos* must occur at some period in the huma intestines, in the water and raw articles of die especially vegetables, fruits, roots, &c. Like th embryos of other *Tæniæ*, however, they escape th human eye. "Their migration is certainly pe formed, like that of the embryos of other *Tænia* by their perforating the intestine and getting int the abdominal cavity, where they prefer attachin themselves to the liver or the kidneys, or to th organs in the thoracic cavity. A portion of them however, may migrate along the *ductus choledochu* to the outer surface of the liver." They take u their position in the same way as the other *Cestoidea* the envelopes formed around them being simila but much thicker.

81. (*b.*) The *Scolex* forms a vesicle which, according to ESCHRICHT, measures 2½—3 inches, and i firmly attached to the organ in which it dwells. Th enveloping cyst is like others, but more conceale and more abundantly permeated by proteinous un organised substances, by which its walls are thickened. It may be partly separated into layers, the inner being smooth, like a serous surface. A secon vesicular body fits exactly to the inner surface of th innermost layer of this enveloping cyst, and is th true *cystic worm*, the so-called mother vesicle of th *Echinococci*, that is, the six-hooked embryo, which continually increasing, has attained an extraordinary size. It is almost impossible to get the cysti worm uninjured out of its cyst, to which it ad-

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[*] "Scolex quiescens=Cysticercus tenuicollis.—Vesicâ caudali *tenui permagna* (1, 2, 4, 6″ et ultra); Corpore 14—30 *millim. et ultra longo*, 5—10 *millim. lato, cylindrico;* Collo 8—15 millim. *longo;* Capite *uti in Tænia filis* 2 *gelatinosis, pone collo ex receptaculo capitis aut scolicis in vesicæ cavitatem emissis.* Metamorphosis *in Tæniam* 10—12 *hebdomadis post pastum peracta.*

Habitat. *Rarius in hominis abdomine (mesenterio et hepate), sæpius in Ruminantium, Equi, Suis Scrofæ Sciuri, Simiæ, &c., cavitate abdominali.*"—KÜCHENMEISTER.

[*] Tænia matura.—*Tænia minima, ad* 3 *millim. longo corpore* 3-*aut* 4-*articulato.* Capite *subgloboso*, 0·3 *millim. lato;* rostello *parvulo, rotundato*, 0·125 *mill. longo;* osculis suctoriis *magnis* 0·13 *mill.*; hamulis *in duplic ordine positis* 28—36, *quorum majores ex Leuckartii mensura* 0·045, *minores* 0·038, *ex meis mensuris* 0·034 *et* 0·02 *habent.* Collo *longiusculo.* Articulis 3—4, *quorum ultimus toto corpore longior* (2 *mill. long.* 0·5 *mill. lat.*) *est.* Utero *medianâ loculis et stolonibus nec ramis propriis instructâ;* Ovulis *ovalibus*, 0·034 *long. et* 0·030 *lat., testa* 0·0019 *mill. crassa, cavitate interna* 0·027 *lat. et* 0·03 *long.*

Habitat. *In Canis domestici, imprimis in Canis lanii, fortasse etiam in Canis lupi, tubo intestinali.*

Scolex quiescens.=Echinococcus scoliciipariens. *Vesica minus pellucida, membranacea, in pariete ad* 1—2 *mill. crassa, ex pluribus* 0·005—0·01 *mill. crassis lamellis concentricis composita, parvulas gemmas* (brood-capsules) *stylosas gignens, in quibus scolices singuli proliferantur, magnitudinem* 30 *mill. et ultra exhibens. Scolices sociales gemmis disruptis libere in vesicam emissi, parvuli, capite Tæniæ modo dictæ.* Metamorphosis *in Tæniam post* 7—8 *hebdomades peracta.*

Habitat. *Interdum in homine, plerumque in aliis animalibus plerumque domesticis ex ordine ruminantium e herbivoracium.*"—KÜCHENMEISTER *in Op. cit.* p. 192, 3.

res so firmly. The walls of this worm are stic, and tremble like jelly, when touched, even er they are empty. They never collapse alto- ther as seen in *Cysticerci*, nor lie, like these, even en dead, at the bottom of the envelope-cyst. eir cut margins roll themselves up, and present gaping appearance. The transverse section of s cystic worm shows a structure of more or less merous consecutive circular strata, varying ac- rding to age.

82. *c.* The *structure* of this cestode has been scribed by Eschricht, Von Siebold, and others, o say that its parietes consist of two similar mem- anes, loosely connected, the outer being firm and rtilaginous, and the inner thin and smooth, resem- ng a mucous surface, which is beset with small vations of a size up to ¼‴, which are partly very ung scolices, in the act of development, partly ther developed scolices of $\frac{1}{10}$‴, and partly the ints on which such scolices formerly sat. In fluid contained in these vesicles there are also e scolices, part of which are still furnished with e remains of the stalk. For other minutiæ of ucture I must refer the reader to Dr. Lankes- r's translation of Küchenmeister's work.

83. This cestode worm is found chiefly in the *er* of man and ruminating animals. It has been tected also between the choroid coat and the retina the human subject. When present in the *liver*, s organ is generally swollen, especially posteri- y, pale, or of an uniform greyish-brown colour. surface presents larger or smaller spots of a itish-yellow colour, of a regular form, and very ghtly raised. This species is generally seated deeply as hardly to project above the level of surface of the organ, unless it is very largely veloped.

84. *d.* The *symptoms* caused by this *Echinococ- s* are usually slight, limited, and equivocal. The sicles seldom exceed the size of a walnut or hen's g. Even when they are present in numbers, their gnosis is most difficult. When they are small few, the disturbance of the functions of the liver y be slight. When more numerous or more ly developed, there are generally pain and un- siness in the hepatic regions, with increased in on pressure and percussion; the dull sound percussion being more extensively heard, and liver being often felt from one to two inches low the false ribs. There is also irregularity the bowels, the evacuations being unhealthy, d often deficient in bile. Jaundice is some- es observed. But all these symptoms may be used by other lesions of the liver.

85. *B.* ECHINOCOCCUS ALTRICIPARIENS. *Echin. minis*, Auctorum.

86. Küchenmeister* believes that this species has been confounded with the preceding.—*a. Its mature Tænia is unknown.* Nevertheless, he thinks that it probably occurs in the human intestines, and indeed in the intestines of those individuals who suffer, or have suffered, from the species of *Echinococcus* belonging to it in some part of their bodies, and in whom such a colony of *Echinococci* has opened towards the intestine. This *Tænia* may also develope itself in the intestines of domestic carnivorous animals. That the eggs and embryos must occur at some time or other in the human body must be admitted, although they escape observation from their small size.

87. *b. The Scolex—the Echinococcus altriciparіens*—occurs not only in man, but also in the larger domestic animals, especially Herbivora. It is very prevalent in Iceland. Dr. Schleissner states that he saw fifty-seven human patients suffering from *Echinococcus* in that island; that it occurred more frequently inland than on the coast; and that it constituted one-eighth of the diseases of the place. Dr. Thorstensohn of that island says, that every seventh living human being in it suffers from *Echinococci;* that females are more liable to them than males, and that their abundance increases with age, men being most frequently attacked by them between their thirtieth and fortieth, and women between their fortieth and fiftieth years.

88. *c.* The *characteristics* of this species of *Echinococcus*, as distinguished from the preceding, appear to be as follows:—(*a.*) The enveloping cyst, and the mode of annexation of the inner wall of this cyst to the primary vesicle of the *Echinococcus* derived from the six-hooked embryo, are similar in this and the foregoing species; but the cyst formed by *Echin. altriciparіens* is much larger than that of *Echin. scoliciparіens*, and hence projects far above the level of the organ in which the colony exists.—(*b.*) Owing to its much greater bulk a proportionately increased interference with the functions of the organ results, and eventually with the whole organism.—(*c.*) As regards the animal itself, we find not only single scolices or a single vesicle in such a colony, but the constant production of fresh vesicles with young (daughter- and granddaughter-vesicles), sometimes with, and sometimes without, the production of separate scolices adhering directly to the walls of the vesicle. According to Thorstensohn and Schleissner, the hydatids occurring in Iceland exhibit this structure. "The hydatid sacs," they state, "are formed not only in the human liver, but also in many parts of the abdomen, and are often of enormous size. Hundreds of hydatids are frequently evacuated through the external opening of the sac, or with the stools, and in vomiting. They do not, however, occur only in the interior of the body, but also very frequently in the skin, where they appear like large saccular swellings. The course of the disorder is very chronic." Küchenmeister states that the vesicles produced do not, like the original mother-vesicle, bear six embryonal hooklets, as they never have occasion for them. The six hooklets may be sought for in vain, even in the mother-vesicle, as, although certainly present, they must, from their extreme minuteness, escape detection on such a large

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* He gives the following definition of its Scolex:—Vesica animata Echinococco scoliciparіenti *similis sed nino eo multo major* (ad ½ *ped. in diamet.*). Scolices *guli quiescentes majore hamulorum minorum numero* , 52 *et ultra*) *armati parantur, aut ex modo* Ech. liciparientis, *aut in gemmis aut capsulis a vesicæ ma- s superficie interna solutis in quibus iterum scolices vesicæ secundariæ scolices gignendi si præditæ gignun-* (mother-, daughter-, and granddaughter-vesicles); *t fortasse in vesicis, quæ divisione quadam aut sec- ne ex vesica matre in vasibus animalis hospitis repente serpente formantur. Vesica mater nihil aliud est nisi icula embryonalis* 6 *hamulis armata, et valde amplifi- a; vesicula filia et neptis hamulis* 6 *destitutæ, quia ex icula embryonali rectâ viâ non exortæ sunt.*

' Habitat. *Non solum in homine, sed etiam, auctoribus ubnero et Creplino, in mammalibus majoribus domesticis, et quidem in diversissimis et hominis et illorum animalium corporis regionibus.* Ovula, *hucusque ignota.*"

vesicle. The smallest of the granddaughter-vesicles are but just visible, and enclose four, five, or more scolices, which adhere periphericallly, by a small stalk, to the inner wall of the common cyst, but converge with thin free ends towards the centre of the cavity of the small vesicle. In very large daughter-vesicles scolices also swim about freely. — (*d.*) The scolices produced or *nursed* by the mother-, daughter-, or granddaughter-vesicles, are in general more slender than those of the preceding species: they have the head with the double circlet of hooks, more frequently protruded during life, at least within the larger daughter-vesicles, exhibit distinctly marked sucking-discs, and bear a greater number (46—54) of hooks, which appear more slender than in the preceding species. — (*e.*) The dwelling places of this species are not limited. They may occur in the liver, the lungs, the kidneys, the sheaths of the testicles, the spleen, the ovaries, the breasts, the throat, in the sub-cutaneous tissues, in the bones, &c.—(*f.*) With the increase of the secondary and tertiary cysts in the mother-cyst, the swelling advances; and the more rapidly this takes place, the recognition of the malady and its natural cure are facilitated; inasmuch as the mother-cyst is often burst by the distension, and probably in many cases becomes destroyed. Sometimes, however, the burst colony appears to heal and to recommence the production of fresh daughter-vesicles.

89. *d.* The *prognosis* of this species is more unfavourable than that of the preceding, "although the *diagnosis* is easier, on account of the more rapid growth and greater bulk of the swelling, the occurrence of the hydatid-buzzing, and the more distinct sensation of fluctuation. The structure of the walls of the mother-vesicle is the same in both species, and is characterised by the numerous parallel concentric layers in the substance of the walls, which appear more distinctly marked in the daughter-vesicles, and make their appearance with remarkable clearness after treatment with caustic potash, with the addition of a drop of red ink." (LANKESTER'S *Transl. of* KÜCHENMEISTER, &c.)

90. *e. The Diagnosis of Echin. altricipariens.*— The symptoms produced by a colony of these parasites vary with the organ in which it is located, and with the size and pressure of the tumour it develops. At an early stage of their growth these animals generally occasion little inconvenience, and when largely increased in bulk, they produce phenomena which vary little from those occasioned by tumours of the same size, in similar situations. Their superficial or deep-seated positions, and their vicinity to, and pressure upon, nerves and blood-vessels, will also modify effects, or even indicate their existence. But it is comparatively rare to obtain certain evidence of the presence of a colony of *Echinococcus* in the body, unless the passage of the gelatinous vesicles already described from the cavities after the bursting of such a colony, or from the punctures or incisions made into tumours. At the same time, the little scolices of the *Echinococcus* must be found in the vesicles, part of these retaining, others wanting their hooks, their sucking-discs being often indistinct. When the vesicles passed have an opening, the little scolices slip out very easily, and if the structures just mentioned be not found, it is doubtful whether or no a sterile colony or an acephalocyst be present.

91. Before perforation or bursting of the cyst has occurred, the tumour produced by it being ve considerable, an examination of it should be ma by palpation and percussion, and if there be obscure or sensible fluctuation, and when aneur mal symptoms are wanting, and when the gene health is either good, or not injured to the exte that might be expected from the size of the tumou if it were of a malignant nature, then an explo tive puncture should be made to complete t diagnosis, and the evacuated fluid examined the microscope in order to ascertain the presen of *Echinococcus scolicis*, or of albuminous ge tinous shreds of *Echinococci*. By these mea only can the nature of a cystic or sacculate fluctuating or elastic tumour be determined, a the existence of these parasites ascertained.*

92. Without these proofs the diagnosis c never be brought beyond one of probability. A sa culated or cystic swelling filled with fluid can alo be inferred. The most useful objective sympto are the existence of such a tumour, which elastic to the touch, and of a peculiar consisten

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* ACEPHALOCYSTS. — LAENNEC in 1804 viewed th structures as independent animal organisms. VON S BOLD and KÜCHENMEISTER more recently opposed t view; and very lately, the last of these writers, in c sequence of his experiments with the eggs of *Tæn* considered *that Acephalocysts are six-hooked cestode e bryos, the growth of which has proceeded without h drance, but which nevertheless have remained barre or, more correctly, which have never attained to pr feration and the production of scolices.*" If Acepha cysts occur where normally developed *Echinococci* u ally have their abode, they cannot be called strayed c tode embryos, but only *cestode embryos which have b disturbed in their normal developement and remai barren.* KÜCHENMEISTER considers the following to the characteristic marks of Acephalocysts: — 1st. A sicle adhering to the inner walls of a larger cyst fr which it is capable of being detached, or is already tached, in particular spots, but never all over, and lapsed in wrinkles, and which presents very sparing cification in its white, and scarcely discoloured walls 2nd. The transverse section exhibits walls consisting distinctly developed, parallel, concentric layers. — 3 The walls have a peculiar, elastic gelatinous trembling 4th. The contents consist of a watery fluid, or of a s stance of a purulent consistence, and contains the mic scopic elements of calcifying encysted proteine masse the act of resorption. — 5th. The vesicle sometimes c ceals, in its interior, secondary cysts, with gelatin walls, in which, however, we seek in vain for scolices cestodea or their remains, especially their hooks. " Acephalocysts which are referred to here belong to following three species of Tæniæ:— 1. Acephalocysts rived from *Tænia Echinococcus scolicipariens.* M of those acephalocysts which bear no daughter-vesi in their interior, must be referred to this species. Acephalocysts derived from *Tænia Echin. altrici riens.* These are acephalocysts with a formation daughter-vesicles. 3. Acephalocysts derived from *niæ ex Cysticerco tenuicolli.*" KÜCHENMEISTER rema respecting these last that what ESCHRICHT regarded possible, has since proved to be the case; for that in administration of eggs of *T. ex Cyst. tenuicolli* to a la he found a sterile *Cysticercus tenuicollis* in the midst other equal-sized and fully developed *Cysticerci* of species. This sterile individual bore perfectly disti indications of life. All structures, he adds, which really acephalocysts, and which are living sterile sp mens of *Cysticerci* and *Cœnuri*, are distinguished fr those derived from *Echinococci* in that the walls of latter consist of very distinct concentric layers, trem like jelly, and are extraordinarily elastic; whilst walls of the analogous structures derived from *Cystic* are considerably thinner, have not the elastic cons ence of jelly, and consist of such fine and delicate c centric layers as hardly admit of detection. Such be the origin and nature of *Acephalocysts*, it is obvious t the phenomena produced by them cannot be materi different from those caused by the two species of *E nococcus.*

The subject of *Acephalocysts* has been already trea of under the article HYDATIDS; but instead of view them as in that article, as independent organisms, more recent Continental microscopists and experim ters have shown them to originate as now stated.

nd form, in places where swellings do not usually ccur; but, when those do make their appearance, ey are generally *Echinococci.* The highest degree f probability that an unopened tumour belongs a colony of *Echinococci* is attained when the welling occurs in places such as the liver, spleen, idneys, lungs, breast, testicles, throat, &c., where *chinococci* are otherwise brought to light, either rtificially or naturally. On *percussion,* the finger, laced over the swelling, often feels a trembling or scillation of the mass underneath it, especially when everal gelatinous tremulous cysts are inclosed ithin a larger vesicle; these being set in motion y the percussion appear to produce this trembling r oscillation, which however frequently is not felt.

93. *f. The Etiology of the Echinococci* is mani- stly the ingestion of one or more of the eggs or six- ooked embryos of the *Tænia Echinococcus altrici- ariens,* at some time of the life of the patient. he mode of life of persons in some localities, and some circumstances, may be favourable to the assage of the eggs of this *Tænia* into the stomach; nd it is now well understood that certain *Cestodea* ften have a very limited habitat. "The *duration the life* of the *Echinococcus* does not appear to e very short. According to Eschricht, one atient must have borne his colony eighteen ears."

94. *g. The Prognosis of the Echinococci* varies cording to the organ in which they are seated, to eir situation in that organ, and to the primary and nsecutive injuries caused by them to the organ d to the whole system. But the prognosis is pon the whole more favourable than is generally pposed, especially when the general health and e powers of vital existence are duly promoted. The tumours, when they are accessible, are nongst the number of curable tumours; they ay cure themselves by bursting, and when they e once got rid of, relapses in the same colony e rare and exceptional cases, and every *Echino- ccus* produced usually owes its existence to a w immigration of embryos. But for this very ason the continuance of the mode of life in en- emically affected places furnishes a more un- vourable prognosis. The natural cure by the ursting of the colony, and the passage of daughter- esicles may be accompanied by symptoms dan- erous to life, or if it take place in the direction the larger bronchi, by difficulty of breathing, may even lead to actual suffocation." (*Op. cit.* . 227, 228.)

95. *B.* Sub-order, Trematoidea—Synon.— *yelmintha,* Diesing; *Egelwürmer; Platyelmin- a isolata,* Isolated flat-worms, Küchenmeister.

Definit. — "*Animalia solitaria, plerumque ermaphroditica, rarissime sexu distincto, et poris erumque suctoriis, medianis aut lateralibus in- ructa. Canalis cibarius furcatim divisus aut mosus, rarissime simplex. Evolutio fit plerumque etamorphosi et sæpissime generatione alternante, rissime sine illis.*"—Leuckart.

96. This *sub-order* is divided by Küchen- eister into two *Families,* the *Monostoma* and the *istoma.*

97. (*a.*) Monostoma.*—Synon. *Cucullanus; Festucaria; Fasciola; Amphistoma; Distoma; Monostoma; Monostomum.*—It is very doubtful whether or no any species of Monostomum has been found in the human body. Professor Jüngken was said to have found eight *Monostoma* in an incipient cataract; and hence Von Nordmann named the species *Monostomum lentis.*

98. (*b.*) Distoma* (Küchenmeister):— *Distomum* (Diesing).—*a. Distoma hepaticum*†—*Distomum hepaticum.*—The fully developed *Distomum hepaticum* has been minutely described by Küchenmeister, but I must refer the reader for his description to his work, or to its excellent translation by Dr. Lankester.—*a.* I may, however, briefly state that its *skin* and *parenchyma* consist of muscular layers—of longitudinal, transverse, fusiform, and short fibres; that its organs of sense are wanting, and its nervous system has not been described; that its alimentary apparatus presents a mouth, pharynx, and excretory organ; that its *female* sexual organs lie towards the ventral surface of the animal, and consist of a germ-stock, with its efferent duct, two vitelligines, a short oviduct, a sac-like uterus, and a vagina; that its *male* sexual organs consist of testicles, a ductus spermaticus, a vesica seminalis, and a penis; and that "the *Distoma* are hermaphrodites, with the following sexual actions: self-impregnation with and without copulation, and impregnation and

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* "*Corpus depressum vel teretiusculum. Caput con- uum, vel collo discretum. Os terminale vel anticum, plurimum acetabuliforme, integrum, crenulatum, in- me vel armatum. Apertura genitalium perclara, du- ex; mascula infra os, interdum acetabuliformis, pene protractili; feminea pone masculum, minima, ut plurimum inconspicua. Porus excretorius supra caudæ apicem antico margine caudali. Animalia mammalium, avium, amphibiorum et piscium corpora,* i. e. *præter tractum intestinalem organa varia inhabitantia, libere aut folliculis inclusa.*" (Diesing.) *Metamorphosis et generatio alternans inter evolutionem, uti in Distomis.* The ventral sucker is therefore deficient, and Diesing gives a warning, "*Cave, ne Bothriocephalidearum articulum solitarium pro* '*Monostomum*' *habeas, aut porum genitalem, interdum callosum, cum acetabulo confundas.*"

* "*Corpus depressum vel teretiusculum, armatum vel inerme, Caput continuum, vel collo discretum. Os terminale, vel anticum, ut plurimum acetabuliforme. Acetabulum unicum ventrale sessile, vel pedicellatum, medianum, ab extremitate postica plus minusve remotum. Aperturæ genitales approximatæ, sæpissime ad exitum conjunctæ (cloacâ instructæ), supra vel infra acetabulum sitæ. Animalia plerumque hermaphroditica, rarissime sexu distincto. Ovula embryones parentibus rarissime similes, plerumque dissimiles aut fimbriatos, aut fimbriis destitutos continentia, quare evolutio fit metamorphosi et generatione alternante.*

"Statu immaturo *aut libere in natura vagantia, aut in organorum parenchymate, imprimis in animalibus inferioribus inclusa.* Statu maturo *entoparasita animalium præprimis vertebratorum, aut libere in variis organis et cavitatibus apertis et clausis viventia, aut in folliculis inclusa.*" — Dujardin et Diesing.

† "*Corpus planum, armatum, saltem in juventuti, ætate magis profectâ adhuc in collo. Individua juniora* $4''' = 9$ *mill. longa,* $1\frac{1}{2}''' = 3{\cdot}3$ *mill. lata; adulta* $8-14''' = 18-31$ *mill. longa,* $3\frac{1}{2}-6''' = 8-13\frac{1}{2}$ *mill. lata.*

"*Collum subconicum, breve. Os haud nodulosum, terminale, triangulare,* 1·4 *mill. latum. Acetabulum* 1·5 *mill. latum, ore majus superum ad colli basin, aperturâ triangulari,* 3–4 *mill. pone os situm.*

"*Orificia genitalia fere contigua, mediâ in parte inter os et acetabulum sita. Penis cylindricus,* 3 *mill. longus,* 0·5 *mill. latus, falciformis, prominens, uncinulis parvulis armatus. Testiculi maximâ ex parte mediâ in corporis posterioris parte siti, ex trunco mediano et ramificationibus, ad finem cæcis, compositi. Organa vitellina ad latera animalis sita, inter se horizontali quodam et transverso ramo conjuncta et statim in uterum simplicem magnitudine crescentem, multifarie volutum transeuntia. Ovula flava, mitra quadam parvula aut obtegulo, dehiscentia,* $0{\cdot}056-0{\cdot}063'''$ (*V. et Par.*) $= 0{\cdot}126-0{\cdot}144$ *mill. longa, et* $0{\cdot}035-0{\cdot}038''' = 0{\cdot}079-0{\cdot}086$ *mill. lata.*

"Embryones Cercariarum utriculi *aut Rediæ, nec minus* Cercariæ liberæ, *si omnino hæc forma præbetur, ignotæ. Migrationum modus nondum cognitus.* Distomum juvenile immaturum *semel sub cute humanâ inventum.*" — Küchenmeister.

copulation with a second indvidual." This *distoma* occasions great devastation in the livers of herbivorous and domestic animals, especially in wet seasons; but it very rarely occurs in man.

99. *b. Diagnosis.* — *Distoma* in the liver causes dilatation and inflammation of the gall-ducts, and destruction by pressure and disappearance of large portions of the parenchyma of the liver in the vicinity of the enlarged ducts. These changes, however, cannot always be recognised, or referred to their true source in the human subject, as several lesions of the biliary organs and apparatus occasion the same symptoms as they produce. The *distoma* may even cause many of the phenomena of gall-stones passing along the ducts, with or without more or less of jaundice; but these cannot assist in establishing a diagnosis, the passage only of the animals with the fæces or with the matters vomited being the only proof of their presence in the human subject.

100. *c.* It is obvious that no *prognosis* of the *Distoma malady* can be formed unless the animal be discharged and recognised. When this takes place, although the prognosis is upon the whole unfavourable, yet there may not be any immediate danger. The life of the patient may be prolonged or even a recovery ultimately obtained, by promoting the secretions and excretions by suitable means, and by supporting vital force and resistance.

101. *β. Distoma lanceolatum** (MEHLIS). This species was seen in the human subject by BUCHOLZ, CHABERT, and MEHLIS. It is narrow and elongated, and distinguished by its long neck, by the want of any spinous coat, and by the female organs especially occupying the abdomen, and the testicles the anterior part of the body. SCHAEFFER, RUDOLPHI, and MEHLIS established this as a distinct species of Distoma, and showed that GOEZE, ZEDER, BREMSER, were wrong in regard- it as a young *Distoma hepaticum.* It is stated by KÜCHENMEISTER to be less injurious to the structure of the biliary apparatus than the *D. hepaticum.* The *diagnosis* is possible only when it passes off. The *prognosis* is probably more favourable than in the case of the other parasite.

102. *γ. Distomum heterophysis*† (VON SIEBOLD). —This parasite has hitherto been found only in two instances, but in very great numbers, in the small intestines, by BILHARZ. Its influence on the animal economy is unknown. It is unnecessary to give a further description of it than that contained in the subjoined definition.

103. *δ. Distomum hæmatobium** (BILHARZ).— —*a.* This parasite was first found in 1851, in the blood of the portal vein. It appeared as a white elongated entozoon, resembling a nematoid worm when examined with the naked eye; but was found to be *Distomum,* with a flat body and a cylindrical tail ten times as long as the body. This tail was no loosely attached, deciduous portion of the body as in the *Cercariæ,* but a continuation of the body of the worm itself, which was flat and rolled towards the ventral surface. This first animal found was clearly recognised as the male; another subsequently found in one of the mesenteric veins of the same subject was ascertained to be the female For a minute description of the sexual organs eggs, and developement of this animal, I must refer the reader to KÜCHENMEISTER's work. It may however, be stated that, according to Professor GRIESINGER, this parasite is so extraordinarily abundant in Egypt as to have been found 117 times in 363 dissections. It would appear that the *Distoma* get into the blood-vessels and lay their eggs, which at last escape from the ruptured vessels in the intestinal and urinary mucous surfaces. Dr. REINHARD saw, hanging out of a vessel accidentally opened by KÜCHENMEISTER, one of these *Distoma* which bore his female with him. The action o their eggs and embryos on the mucous coat of the intestines and urinary organs, and on the biliary apparatus, is of a very dangerous nature.

104. *b. In the intestines* are found deposits upon and beneath the mucous membrane, verrucos

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* " *Corpus læve, lanceolatum, planum, aliquid pellucidum, aut ovulis flavofuscum,* 4·5—12 *millim. seu* 2—6‴ *longum,* 2 *ad* 2·2 *millim. aut* 1—2‴ *latum in anteriore parte tenuius, acetabulo finitum, in posteriore aliquid obtusum. Collum continuum, conicum, planum, longius quam in* D. hepatico. *Os fere terminale, globosum,* 0·48 *mill. latum, acetabulum orbiculare,* 0·48 *mill. latum,* 1·1 *mill. pone os situm, ore majus. Œsophagus* 0·48 *mill. longus, bulbus œsophagi* 0·10 *mill. latus; intestinum bifurcatum, rectum, simplex, non amplius ramificatum,* 0·04 *mill. latum.*

" *Genitalia inter os et acetabulum ventrale sese aperientia, inter intestini bifurcationem sita. Vesica seminalis exterior=cirrhus claviformis; funiculus spermaticus flexuosus; penis longus, cylindricus, plerumque rectus; testiculi* 2 *majores et tertius minor vesicam seminalem internam exhibens; unus pone alterum et pone acetabulum ventrale siti, vix lobati. Organa vitellina multo minora, quam in* D. hepatico, *albida, lateralia, ramificata,* 1—1½ *mill. longa, in ovarium et uterum intrantia, longiora quam in* Dist. hepatico *et tenuiora, sed colore obscuriore prædita, multifarie voluta. Ovulo multo minora, quam in* Dist. hepatico, 0·041 *mill.*= 0·018‴ *Par.* 0·0185‴ *Vienna longa, et* 0·0246 *mill.*= 0·0108‴ *Par.* 0·011‴ *Vienna lata, sed in statu maturo multo obscuriora quam in* D. hepatico, *et nigro-rubra.*

" *Systema excretorium: Vasa lateralia, ad collum usque prominentia, ibique recurrentia et intumescentiâ minore, ad animalis apicem sitâ, finita.*" — KÜCHENMEISTER.

† Descriptio. " *Dist. heter., hermaphroditum. — Corpus ovato-oblongum, depressum, subtus planum, supra leviter convexum. Acetabulum oris subapicale, infundibuliforme, parvum. Acetabulum ventrale paululum ante medium situm, magnum (acetabulum oris decies et ultra superans), globosum. Pharynx muscularis, globosa; canalis cibarius ante acetabulum ventrale in partes cæcas divisus. Cirrhus post acetabulum ventrale situs, et oblique cum sinistrâ ejus parte coalitus, globosus, acetabuliformis, circulo incompleto setarum* 7 *minutissimarum, ramulis* 5 *secundis instructarum coronatus, testiculis organoque germinifero globosis. Longitudine* ½—¾‴; *latit.* ¼‴.

" Patria. *Ægyptus; in hominis intestino tenui bi repertum, numero permagno.*" — KÜCHENMEISTER.

* Descriptio vermis secundum BILHARZ. " *Distomum hæmatobium, sexu distincto. Maris corpus molle, albidum filiforme, parte anteriore totius longitudinis octava ve nona ('trunco') depressa, lanceolata, subtus plana ve concava, supra leviter convexa, superficie lævi, reliqua corporis parte ('cauda') terete, margine corporis a acetabulo ventrali retro utrinque versus faciem ventralem conflexo, eoque modo canalem 'gynæcophorum' efficiente, apice postico, attenuato, superficie externa tuberculis piligeris conferta, superficie canalis interior linea mediana lævi et partibus lateralibus aculeis minutissimis scabra. Acetabulum oris apicale subinferum triangulare. Acetabulum ventrale sub finem 'trunci insertum, orbiculare eadem magnitudine cum acetabul oris. Superficies utriusque acetabuli granulis crebri minutissimis scabra. Canalis cibarius sine pharyng musculari ante acetabulum ventrale in* 2 *partes divisus in posteriore 'caudæ' parte denuo unitus, cæcus. Porus genitalis inter acetabulum ventrale et canalis 'gynæcophori' originem situs.*

" *Feminæ forma dissimilis, tenerrima, gracillima corpus tæniæforme, læve, hyalinum, antice sensim vald attenuatum, cauda canali nullo apice angustata. Acetabula et canalis cibarius, ut in mare. Porus genitali cum margine posteriore acetabuli ventralis coalitus.*

" *Longit.* 3—4 *lin.; mas feminam latitudine multo superans.*

" Patria. *Ægyptus; in hominis vena portarum ejusque ramificationibus et in vesicæ urinariæ parietibus In venis meseraicis reperiuntur mares feminam in canali gynæcophoro gerentes, in venis intestinalibus et hepaticis, in vena lienali semper vidui.*"

and lobate fungous excrescences, and also the aggregations of the eggs in the vessels of this membrane, "where the eggs are often fixed in rows in the mucous and sub-mucous tissues, in and beneath the croupous exudations upon the intestinal ulcers; and, lastly, after the rupture of the vessels upon the free surface of the mucous membrane."

105. *c. Action on the Liver.*—" The entire trunk of the portal vein is sometimes filled with mature animals, with eggs in the substance of the liver; and it is not impossible that the *Distoma* situated in these places may give rise to a tough, dry, anæmatous consistence of the liver, or perhaps even to abscesses."

106. *d. The alterations in the urinary bladder* produced by *Distoma hæmatobium* are at first circumscribed spots of hyperæmia, with bloody extravasation and swelling of the mucous membrane, or tenacious mucus, with greyish-yellow masses of exudation, in which the eggs are imbedded. " It is rare that the whole inner wall of the bladder is injected and ecchymosed. The urine is mucous, but pale and clear; and Bilharz found eggs in the urine passed." In later stages, yellowish discoloured elevations, mixed with many pigment spots. These elevations often form a soft coat, sometimes a line in thickness, mixed with bloody extravasations, firmly attached to the mucous membrane. Sometimes calcareous incrustations of the egg-shells, the deposition of the salts of the urine, and the aggregation of eggs, give the whole a sandy texture. Very rarely this coating covers true ulcers with loss of substance. At other times, single or aggregated vegetations, varying from the size of a pea to that of a bean, of a yellowish colour or ecchymosed with blood, are found on the vesicle mucous surface. In the smooth-edged spaces of these vegetations, sitting in the sub-mucous tissue, formed by the diverticula of its vessels, and only constituting productions of the vessels, Bilharz first found the Distoma, and in the mucus and exudation over these spots their eggs. We may conclude from this that the Distoma collect there, and in similar situations, to lay the eggs which are to be passed off.

107. *e. The mucous membrane of the ureters,* either alone or with that of the bladder, or even with that of the pelvis of the kidney, in rare cases, is attacked in a similar manner. A gravelly matter, in molecular masses of imbedded eggs of *Distoma*, either empty or containing embryos, with blood, exudation corpuscles, and crystals of uric acid, is sometimes passed in the urine. Individual embryos also occur free, but Griesinger found these in a dead state only. In consequence of the thickening of the inner coats of the ureters, complete or partial occlusion of these ducts with dilatations above it, with retention of urine and its consequences, sometimes supervene. The kidneys are somewhat swollen and congested with blood, and the mucous membrane of the pelvis is much injected. The kidneys, in rare instances, ultimately degenerate in a fatty or suetty state. " The aggregation of eggs of the *Distoma* are not unfrequently the nuclei of deposits of gravel and stones, consisting chiefly of crystals of uric acid, in the kidneys, ureters and bladder, and thus give rise to the well-known consequences of stone and gravel. This is the *Lithiasis* of the Egyptians, described by Prosper Alpinus in " Medicina Ægyptiorum."

108. The seasons appear to have some influence upon the frequent occurrence of this worm, as it has been observed to be more abundant from June to August, and more rare in September, October, and January. This difference is probably owing more to the kind and quality of the food in these months, than to temperature or season.

109. *f. The symptoms* of this parasite are manifested chiefly in the urinary apparatus, and in the urine itself, at an early period of the lesions produced by it. Causeless hæmaturia, especially if frequent, and attended by anæmia, emaciation, and disordered bowels, should be a cause of suspicion, especially in tropical countries. The *diagnosis*, however, during life, can be certain only when the eggs are found in the bloody urine and in other evacuations, as they were by Bilharz.

110. ε. *Distomum ophthalmobium* * (Diesing). — This parasite was found in the eye of an infant, between the lens and the capsule, by Gescheidt. The infant was five months old, and was born with *cataracta lenticularis*, with partial suffusion of the capsule. Four specimens of this *Distoma* were found, and were recognisable by the naked eye.

ii. Order, Nematelmia — Nematoidea. — Thread-worms, Round-worms.

111. The worms now to be treated of are the *First Order* of Rudolphi.—"*Nematoidea: Corpore elongato, tereti, elastico.*" Diesing, in his "*Systema*," arranges them as the *Sixth Order* of his *first sub-class*, and *defines them* —" *Nematoidea: Corpus elasticum, cavum, subcylindricum; tractus cibarius simplex; caput in proboscidem haud protractile. Endoparasitica, tandem rarius extus libere vagantia.*" They form the *second order* of Küchenmeister's *second sub-class*, and he *defines them as follows*: —" Nematelmia: Corpus *teres, elasticum, sæpe attenuatum, filiforme; ore centrali, vel sub-centrali; canalis cibarius aut distinctus aut obsoletus, anoque destitutus.* Metamorphosis *in paucissimis.* Migrationes *activæ aut passivæ in permultis.*"

112. *Mature Nematode Worms* are met with in the human subject in the cavities of the body, having mucous surfaces, in the sub-cutaneous cellular tissue, with an artificial external communication, and during their youth, and in an immature state, in various muscles, especially primitive muscular fasciculi. The division of this order of worms into numerous genera and species has been attempted by Dujardin, Von Siebold, Diesing, and others, but without sufficient agreement to admit of further reference to it than is made by Küchenmeister, who does not adhere to a strict classification, but rather reviews them in accordance with their dwelling place in the human body, and selects for them the name most generally employed. It was formerly thought that the *Nematoidea* were the most accurately known of *Entozoa*; but at the present day we have more positive knowledge of the history and developement of the Cestode Worms, and even of the *Trematoda*, than of this, the order of Round worms.

113. " The distinct presence of a digestive

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* " *Corpus ovato-lanceolatum, depressum, variabile. Collum breve subcylindricum. Os terminale orbiculare. Acetabulum ore* $\frac{1}{3}$ *majus, subcentrale, apertura circulari. Longitud.* $\frac{1}{4}$–$\frac{1}{2}'''$; *latitud.* $\frac{1}{6}'''$."—Diesing.

apparatus, divisible into mouth, œsophagus, stomach, intestine, and anus, the separation of the sexes into two individuals, the certain detection of a nervous system in some of them, and the apparently jointed structure of the round worms, bring them near to the Articulata. In the human subject we must take into consideration — 1, the *Trichocephali* and *Trichinæ*; 2, the *Oxyuri*; 3, the *Strongyli* and *Ancylostoma*; 4, the *Filariæ*; and 5, the *Ascarides*." (*Op. cit.* p. 289.)

114. A great part of the Nematode worms appear to reach maturity only after they have undertaken various immigrations and emigrations during their youth. One species of round worm common to man is to some extent capable of migration also in the mature state. The migration in the early stage of developement consists of the escape outwards of the eggs of these worms with the human fæces, with which they get into dunghills, sewers, &c., and experience the transitions described above (§ 7, *et seq.*). My limits admit not of an account of the sexual and other organs of this order of worms, and of the various stages of their developement; sufficient reference to these topics for practical purposes has already been made, and the reader may further peruse the minute descriptions of KÜCHENMEISTER and VON SIEBOLD, and of other recent observers, to whom I have referred.

i. TRICHOCEPHALUS.[*] — SYNON. *Trichuris*, ROEDERER; *Ascaris*, LINNÆUS; *Mastigodes*, ZEDER; *Trichocephalus*, GOEZE, DIESING, DUJARDIN, &c.

115. 1st. *Trichocephalus dispar*[†], with its progeny known as *Trichina spiralis*[‡], OWEN and LUSCHKA.

SYNON. *Trichocephalus dispar*, GOEZE; *Trichuris*, ROEDERER and WAGLER; *Ascaris*, LINNÆUS; *Mastigodes*, ZEDER; *Trichina*, *Filaria*, Auct.; *Trichure*, Fr.

116. *A.* This worm was first discovered by MORGAGNI in the cæcum and vermiform appendage of typhous patients; and ROEDERER and WAGLER, in 1761, recognised it as a distinct worm, in the "*morbus mucosus*," or mucous fever, so prevalent in Germany in the middle of the eighteenth century. It was long supposed to exist only in the intestines of typhous patients, but it is now fully ascertained to have no particular relation to any disorder of the human bowels. It is found chiefly or only in the lowest region of the small intestine, near the ileocæcal valve, in the cæcum, and colon. From the dingy colour of the worm, it is liable to escape detection, and only is detected with ease when the lower intestines are free from their thick and coloured contents, as in disorders attended by diarrhœa. If carefully sought after, these worms will be found more frequently and in greater numbers than is commonly believed. RUDOLPHI found many hundreds in the situations just named. BELLINGHAM saw upwards of 100 in the cæcum only of one patient in Dublin. They occur in both children and adults, and in Europe and Africa. KÜCHENMEISTER's work and its translation by Dr. LANKESTER, contain very minute descriptions of the organization of this parasite. The subjoined systematic description is sufficient for all practical purposes.

117. *B. Trichina spiralis* (OWEN and LUSCHKA), *as the brood of Trichocephalus dispar, engaged in migration.*—This asexual worm was first described by OWEN in 1835, although previously seen by TIEDEMANN in 1822, and by HILTON and WORMALD in 1833. It was afterwards seen and described by PAGET, KNOX, and others. The seat of this worm is, as is well known, the muscles of voluntary motion, and indeed all the muscles excepting the heart and the sphincter ani, where it has not yet been found. In the places where capsules of *Trichina* are seated, fatty tissue is constantly inserted, chiefly at their anterior and posterior extremities; the fat being apparently deposited to fill up the space produced by the *Trichina* having penetrated between the muscular fibres.

118. *a.* The *developement* of *Trichina spiralis* seems to be as follows: — " When a human being

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[*] Descript. Systemat.—"*Corpus longissimum, ex 2 partibus formatum, quarum anterior tenuior, filiformis, posterior crassa, organa sexualia continens.*

" Mas: *tenuior quam femina; penis simplex;* organon copulatorium auxiliare *spinosum, ex 3 branchiis compositum.*

" Femina: *mare major et crassior;* vagina *musculosa in abdomine sese aperiens; uterus simplex;* ovarium *simplex.* Animalia ovipara, *vix aut rarissime* vivipara.

" Ovula *oblonga, subfusca, in utraque extremitate collo quodam parvulo prominente ornata* (en une sorte de goulot court, *Dujardin*)."—KÜCHENMEISTER.

[†] Systematic description of *Trichocephalus dispar.*—" Cutis *transversa striata, marginales rugas ad anum versus magnitudine adductas exhibens. Caput* 0·02 *mill. latum, retractile, obtuso-acuminatum, interdum perparvâ papillâ instructum. Tractus intestinalis constituitur ex œsophago ab initio recto, angustissimo paullo post toruloso, sensim per totum collum intumescente; ventriculus pyriformis, ad latera sua glandulas* 2 *perparvas aut appendices alosas aut nervorum ganglia gerens. Animalia fæcibus humanis pro nutrimento utentia.* Mas: *omnino colore clarior, fusco-albior; circiter* 37 *mill. longus* (*caput et collum* 22; *truncus aut abdomen* 15); *in trunco* 0·5 *mill.*—1·0 *mill. latus; formam spiralem amans. Testis et funiculus spermaticus simplex ad intestini tenuis formam volutus; unà cum tubo intestinali ante anum in cloacam communem apertus. Penis simplex;* 3·35 *mill. longus;* 0.042 *mill. ad extremitatem infundibuliformem,* 0·027 *mill. ad apicem versus latus; vaginâ lævi cylindricâ instructus. Extremitas caudalis organo copulatorio auxiliario, spinis armato, subcylindrico ornata, cujus longitudo* 0·451 *mill.*=0·198‴ *Par.* =0 203‴ *V., latitudo in parte libera* 0·090 *mill.*=0·039‴ *Par.*=0·040‴ *V., in parte opposita fere* 0·049 *mill.*= 0·0216‴ *P.*=0·022‴ *V. est. Cloacæ communis musculosæ in maribus longitudo circiter* 4 *mill.*=2‴ *P.; latitudo* 0·261 *mill.*=0·116‴ *P.*=0·119‴ *V.; latitudo foraminis cloacæ ipsius*=(the lumen of the canal formed by the cloaca) 0·130 *mill.*=0·058‴ *P.*=0·059‴ *V. Spermatozoida globuliformia ad* 50 *mill. longa.*

" Femina: *in trunco rectior, minus curvata, mare aliquid latior, minusque elastica et flexibilis, ob ovulorum in utero et in ovariis copiam, eaque de causa colore magis fusca; extremitate caudali obtuso acuminata.*

" Ovula *fusca cum generis speciminibus;* 0·054 *mill.*= 0·022‴ *P. et V. longa; media in parte* 0·025 *mill.*= 0·0112‴ *P. et V. in apicibus* 0·01 *mill.*=0·0048‴ *P. et V. lata. Embryonum migrationes adhuc ignotæ. Verisimillimum est, Trichinas, quas dicunt spirales, Trichocephali disparis embryones esse.*"

[‡] Description of *Trichina spiralis.*—" *Corpus plerumque in spiras* 2 *retortum, ad anum versus crassius et obrotundatum, ad caput attenuatum; tubus intestinalis, uti apud Trichoc. disparem, ab initio multifarie retortus, ventriculus pyriformis cum lateralibus* 2 *appendicibus alosis* (*lobulis aut glandulis aut nervis*), *intestinum rectum post coarctationem quandam iterum incrassatum, rectâque viâ ad anum in extremitate posteriore eâque crassiore apertum profectum. Funiculus quidam secundus in utrâque extremitate cæcus et semilunaris genitalium primordia format* (?).

" *Longit. vesicularum* 0·2—0·5—0·7‴=0·4—1·0—1·5 *mill.; latitudo fere mediam partem exhibet.*

" *Longitudo vermiculi ex cystide liberati et evoluti secundum* LUSCHKA ⅓—½‴; *secundum meas mensuras* 1·115 *mill* =0 50‴ *P. et* 0·518‴ *V.; latitudo in capitis apice* 0·008 *mill.*=0·0036‴ *P. et* 0·0037‴ *V.; latitudo extremitatis posterioris seu ani* 0·024 *mill.*=0·0108‴ *P.* =0·111‴ *V.*"—KÜCHENMEISTER.

swallowed the eggs, or the youngest brood
veloped into ready-formed embryos which occur
the eggs, or perhaps also when any female
ichocephali residing in the small intestine scatter
ir eggs with the ready-formed embryos in them,
l when in either case the egg-shells are burst,
d the embryos set free in the intestinal canal,
e desire of migration awakens in them, and they
out, like the embryos of many other *Nema-*
a, in the shortest and easiest way towards the
sues which they prefer as their resting place."
at in this case, as in that of the *Cestodea,* the
gestive canal may be the place of immigration
m the exterior, is shown by the fact that the
iscles of the tongue, pharynx, and œsophagus,
well as the sphincter ani internus, are visited
the *Trichinæ.* In some cases the blood may
the bearer of the migrating brood. MEISSNER
und the young attached to the inner walls of
ood-vessels, and of the heart; and both he and
UCKART think that, the circumstance of the
ood of cestode worms being found so abun-
ntly in the blood-vessels, shows that the blood
their most usual course of migration. KÜCHEN-
ISTER believes that both courses of migration
e followed by penetrating the tissues, and by
e blood. The *Trichina* having found a resting
ace, a cyst closely adhering to the tissues is
med around it. This cyst consists of concentric
yers of a fibrous or lamellar substance, with
bedded cell-nuclei. The brood reposing in this
st approximates the head and caudal extremities
spiral turns, without, however, contracting a
rt of the head, and is then perhaps surrounded,
en on the part of the worm, with a peculiar
yer, but certainly enveloped on the part of the
st, with a capsule and cyst, in which the worm
creases in size; and, besides the intestinal canal,
velopes the primitive foundations of an organ
hich belongs to the generative apparatus. The
aterial for the capsule or cyst enveloping the
ichina, according to LUSCHKA, is formed from
e inflammatory exudation produced by the pas-
ge and site of the worm; and hence the cyst
ries in appearance with the time which has
apsed since the immigration, the oldest cysts
hibiting granules of lime-salts combined with
organic substance, this deposition of lime-salts
creasing with the age of the cyst. SANDERS and
IRK state that there are around the worm — 1,
n external fibrous envelope; 2, a tolerably thick
yer of a white, transparent, homogeneous sub-
tance; and 3, an internal round capsule.

119. *b.* The *contents* of the cyst consist of one or
ore animals, and a small quantity of fluid, which
eeps the inner envelope extended (which enve-
ope KÜCHENMEISTER and LUSCHKA believe to be
erived from the animal itself); the fluid is some-
imes clear, especially in the comparatively young
richinæ. In cysts with worms recently dead or
estroyed, it showed traces of organic decomposi-
ion. In cysts with worms which have been long
ead, or in those which contained no worms,
vhich are rare, is found a clear, thickish fluid,
vith small formative elements, or only a few ele-
nentary granules. These wormless cysts probably
ad previously enclosed a *Trichina,* which had
ied, and that a complete solution of the worm
ad taken place, or which had migrated from the
yst, and wandered to some other situation, where
t had again become encysted.

120. As to the destination of the *Trichinæ,* there is no doubt that a great number, if not all, of those which occur in the muscles of man, become abortive and die. The latter then lie in their cysts, in the midst of the cyst-fluid, which is in course of sebacification, desiccation, and calcification, rolled in spiral convolutions, in the same way as the *Trichinæ* seen in a living state. These spiral structures are, however, broken up into fragments, which indicate a ringed appearance or a segmentation of the bodies of these animals. " But how these encysted nematode worms, with our present state of civilisation, can reach, before the period of their death — which, however, only occurs very late, perhaps in 30 to 40 years, or after a still longer period in particular cases — places in which they are in a position to pass through their further and higher development, is beyond my power to divine" (KÜCHENMEISTER). On this subject, the experiments of this writer, and of ZENKER and LEUCKART, have thrown no light.

121. *c.* The reasons which have induced KÜCHENMEISTER to regard the *Trichina* of OWEN and LUSCHKA as the young brood of *Trichocephalus dispar,* and to consider both these nematode worms, hitherto placed separately as belonging to one species, are the following:—1. The *skin* of both has a peculiar ringed and jointed structure, which presents itself more distinctly than in many other *Nematoda.* 2. In both, a *longitudinal stria* runs down the sides, indicating the limit to which the contractile parenchyma of the worm, in which its internal organs are imbedded, reaches. These striæ are certainly the points of attachment of the parenchyma to the inner wall of the integument of the *Trichina.* 3. The *alimentary canal* is organised in exactly the same way in both. The mouth and anus are situated exactly in the centre of the two extremities of these bodies, the anterior and posterior; this circumstance excluding the *Ascarides, Oxyurides,* and *Strongyli,* and most of the *Filariæ,* from any relationship with *Trichina spiralis.* 4. The *second tube* which occurs in the abdomen, together with the intestinal canal, favours the identity of the two worms; the course of this tube admitting of being so developed as to produce either female or male *Trichocephali.* For these reasons KÜCHENMEISTER regards the *Trichinæ* as the brood of *Trichocephali* engaged in migration, by swallowing which we infect ourselves with the *Trichocephalus dispar* of both sexes. The *symptoms* produced by these worms have not been observed or stated. Even the immigration of the brood of *Trichina* appears to take place without any general reaction, and is also borne without injury for many years.

122. ii. OXYURIS=*sharp-tail* (from ὀξὺς and οὐρά). This name applies only to the female, but by no means to the male. This worm is differently classed by DUJARDIN and DIESING, whose classifications are too artificial, and too subdivided to admit of notice at this place. The *Oxyuris,* according to DUJARDIN and most other authors, is a *genus* of *Nematoda* separated from *Ascaris.* This writer gives the subjoined systematic description of it.*

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* " *Corpus cylindricum aut fere fusiforme, sublongum, in feminis retrorsum subulatum; caput inerme; os rotundum (in statu contractionis) aut triangulare (in statu*

123. *A. Oxyuris vermicularis*, BREMSER, DUJARDIN, VON SIEBOLD, GOEZE, RUDOLPHI, DIESING, &c.; *Fusaria vermicularis*, ZEDER; *Kinder-, Mastdarm-, Madenwurm*; Thread-worm.* — *a. Three forms as to size, sex, &c.*, of these worms are met with:—1. *The mature females*, which are remarkable for their size, thickness, and whiteness, for their acute capillary tail, and for an obtuse, broad head. 2. *The young immature females* resemble the pale-gray colour of the males, but they are somewhat larger than they, and are recognised by their acute tails, and by the femal sexual organs in grades of developement varyin with their age. 3. *The mature males* are remarkable by their pale silver-gray colour, and the obtuse anterior and posterior extremities, as als by the penis. All the three forms occur abundantly in one and the same intestine. The skir head, and œsophagus, and intestine are similar i both sexes. The nervous system of the *Oxyurid* is, according to WALTER, greatly develope although hitherto overlooked. They have bot cephalic and caudal ganglia, with other gangli plexuses, and lateral filaments, which are minutel described by WALTER and KÜCHENMEISTER. Th primitive nervous filaments are produced fro the processes of the ganglionic cells; by the unio of several primitive filaments of this kind, narrowe or broader branches are produced. The skin c the oxyurides consists of an external *epidermi* and beneath this a delicate but densely fibrou corium. The *parenchyma* of the body does no extend into the tail. The *muscular system* i highly developed. The *alimentary apparatu* consists of a mouth, œsophagus, stomach, intestine rectum, and anal cleft. For a minute descriptio of these and of the sexual organisation, my limit oblige me to refer the reader to the works of th authors just named, who ascertained that the male of the oxyuris vermicularis are much more numerous than was formerly supposed.

124. *b. The locality* of these worms in the human body is the lower portion of the intestinal canal, especially the rectum. They occasionally stra upwards, but rarely higher than the lower part o the small intestine. They wander, however, ou of the anus and into the vagina of females. Although most frequent in boys and young persons, yet they are not uncommon at all more advanced ages, even in the most aged, in whom I have repeatedly found them the most tormenting. They are gregarious, forming balls in the large intestines, frequently along with other worms, especially the *Ascaris lumbricoides*. J. P. FRANK found them in the intestines of an infant so young that the umbilical portion of the chord had not separated. They are, of all the *Helmintha*, the most frequent tormentors of every age and of every people; for they are not limited to particular parts of the world.

125. *c. Symptoms.* — These vary with the number of the worms and their position. A few hardly occasion any marked symptoms; but when numerous, in the lowest part of the rectum, they occasion extremely distressing itching and an irritating annoyance, difficult to be described, extending to adjoining parts. Certain articles of diet, as onions, carrots, fruits, &c., render the worms more restless and irritating during the whole day; but they are generally most annoying when the patient goes to bed. When the patient falls asleep, grinding of the teeth, excitement of the sexual organs, and restlessness are caused by them. The consequences of this local and constant irritation are, especially at, and subsequently to, the period of puberty, increased sexual irritation, masturbation, &c., in both sexes, and in the female sex most distressingly when the worms wander into the vagina, when they occasion not merely pruritus but also leucorrhœa, &c. The loss of rest and the irritation they produce, ultimately impair nutrition, give rise to pallor, anæmia, and loss of

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actionis), trilabiatum; œsophagus musculosus cylindricus aut claviformis et canali triquetro perforatus; ventriculus globosus cavitate triangulari; intestinum in feminis ante apicem caudæ acutæ, in maribus in centro caudæ apertum.

"Mares: *fere microscopici; plerumque spirales in fine posteriore obtusi; penis simplex, uncinatus.*

"Feminæ: *cauda acuta; vagina semper in parte vermis anteriore sita; uterus bilocularis cum ovariis* 2. *Ovula lævia, oblonga, non symmetrica, multo longiora quam latiora, omnino magna:* 0·064 *mill.* 0·136 *longa.*"

* "*Corpus album; cutis transverse striata, in margine utroque cum duplice ordine dentium acutiorum et obtusiorum, secundum Dujardini mensuras* 0·018–0·023 *mill., secundum meas in feminis* 0·024 – 0·030 *mill.*= 0·0108–0·014''' *P.*=0·011–0·015''' *V., in maribus autem* 0·008 *mill.*=0·0036''' *P.*=0·0037''' *V., inter se distantium; caput* 2 *appendicibus lateralibus, vesiculosis epidermidis duplicaturâ; os rotundum, antice margine trilabiatum et angustum; œsophagus carnosus, musculis longitudinalibus et transversis, canali triquetro; ventriculus strictura; œsophago sejunctus, globosus, cum cavitate interna triquetra, et valvularum apparatu; epithelio polyedrico cum nodulo pellucido sparsim instructus.*

"Mas: 2·05 *mill.*=0·90''' *P.*=0·95''' *V. ad* 2·5 *mill. ad* 3·37 *mill. longus* (*si caudam semper curvatam tanquam lineâ rectâ extensam mensus est*); *in capite una cum appendicibus* 0·094 *mill.* = 0·041''' *P.*= 0·042''' *V., sine appendicibus* 0·024 *mill.*=0·0108''' *P.*=0·011''' *V., medio in corpore* 0·123 *mill.*=0·054''' *P.*=0·055''' *V., in cauda* 0·023 *mill.*—0·0144''' *P.*=0·0148''' *V. latus. Œsophagus a* 0·024 *mill.*=0·0108''' *P.*=0·011''' *V. ad* 0·041 *mill.*= 0·0108'' *P.*=0·011 *V. ad* 0·041 *mill.*=0·018''' *P.*=0·0185''' *V. latitudinis intumidus est, circiter* 0·311 *mill*=0·137''' *P.* =0·141''' *V. longus. Œsophagum sequitur brevis tubi intestinalis strictura* 0·008 *mill.* =0·0036''' *P.*=0·0037''' *V. longa, et* 0·016 *mill.*=0·0072''' *P.*=0·0074''' *V. lata. Postea sequitur ventriculus* 0·115 *mill.*=0·050''' *P.*=0 052''' *V. longus, et* 0·065 *mill.*=0·028[illegible] *P.*=0·0296''' *V. latus, cum valvularum apparatu cognito; tubus intestinalis paulo post ventriculum latitudinis* 0·0[illegible] *mill.*=0·025''' *P.* = 0·026''' *V. est, ad anum vero* 0·008 *mill.*=0·0036''' *P.*=0·0037''' *V. Penis simplex,* [illegible] *mill.*=0·025''' *P.*=0·0[illegible]6 *V. longus, ad basin* 0·008 *mill.*= 0·0036''' *P.*=0·0037''' *V., in apice vero semper ad hamuli instar recurvato, latitudinis* (*adultiorum* 0·00[illegible] *mill.*=[illegible]''' *P. et V.*). *Funiculus spermaticus et testis simplex; spermatozoidia epitheliorum imaginem simulantia. Caudæ apex in foveam suctoriam mutabilis;*

"Femina: 7·84 *ex aliis ad* [illegible] *mill.*=3·48, *ex aliis ad* 4·337''' *P.*=3·57, *ex aliis ad* 4·50''' *V. longa; in capitis apice cum appendicibus* 0·196 *mill.*=0·087''' *P.*=0·089''' *V.; sine appendicibus* 0·06[illegible] *mill.*=0·029''' *P.*=0·0298''' *V.; in medio corpore* 0·49 *ad* 0·59 *mill.*=0·21 – 0·26''' *P.* =0·22–0·27''' *V.; extremitas caudalis acutissima. Longitudo caudæ* (i. e., *partis inter anum et apicem*) 1·798 *mill.*=0·797''' *P*=0·819''' *V.; latitudo caudæ ad anum ipsam* 0·26 *mill.*=0·116''' *P.*=0·119''' *V., inde diminuta. Œsophagus* 0·65 *mill.*=0·29''' *P.*=0·298''' *V. longus, in capitis apice* 0·065 *mill.*=0 029''' *P.*=0·298''' *V., in parte posteriore* 0·098 *mill.*=0·043''' *P.*=0·044''' *V. latus. Strictura tubi intestinalis pone œsophagum uti in maribus perbrevis et* 0·028 *mill. seu* 0·128''' *P. et V. lata. Ventriculus* 0·172 *mill.*=0·0768''' *P. et V. et longus et latus, interdum latitudine aliquid minor. Vagina ex Dujardini mensuris* 1·8 *mill. ex meis ad* 1·64 *mill.*=0 7''' *pone caput sita; in vivis* 1·06 – 1·2 *mill.*=0·46–0·54''' *longa et* 0·11 *mill.*=0·049''' *lata; cum foramine latitudinis* 0·13 *mill.*=0·06''', *longitudinis* 0·15 *mill.*=0·07'''; *uterus duplex, cujus ramus posterior* 2·0 *mill.*=0·9''', *cujus anterior* 1·35 *mill.*=0·6''' *longus; ramosum ovulis impletorum latitudo ad* 0·4 *mill.*=0·18''' *et ultra ovulis expulsis,* 0·2 *mill.*=0·09'''; *ovarium duplex, in transitu uteri in anum* 0·03 *mill.*=0·015''' *latum.*

"Ovula *fere oblonga non symmetrica; ex Dujardini mensuris* 0·055 *mill. lata et* 0·064 *mill. longa, ex meis media in parte ovulorum* 0.029 *mill.*=0·012''' *P.*=0·015''' *V., in apicibus circiter* 0·012 *mill.*=0·005''' *P.*=0·006''' *V. lata et* 0·05 *mill.*=0·022''' *P. et V. longa. Embryones viventes in ovulis nondum vidi.*"—KÜCHENMEISTER.

esh; irritation of the nostrils, sneezings, dis-looration of the countenance, or a dark circle round the eyes, dilated pupils, and various sym-athetic phenomena.

126. *d.* The *Diagnosis*, however, of these thread-worms can be established with certainty only y examining the fæcal evacuations, especially fter the administration of an enema. The *prog-osis*, although the complaint is unattended by anger, is not favourable as respects either a peedy or a permanent cure.

127. iii. STRONGYLI* *and their Allies.* — This enus of worms has been often described; but, of he less recent writers, more especially by RU-DOLPHI and BREMSER. The *species* which most articularly interest the physician is —

128. *A. The Strongylus gigas.*† — *Ascaris visce-alis aut renalis*, GMELIN; *Lumbrici in renibus*, BLASIUS; *L. renalis*, REDI; *Fusaria visceralis aut enalis*, ZEDER. KÜCHENMEISTER remarks that BREMSER has shown this worm, which occurs, lthough rarely in the abdominal cavity, the mentum, but especially in the kidneys and urinary ladder, more rarely in the lungs and liver, and nly when strayed in the intestinal canal of martens, dogs, wolves, seals, otters, oxen, and orses, is still more rare in man; and that a number f those accounts of worms passing off through the rinary passages are delusions. Since a minute nowledge of the pathology of the kidneys has een acquired, it may be inferred that many of hese cases would be recognised as fibrinous casts hrown off in the urine during disease of these rgans. That these worms are extremely rare, ven in the kidneys, must be admitted, since KÜ-HENMEISTER has never met with a case in his own ractice. He has, moreover, thrown rational oubts on the authenticity of most of the cases on ecord, showing that these cases, at least some of hem, may have been instances of mistaken diag-osis. DR. LANKESTER, however, states that there s a fine specimen of this worm taken from a uman kidney in the Museum of the Royal College f Surgeons of England.

129. *a.* When fresh, this worm has a reddish colour. In spirit this colour fades, and the worm assumes a greyish leaden hue. Four longitudinal stripes are observed on it. The total length of a female specimen was 19 Saxon inches. DUJARDIN states that the vagina opens 1 to 2 inches from the caudal extremity. DIESING says that the ganglial system of nerves is most manifest in this worm, a remark which is confirmed by BLANCHARD, OTTO, and VON SIEBOLD.

130. *b. The symptoms* of this worm are equivocal, for there can be no evidence of its existence to be relied upon, until it is discharged, thereby demonstrating its existence. Another species of *Strongylus*, the *S. longevaginatus* of DIESING, has been said to have been found in the human subject, but without sufficient proof.

131. iv. ANCYLOSTOMUM.* — *Anchylostoma*, DUBINI; *Ancylostoma*, CREPLIN.—This worm was found by DUBINI in Milan, in 1838, in the duodenum, and upper part of the jejunum; and subsequently also by PRUNER, BILHARZ, and GRIESINGER, in the countries watered by the Nile. According to VON SIEBOLD, it has never been found in Europe to the north of the Alps. DUBINI established this as a distinct *genus* from the *Strongyli*, by the symmetrical arrangement of the dental apparatus. We are, however, at present acquainted only with a single species of it.

132. *A. Ancylostomum duodenale.*† — BILHARZ, having had his attention called to this worm by VON SIEBOLD, in consequence of PRUNER having found it in Egypt, observed it in every body he examined after death in that country, sometimes in small numbers, sometimes in hundreds, less in the duodenum than in the jejunum, between the transverse folds of the mucous membrane. One male is found to three females. At the oval end, a large, obliquely truncated horny capsule, furnished with four strong teeth on the projecting portion of the upper margin, is seen. The oval orifice is turned to the surface opposite to the sexual and anal orifices. The animal attaches itself by its mouth so firmly to the mucous surface

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* "A. *Strongyli veri.* Corpore *subcylindrici, utrin-ue attenuato;* capite *nudo rarius alato, 2 appendicibus teralibus armato;* ore *terminali, nudo vel sex papillis istructo, vel orbiculari; œsophago triangulari, muscu-oso;* cute *tenui.* Mas: *appendice multilobata aut ra-iata;* penis *simplex vel duplex, multilobatus, ad digito-um instar.* Femina: *caudâ obtusâ, rectâ;* ano *in arte caudali;* vaginâ *antrorsum sitâ;* utero *simplici ut biloculari;* ovulis *magnis* (0·06—0·12 *mill.*). *Ani-alia* ovi- *aut* vivipara."—KÜCHENMEISTER.

DUJARDIN arranges the *Strongyli veri* as the xivth enus of his *Nematoides.* DIESING places the two pecies, *Str. gigas* and *Str. longivaginatus*, in his *Gen.* v., *Eustrongylus*, thus defined by him: "*Corpore sub-ylindrico, utrinque sensim attenuato, capite corpore ontinuo, ore terminali, orbiculari, papilloso; bursa aris terminali, integra; pene filiformi longo, haud va-inato; vaginâ aut antrorsum aut retrorsum sitâ. ystemati gangliorum distinctissimo. Animalia ovi- aut ivipara, extra tubum intestinalem habitantia.*"

† "Corpore *rubro, cylindrico, longissimo, utrinque ttenuato, striis aut annulis transversis interruptis et* 8 *asciis fibrarum longitudinalium instructo; capite ob-uso, truncato; ore orbiculari* 6 *papillis aut nodulis pla-iusculis, appropinquantibus; œsophago* 15—22 *mill. irciter longo, tenui et angustiore quam canalis intes-inalis.*

"Mas: *corpore antrorsum magis attenuato,* 140 *ad* 140 *mill.*=10″—1′ *longo,* 4—6 *mill. lato; caudâ obtusâ cum ursâ membranaceâ patelliformi, circa* 3 *mill. latâ, trun-atâ; pene tenuissimo simplici.*

"Femina: *corpore utrinque attenuato,* 2 *decim. ad metr.*=5″—3′ *longo,* 5—12 *mill. lato; caudâ magis ectâ, obtuso-rotundatâ; ano triangulari, oblongo, sub xtremitate caudali sito; vaginâ antrorsum sitâ; utero implici; ovulis fere globulosis.*"—KÜCHENMEISTER.

* "*Vermes subcinerei, vivipari, corpus cylindricum; caput aliquid attenuatum; pharynx infundibuliformis, colore subfusco, parietibus resistentibus. Os acetabuliforme, subcorneum; apertura oris ampla circularis subdorsalis; dentes in fundo oris intra aperturæ marginem abdominalem 4, uncinati (os in altitudine infundibuli 4 uncinis intus recurvatis munitum et in fundo cum eminentiis conicis, in tabularum explicatione 'unguli tegumentarii' nominatis, in uncinos versis, utrique generi communibus,* Dubini); *œsophagus carnosus, qui ad clavæ instar inter descendendum largitur; cutis transverse striata, unde* 2 *eminentiæ conicæ prominent, uno alteri opposita, inter sextam anteriorem partem longitudinis vermiculi totalis et inter reliquas posteriores vermiculi partes, quæ quinquies sextam longitudinis totalis partem exhibent; anus lateralis et aliquid ab extremitate caudali remota. Extremitas caudalis maris bursam terminalem integram subtus excisam multiradiatam exappendiculatam; penem duplicem longissimum exhibens; feminæ obtusa, aperturam genitalem retrorsum sitam præbens,*"—DIESING et DUBINI.

† "*Caput apice rotundatum; oris limbi papillis conicis inæqualibus, duabus minoribus, uncinis papillis impositis apicibus convergentibus. Corpus subrectum v. parum curvatum, anteriore parte transparens, ventriculo globoso nigrescente, posteriore flavido-fuscum, maris antrorsum attenuatum, extremitate caudali inflexâ; bursâ cyathiformi bilobâ* 11-*radiatâ, cujus radii ita sunt positi, ut triplicem eorum ordinem conspicere possis, in utroque enim latere ordinem quatuor, media in parte trium radiorum (radiis lateralibus utriusque* 5 *simplicibus:* Diesing); *radio dorsali apice furcato; feminæ extremitate posticâ acute conicâ. Longit. mar.*3—4‴; *fem.* 4—5‴; *crassit. ad* $\frac{1}{8}$‴."—DIESING et VON SIEBOLD.

that the mouth is torn away when it is detached by force. Its nourishment is blood, as proved by its intestine being filled with this fluid.

133. *a. Pathology.* — This worm is of great interest and importance, and is often fatal to those afflicted with it. GRIESINGER, the best chemical observer of this worm, states that this worm attaches itself firmly by biting into the mucous and submucous membranes; and that the spot on which a worm has been attached is indicated by an ecchymosis of the size of a lentil, in the centre of which, a white spot, the size of a pin's head, appears, which is pierced by a hole penetrating into the submucous tissue. From these wounds the blood enters freely into the intestine of the worm, which is filled with blood from the punctured places. Frequently the mucous membrane of the intestine is studded with flat, livid, brownish-red elevations of the size of a lentil. This is owing to the collection of the blood between the mucous membrane and muscular coat. In some cases a specimen of the worm is found lying in the cavity thus formed, covered with blood, with which it has completely engorged itself. The manifest consequence of this infliction is *anæmia*. GRIESINGER imputes the "*Egyptian chlorosis*," which he had previously described, and which, he avers, attacks one fourth of the population, entirely to the presence of this worm.

134. *b. Symptoms.*—At an *early period*, pallor of the face, general surface, lips and gums; palpitations of the heart, especially on any exertion, sounds in the jugular veins on auscultation, lassitude, debility without emaciation, are the chief phenomena. Subsequently disordered digestion, irregularity of the bowels, and *Catarrhus intestinalis* are complained of. These symptoms may continue an indefinite time; but if not removed by a decided treatment, the consequences are most serious and generally fatal. Emaciation often does not commence until late in the disease. Œdema of the extremities and eyelids; a pale yellowish or greenish yellow hue of the general surface; a withered, dry, flabby, and cold state of the integuments, and a remarkable pallor of the outlets of mucous canals; remarkable apathy, and sense of exhaustion; constant and distressing palpitations, the sounds of the heart being often heard at the distance of several feet; murmurs in all the larger arteries, and a rushing or purring sound in the jugulars, slowly supervene. The pulse is uncommonly quick and small; the respiratory movements are weak, frequent, and short; the urine is abundant, pale, and rarely contains albumen. Giddiness and headache are commonly experienced. Constant hunger, singular appetites, and slight febrile movements, sometimes with enlargement of the spleen and atrophy of the liver, are observed. With indulgence and full diet this state may last for years; but in very many cases the progress of the malady is rapid. Even in the best circumstances the patient is pallid, sickly, and miserable, exhibiting a high degree of anæmia and hydræmia. Various acute affections often supervene and complicate the disease, and a chronic diarrhœa or dysentery ultimately carries off the patient. Fatiguing labour, a lowering or antiphlogistic treatment, and debilitating agents hasten dissolution. A restorative regimen, change of climate, and judicious treatment, often arrest the complaint. All the phenomena consequent on the presence of these parasites are characteristic of a very slow but continued loss of blood, which, if not arrested goes on until the quantity and the quality of this fluid are no longer sufficient to sustain life; *death* supervening with faintness, dyspnœa, and fata syncope.

135. *c.* On *examination* after death, the organs and structures generally are wasted, pallid and softened. The spleen is often enlarged; the liver is pale and atrophied; the veins are nearly empty the heart and large venous trunks contain only soft small brown coagula, with very little fibrine. In many even of the large venous trunks there is only a dark serous-looking fluid, with a few pale, large and colourless blood-globules. The substance o the heart, especially the inner layers of muscles are very pale and even fatty. This organ is generally large, thick, hypertrophied or dilated particularly on the left side. The endocardium and valves are often irregular, as if thickened in parts. The brain, the lungs, the muscles, the digestive mucous surface, &c., exhibit remarkable pallor and anæmia; the cellular tissue and muscles being softened, flabby, and in parts exhibiting a watery infiltration (§ 134.).

136. v. THE FILARIÆ.* — These form the seventh genus of the first class "*Nematodes*," o DUJARDIN, and the fortieth genus of the sixth order, "*Nematoidea*" of DIESING. From the *Gordii* they are distinguished by structure, mode of life, the nature of the youngest brood, and by the circumstance that they readily burst in water like other *Nematoda*, which is not the case with the *Gordii* (DIESING).

137. *A. Filaria Medinensis.* † — PLUTARCH refers in the ninth question of the eighth book o his "*Symposiacon*," to the statement of AGATHARCHIDES of Cnidus, the geographer and philosopher "That the people on the Arabian side of the Red Sea suffered many strange diseases; amongst others, worms, like little snakes (*δρακόντια μικρά*), came out upon them, which gnawed their legs and arms, and when touched retracted themselves, coiled themselves up in the flesh, and gave rise to the most insupportable pains; but that this evil

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* Diagnosis: "*Vermes albi, subfusci, aut rubri, corpore filiformi, elastico, cylindrico, ut plurimum longissimo; capite corpore continuo, inermi aut spinulis rectis et corneis (dentibus seu papillis prominentibus Autorum) armato; ore terminali non labiato, vel labiato rotundo, aut triangulari; œsophago brevi, tubuloso, rectiore quam intestinum; ano terminali aut ante caudæ apicem sito; cute lævi aut leviter oblique striata.*

"Mas: *caudâ plerumque obtusâ, interdum membranam accessoriam alosam exhibente; spiculis filiformibus in vagina tubulosa aut ligulæformi, ex* Dujardino *inæqualibus, curvatis* (?). Femina: *vagina antrorsum proxime ad os sita, plerumque duplici* (*Filaria rigida*) *aut multiplici* (*exc. quinqueloculari in Filaria labiata,* Nathusius); *ovulis ellipticis aut globosis, laeribus. Nunc* ovi- *nunc* viviparæ."

† "Mares *omnino ignoti aut potius ab auctoribus neglecti et omissi, quin ob minorem magnitudinem minores efficiunt et molestias et dolores et vix unquam majores tumores; sed uti* Diesingius *ipse enarrat, a* Clellandio *in* Calcutta Journ. of Nat. Hist. I. 359, Pl. X., *fig.* 1. *delineati.*

"Feminæ: *corpore longissimo (ad* 3 *ulnas et aliquid supra), subalbo, filiformi, subæquali, secundum* Dujardinum *antrorsum, sed secundum* Diesingium *et quidem quod ipse affirmare possum retrorsum, sensim attenuato, ad* 1‴ *seu ad* 1–2½ *mill. lato; ore orbiculari, spinulis* 4 *cruciatim oppositis; caudâ ad apicem uncinatâ, subacutâ, in apice* 0·065–0·082 *mill.*=0·028–0·036‴ *Par.*= 0·029–0·037‴ *V. latâ, interdum in vermis ipsius cute ita affixâ, ut vix apicem liberum facere possis; vagina ovulis; embryonibus* 1″ *longis, vix* ¼‴ *latis. Species vivipara.*"—KÜCHENMEISTER.

s been found only then, and neither before nor ice amongst any other people." Many authors, th much appearance of justice, believe that the ry serpents, which MOSES states to have been so structive to the Israelites when journeying in the cinity of the Red Sea, were *Filariæ Medinenses,* id consequently that MOSES is the first writer to otice this worm, and that the fiery inflammation oduced by it, gave rise to the appellation be- owed upon it by the Hebrew writer.* That the *ilaria* was considered a species of serpent by e ancients, is proved by the Greek name *δρα- ντιον, dracunculus,* which was given it, and by the flammation, pain, and swelling which occurred ith the breaking out of the worm. The mortality nongst the Israelites may be explained by their norance of the proper treatment, and of the inger consequent upon the breaking of the worm. VENZOAR states that, in his country, "Æger in ontinenti post dolorem vehementem in parte fecta exortum moriatur." The distemper being idemic in the place where the Israelites were journing (in Arabia Petrea), in circumstances great difficulty and even distress, and during e hygienic privations of encampments in a arren country, it is not surprising that it then id there assumed an epidemic and fatal cha- acter.

138. SYNON. The *Filaria Medinensis* has re- eived a variety of names, viz. the *Dracunculus* ; the *rac. tibiarum* ; the *Drac. Persarum* ; the *Guinea- orm* or *G. thread-worm* ; from its frequent occur- ence on the coast of Guinea ; the *Guinea dragon;* ie *Guinea hair-worm; Pharaoh's worm* ; the *Skin- orm* ; the *leg-worm* ; *le Dragonneau, le ver de uinée, le ver Cutané*, by the French ; *Guinischer adenwurm* ; *Guinische Drache, Pharaohswurm,* y the Germans.

139. *a.* Our knowledge of the natural history f this worm, and of the early stages of its develop- ient, is very deficient. KÜCHENMEISTER states iat it is of the thickness of packthread, its anterior xtremity obtuse, the mouth circular, without lips, ut beset with four hooks, or more correctly with our styles, or acute straight spines; the vagina opens in the vicinity of the mouth, and the vagina and uterus are probably double, as in most Filaria. The length of the worm varies from several inches to three yards. Statements of greater dimensions are probably founded in error. The whole surface of the worm and its tail exhibit the well-known fine rings, placed at an uniform distance. The substance of the body is homogeneous, finely granulated, and exhibits no traces of muscular fibres. Its œsophagus, intestinal canal, uterus, &c., require no description.*

140. *b.* The worm is indigenous only in the hot zone, and, even when transported into colder climates, does not appear to propagate itself. Even in the hot zone it does not occur everywhere, but only in particular countries, like all the *Helmintha*, and is entirely in certain places in affected countries, as, for instance, in the Gambia, Angola, Canlabah, &c. The places in which the *Filaria Medinensis* more particularly occurs, are Senegal and the coast of Guinea, the East Indies, Persia, Arabia Petrea, the coasts of the Red Sea, especially towards the south, the shores of the Ganges, Bombay, the Caspian Sea, Upper Egypt, Abyssinia, Nubia. It was introduced into America by Negro slaves, especially into Surinam. Throughout the countries now mentioned it attacks aborigines and foreigners without distinction. According to PRUNER the worm often becomes epidemic, in wet seasons and in marshy districts. BREMSER states that it is most frequently seen in the East Indies from November to January (the rainy season); and in Upper Egypt, according to BILHARZ, shortly after the inundations of the Nile.

141. *c.* The mode of production of the worm is still enveloped in obscurity. English officers, who never went about with the feet and arms uncovered, remained free from this worm. PRUNER thinks that the germ of the worm is an independent marsh animal, which is converted into a Dracunculus within the human body. FORBES believes that he found the brood of the Dracunculus free in the red, ochrey mud of the drying marshes. However, the aborigines think that it comes from the marshy grounds into the skin. The ordinary seat of the worm is the sub-cutaneous cellular tissue, especially of the lower extremities, around the ankle. It may, however, occur under the skin and muscles in all other parts of the human body. Instances of its occurrence in other parts of the body besides the extremities are recorded by KÄMPFER, BAJON, BAILLIE, PERÉ, and have been seen by myself in Africa. M'GREGOR, in 172 cases, states that it occurred 124 times in the feet, 33 times in the lower, 11 times in the upper part of the thigh, twice in the scrotum, and twice in the hands. PRUNER found a specimen behind the liver, between the layers of the mesentery. Sometimes the worm lies coiled up in a small space, sometimes it is extended ; and in the latter case, if it lies on the surface, it feels as a varicose vein. PERÉ saw it lying in a snake-like form under the whole of the skin of the abdomen and

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* Upon referring to a translation of the Bible from ie Hebrew into Latin, with very copious annotations, by MMANUEL TREMELLI and FRANCIS JUNIUS (the former learned Rabbi converted to Christianity, the first and econd editions of which, published in London in 1579— 0, and 1584 in quarto, are in my library), I find that he ranslates the Hebrew description as follows : — "Tum nmisit Jehova in populum illum serpentes presteres, ui morderunt populum : ita moriabatur populus mul- us ex Israele." Here TREMELLI translates the Hebrew ito venomous serpents ; but in a note he states, that ccording to the original they were fiery serpents. To his translation of the Bible and to its copious annota- ions, the translators of King James's Bible, and modern nnotators, are more indebted than has been made to ppear. Upon referring further to the very rare edi- ion of the Vulgate, also in my possession, which was rinted in 1481, and known by the term "*Fontibus ex ræcis*," &c., the serpents are called "fiery serpents — Misit Deus ignitos serpentes) — which inflicted wounds nd death on many." This edition of the Bible is in olio, on a thick, beautiful paper, the ink being a bright et-black, without the name of either printer or pub- isher, and without the verses being numbered, but vith the initial letters illuminated and coloured. These ranslations vary only in the term "venomous" being ised by the former for "fiery ;" whilst the statement in he latter, that these serpents "inflicted wounds and leath on many," may be considered as nearer the truth, is the infliction of wounds does not imply that death was lways the result. Some translations, which retain the ppellation "fiery," very justly explain it by stating t to refer entirely to the inflammation and pain pro- luced by these animals.

* BREMSER gives the following systematic description of this worm : "Longissima cylindrata, elastica, ferè equaliter crassa, capite attenuata, ore minimo, circulari, cauda maris medium sui finis ad locum, quintali spirali, prominente, sublata, inflexa ; feminæ semitereti, acutiuscula, incurva prædita ; in hominis tela cellulosa subcutanea, præsertim pedum ; in regionibus tropicis figi solita."

a part of that of the chest, and similar cases of its extension are on record. "These examples will suffice to give a clear idea of this worm, of which, moreover, as many as twenty-eight, thirty, nay even fifty specimens have been observed in one man" (KÜCHENMEISTER).

142. *d. Diagnosis.* — If the worm is superficial, with a hard substratum, its growth is seen to take place with extraordinary rapidity, from 4‴ it becomes several inches long in a couple of days. It is then easily killed by poultices of boiled garlic, after which it is absorbed without injurious consequences. Frequently the worm occasions little or no annoyance for a long time. DAMPIER and ISERT had quitted the district of these worms for 6—8 months, and WENGLER's patient for 4—6 months before the worm betrayed itself. According to KÄMPFER and others, this latent state may continue 12—15 months, and in rare cases, even until the third year. In other instances, emaciation, notwithstanding a good appetite and absence of fever, takes place, terminating at last in fatal exhaustion. When the worm is making its way out, a small pustule appears at the point where it will break through, sometimes with, and sometimes without, preliminary annoyance, or headache, pain in the stomach, nausea, fever, &c. At the point where it breaks through, inflammation, swelling, and suppuration occur several days previously, and continue until the worm is extracted. If it lies over or near to a joint, the use of the limb is prevented, and the symptoms are still more severe. In the case of DRUMMOND, after pain and stiffness of the leg, a reddish swelling, with a black point in the centre, was formed above the inside of the ankle; and at the same time he felt a firm, round, catgut-like substance twisted under the integuments. About three weeks after the first sensation of stiffness, he was seized with a sudden insupportable itching over the whole body, with fever, violent colic, vomiting, and purging; after which, shiverings without perspiration followed. In the mean time the swelling had burst, and a hard white substance appeared, but so deep that it could not be laid hold of, the animal having buried itself deeper amongst the muscles. The cat-gut-like twisted substance formerly felt was not now present. In the following night the ankle and vicinity were much inflamed; and three days afterwards a thread was passed round the animal, and a bloody ichorous discharge continued for six or seven weeks from the wound, which healed up gradually to a small point, when the worm again came forth, and was fastened with a thread, rolled upon a stick, and drawn out twice a day. In twenty days the extraction was completed. Two or three days after the formation of vesicles on the inflamed part these open up, or are opened by a lancet, when matter, blood, and sanies, and two or three inches of the anterior end of the worm came forth. If this end be carefully pulled several inches, more often follow. All this is coiled around a little roll of linen, or a small stick, and fastened over the wound with a compress and adhesive plaster; and the worm is thus wound out by repeated, careful operations, twice daily. The worm rarely comes away on the first attempt, several days, or even weeks, being required before this is accomplished. Mr. Busk, in the *Transactions of the Microscopical Society*, has given one of the best descriptions of this worm.

143. vi. ASCARIDES. — These worms are arranged by DUJARDIN as the nineteenth genus o the *Nematoda*; and by DIESING as the twentieth genus of the sixth order of the *Achæthelminthe elastica*, but the *Oxyuri* are also introduced b him into this genus. The classification of DIESING is so involved that more confusion than elucidation is the result. Refining, hair-splitting, and drawing distinctions, which are either observed with difficulty, or not at all, are not the leas faults of some modern observers. I subjoin DUJARDIN's systematic description of this genus.* The only *species* to be here noticed is the —

144. *A. Ascaris lumbricoides.* — SYNON.: *Ascaris gymnoascaridæ*, DIESING; *Ascaris lumbricoides*, LINNÆUS; *A. gigas*, GOEZE; *Lumbricu teres*, AUCT; *Fusaria lumbricoides*, ZEDER; but the Linnæan name is very generally retained.†

145. *a. Description.* — The head of the worm is distinctly composed of three papillæ, which can undoubtedly be spread out upon the intestine, in a broad, circular, sucker-like surface, in the sucking act of the worm. BREMSER has seen the opening and closing of these papillæ, and described the mechanism. He even reports that at the moment of opening he saw a little tube protrude from the centre, which is the true oral orifice WEDL thinks that this is the cleft proboscis, which is everted from the oral aperture for the reception of nourishment. The true oral aperture is, however, formed by the opened lips or papillæ; th

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* "Ascarides: *corpore albo aut subflavo, subcylindrico, utrinque attenuato, fusiformi,* 4 *striis longitudinalibus subalbis, opacis, linearibus, instructo; cut transverse striatâ; capite tubus, valvulis (labiis) convexis aut semilunaribus, interne fenestratis; æsophag valde musculoso, cylindrico aut clavæformi; ventricul cavitatem triangularem præbente.*

"Mas *minor quam femina; extremitate caudali aliquid curvatâ et involutâ, nunc nudâ, nunc membran alatâ duplici, aut duplici tuberculorum et papillarum ordine aut rarissime acetabulo instructâ caudâ breviore obtusiore, quam in feminis; spiculo aut pene duplic plus minusve longo et arcuato.*

"Femina *caudâ rectiore et longiore; vaginâ simplic antrorsum sitâ; utero bi-aut multiloculari; ovariis filiformibus, longissimis, duplicibus aut multiplicibus ovula elliptica aut globulosa, extus lævia. Species au* ovi- *aut* viviparæ, *plerumque in tubo intestinali viventes.*"

† "*Vermes albi aut rubro-pallidi, cylindrici, in extremitatibus attenuati, fusiformes elastici; cute transvers subarticulata striis transversis* 0·02 *mill. inter se distantibus, ex duobus stratis composita,* 4 *lineis lateralibus longitudinalibus subalbis majoribus, capite distincto parvo* (0·7 *mill. lato*), *tribus valvulis semilunaribus, prominentibus, ad margines hyalinis armato, interne denticulatum musculorum stratum ad galli jubæ modum præbente; æsophago musculoso,* 6—8 *mill. longo, filiformi, triquetro, ventriculo clavæformi* (0·7 *mill. lato,* 2—3 *mill. longo*) *parvulo, intestino simplici valvulis au villis et epithelio polyedrico sparsim instructo.*

"Mas: 150 *ad* 170 *mill.*=4 *ad* 6‴ *long.*, 3·2 *mill. lat. cauda aliquid depressa, conica, inflexa et curvata, spiculis* 2 *planis, subensiformibus, fere rectis,* 1·8 *mill. a* 2·12 *mill. longis,* 0·18 *ad* 0·23 *mill. latis. Organo spermatico simplici,* 1200 *mill. longo, testiculo cæco perparvo, retortiformi, funiculo spermatico albo-intumido ductu ejaculatorio angustiore ad ani latus sese aperienti Spermatozoidia globuliformia, granulosa, in feminæ vagina maturescentia.*

"Femina: 200 *ad* 275 *mill. et supra longa*=8 *ad* 18″; *media in parte* 4 *ad* 5·5 *mill. lata; caudâ conicâ obtusâ; aut aliquid ante caudæ apicem sito* (1 *mill. circiter*); *vaginâ simplici ante corporis dimidium sitâ, ex magnitudine feminarum variabili (ex c.* 85 *mill. pone caput in femina* 245 *mill. et* 103 *mill. in femina* 214 *mill. longa*); *utero ab initio simplici, bipartita aut biloculari. Ovaria filiformia, sensim attenuata, retrorsum usque ad anum et antrorsum supra vaginam aliquantulum pergentia. Totalis utriusque ovarii longitudo ad* 44′ *Lips.*

"Ovula *immatura subtriquetra, numero* 4 *ad* 8 *conglomerata, matura isolata, rotunda, ad* 0·087 *mill. lata, cum testâ tenui, lævi; in natura libera sensim embryones evolventia.*"—KÜCHENMEISTER.

mall tubule in the centre represents the *introitus ucium.* Its protrusion is probably as much by own muscular structure as by the contraction the general muscular structure of the body. he males and females may be distinguished by eir form and external appearance. The abdoen of the female is slender, and fusiformly ointed. The male is bent like a hook, and somenes presents, a short distance from the tail, a ir of white, delicate, projecting hairs, which are e protruded penis. If the female be pressed, or lowed to swell in water, a prolapsus of these bes (ovaries), and a discharge of a milky subance (eggs), takes place in the anterior half of e animal from the vaginal orifice. If the male be ressed, a milky juice (seminal globules) flows ut in the vicinity of the anus, without the occurnce of a prolapsus. The intestinal canal is hitish and muscular at its commencement; the sophagus is composed of thick layers of longiudinal and transverse fibres, and passes rapidly, nd without any marked constriction, into the ntestinal canal, the parietes of which are thin, inernally covered with epithelium, and shines hrough, of a brownish colour, from the brown xcrement. This intestine has a muscular coat, which is connected with the cutaneous longitudinal nd circular muscles. The external integument onsists of six layers. Under the outer layer are wo layers of fibres crossing each other obliquely, nd two laid at a right angle over each other, and etween the former and latter two a sixth homoeneous layer, which appears to contain a peculiar dorous fluid, of an oily and reddish appearance, nd exhibits refractive phenomena (KÜCHENMEISTER).

146. *b. Symptoms.*—Very generally the host and is guests, the *Ascarides*, agree very well together, ntil, owing to causes affecting these animals, r the digestive organs of their host, a disagreement between them takes place, and various disorders or symptoms ensue. When these worms re few in number, notwithstanding their size, they often occasion but little disorder, and live amicably with their entertainer on unelaborated chyme, until their numbers, changes of diet, and other occurrences produce more or less ailment. In most cases, when their numbers are not great, a good, or a too good appetite, is the chief injury they do; and in this respect they are much less noxious than the much smaller *Ancylostoma.* Great numbers of these worms in the intestines, and a firm aggregation of them into coils and knots, sometimes with the small thread-worms intervening, often occasion much disorder, according to the mechanical obstacle and the irritation they may produce. Colic, ileus, constipation, diarrhœa, flatulency, congestions of the brain, especially in children, and various reflex phenomena manifested in distant parts, and on voluntary muscles both of the trunk and of the lower extremities, are then not unfrequent occurrences. Besides the influence of inordinate numbers—of 200—350—knotted into balls, which I have expelled from the bowels of both children and adults, the irritation and the consequent effects produced by even small or moderate numbers are often serious; for, owing to states of the digestive organs of their host, to the influence of certain kinds of food, or of change of diet upon them, or to the agitation arising in them from the influence of season, and to the periodical seeking of the females by the males, much disturbance may ensue, or the worms may travel or stray into parts of the digestive canal not usually visited by them, and thus induce very serious effects; which may even terminate in death. These effects, however, will depend much upon the irritability and other circumstances of the patient, the number of the wanderers, and the parts which they have reached. When irritations of the intestinal canal occur, and produce watery diarrhœa, cholera, &c., these worms are thereby affected; they swell up, lose their powers of adhesion, and are often carried away *per anum.* But one or more worms may pass unusually high in the intestines, may rise through the pylorus into the stomach, and occasion retching, vomitings, &c., irritation in the œsophagus, fever, delirium, and upon the discharge of the worm all rapidly disappear. But before rising so high in the digestive canal, one or more may pass into the common duct, or even into the cystic, or the hepatic, or the pancreatic ducts, and produce symptoms similar, or approaching to gall-stones, or inflammation, spasm, and disease of these ducts. These latter occurrences are, however, very rare; for generally the secretions passing along these ducts into the duodenum are not much relished by these worms, and these routes are not pursued by them. When the worm passes into the stomach, it may rapidly rise into the upper part of the œsophagus, or into the pharynx, and even get entangled in the larynx and produce the most distressing effects. But such occurrences, although observed, are very rare. After long periods of abstinence or inanition they have been found to migrate and escape from the anus, mouth, and nose; and such migrations are not uncommon in the course of continued and remittent fevers.

147. The *symptoms* produced by Ascarides, whilst they continue in the intestine, are mechanical, direct, and reflex. The former are the phenomena of the usual catarrhal affections of the stomach and intestines (gastro-intestinal irritations) in every grade; costiveness, tormina, colic; a sense of weight, of irritation, or of a ball, or gnawing and itching near the umbilicus; disordered, craving, and irregular appetite, and digestion, &c. The latter are hiccup, subsultus of the abdominal muscles, cramps of the lower extremities, yawning, increased secretion of saliva, snuffling or tickling of the nose, but rare of the anus, unless upon the passage of a worm.

148. The question has been often entertained as to the possibility of these worms perforating the parietes of the healthy intestines, and making their way into places more or less distant from their usual residence. That these worms can *never perforate the healthy intestine; the structure of its head, and its thin lips being adapted only for suction and not for boring,* is the opinion of RUDOLPHI, BREMSER, ROKITANSKY, BEMBERGER, J. P. FRANK, KÜCHENMEISTER, and myself, in opposition to that of VON SIEBOLD and MONDIÈRE. Therefore it may be concluded that when these worms are found in situations external to the digestive canal, they have reached it by some pre-existing ulceration, perforation, or fistula.

149. Many, especially of the older authors, have attributed a prognostic and generally an unfavourable import to the discharge of worms during febrile diseases, and more especially during typhoid

fevers; and this opinion is not limited to the Ascarides, but is extended to the flat worms, and they have argued that the worms in these circumstances are like the rats, and have the prescience of deserting a sinking ship! But as the discharge of worms from a fever-patient does not occur until after the seventh day, according to Zimmermann, it is much more probable that they travel from the intestines, owing to the food obtained by them being insufficient or not suited to them, and to the secretions of the intestines being injurious to them, and in search of more abundant or more suitable aliment. The ulcerations of the intestines and the morbid matter from these ulcers in the advanced stages of continued fevers, will also tend to expel or to occasion a discharge of these worms, which, when observed, may be justly viewed, both as an indication of the existence of these lesions, and of the extreme danger of the malady.

150. vi. A General View of the Symptoms produced by Worms in the Digestive Canal. —Most of the symptoms produced by worms may arise from other causes; but a careful recognition and observation of these symptoms, of their successions, grouping, &c., are requisite for the due regulation of the treatment, and for the ascertaining of the species of worm which is present. The symptoms produced most commonly by the individual species of worm have been noticed with reference to each; but recent writers have been more intent upon the microscopic descriptions of these parasites, and upon drawing minute distinctions, &c., than upon more useful and practical considerations connected with them. It is justly argued that the discharge of the more common species of worms infesting the intestinal canal is the only true *diagnosis* of verminous diseases; but this discharge, even in the most serious cases, may not occur without means being used to effect it; and it is by a knowledge of these symptoms, independently of such discharge, that we are led to administer the means most likely both to establish this diagnosis and to effect a cure.

151. *A.* The more *direct and local symptoms*, or those more immediately caused by worms are—a capricious and variable appetite—at one time, a craving and insatiable hunger or an unsated desire of food; at other times, nausea, or cardialgia, borborygmi, loathing, retching, or vomiting, being present; a sense of weight in the abdomen, with distension, gnawing, or erosion; a feeling of cold internally, or of emptiness or inanition, often with palpitations, or leipothymia, or faintness; a dragging, twisting, or lancinating pain in the abdominal regions, especially near the umbilicus, or tormina, spasms, colicky attacks, tenesmus, constipation, or irregularities of the intestinal functions; leucorrhœa, and itching, or a mucous or watery exudation from the anus, sometimes a mucous diarrhœa, tenesmus, and bearing down pains in adult females, or derangements of the catamenia, or even abortion; and in children, more especially tormina, colic, constipation, and intus-susception of the bowels, with various cerebral symptoms about to be noticed. In both sexes "manustupratio" is not infrequent, even at an early age.

152. *B.* The *symptoms* caused in more distant parts by sympathy with the seat of irritation, or by direct and reflex sympathy, are chiefly a frequent, dry, and tickling cough; hiccup, anxiety at the præcordia, or pungent pains passing under the false-ribs and at the epigastrium; a sense something in the œsophagus, sometimes with tic ling in the pharynx; partial amaurosis and dila tion of the pupils; sneezings, itching and dryn of the nose and nostrils, sometimes epistaxis, itc ing of the skin, without eruption; grinding grating of the teeth, and sudden startings wh asleep; subsultus and spasms of the abdomin muscles; partial or general convulsive movemen without complete loss of consciousness; chorea twitchings, or irregular contractions of particul muscles, especially those of the face and low extremities; and more or less fully develope general, or epileptic convulsions. The urina excretion is sometimes disordered, and dysuria frequent micturition complained of, the urine b ing whey-coloured, turbid, &c., with, or witho a sediment.

153. *C. A general Verminous Cachexia* is n infrequently present, manifested by a pale, tumi or livid state of the features; by a sunken appea ance of the eyes and a leaden hue beneath them a general pallor, and more or less anæmia of th surface of the body, lips, &c.; a perverted state the sense of smell, or the entire loss of smell; strawberry hue of the tongue, or mucous sord on the tongue, and about the teeth and gum stridor of the teeth, and a peculiar fœtor of th breath, sometimes a more or less evident affectio of the voice and speech; a morose, irritable stat of temper, vertigo, frightful dreams, timidit somnolency; slight or low delirium, risus sa donicus, and prostration of strength. The biliar secretion is sometimes scanty, and in some cas even jaundice is observed. The abdominal secre tions are very often disordered, and the functio of excretion generally impeded. These and othe effects—local and sympathetic—are manifestl produced—1st, by the irritation of the digestiv mucous surface, which may, in the cases of certai worms, and in susceptible constitutions especially go on to inflammation and its consequences; and 2nd, by the changes these animals produce in th chyme and chyle derived from the ordinary food and upon the secretions of the gastro-intestina surface, and upon those of the liver and pancreas The former of these effects, namely, those consisting of gastro-intestinal irritation and its consequences, will also contribute to the production o the latter; but it cannot be doubted that much o the nourishment which should be taken up by th intestinal surface is intercepted by these parasites whilst a portion of the fluids, lacteal or serous, ar removed from this surface by the suction exerte by these animals.

154. All the symptoms now enumerated are not observed in the same case, but many of them either co-exist or appear in succession, and are variously grouped in different subjects, so as to render a diagnosis very difficult between this and other complaints. When the cachexia, debility, and sympathetic disturbance of the brain and its functions are considerable, more especially when the circulating fluids are diminished in quantity from deficient aliment, or impaired in quality by imperfect assimilation and depuration, the symptoms may assume a febrile character, sometimes mistaken for a form either of low fever, or of gastric fever; but more correctly recognised by some of the older writers by the term worm- or verminous fever. (See also § 73.)

155. vii. THE CAUSES OF WORMS may be in-rred from what has been stated above; yet it ay be of use to notice some particulars too gene-lly overlooked by the recent writers, who have sisted upon the propagation of worms by means ova, &c., and who may be considered as having sproved the doctrine of equivocal generation — more correctly of spontaneous formation. A nowledge of the *predisposing causes* furnishes im-rtant indications in both the prevention and the eatment of verminous diseases; for, although the solete doctrine of spontaneous formation ren-ered this knowledge of the greatest interest, in-much as it was founded upon antecedent changes the constitution, yet these changes are by no eans devoid of influence in favouring the deve-pment of the ova and embryos of parasitic ani-als. There can be no doubt, that children of eak, aged, and vitally exhausted parents; the male sex, debilitated males; and persons of all ges, who have been insufficiently or improperly d in early life, or of a relaxed fibre or asthenic athesis, are much more subject to worms, than ose who are otherwise circumstanced. A tender nd delicate state of health in early life; the use crude, viscous, gelatinous, and vegetable food; hatever tends to lower the organic nervous force nd vital resistance; a relaxed and asthenic habit body; hereditary conformation; a residence in rowded and insufficiently drained cities and towns, r in cold and moist situations, especially in those hich are abundantly covered with vegetable pro-uctions peculiar to the country, and a scanty use such condiments, as salt and hot spices, as the limate may require, predispose to the generation of orms. In places where salt cannot be obtained quantities requisite to the wants of the œconomy, s in some intertropical countries, the hot spices are sed in its place by the natives. Those who con-end, and, from recent researches, with manifest ruth, that the presence of ova is necessary to the eneration of human parasites, consider that the redisposition produced by these causes favour his generation, and that robust health and a sound onstitution are subversive of their developement. hose who argue for their spontaneous formation elieve that these causes not merely predispose to his formation, but also directly produce it; and hat, owing to a weak and imperfect chylification nd assimilation, or to a metamorphosis of the ecretions, a material is evolved, which, under the avourable circumstances in which it is placed, nd owing to a vital emanation from the body in vhich it lodged, assumes an organised and sepa-ate existence. These doctrines, however opposite — the former assuming, as predisposing causes, nerely what the latter contends to be direct and xciting, or efficient, causes — agree in that, which s of the greatest importance to the physician: hey both point out the best indications for preventing the continued, or the future, generation of worms, where they already exist or have existed, and for guarding against their invasion in circumstances which render such invasion more or less probable.

156. IV. TREATMENT OF WORMS.—The treatment of worms should have reference — 1st, To their *prophylaxis*, or prevention; — 2d, To their *expulsion*; — and 3d, To the *prevention of their recurrence*.

157. i. PROPHYLAXIS.—*A*. As to the *first of these intentions*, it must be admitted, that the accomplishment of it is always difficult, and often impossible. Our knowledge also of the modes and channels by which these parasites are conveyed into, and propagated by, the lower animals and human subjects, is imperfect. Admitting that they originate in ova which experience the changes in the processes of their developement above described, we still find it difficult to account for the presence of these ova, and for their passage into the human stomach. That the ova, as stated above, may attach themselves to raw vegetables and fruit, is not improbable. The feeding of domestic animals also upon the garbage or viscera of fish, fowls, or the mammalia, certainly favours the production of worms, especially those of the cistoid order, in these animals; and the ova from these, where perfect cleanliness in all respects is not observed, may be conveyed in the food or drink, or by the hands, especially unclean hands, into the human body. The amount of knowledge as to this topic appears to be limited to the observance of perfect cleanliness in all its bearings, including the utmost care as to the purity of the water used, and as to the use of raw vegetables and fruits. Marsh, stagnant, and even river water ought not to be used; or if the latter be taken, it ought to be previously boiled or filtered. Vegetables and fruits should be carefully washed, especially fallen fruit, if eaten in a raw state; and the domestic animals ought to be confined to their proper places, and neither petted nor fondled. The diet is also of some consequence; and no kind of animal food should be taken, unless it be sufficiently cooked. The raw flesh of animals, especially of pigs, and imperfectly cooked viscera of animals, and all unnatural modes of living, and neglect of the strictest attention to cleanliness in respect of diet and modes of living, should be most carefully avoided.

158. *B*. But it is not only the *prevention of the ingestion of ova* into the human body that should be studied, but also the *means of rendering these ova inert, or rather of preventing their developement* in the digestive canal. As with the former, so with the latter means of prevention, our knowledge is very imperfect. We may, however, infer, that those *predisposing causes* of worms, enumerated above, should, as much as possible, be removed or counteracted. Without a due attention to the removal of the predisposition, which favours the generation and developement of the entozoa, the treatment of verminous diseases will prove inefficient as regards the issue, and empirical in practice, especially when viewed in relation to the scientific application of the resources which the progress of knowledge and the discoveries of our contemporaries have placed within our reach. In furtherance of this indication, the diet and the treatment should be adopted that are most efficacious in promoting the organic nervous force, and the tone of the digestive organs, and in removing tenacious mucus and pituitous sordes, which often adhere to the digestive mucous surface, especially in asthenic, leucophlegmatic, and debilitated subjects, and which often form the nidus in which the ova of parasites are lodged and hatched. It will generally be noticed that the secretions and excretions, which, in all persons, form the principal part of the fæcal discharge, are seldom thrown off from the secreting surfaces so quickly and en-

tirely in the delicate and debilitated as in the robust and healthy; but remain, or are retained, in the former class of subjects, and become the soil in which these animals are reared.

159. *C.* Persons who are, or who have been, subject to verminous diseases, ought to adopt that kind of food, and to have recourse to those medicines, which their feelings and observation indicate as being calculated to distress, injure, and ultimately to destroy or eject intestinal worms. A due attention to such means is required not only for the expulsion, but also for preventing the future generation of these parasites. Another object, and one, indeed, which is the basis of the prevention and of the treatment of worms, is to determine, in as accurate a manner as possible, from the character of the symptoms, and from the examination of the fæces, the *species* of the animal which is to be dislodged. While, however, this diagnosis receives its due attention, care must be taken not to mistake other diseases, which possess many of the same features, for those proceeding from the presence of worms. This error is likely to occur frequently, since the one class of disorders often reciprocally bear the relation of cause and effect to each other. Nor, in many cases, will it be attended by any serious consequences, farther than from wanting appropriate direction, the treatment must be inefficient, and redundant and superfluous. It should also be kept in recollection, that worms are more apt to be generated during fevers, and during convalescence from fevers, especially such as are epidemic, adynamic or nervous, or are gastric or exanthematous, than in robust health, or even in other circumstances. The generation of parasitical animals in these maladies is not confined to the surface of the intestinal canal only. It is not unusual to observe the parasites, usually produced, in favourable circumstances, on the external surface of the body, become remarkably abundant during and after these fevers, especially when the diseased secretions are allowed to accumulate from a neglect of ablutions and of frequent change of linen. The appearance of animal parasites on these occasions was explained by the supporters of spontaneous formation, in the way above noticed (§§ 6, *et seq.*); whilst it was viewed, by the believers in generation from ova, as the result of a more favourable occasion being furnished for the developement of the ova during these diseases.

160. One of the earliest methods of preventing and of curing verminous diseases, resorted to by many physicians, is to remove, or attempt to remove, by purgatives or drastic means, the tenacious mucus adhering to the digestive mucous surface, and which, as they believe, forms the nidus or lodgement of worms; and they believe that the quantities of mucus dislodged from the bowels during and for some time after the exhibition of vermifuge, and other purgatives, are proofs of the accumulation of this mucus on the intestinal surface. That this mucus or sordes may be excessive, in many cases, may be admitted; but it may also be allowed, that the greater portion of this mucus is produced, by the irritation of the intestinal mucous membrane, by these purgatives. This method of prevention and treatment, when moderately and appropriately prescribed, may be of service in many cases; but it should not be overlooked, that the rough operation of these medicines often leaves a debilitated state of the intestines after their operation, which disposes them to generate, and prevents them from throwing of the mucous sordes and worms which these medicines were employed to remove. They cannot by any mechanical property, or by any chemica or other influence on the intestinal secretions and excretions, always remove them from the extende surface covered by them in the manner, or completely as, contemplated; and, even when th proposed end is completely attained, the intestina functions are left in a more favourable conditio than before, to reproduce both mucous sordes an worms, especially if any of the ova still remai unexpelled. Therefore, instead of trusting to th medicines usually employed as anthelmintics, vermifuge purgatives, alterants, &c., our attentio ought to be directed (in some cases, instead o these medicines, in others, in addition to them and subsequently to the use of them) to the adoption of remedies which promote the organic nervous forces, and the digestive and vital energies i general, thereby increasing the healthy and vigorous discharge of the various functions, and the du evolution and evacuation of the secretions an excretions from the digestive organs. (*See als the treatment after the expulsion of worms.*)

161. ii. DIRECT AND CURATIVE TREATMENT.— J. P. FRANK, whose experience of the treatmen of worms, when he wrote on the subject, had extended to half a century, considered that drasti purgatives and anthelmintics, at the commencement of the treatment, were seldom so serviceable especially against tænia, as more gentle measures which, in his opinion, should be first adopted, an be followed by more energetic remedies. Bu the diversity not only of these medicines, and o the combinations and methods of prescribing them bewilder the inexperienced, until repeated opportunities of observation enable him to select thos means and combinations upon which confidenc can be placed. KÜCHENMEISTER justly remarks, that, if the multitude of remedies recommended for any disease is an evidence of their want o power against it, the therapeutics of worms are extremely defective. In truth, the treatment o these parasites leaves much to be desired as respects the efficacy of the medicines prescribed for them, the pleasantness of the most efficacious amongst them, and the disagreeable effects which often accompany and follow those most to be relied upon.

162. *A.* THE TREATMENT OF TAPE-WORM will *firstly*, and more especially, occupy attention, as it will comprise the most efficacious medicines and methods which have been employed, not only for these worms, but also for many of the others which have been noticed above; and when the treatment of these latter comes under consideration, then a brief reference to what has already been stated will be sufficient. KÜCHENMEISTER tested a great many of the medicines recommended against *tæniæ, by placing live tape-worms in a mixture of the particular medicines with white of egg*, and by determining the time in which they died by the assistance of the rotation apparatus, the two poles of which he introduced into the mixture. According to these experiments, the *tæniæ* lived for many hours, or even for days, in the mixture containing the *cuprum oxydatum nigrum*, in that containing *dolichos pruriens*; and for several hours in *castor*

, and in a salad made with *pickled herrings,* *ions, garlic,* &c. *Tin* has little or no effect, or erely the same effect as the cow-itch. *Electri-* *y* has no destructive action on *Tæniæ*. "It is herwise, however, with *kousso*, in the infusion of hich, mixed with milk, the *tæniæ* died within lf an hour of their introduction; and with *oil* *turpentine*, in a mixture of which with white of g, they died in 1—1¼ hour. In a decoction of *uyera* (*kousso*) mixed with white of egg, the *niæ* died in 1½—3 hours. In a decoction of *rad.* *nicæ granatorum*, mixed with white of egg, in hours; and with the same decoction, mixed th milk, in 3—3½ hours. In a mixture of *ex-* *ct. filicis maris æther.* with white of egg, the *niæ* died in 3½—4 hours. The so-called *filicine* *licic acid* of LUTZ), mixed with white of egg, o has an energetic action on the *Tæniæ*, which therein in the course of a few hours, and ex- bit œdematous swellings in various parts." The rticular methods of expulsion, arranged accord- to the remedies, have been enumerated by EYER, SEEGER, and KÜCHENMEISTER; but the lts which this last-named writer finds with his o predecessors, viz. that in the enumeration of thods these are thrown together in a disorderly nner, may also be imputed to himself, although a less degree.

163. *a.* METHODS WITH TIN. — FRANK com- nces the treatment with the powder of *tin*, or filings, given in a simple syrup, either alone, or h *sulphur*, or the *extractum absinthii*. After ving pursued this plan during three or four ys, allowing only a spare diet, he prescribes, in lition to the tin, a moderate dose of *jalap*, low t being still observed. DUPUIS prescribes, with- any preliminary treatment, at six, and at half- t six, in the morning, each time a powder of *nn. rasp. Angl.* ℈ss.; *Tannini puri* ℨi. *Gi* *ti (cambogiæ)* gr. v.; *Elæosacchari cajuputi,* ij ss.; and after each dose, the patient drinks cups of black coffee. In two hours, the worm xpected to pass off, usually with colicky pains, the occurrence of which strong black coffee is mediately given. For the subsequent treatment, ncture of iron is advised. BECKER recommends chemically *precipitated tin*. According to him, s certain in its action, does not irritate the in- tines mechanically, and is preferable in doubt- cases. It is, however, difficult to be obtained. CHENMEISTER protests against the administra- n of tin-filings, as being, in his opinion, a much irritating medicine. But he has twice pre- ibed *tin*, precipitated from chloride of tin, in an remely fine powder, making it into an *electuary* *h honey, a little extr. punic. granat., extr. filicis* *ris æther., and camboge or jalap.* Even young l weakly children support this remedy very ll. On one occasion, the entire worm passed, d, on the second day. In the other case, an lt, several yards passed after this medicine, the remainder of the worm was expelled by ordinary mixture (§ 181.). He considers the dicine to be uncertain, but suitable to children, l persons who are much reduced. *Tin*, in ious combinations, has been prescribed, also, ALSTON, MAYER, MATTHIEU, HAUTESIARK, l AUTENRIETH; but its operation, as they ve prescribed it, is often either ineffective, or irritating to the digestive mucous surface.

164. *b.* METHODS WITH THE MALE FERN. — *The Aspidium filix mas,* which is always efficacious against the *Bothriocephali*, is much less so against *Tæniæ*. BUCHHEIM prescribes a soft resin, obtained from this plant, with good effects. The most efficacious preparation, according to KÜCHENMEISTER, is the *æthereal extract of Filix Mas,* the powder being mixed with the extract, so as to increase the surface of contact of the medicine; or the extract being mixed with pomegranate root, which latter he prefers.—(*a.*) WAWRUCH's method is a *preliminary treatment* of three to four days, consisting of strong beef-tea with white bread, three times a day, taking at the same time the following resolvent: — ℞ *Rud. taraxaci et cichorei,* āā. ℥j.; *decoque per* ½ *horæ: colaturæ* ℥vj., *adde ammon. chlor. præcip.* ℈j.; *syrupi cichorei cum rheo* ℥ss. M. Two table-spoonfuls every two hours. With this, daily laxative clysters of milk, linseed, herb. althææ, flor. verbasc., and flor. papaver. are ordered, and on the evening before the expulsion, a very rich gruel (½ lb. of water and 2—4 ounces of butter and wheat bread). *The expulsion* is attempted by taking, "in the morning fasting, a thick gruel; and about five, six, and seven o'clock, a clyster of linseed and milk; about eight o'clock, two table-spoonfuls of castor oil; at half-past eight, pulv. rad. filicis maris ℈ij.—℈iv.; at nine o'clock, two table-spoonfuls of castor oil; at half-past nine, the fern-powder again; at ten o'clock, two table-spoonfuls of castor oil; and at half-past ten, the third powder. After each dose, the patient washes his mouth with tea made from flor. tiliæ, and summitat. millefolii; and in the intervals, he chews flavid. cort. aurantior., of which a dose of ℥ss. is prescribed. At one o'clock, he takes a powder of camboge and calomel aa. gr. v.—vj., with ℈ss. sacch. albi, and applies emollient poultices over the abdomen. If the worm be not expelled, castor oil is again given in half an hour; in a second half-hour, camboge powder; then castor oil again; and possibly, if no inflammation occurs, the powder of camboge and calomel again at half-past four. At the same time, a clyster is administered every hour!" The subsequent treatment consists of the removal of the inflammatory state of the intestines by leeches, mild diet, &c.

165. (*b.*) *Weisshaar's method* is a modification of the above. On the second, third, and fourth day of *preliminary* treatment, a pickled herring diet; and on the following day, he attempts the *expulsion* of the worm nearly as advised by WAWRUCH, excepting that he gives the castor oil in meat broth, and, instead of orange-peel, candied calamus. Of the fern-powder he gives only xv.—xx. gr. *pro dosi,* with 15—20 grs. olei filicis maris; and even the latter only to irritable subjects. Recently he prescribes 60—80 drops ol. filicis maris with ℥ss. ol. ricini; in half an hour, two table-spoonfuls of castor oil; in an hour, the first powder of camboge and calomel; in half an hour, oil again; in another half-hour, the second powder of camboge and calomel, and so forth. He states that he easily expels *T. solium* by this method; but that *T. mediocanellata* (§§ 68—70.) requires strong doses of oil of turpentine.

166. (*c.*) *The Wurtemberg method* is one ounce of fern-root boiled for an hour with three pints of water; one drachm of fresh *cort. mezerei* is added to the hot decoction, which in ten or twelve minutes is strained, and then mixed with two or

three drachms of finely powdered fern-root. This is taken in the morning fasting, either at once, or in three portions at intervals of an hour. In three or four hours, sickness and disorder of the stomach cease; and then calomel, freshly prepared sulphate of iron, aa. gr. x.—℈j., according to age, are administered, and repeated if vomiting occur. The worm is said to be generally expelled in the evening; when this is not the case, a rich gruel is given on the same evening; and on the following morning fasting, rhubarb and jalap, aa. gr. x.—xv.—ʒ ss.

167. (*d.*) *Alibert's and Dubois' methods* are nearly the same, and as follows: — After a preliminary treatment for eight days, to which garlic, roasted under the ashes, is added, the abdomen is to be rubbed several times a-day with a liniment of camphor, with balsams and nut oil, and with crushed bulbs of garlic, also a ptisane of *helminthocorton* and *filix mas*, and a nightly enema of marsh-mallow water are prescribed. Without this preparation, ALIBERT prescribes —

No. 380. ℞ Rad. Filicis Maris, ʒ iv.; — Coque cum Aq. Font. ℔ iij., usque ad remanentiam ℔ ij.; — Colaturæ adde Syrupi Helminthocort. ℥ ij. M.

This is to be drunk in cupfuls during the day. After three hours of repose, calomel and corn. cerv. ust., of each gr. iij., made into a bolus with conserv. rosæ q. s., are given. In the evening, ℥j. of oil of sweet almonds; and on the second day, the following purgative: —

No. 381. ℞ Scammonii, gr. xviij.; — Rad. Filicis Maris, ℥ j.; — Cambogiæ, Calomel. āā. gr. xij. M.

To be taken in three portions in sugar and water. DUBOIS, after the preliminary treatment just noticed, prescribes, early in the morning, ℥ss. of filix mas in broth; and every half-hour one of the following: —

No. 382. ℞ Res. Jalap., Scammonii, Cambogiæ, āā. ℈ ss.; — Syrupi Rhamni Cathart. q. s. ut fiant Boli, sing. gr. vj.

168. (*e.*) *Biching's and Seeger's methods.* The former commences with draughts and clysters of cold water, and with full diet and cold baths. With this diet, but without the cold water, according to SEEGER, a saturated decoction of ℥ss. of fern-root is drunk cold after every meal, when the worm will be expelled in from three to fourteen days. SEEGER's plan, according to KÜCHENMEISTER, is suited to irritable and weak persons.

169. (*f.*) *Nuffer's and Odier's method.* The evening before the treatment, the patient takes a thin gruel with two ounces of butter; a quarter of an hour afterwards, a glass of wine, and, if necessary, a clyster. The next morning fasting, ʒ iij. pulv. fil. maris in ℥ iv.—℥ vj. aq. tiliæ. If vomiting occur, this is to be repeated; and if sickness be felt, black coffee is taken. Two hours after this, the following bolus is given: —

No. 383. ℞ Calomel., Scammonii, āā. gr. x.—xv.; — Cambogiæ, gr. v.—vij.—viij.; — Confect. Hyacinth. q. s. Misce.

For weak patients and children, in two doses. If the bolus be thrown up, or not have operated in four hours, or if the worm hangs out of the anus, ʒ vj.—℥ j. of Epsom salts, dissolved in warm water, are given. If the worm be not expelled by this, the gruel and powder are to be repeated, but the Epsom salts are to be given instead of the bolus. ODIER directs a table-spoonful of castor oil in meat broth every half-hour instead of the bolus. This treatment is said to be certain agai *Bothriocephali.*

170. (*g.*) *Blossfeld's and Rapp's method* is mu praised. The previous evening, a thick mixtu of bread and milk is taken; and in the followi morning ʒ j. *pulv. rad. fil. maris* is given eve hour, in an ounce and a half of nutmeg t After six or eight doses, the worm is expelle RAPP directs the root to be fresh, and administ ʒ vj.—℥ j. of it one dose.

171. (*h.*) *Mayor's method.* MAYOR, of G neva, regards the root of *filix mas* as speci against *Bothriocephalus*, and *tin* and *pomegran root* against *Tænia solium*, and states that t powder of the fern-root should appear quite gre as it is otherwise inefficacious. He gives ʒ iij. ʒ iv. in a mixture of balm tea and ℥ j. of gu syrup. This draught is to be taken at night, a ℥ jss. of castor oil the next morning. MAYO in some cases, instead of the powder, prescrib the *oleum filicis maris* in the form of pills,—thi to fifty drops in twenty-four pills, of which twel are taken at night, and twelve in the morning, a an hour afterwards ℥ jss. of castor oil. In ot cases, he gives the fern-oil either pure, or mix with castor oil, in doses of ʒ ss.—ʒ j.; but usua the castor oil afterwards.

172. (*i.*) *O. Bang's method.* "For three da the patient takes only one basin of meat bro with white bread. At night, he has a clyster warm milk. On the fourth day, he takes a eight cups of black coffee with plenty of sug and two to three large pickled herrings in form of salad, with plenty of vinegar, pepper, and onions. On the fifth day, he takes alternate every two hours, one third of a herring, an heaped-up tea-spoonful of pulv. rad. filicis ma and with this two to three cups of coffee. night, a milk clyster and a dessert-spoonful castor oil. On the sixth morning, fasting, t tea-spoonfuls of fern-powder; an hour afterwar two table-spoonfuls of castor oil, and the sa quantity every two hours until the worm is pelled. During this he drinks tea; and, las for the subsequent treatment, iron is used."

173. (*k.*) *Ullersperger's method.* Without a previous treatment, he gives ʒ iij.—ʒ iv. of t bark of the roots freshly peeled, treated with al hol the day before, and lets the patient lie in b When no vomiting takes place within two hou an aperient of 6 gr. calomel and ℈ j. of sapo lap. in pills is given. This method is said to rapid and efficacious.

174. (*l.*) *J. P. Frank's method* is to commen either with the exhibition of *tin*, as above, and follow with the *male fern*, or to begin at o with this latter, giving about three drachms in draught of cold water, and to give frequently c diluents, allowing the most rigorous abstinen A dose of castor oil may be taken the followi day, and repeated every two hours until copi evacuations are procured.

175. (*m.*) *Mayer's and Karsten's methods.* On day when fragments pass off spontaneously, the tient takes a herring salad at night. At six o'clo next morning, ʒ iij. of fern-powder in ℥ vj. of flor. tiliæ is taken in tea-spoonfuls without st ping, and immediately after this a table-spoonful castor oil, and then a cup of thin broth. The is then continued every half-hour until ℥ ij. taken. For any sensation of fulness and naus

hot black coffee is given. About twelve o'clock, he greater part of the worm is expelled, and the head passes at one or two o'clock. Bitters are prescribed subsequently.—KARSTEN's method consists of a mild aperient and scanty diet the day before; and early in the morning, ʒ iij. of fern-root in teaspoonfuls. If sickness be felt, thin broth is given. Between eleven and one o'clock, the worm is expelled without any further treatment. Several other methods of employing the male-fern root have been enumerated by KÜCHENMEISTER, generally premising various means, the modus operandi and utility of which are not very apparent. I shall next notice two other preparations of this root — the *extract* and the *æthereal oil*, which have been used with great benefit. The *compound decoction of male fern*, for which I have given a *Formula* in the APPENDIX, will be found one of he most efficacious modes of prescribing this emedy. (See *Form.* 62.)

176. (*n.*) *The extractum filicis maris* has been prescribed by several physicians. PESCHIER administers it as follows: —

No. 384. ℞ Extr. Filicis Maris Æther. ℈ j.—ʒ ss.; — Pulv. Rad. Fil. Maris, q. s. ut fiant Pilulæ xx.

To be taken in two portions half an hour before ed-time, after fasting from five o'clock in the vening; next morning an aperient. Several hysicians have adopted this preparation and its mode of exhibition with success. KIESER and MILLER gave the extract, for several days together, to the total amount of ʒ iij. with good results. After several days of spare diet, MÖSING ave fifteen of PESCHIER's pills to the fasting patient at nine o'clock, and again at half-past ne. His prescription is as follows: —

No. 385. ℞ Extr. Filicis Maris Æther. ʒ jss.; — Pulv. Rad. Fil. Mar. q. s. ut fiant Pilulæ xxx.

After the last dose, he gave ℥ iij. infusi sennæ compos. at once. FUNK administered the extract ight and morning with syrup and gum, and afterwards gave castor oil every hour until it operated eely. Noss prescribed an aperient on the preceding day, and the extract to the fasting patient with syrup—℈ ss.—ʒ ss. of the extract twice with n interval of an hour; then castor oil every hour. ALBERS, after a restricted diet for one to three ays, and on the day before the exhibition of the xtract, prescribed a purgative of Glauber's salts; nd on the following morning, ʒ ss. of extract of male rn whilst fasting, and the same quantity an hour fterwards—one to two hours afterwards, castor il. RAYER gave seventy-two drops of PESCHIER's in extract of fern made into pills with the powder the root, of which eight are to be taken at night, d eight in the morning; two hours afterwards, stor oil. MAGENDIE prepared a *tincture* from e *buds of the fern*, and made it into pills with e powder of the bark of the root, each containing drop of the tincture. From eight to twenty ere said to be sufficient for expulsion of the orm. The circumstance of no further accounts the employment of this tincture having appeared, is not in favour of its efficacy.

177. (*o.*) *The æthereal oil of male fern* has been uch employed and praised by Dr. JENNER. He used the patient to be kept without food for xteen or eighteen hours, before he gave the oil; d he further recommends the following mode of ministering it: — "For an adult, two pills may be taken at bed-time, containing three grains of calomel, and eight of compound colocynth pill; the following morning, a dose of castor oil. A little broth only should be given till the bowels have been thoroughly cleared out. As soon as that object is effected, one drachm and a half of oil of male fern is to be given on an ounce of some aromatic water; and the dose of oil of male fern is to be repeated in six hours, if the first dose has not proved effectual before the expiration of that time. For a child, calomel and jalap may be substituted for the colocynth and calomel. The dose of the oil of male fern must be as large for the child as for the adult; seeing that its action is on the parasite, and not on the patient, I have never seen any unpleasant results follow its employment in the child." I have, in several cases, given the male fern successfully, when connected, many years ago, with public medical institutions; and since the publication of Dr. JENNER's interesting paper on the use of the æthereal oil of male fern, I have prescribed it in two cases — in one with complete success, but in the other it failed. In this latter, the oil of turpentine and the kousso had been prescribed separately and after considerable intervals, and both had failed, portions of the worm only having come away. An opportunity, however, was not afforded me of persevering in the treatment beyond the exhibition of two doses of two drachms each. The oil was procured from an undoubted quarter. I give, in the subjoined note, Dr. JENNER's account of his experience with this oil.* In a case, recorded in

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* "The anthelmintics chiefly employed in cases of tape-worm in this country, are turpentine, kousso, pomegranate, and male fern. The objection to turpentine is its horribly nauseous flavour, and its very unpleasant effects on the head, and occasionally on the kidneys. It is a remedy which should be used only as a last resource. Kousso is expensive and bulky. Pomegranate is bulky and nauseous, and, as ordinarily obtained in this country, not very certain in its action. Male fern has the advantages of being inexpensive, only moderately disagreeable in flavour, so that children take it readily, of small bulk, perfectly innocuous to the patient, and more certain than the other agents in its action on the parasite. It is one of the oldest of the remedies for tape-worm, and one of the very best. The preparation I have used is the æthereal oil. An aperient was given in the morning, the patient was kept without food for sixteen or eighteen hours, and then one or two drachms of the oil of male fern were administered on a little cinnamon water.

"I have notes of twenty-four cases to which the oil of male fern was given. Sixteen of these cases were cured by a single dose. In three of these sixteen cases the head was found; three of the remaining thirteen were ascertained to be well two years after the administration of the oil, one a year after, one seven months, two six months, three four months, one three months; and before the other two ceased to be under observation, a second dose was given by way of precaution, as it was to all the patients when the head was not found, without any tænia coming away with the stool.

"Three required two doses of the drug; in one of these three, some yards of tænia were expelled by the first dose; for two months after this no joints were found in the stools, then a few appeared, and a second dose was given, and was followed by the expulsion of nine yards of tænia; the patient continued well two years after this. In the second case, three yards were expelled by the first dose; and a month after, five feet by a second dose; at the expiration of four months and a half, the patient continued well; in the third case, five and a half yards of tænia were expelled by the first dose, and seven yards by the second, given two months after the first.

"Three doses were required in two cases. The first dose of the oil, however, given to one of these cases, was not of good quality. In one of the two, three days elapsed between the first and second dose, and four hours between the second and third. In the other, two days elapsed between the first and second dose, and one between the second and third. In both cases the head was obtained.

"In one case, viz., that of a child five years and six the same journal (August 30. 1856, p. 733.) by Mr. SYMPSON, two drachms of the æthereal oil of male fern, given without preparation, brought away the *Bothriocephalus* in three hours after their exhibition, the worm being voided in two portions with its head connected with the part last voided.

178. *c.* METHODS WITH POMEGRANATE BARK. — DIOSCORIDES, CELSUS, and PLINY mention the *radix punicæ granati* as a vermifuge; and in the East its reputation as an anthelmintic remedy has been great from time immemorial. It was introduced into Europe early in this country by BUCHANAN, BRETON, FLEMMING, and others. SEEGER states that of 419 cases treated with it up to 1852, 371 are reported as complete cures, 24 as doubtful, and 24 as unsuccessful. KÜCHENMEISTER adds that he could considerably increase the number of successful cases, partly by his own observations, and partly by those made by others, according to his method — this appearing to be his favourite remedy. The following inferences are stated by him as to *the preparation of the bark*: — 1st, All experiments to ascertain the active principle of the *bark of the radix punicæ granati* have failed. — 2d, This bark is often adulterated, or contains much impurity. — 3d, The bark of the root is more active than the bark of the trunk; ʒiij. of the former = ʒiv. of the latter. The bark of the branches has no action. — 4th, The fresh bark acts more gently than the dried bark, but more of it is required; ʒiij. = ʒij. of dried bark. — 5th, According to several authorities, the East Indian bark — which is thicker — should be preferred to the European. — 6th, "After maceration for at least twelve to twenty-four hours, the bark is well boiled; and, according to CENEDELLA, it is better made in earthen than in metallic vessels; it is filtered while hot, as, on cooling, active substances appear to be thrown down again. The decoction was formerly most generally used, but I prefer the extract. The best method of preparing this is as follows: —

No. 386. ℞ Corticis leviter contusi Rad. Punicæ Granati, ℥iv.; macerentur per horas xxiv. cum aquæ destill. ℔j.; posthac coque in leni calore per horas xij. ad remanentiam ℥vj. et cola.

To be taken in three to four doses at intervals o from half an hour to an hour."—7th, According to German physicians, the fresh bark, or the extract prepared in the East Indies from the fres bark, is to be preferred. Even the fresh bark cultivated in Germany and in green-houses, i more efficacious than the dried bark. WAITZ' extract, prepared from the fresh bark in the Eas Indies, is very active; the dose of it being ʒj.— ʒij. — 8th, "The most efficacious form, unde all circumstances, is the solution of the extract i a certain quantity of water. The extract itself made into an electuary with honey, or administered in pills, is to be recommended where ther is great tendency to vomit; but on the whole, it aqueous solution is the best. — 9th, An alcoholic extract is also recommended by DESLANDES and recently by MARTINS; and an æthereal extract has been prepared by WAITZ in Java. O the latter, ʒiij.—ʒiv. are administered in ʒv. o fennel water with syrupi corticis aurant. ʒj., i three doses, at intervals of half an hour."— 10th, Although boiling water is, to a certain extent, sufficient for the preparation of the activ substance of the bark, yet the addition of causti potash or soda, or of a little white wine to th water employed in the maceration, and afterward in the decoction, of the bark, greatly increases th efficacy of the extract. — 11th, Bark which ha been long kept is to be rejected as inefficacious — 12th, KÜCHENMEISTER has recourse to anothe method of preparing the decoction and extract beside that advised above (6th). It is as follows:—

No. 387. ℞ Cort. Rad. Punicæ Granati, ʒvj.;— Pulv. Rhamni Cathart. ℥j.; — Aquæ Destill. ℔ij.; — Liq. Kali Caustici Concent. ♏x. Macera per hora 12—14; coque leni calore in balneo vapor. per horas 2 ad remanentiam extracti.

The woody parts are to be removed by washin and pressing some time before the conclusion c the evaporation; the washing water being evaporated with the rest. A quantity of this extrac corresponding with the dose of the pomegranat bark prescribed, is to be dissolved in ʒvj.—vij of hot water; and, before administration, ℈j.—ʒss extracti filicis maris æther. may be added, whe it is desired to combine the two extracts. (Se § 176).

179. *d.* METHODS OF PRESCRIBING POMEGRANATE BARK. — (*a.*) *Recent bark.* — BUCHANA prescribes ʒviij. of fresh bark of the root to b boiled with three pints of water until two pint remain, and drunk in cupfuls, at short interval until the worm is expelled. KÜCHENMEISTER say that, by this violent vomiting, colic and purgin are produced. BRETON recommends ʒij. of th fresh bark to be boiled down from ʒxviij. to ʒix or, according to GOMEZ, from ℔jss. of water t ℔j., and this decoction to be taken by cupful MÉRAT advises ʒij. of fresh bark to be infused a night in ℔jss. of water, and left to macerat through the night, and to be boiled down to ℔ in the morning. After being filtered and wei pressed, this decoction is to be taken in thre equal parts within two hours. If vomiting occu after the first dose, this should not prevent th

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months old, between the 15th of July and the 4th of August inclusive, five doses of castor oil, and as many of oil of male fern, were administered without a decided effect; a few joints of tænia only being expelled. On the 17th of August, twenty grains of the extract of male fern, obtained from Duncan and Flockhart, of Edinburgh, were given without effect. On August 23rd, one pint of infusion of pumpkin seeds; on September 1st, decoction of pomegranate; and on September 5th, infusion of kousso; all produced copious evacuations, but no tape-worm. The child now left the hospital. In November he was readmitted, and, during my absence, was treated with success, by my friend Dr. BALLARD, with the oil of male fern. This time the child was kept for forty-eight hours with little, if any, food, before the oil was given. The child was free from tape-worm some months after he left the hospital.

"One man took the oil two or three times without any good effect, but then large quantities of solid fæces were discharged from its action; and before it could be administered in a more effectual manner, the patient escaped observation.

"Among those cured by a single dose, and well two years afterwards, was one man who had taken kousso three times, and oil of turpentine twice. Several of the others had taken turpentine and other remedies with permanent good effect. In three cases (children), the patients rejected the oil by vomiting; with one exception, all admitted that it was much less nauseous than castor oil. In no case did it cause griping or other unpleasant symptoms. The shortest time after taking the oil in which the worm was expelled, was half an hour; the longest, twelve hours; the ordinary time four hours. A large quantity of tenacious yellow mucus was usually expelled either with or before the worm, and often, also, when no worm was present, as when the oil was given to ascertain that no worm remained, the head not having been found.

"In no case was the worm alive when expelled, and in no case was it expelled entire."—(*Association Med. and Journ.*, Aug. 23. 1856, p. 718.)

llowing doses from being given; but if the pa- ent vomit these, the treatment must be desisted om. According to SCHMIDTMÜLLER, after one ay's fasting, and the administration at night of ij. of castor oil, ℥iij. of fresh bark are mace- ited for twelve hours in ℥xij. of water, and con- entrated to ℥vj.; this is taken in three doses ithin an hour. KÜCHENMEISTER remarks that, in all these methods, evacuations take place ithout purgatives, as the fresh bark usually acts an aperient itself; and in this lies the great dvantage of the fresh bark, and a principal cause the great uncertainty of most of the previous ethods, in which the dried bark was employed. o produce the aperient action with certainty, the ied bark needs the addition of purgatives. Ac- ording to my experience, the neutral salts and e true drastics, such as jalap, are greatly to be eferred to the oils." The decoction of fresh omegranate bark may also be prescribed as stated the APPENDIX. (See *Form.* 69.)

180. This writer prefers the extract. radicis inicæ granati, prepared according to the pre- ription given above (§ 178. No. 387.), to all her remedies for tape-worm with which he is quainted; for, in almost every case of expulsion this medicine, the worm was passed in one ece with the head, or unbroken and in a single il — sufficient reason, in his opinion, for en- eavouring to make the administration of this medy more agreeable, and its results still more rtain.

181. (*b.*) *Combinations of pomegranate bark and ale fern.* — This was attempted by VON KLEIN, nd afterwards by KÜCHENMEISTER. The latter escribed it as follows: —

No. 388. ℞ Extracti Radicis Punicæ Granati Aquosi antum est ex Rad. ℥iv.—℥vj. solve in Aq. Destill. ervidæ ℥vj.—viij. Adde Extr. Filicis Maris Æther. j.—ʒss.; — Extr. Tanaceti Vulgaris, ʒij.; — Cambo- æ gr. iv.—vj. ad x. Misce.

cupful to be taken in the morning fasting; a milar dose in three quarters of an hour. The ird is kept in reserve. If the worm be not ex- elled in an hour and a half after the second dose, e last portion is also to be taken. If vomiting ccur, a table-spoonful of the medicine is given very ten minutes; and, to alleviate the tendency vomit, the patient is recommended to gargle, ter every dose, with fresh milk, without swallow- g any of it. Small pieces of candied citron or mon-peel are allowed between the doses. If no vacuation have occurred three hours after the rst dose, and the worm have not been expelled, n aperient is administered. "With *tænia solium*, astor oil is usually sufficient; one to two table- oonfuls every half-hour or hour; or: —

No. 389. ℞ Cambogiæ gr. vj.—viij.; — Pulv. Rad. alapæ, gr. x.—xv.

o be repeated in two hours, if required." With . *mediocanellata*, this writer has found the best esults with the following aperient: —

No. 390. ℞ Calomelanos, gr. iv.—vj.; — Pulv. Ja- pæ gr. x.—xv.

o be taken at once. After the expulsion of the orm, he advises no treatment, excepting tonics cases of great weakness.

182. (*c.*) *The preliminary treatment, advised by* ÜCHENMEISTER, is as follows: — At the seasons f fresh strawberries and grapes, he gives half a int of these fruits every morning, fasting, for six to eight days; and on the evening before the expulsion, a herring salad with plenty of vinegar, onions, raw and boiled ham, and plenty of oil; and to very costive persons, ℥j. of castor oil; after which the patient may drink a large glass of light Rhenish wine, or a glass of bitter beer. If the fresh fruits are not to be had, the salad alone will suffice. In very obstinate cases of *Tænia mediocanellata*, he allows the patient to take as much confection of senna with extr. tanaceti vulg. (ʒij. to the ounce of the confection) as will produce two soft motions daily; he then takes the mixture, and not before. Fasting the night before is not advised, as the medicine does not agree well with an empty stomach.

183. *e.* METHODS WITH OIL OF TURPENTINE. — I have prescribed this medicine both as a preliminary means variously combined, and as a direct remedy, or after little or no previous treatment. As a preliminary medicine, I have most frequently given it in the following form: —

No. 391. ℞ Olei Terebinthinæ, ʒij.—ʒiv.; — Ætheris Sulphurici (vel Spirit. Ætheris Sulph. Comp.), ʒiv. —vj.; — Tinct. Camphoræ Comp. (vel Tinct. Benzoniæ Comp.), ℥ss.; — Olei Cajuputi ♏xij.—xx. Tere cum Pulv. Tragacanth. Comp. ʒiij., Pulv. Glycyrrh. ℈ij., et adde Syrupi Rosæ et Syrupi Tolutani, āā. ʒjss., Aquæ Destill. ad ℥viij. Fiat mist. cujus capiat cochl. j. vel ij. larga, 4tis vel 6tis horis, prius agitatâ phialâ.

Cold water, or linseed tea, barley water, &c., may be taken frequently during the continuance of this medicine; and in some cases, as soon as any indication of disorder of the urinary functions occur, a full dose of either castor oil, or of calomel with camboge or jalap, so as to freely evacuate the bowels, should be given. Frequently a considerable portion of the worm is expelled by these means; but, nevertheless, the male fern, or its æthereal oil, or the pomegranate bark, should be taken, as prescribed above (§§ 164—181.), a few hours after the exhibition of the purgative; or, in other cases, a few hours before, especially if the bowels have not been long confined.

184. KÜCHENMEISTER states that "the dose of this remedy is ℥ij. at once, in the morning, fasting; and, if no stools result, another ℥j.—℥ij. afterwards (FENWICK and COPLAND); or ℥j. olei terebinthinæ, made into an electuary with honey, &c., in two doses at night before going to bed (THOMPSON); or ℥ij.—ijss. (SCHMIDTMANN); or with the olei filicis maris (MAYOR). Or the patient, for three days, is allowed to eat only water-gruel with small portions of white bread, three times a-day; and on the next day, when fasting, to take the following: —

No. 392. ℞ Olei Terebinthinæ, ℥j.; — cum Vit. Ovorum, ij.; — Sacchari Albi Subacti, ʒss. M.

and if the worm is not expelled on this day, the dose is repeated on the following day (MERCK). Some also give ℥ij.—ijss., one half in the morning, and the other at night." This is one of the most effective agents against tape-worms, as LANGE, KÜCHENMEISTER, and others admit. The latter of these writers states that tape-worms laid in turpentine mixed with white of egg, died within one hour and three quarters; and that the touch-stone of a remedy for tape-worms is not whether it expels *Bothriocephalus latus* or *Tænia solium*, but whether it is also capable of expelling the *T. mediocanellata*. That the oil of turpentine is efficacious in the latter case, he can prove; for the finest specimen of this last-named worm was expelled by it. In general, it acts with tolerable rapidity, and entirely. This latter circumstance he regards as a requisite of a good vermifuge in cases of tape-worm, especially as the doctor and the patient are anxious to ascertain the expulsion of the head of the parasite.

185. The principal objections to this substance are its nauseous taste, the inclinations to vomit, the unpleasant eructations, griping pains, and disorders of the urinary excretion, it often occasions. It more frequently produces these unpleasant effects when taken in the form of an electuary. When prescribed in the form of mixture, as above (§ 183.), or suspended by white of egg, or taken either pure in a full dose (℥j.—ij.), or with the addition of castor oil, on the surface of coffee, or milk, or on any aromatic water, at bed-time, or early in the morning, it is generally the most efficacious, and least likely to produce any of the above unpleasant symptoms. It is often taken, with less discomfort, on the surface of Hollands or common unsweetened gin. When castor oil is not given with it, and when it does not act on the bowels in a few hours, either a full dose of castor oil, or of some one of the purgatives already mentioned, should be taken without delay.

186. *f.* Methods with Kousso.—*Kosso*—*flores kousso*—the dried and powdered flowers of the *Bruyera anthelmintica*, has lately been much in vogue against tape-worm. It has been supposed, by several physicians, to have been adulterated. Küchenmeister supposes that it is not so much adulterated as mixed with other Abyssinian medicines against tænia, as with the powder of the root of *Verbascum ternacha*, and with the powdered leaves of *Jasminum floribundum*. The dose of the powder of kousso is ʒ vj. to ℥ j. I have prescribed this remedy in four cases. In the first, successfully in the case of a medical man in Hertfordshire; the entire worm with the head having been brought away, after turpentine and some other anthelmintics were said to have failed; but in two cases, with only a partial benefit; and in one case, without any effect. The writer just mentioned states that he has always been more or less unlucky with this remedy, which, in the ordinary mode of administration, shares all the defects of the other remedies for tape-worms, and easily produces sickness and violent pains in the intestines; and that the worm has generally been expelled by it in numerous fragments, and at most the worm up to the neck; but that he never found the head, excepting once, after a second dose of the kousso, which caused violent pain in the abdomen. Several attempts have been made in Germany to isolate the active constituents of this substance, and to prepare infusions, decoctions, and infuso-decoctions of it, with and without the flowers being retained in them; but, although the effect appeared to equal or to approach that of the powder of kousso itself, yet little was gained, excepting when the quantity (ʒ vj.—℥j.) of kousso usually employed was macerated in cold water for twenty-four hours, and then boiled for half an hour, and the whole taken — without straining — with the flowers in it, in two portions; ℥j. to ℥ij. of castor oil having been given two hours after the second portion. This infuso-decoction was said to have been well borne, and to have acted with certainty.

187. *g.* Notices of several other Medicines and Methods against Tape-worms. — (*a.*) The *Spigelia anthelmintica* has been employed, according to Noverre, in the West Indies; but its effects are unpleasant, and it not easily admits of use in Europe.—(*b.*) *Sabadilla* has been given in a dose of half a drachm of the powder in the morning, the patient having been purged on the previous day with rhubarb and Glauber's salts. The sabadilla powder is given with the same quantity of fennel sugar, and the patient afterwards drinks one to two cups of chamomile or elder-flower tea. If vomiting be produced, worms in the stomach are thrown up. On the second day, the same dose of sabadilla is taken; and if no more of the worm appears, half the quantity of this medicine is taken morning and evening of the third and fourth days. On the fifth morning, whilst fasting, a purgative is administered, and the living or dead worm is brought away. For children from two to four years, two grains of sabadilla powder is a sufficient dose. This medicine is of service against *ascarides*.—(*c.*) The *schebdi*—*the Phytolacca dodecandra* or *Abyssinica.* The fruit of this plant has been tried in Europe, and fragments of the worm have been brought away; but sufficient trials have not been made of its efficacy. — (*d.*) The *fructus saoriæ*, the fruit of *Mæsa picta*, Hochstetter, has been given in doses of ℥j.—℥jss. with uncertain results. This remedy is easily taken. Its taste is less repulsive than that of other remedies. Nausea, vomiting, and slight pain in the abdomen are often experienced from it. In two cases, the worms were expelled by it up to the head, but always in fragments. This remedy appears to be deserving recommendation for *ascarides* and *oxyurides.*— (*e.*) The *Mucuna*—*cortex mucunæ*—from *Mucuna anthelmintica*. The dose of the powder is ʒvj., and is usually, in the East, given with honey in a stiff paste. Single fragments of the worm were brought away by it, but the medicine was probably injured by keeping.

188. *h.* Drastic Purgatives with and without Calomel. — Bremser's and Schmidt's methods of employing these medicines are too severe, and are often productive of inflammation of the digestive mucous surface, which may not be allayed for some weeks. I will not, therefore, mention them. According to Ettmüller's plan, the patient takes, at seven o'clock in the evening, calomel. gr. xij., lapid. cancror. ℈j.; and about nine o'clock, olei amygdal. dulc. ℥jss.; which usually operate twice in the night. At seven and nine o'clock next morning, he takes cambogiæ gr. xij., rad. valerianæ, and sem. cinæ, āā., gr. iv., when the worm is afterwards expelled. I much doubt this result. It is quite unnecessary to state the various modes in which the changes are rung upon the purgatives believed to be most appropriate in cases of tape-worm, by writers of no mean reputation, and the several ways these medicines may be combined, and successively administered. Calomel, camboge, jalap, castor oil, the sulphates of potash, soda, magnesia, &c., variously conjoined or administered in succession, with or without valerian, oleum tanaceti, &c., are the chief medicines advised. But, in order to be efficient, their doses, and the repetitions of them, are such as to risk the supervention of inflammation; and in a large proportion of cases they fail altogether.

189. *i.* INFERENCES. — (*a.*) Simple methods treatment with the *filix mas* and its *æthereal* and *extract* (§§ 176, 177.), are sufficient to re- ove the *Bothriocephali.*— (*b.*) For the expulsion *Tænia solium*, the combination of the aqueous tract of the bark of the pomegranate root, with e addition of the æthereal extract of male fern, considered by KÜCHENMEISTER as the most icacious, camboge, gr. iv.—viij., being pre- able to the saline addition mentioned above. — .) The *Tænia mediocanellata* is generally ex- lled by the same combination, especially when powder with calomel and jalap, or camboge, is ven afterwards. — (*d.*) In very obstinate cases, e methods with tin, or those with turpentine, or th these latter following the former, may be ployed with care and circumspection. — (*e.*) e kousso does not promise any advantage over e above remedies, if, indeed, it be equal to any them. — (*f.*) When the worms depend from e anus, the German physicians advise a cup of ong black coffee with plenty of sugar to be given mediately. A dose of calomel and jalap, or s followed by castor oil, appears to be more icient.

190. *k.* TREATMENT WITH KAMALA (*the red wder obtained from the capsules of Rottlera ctoria*, Roxburgh). — This substance, long own in India as a valuable dye for silk, has en much employed against tape-worm, which very prevalent in the Punjab and North-western ovinces of India, and has recently been pre- ribed with success in this country by Dr. EARED and others. This peculiar red powder ay be prescribed in doses of half a drachm to ree drachms suspended in water. "A single se is often found sufficient, and in general it is t necessary to give any other medicine before after. In some cases, however, where a small se of *kamala* has been administered, castor oil s been afterwards given with good effect. Dr. ORDON has prescribed kamala in the dose of e drachm, repeated at intervals of three hours. amala may be given also in the form of tincture, e formula for which, recommended by Dr. AN- ERSON, is as follows: —

No. 393. ℞ Kamalæ, ℥vj.; — Spiritûs rectificati, xvj. Macera per biduum et cola.

n æthereal tincture may be prepared of the same ength; but it is said to offer no particular ad- ntage over the alcoholic. The dose of *tinctura malæ* is from ʒj. to ʒiv., diluted with some omatic water." (Dr. HANBURY, in *Pharma- utical Journ.* Feb. 1858, p. 405.)

191. Drs. C. MACKINNON, ANDERSON, COR- YN, and GORDON have praised the anthelmintic owers of this medicine. Dr. MACKINNON states, at the results have been so satisfactory, that he as continued to employ this whenever a case of enia presented itself, and that he has given it in xteen cases without a single failure. In none of s cases, excepting one, did he ever exceed, for a ngle dose, three drachms. This dose usually urges from five to seven times; and the worm is sually expelled dead in the fourth or fifth stool. n about half the cases, some degree of nausea nd slight griping were experienced; in the re- aining half, no inconvenience whatever was felt. r. MACKINNON states the following as the results f his experience of this medicine: — "1st, That amala is a safe and efficient remedy for tape-worm, and more certain than either turpentine or kousso; — 2d, That, to a strong European, three drachms may be safely given as a dose; — 3d, That, to a person of feeble habit, or to a female, one drachm and a half, followed, if necessary, by half an ounce of castor oil, is a sufficient dose." Since the above was published, Dr. MACKINNON has administered this medicine to nearly fifty patients, and in two instances only was no worm expelled. (*Medical Times and Gazette*, Dec. 19. 1857, p. 628; and *Indian Annals of Med. Science*, vol. iii. p. 86.)

192. Dr. ANDERSON states that, "after three drachms of the powder (of kamala) have been administered, the worm is usually expelled in the third or fourth stool. It is generally passed entire, and almost always dead; and in all the cases I have examined (about fifteen), I was able to detect the head. In only two cases do I know of the worm being passed alive. The advantage of the tincture over the powder consists in its action being more certain and milder, and in its being rarely accompanied by nausea and griping. In two or three cases, only two or three stools followed the dose usually given, and the worm was expelled in the second stool; in one patient, only one stool was caused by the medicine, and in it the worm came away dead." (*Ind. Ann. of Med. Sc.* vol. iii. p. 82.) Dr. ANDERSON alludes to ninety-five cases of tape-worm, in which *kamala* was prescribed, and of this number (eighty-six were European soldiers) he was aware of only two in which no worm was expelled. Dr. C. A. GORDON remarks, that "with this medicine there is no unpleasant effect. It is not even necessary to take a dose of purging medicine as a preparative; and, beyond a trifling amount of nausea and griping in some instances, no unpleasant effects are experienced; while by far the greater number of persons to whom it is administered suffer no inconvenience whatever beyond what they would from a dose of ordinary purging medicine." (*Med. Times and Gaz.* May, 1857, p. 429.)

193. Dr. ANDERSON and Dr. GORDON agree in stating that the frequency of tænia in the North-west and Upper Provinces of India arises from the free use of animal food of a very unwholesome character by the European soldiers; whilst among the Hindu natives, whose food is entirely vegetable, this parasite is unknown. Foul-feeding and half-starved pigs, cattle and sheep, as well as ducks, turkeys, fowls, pigeons, equally foul-fed and diseased, are often made articles of diet by the European soldiers, and are justly viewed, by the physicians mentioned above, as the causes of the prevalence of tape-worm in this class.

194. iii. TREATMENT OF THE OTHER WORMS. — *A. Echinococci, cysticerci*, and *acephalocysts* rarely admit of treatment, and only of surgical treatment. This subject is sufficiently noticed in the article HYDATIDS.

195. *B.* The comparative rarity of the *Distoma hepaticum* (§§ 98—100.), and the difficulty of its *diagnosis*, render the prophylaxis and treatment of this worm, in some respects, matters of subordinate importance. The *prevention* is either difficult, or impossible, owing chiefly to our imperfect knowledge of its developmental history. As far as this history may be inferred from the subjoined remarks of KÜCHENMEISTER, the prophylaxis must be founded on it, and be

viewed as conformable with what has been stated above* (§§ 157—160.). The *direct treatment* of *Distoma hepaticum* can rarely be ventured upon with success, owing, *first*, to the almost impossibility of its diagnosis, unless its presence be inferred from the passage upwards or downwards of some individuals of this species; and *next*, from the serious nature of the lesions produced by it. Even granting, then, the detection of the malady, medicines can be exhibited only with great uncertainty as to their beneficial effects. As, in many of these cases, the biliary functions are more or less interrupted, and organic vital force impaired, it becomes necessary to attempt the restoration of the former, and the development of the latter, by suitable means. To remove biliary obstruction, calomel and other mercurial preparations combined according to the peculiarities of the case; the nitro-muriatic acids internally and externally; the preparations of taraxacum, and the mineral waters of Carlsbad, Marienbad, Kissingen, and similar springs. DURAND's medicine against gall-stones and obstruction of the gall-ducts has also been recommended. This medicine consists of equal quantities of oil of turpentine and sulphuric æther. It may be given in moderate and frequent doses; or the oil may be conjoined with alcohol, or with nitric æther, or with the sweet spirits of nitre. These appear to be appropriate for this parasite, as the efficacy of the turpentine against other worms, and the rapidity of the absorption of it into the circulation, are indications in favour of the use of it, in cases where the existence of this animal is inferred. KÜCHENMEISTER states that the principal ingredient of the remedy of DURAND has been successfully administered for *distoma* of some of the lower animals; and that, upon his recommendation, turpentine was administered to several sheep, and followed by a purgative; but the results were not fully ascertained when he wrote. The propriety of enabling the constitution to throw off the parasitic animal by the exhibition of tonics conjoined with alteratives and deobstruents, such as the bi-chloride of mercury with preparations of cinchona; the extract of taraxacum with the solution of potash, and with tonic and bitter infusions or decoctions; and the nitro-muriatic acids with these latter and with taraxacum, cannot be reasonably doubted.

196. *C. The Distoma hæmatobium*, so remarkably prevalent in Egypt (§§ 103—109.), cannot be encountered with any means of *prevention* or of *cure*, upon which any reliance may be placed. GRIESINGER, who has furnished the chief amount of information respecting this parasite, considers that — 1st, the waters of the Nile used without filtration; — 2d, the bread, grain, and dates employed for food; — and 3d, the use of half-putrid fish; being the chief causes of its existence — the prevention of it must be based on the avoidance of these causes, and of the circumstances connected with them, which admit of avoidance. As regards *the cure*, calomel and turpentine are chiefly recommended by GRIESINGER, the latter being readily absorbed into the circulation, as first shown by me in a memoir on this remedy, published in the *London Medical and Physical Journal for* 1821. He also advises the use of onions, garlic, &c. The tinctura ferri muriatis, and other preparations of iron, of camphor, assafœtida, &c., variously combined, and long persisted in, may also prove of benefit, especially as anæmia and chlorosis form a marked characteristic of these cases.

197. *D. The Oxyuris vermicularis* (§§ 123—126.) is always treated with difficulty, and, according to my experience, with greater difficulty in old, than in young subjects. KÜCHENMEISTER states that internal remedies in general are but little to be recommended. I am of a very different opinion, based upon very considerable experience. This writer advises the long continued use of a tea made from the *flores verbasci*. The flowers are left in the infusion, and used with it. The fine hairs appear to irritate and disturb the worms mechanically. The remedies already noticed for the cure of tape-worm, especially turpentine, the pomegranate root, the filix mas, &c., often bring away the thread-worms, but they are soon regenerated. The permanent removal of them cannot be effected by these or by similar means. Medicines calculated to act upon the lower bowels, and to restore the tone of the digestive mucous surface, and to correct the state of the intestinal secretions and excretions, are especially required against these worms. Dr. POCKELS recommends the powder of filix mas and jalap in some suitable vehicle; KÜCHENMEISTER, the preparations of the semen cinæ — the santonicum, or semen contra vermes — internally for two days, and afterwards strong purgatives, followed by clysters; DUJARDIN advises enemata with valerian, or garlic, or wormwood, with the addition of aloes; and many administer clysters of salt water, or a solution of salt in water with olive or castor oil. When the patient is distressed by these parasites during the night these or similar enemata should be administered at bed-time or shortly before. Numerous preparations of the santonicum, and various combinations of this seed with other substances, as the powder (℈ j.—ʒ ij.), the infusion, the decoction, the extract — in the form of electuary, mixture, confection, bolus, &c., — with valerian, or jalap, or calomel, or aloes, or rhubarb, or sulphate of potash, or with sulphate of iron, or with alkaline carbonates, are contained in the Continental pharmacopœiæ, and employed against this and other species of worms.

198. The means which I have usually employed, for many years, against the *Oxyuris vermicularis*, with the view, not merely of removing

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* "Although it is still unknown to us how the embryo becomes metamorphosed, and into what *cercaria-sacs* or *rediæ* it is converted, and where these *cercaria-sacs* or *rediæ* live; although we do not know whether the brood of *D. hepaticum* is tailed or tailless, and where it encysts itself, whether free in the water in the manner of *Monostomum*, in aquatic mollusca or insects, or in higher animals which occasionally visit stagnant waters — yet there is much probability that the herbivorous or omnivorous domestic mammalia infect themselves with free encysted young *Distoma*, either by devouring snails which adhere to the grass of the meadows, especially in moist pastures, or by drinking from impure, stagnant waters (marsh or pond water). Exactly the same thing would then take place in man, by means of snails adhering to salad, fallen fruits, radishes, turnips, and other roots. Nay, such small snails might even be introduced with dry fodder into the stomachs of our domestic animals during the winter, by their eating the small species, passing their winter sleep in their closed shells, or the shell-less slugs adhering to roots protected from frost in warm cavities or cellars. Whether the production of *D. hepaticum*, in the human liver, may take place by drinking impure water, must remain quite undecided. The finding of a young *Distomum*, in the sole of a woman's foot, appears to be in favour of an immigration, and a mode of existence similar to the *Cercariæ*."—(*Op. cit.* p. 270, 1.)

hem, but also of preventing their regeneration, nd of improving the functions of the bowels and he state of the general health, are, combinations f preparations of iron with those of aloes, taken nternally for some days, or even weeks, according to their effects; and afterwards, enemata with live or castor oil, spirit of turpentine, or assafœtida, camphor, salt, &c., in gruel, according to he peculiarities of the case. The mist. ferri may hus be conjoined with the decoctum aloes comos., or with the tinct. aloes; or the pilula ferri omp., or sulph. ferri, may be given with the ilula aloes cum myrrhâ, the pilula galbani comp. nd camphor. Electuaries may also be prescribed n other cases, with the carbonates or oxydes of ron, the santonicum, and confection of senna, vith a small proportion of the confection of black epper; and, if these do not completely remove he annoyance, the use of the enemata already ecommended should be adopted (see FORM. 71, 0, 105, 106, 149, 151, and 153). In some cases vhere these are required, the long flexible tube hould be introduced above the sigmoid flexure of he colon, so that the remedies may reach above his part of the bowel. Having removed the vorms, it will be of service, in order to prevent heir regeneration, to continue the use of the preparations of iron in conjunction with aperients nd the other medicines which the circumstances f the case will suggest. The following pills have een found by me, for many years, to be most uccessful in removing and in preventing the regeneration of the *oxyuris vermicularis* and the *scarides lumbricoides*, both of which parasites are often present in the same case: —

No. 394. ℞ Ferri Sulphatis; — Quinæ Sulphatis; — Camphoræ, āā. gr. xvj.; — Pilulæ Galbani Comp. ℈ ijss.; — Pilulæ Aloës cum Myrrhâ, ℈ j.; — Pulv. Capsici, gr. xvj.; — Olei Cajuputi, ♏ xx.; Mucilag. Acaciæ, q. s. Misce, contunde bene, et divide in pilulas xxxvj., quarum capiat unam, duas, vel tres, bis terve in die.

The aloes, in combination with sulphate of quinæ, cts energetically on the bowels; therefore the dose of these pills should be regulated according o their operation; a larger dose being given for he expulsion of the different species of ascarides; nd the smaller doses, for the prevention of their egeneration. The enemata already recommended hould also be administered after the pills have een taken during two, three, or five days, the epeated exhibition of these latter rendering the ormer more efficient and generally successful.

199. *E. The Strongylus gigas* (§§ 128—130.). This worm, which is found chiefly in the kidneys nd urinary bladder, can hardly be inferred to exist during life, unless its discharge takes place, which very rarely occurs. KÜCHENMEISTER remarks that, if several worms, or one large female, be present, the kidneys will be enlarged, so that the enlargement may be detected by palpation, percussion, and perhaps by inspection; but the cause of this swelling, or any flow of blood from the urinary passages, or of any existing retention of urine, could be referred to the presence of these worms only when any of them are passed from the bladder; and in this case, the *treatment* would be chiefly to alleviate irritation by mucilaginous and oily medicines, and emollients, demulcents, &c. The oil of turpentine, internally and externally, may probably be of use in some instances.

200. *F. The Ancylostomum duodenale* (§§ 132—135.) is one of the inflictions on Egypt and some other tropical countries, and to GRIESINGER we are indebted for all we know respecting it. Unacquainted at first with the real cause of the disease which it occasions — with the prevalent anæmia, chlorosis, &c., produced by it—he had prescribed iron, quinine, calcaria phosphorica (*phosphate of lime?*), &c., with much benefit in slight cases, but never with complete success in those which were severe. KÜCHENMEISTER states that, in one of his last dissections, a sudden light broke in upon him on this subject, when he found the duodenum, the jejunum, and even the upper half of the ileum, entirely filled with fresh, red blood, only coagulated here and there, and thousands of *Ancylostoma* on the mucous membrane of the small intestine, each with its little ecchymosis resembling the bite of a leech. Although he thus left Egypt, and could collect no further clinical observations, he told the Arabian prosector, "You must now employ calomel and other anthelmintics against these *Ancylostoma* and the *Distoma* of the portal vein, in short, against the tropical chlorosis, as well as against hæmaturia, stone, dysentery, abscess of the liver, and all the undetermined diseases of tropical countries, perhaps even some of the tropical fevers, and investigate the latter illness itself, with reference to the most recent helminthological discoveries." Above all things, GRIESINGER praises calomel and oil of turpentine *à priori*, the latter, indeed, especially for the *Distoma* of the portal vein, above all for the *Ancylostoma*, as it certainly reaches the worms situated in the uppermost parts of the intestine; in substance, worms die in it very readily, and it also acts as a styptic upon the injured, bleeding vessels. This last remedy when mixed with castor oil, or with castor oil and a few grains of santonine, or the *natron santonicum*, to which vegetable purgatives are added, must prove particularly efficacious. "None of our colleagues working in the tropics should forget that tropical chlorosis is the consequence of the repeated, small intestinal bleedings, which scarcely betray themselves externally, caused by intestinal worms, especially *Ancylostoma*."

201. *G. The Filaria Medinensis* (§§ 138—142.). *a.* The *prevention* of this worm may be inferred from the causes and circumstances connected with its occurrence, namely, the endemic prevalence of filaria in certain climates and localities, its youngest brood living free in the water, or in wet grass, marshes, or moist soil, &c. Hence, wading through these places with naked feet, or exposing naked parts of the body to foul or impure water, should be avoided, as sources from whence the brood comes in contact with these parts, in the native countries of this worm. PRUNER states that an infection of the filaria may occur, as shown by numerous facts, even in those tropical regions in which the worm is not endemic, an actual transfer from one person to another, or to dogs and horses, taking place. BREMSER says that, even in his time, the worm had become naturalised in Curaçoa by the importation of negroes. No one, therefore, should use the same vessels employed by the patient in bathing, or washing the feet; and that great caution should be observed with the bandages of such patients.

202. *b. Curative Treatment.*—At the commencement of its growth, this worm is said, when super-

ficial, to be easily killed by poultices of boiled garlic. When quite superficial, an incision is made upon it, and the worm pulled out with a hook. Slave-dealers rub in civet and musk on its first appearance. But the worm often produces no annoyance for a long time — six to eight months. When it inflames and ulcerates the integuments over its seat, the part of which appears is seized, and carefully pulled and fastened to a roll of linen or stick, and gradually extracted by turning these twice daily. Some writers advise, when the worm is felt, to cut down through the integuments, making an incision of several inches long, and removing the worm in a loop, or wedging into a piece of wood, and then pulling now on one side, and now on the other; the muscles being all the while relaxed. If inflammation, swelling, and pain are great, and the worm resists dragging, or break off, these symptoms are to be treated in the usual way, by poultices of linseed meal, or of onions and bread, or onions boiled in milk, or of roasted onions, &c. In these cases, numerous means have been recommended in addition, but none of them appear very appropriate or successful.

203. From the most ancient periods, the breaking of the worm has been considered a very serious accident; and severe inflammation, fever, gangrene, &c., have been, even by some modern writers, said to have resulted from it. According to the observations of most authors, who had themselves suffered from the breaking of the worms, violent swelling, inflammation, fever, sleeplessness had occurred, and were cured only when they were killed. The diagnosis, in cases of *Filaria Medinensis*, should always be correctly made, in order to determine the presence of this worm, and to distinguish between Furunculi (see that article) and inflammatory swellings caused by it.

204. *H. The Treatment of Ascaris lumbricoides* (§§ 144—149.). — *a.* For the *prevention* of this worm, it is necessary to bear in mind the circumstances in which the eggs may occur, and the long period during which they may be preserved. Richter ascertained that the eggs may remain in sewage and foul water for some time, and that they attain their full maturity, and undergo the process of segmentation in this situation. Barry, Bischoff, and others have shown that alkalies and salts do not prevent this process. Verloren, that a period of eleven or twelve months is required for the completion of this process in the *Ascaris lumbricoides*. Richter and Küchenmeister state that eggs which had been put in water had not shown any appearance of embryos several months afterwards. As to what becomes of the ready-formed embryos, nothing is known positively; they probably get into our bodies with water, and perhaps this is sufficient for their development.

205. *b. The Cure of Ascaris lumbricoides.* — The number of medicines recommended with this object are so great that the judgment is distracted respecting them. In order to assist the selection, it has been attempted to determine the effects of the most reputed vermifuges upon living intestinal worms from recently killed domestic animals, by Redi, Andry, Leclerc, Torti, Arnemann, Chabert, and others. More lately, Küchenmeister has had recourse to similar experiments made in the temperature of the animal, by mixing the anthelmintic in white of egg, and placing the living worm in the mixture; and has given us the following results, "arranged according to the time in which round-worms died in white of egg mixed with the various remedies: —

206. "1. Death took place in one to two hours in white of egg mixed with creasote, and large doses of common salt, and corrosive sublimate.

207. "2. Death took place in two to five hours in white of egg mixed with petroleum, cajuput oil, oil of turpentine, mustard, weaker solutions of common salt, and washed herring's milt.

208. "3. Death took place in five to fifteen hours in white of egg mixed with garlic, onions, laurel, cloves, wood vinegar, rad. pun. granati, tinct. gallarum, concentr. sol. of sulph. soda.

209. "4. Death took place in fifteen to twenty-four hours in white of egg mixed with camphor, anise, and infusions or decoctions of ginger, gentian, elm-bark, kousso, and hops.

210. "5. Death took place after twenty-four hours in white of egg mixed with infusion or decoction of parsley, rice, milfoil, tansy, valerian, chamomile, wormwood, myrrha, quassia, calamus, ipecacuanha, walnuts, china-bark, willow-bark, oak-bark, catechu, kino, assafœtida, gum ammoniac, Peruvian balsam, ol. ricini, aqua picis, creasote water," &c.

211. This writer states that besides the remedies here enumerated, he has tested the semina cinæ (santonici) with their preparations. In a mixture of white of egg with coarsely powdered seeds, the worms live for days; and in a mixture of white of egg with a strong infusion of semin. cinæ, with repeated additions of unboiled powder, they also lived for days. In a mixture of *santonine* with water and white of egg, the worms lived for days; and also in white of egg with santonine and a little vinegar. At the same time, however, the total insolubility of the santonine was proved by further experiments. In white of eggs mixed with castor oil and santonine, the worms died within an hour; but in this experiment the temperature was raised too high. In a mixture of white of egg with *natron santonicum* (santonate of soda) dissolved in water, ascarides lived more than twelve hours. These experiments form an introduction to the treatment advised for *Ascaris lumbricoides* by Küchenmeister, and more especially to the use of the preparations of *santonine*; but he previously notices the employment of the *semina santonici* by other helminthologists, who generally prescribed this remedy in the form of an electuary.

212. *(a.)* Storck's *Formula*:—

No. 395. ℞ Pulv. Semin. Santonici (vel Cinæ), ʒij.; — Rad. Valerianæ Min. Pulv. ʒj.; — Rad. Jalapæ Pulv. ʒss.; — Oxymellis Scill. q. s. ut fiat electuarium molle.

One teaspoonful every three hours.

213. *(b.)* Selle's *Tonic Worm Electuary*:—

No. 396. ℞ Pulv. Seminum Cinæ, ʒvj.; — Ferri Sulph. Cryst.; — Extr. Chinæ Fusc., āā. ʒij.; — Syrupi Cinnam. q. s. ut fiat electuarium molle.

One tea-spoonful three times a day. This electuary is to be preferred some time after the expulsion of Ascarides, and to ascertain their permanent removal.

214. *(c.)* Hufeland's *Worm Electuary*:—

No. 397. ℞ Pulv. Sem. Santonici, ℥ss.; — Pulv. Rad. Jalapæ, ʒj.; — Kali Tartar. depur. ʒij.; — Pulv. Rad.

alerianæ, ʒjss.; — Oxymel. Scillæ, ʒvj.; — Syrupi imp. q. s. ut fiat electuarium molle.

One tea-spoonful every two or three hours.

215. (*d.*) CLARUS and other German physicians dvised the Semin. Santonici, coarsely powdered, to be sprinkled over bread, and spreading syrup or honey over the powder, administering from ʒss. to ʒj. several times a day in this manner, followed very third or fourth day by a purgative.

216. (*e.*) BREMSER's *Electuary*:—

No. 398. ℞ Seminum Santonici vel Tanaceti Vularis ruditer contusorum, ℥ss.; — Pulv. Rad. Valerianæ, ʒij.; — Pulv. Rad. Jalapæ, ℈jss.—ij.; — Tart. Vitriol. (Potassæ Sulph.), ʒjss.—ʒij.; — Oxymel. Scillæ q. s. ut fiat electuarium molle.

A tea-spoonful to be taken two or three times a day. After taking two tea-spoonsfuls daily, for hree or four days, slime and worms pass off with more copious stools. If the worms are not expelled, BREMSER administers some more of the electuary twice or thrice. If the first pot of electuary be insufficient, a second is taken, but watery stools must not be produced. He never allowed more than two potfuls to be taken; and he considered it unimportant whether worms passed or did not pass during its use. To relax the bowels once in the midst of this treatment he prescribed the following:—

No. 399. ℞ Pulv. Rad. Jalapæ, ℈j.; — Pulv. Fol. Sennæ, ʒss.; — Potassæ Sulph. ʒj. Misce. Fiat pulvis in partes iij. vel iv. æq. divid.

Half a powder to be taken every half, or every hour, or two hours, until it operates. For leucophlegmatic subjects he often gave CHABERT's oil (composed chiefly of turpentine rendered still more nauseous) in doses of two tea-spoonfuls in water night and morning.

217. The Semina Santonici, KÜCHENMEISTER states, have been recently displaced by the preparations obtained from them, and in his opinion with justice. He extols chiefly two of them, viz. Santonine and the Santonate of Soda; all the rest being unnecessary. He considers it to be preferable to administer Santonine with fatty oils, in order to bring it into solution as readily as possible; and for this purpose he prefers to give it sprinkled upon bread and butter, or in the yolk of an egg with sugar; and afterwards to follow it every three or four days with a gentle purgative (jalap or confection of senna), or to administer it in castor oil— gr. ij. to iv. of the *santonine** in ℥j. of the oil, to be taken in tea-spoonfuls until purgative action commences. In this way the remedy should be repeated, if possible, for some days, or every other day, so that soft stools, rather than actual purging, should be passed. Milk and butter-milk may be taken during this treatment. "Amongst the santonine lozenges, those prepared from cocoa, undeprived of oil, are most deserving praise." KÜCHENMEISTER remarks that the most troublesome effects of this remedy are spasms, obstructions, with tenesmus, and even bloody stools; but that with a careful employment of the remedy (gr. ij. to iv. with ℥j. of castor oil) he has never seen ill effects produced by it, the administration of it with castor oil always preventing intestinal obstructions. The most annoying symptom, to the patient only, is the yellow or blue, or even green, appearance of objects, owing probably to the effect of this remedy on the nervous system; but this appears to be only a temporary inconvenience, which soon disappears after the discontinuance of the remedy. This writer adds that "it follows, as a matter of course, to be cautious in the use of santonine, that he would never give more than eight grains of it in two days, divided into doses of two grains each twice a day, and that, on the second day of its use, he would administer an aperient."

218. (*f.*) *The Santonate of Soda.—Natron Santonicum* has recently been greatly praised by H. E. RICHTER and KÜCHENMEISTER, for its successful action in cases of *Ascaris lumbricoides.* The latter of these physicians states that he has never seen injurious effects from this medicine, even when administered in doses of eight to ten grains twice a day to adults. "The remedy to be given alone, as every acid decomposes it, and it must not be mixed in electuaries." He adopts nearly the following method:—He lets children (or adults) take a powder of *santonate of soda* with sugar (from two to six grains) on a Friday night, and he repeats the same dose on Saturday morning (fasting) and evening, and again on Sunday morning. On Sunday, half an hour or an hour after the last powder, an aperient electuary (confectio sennæ, &c.), or a sufficient dose of jalap, is taken, so that several soft motions may follow. By these means the worms usually pass off alive; or they wander forth singly afterwards, and without stools, their residence having become disagreeable to them. Dr. POCKELS, who noticed a blackish discoloration of the tongue after santonine, praises, as a remedy for *Ascaris lumbricoides*, the root of *Aspidium filex mas* in conjunction with purgatives.

219. (*g.*) I have found no remedies more efficacious for the *Ascaris lumbricoides* than turpentine as prescribed above (§§ 183—185.) and in *Form.* 216, and the *infusion of spigelia and santonicus*, as directed in *Form.* 264 in the APPENDIX. For this worm, also, as well as for the *Oxyuris vermicularis*, the preparations of the *semina santonici*, prescribed in the APPENDIX, will also be found successful. (See *Formulæ* 71, 80, 105, and 106.) These and other medicines will be frequently as successful without, as with, the preliminary treatment recommended by the German writers; the exact operation of such treatment often being not very manifest. The great success derived from the *powder* and *tincture of kamala*, in India, in the treatment of *tape-worms* (see §§ 190—193.), and the effects of this substance upon these worms, promise similar results from it, if it were prescribed against the *Ascaris lumbricoides* and the *Oxyuris vermicularis.*

220. iv. AFTER-TREATMENT OF WORMS.—It is often requisite after the expulsion of intestinal worms has been effected — 1st, To soothe the irritation, and to subdue the inflammatory action produced in the digestive mucous membrane by the vermifuges and drastic purges which had been prescribed. 2nd, To remove any stray worms which had become so sickened, or so injured by the treatment, as to be readily thrown off by means

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* The preparation of *santonine* is best effected by the employment of ammonia. It must be tasteless, when pure, because it does not dissolve in the mouth. Dissolved in alcohol, it is bitter. It is sparingly soluble in warm water; but is readily in oils. It is inodorous, has a slight acid reaction, combines readily with alkalies, and becomes yellow in the light of the sun. When impure, it still contains resins and essential oils, and is consequently nauseous to the taste. — (CALLOND, in *Pharmac. Centralblatt*, 1849, p. 413.; and J. CLARUS, in *Handbuch der Speciellen Arzneimittellehre*, 1852, p. 333.)

which would restore the vital tone of the bowels and further injure the worms, and render their residence disagreeable or untenable. And 3rd, To prevent the regeneration of these parasites by removing their ova and rendering the digestive mucous surface ungenial to their development. (*a.*) The *first* of these intentions is best accomplished by emollients and demulcents with small doses of nitrate of potash, of hydrocyanic acid, and syrup of poppies, &c. When sickness is troublesome, and no inflammatory action is present, a pill with half a drop of creosote, may be given with each dose of the above, or may be taken in the intervals between each. The diet should be spare, light, and digestible, and the bowels assisted by gentle laxatives, such as magnesia, with or without confection of senna, and by suitable enemata, especially by such as contain castor or olive oil, with oil of turpentine when the irritation is chiefly experienced in the stomach and upper portions of the intestinal canal; at the same time, the warm bath, or terebinthinate embrocations, or a recourse to these latter upon leaving the bath, will be found of much service. The drink of the patient should be demulcent, and in small quantity; thirst in these cases being most relieved by sucking small morsels of ice.

221. (*b.*) The *second intention* presupposes either the non-existence or the removal of those conditions against which the first intention was directed, and consists in the occasional exhibition of a moderate or less irritating dose or doses of the anthelmintic suitable to the expulsion of the worm found to be present, and the combination of it with such other means as the peculiar features of the case will suggest; a recourse to vermifuge clysters, especially to those already suggested, or those advised above (§ 194.), being had after the internal remedies had been taken.

222. (*c.*) The *third intention* is of no small importance if the permanent cure of the patient be considered. For the original conformation, or the depression of vital power, of the patient; or the irritability and exhaustion of the digestive canal, may be so great in consequence both of the existence of these parasites and of the means taken to expel them, that a tonic and restorative treatment becomes imperative in order to prevent various unpleasant contingencies. Besides, in many instances, anæmia has become so considerable as to require a treatment directed more or less to it, and to the other morbid tendencies. In these circumstances not only should due care be directed to the prevention of intestinal worms, but recourse should be had to those medicines which are calculated to restore the vital tone of the digestive organs, to improve the state of the secretions and excretions of the body generally, but of the intestines in particular, to promote the functions and actions of the bowels, and to render the human intestinal canal an unsuitable and an uncongenial habitation for the ova of worms and for their development. These are objects which should always be entertained after the expulsion of worms of whatever species, and should be attempted by such means as are most likely to accomplish them. It may be asked, however, where are we to find, how are we to combine these means, and how are we to prevail on the patient to persevere in their use, or even to have recourse to them when he believes himself free from his enemy? I cannot say that there are no other means calculated to atta these objects, but I may enumerate* those whic I have employed with these views, combining the variously, and exhibiting them in such succession intervals, &c., and as the circumstances of par cular cases appeared to require. The medicin which I have thus employed are the preparations iron, assafœtida, of cinchona and quina, of myrr camphor, aloes, infusions of willow, cascarilla, an cedar bark, berberine, &c. The compound mix ture of iron may be given with the decoction c tincture of aloes, &c.; or the sulphate of iron ma be prescribed with sulphate of quina, compoun galbanum pill, and with the aloes and myrrh pil Camphor may be conjoined with these latter sub stances (§ 198.) singly or in the combination no stated. The sulphate of quina may be given wit dilute sulphuric acid, and sulphuric æther. Th infusions of the barks may be taken with tonic an laxative tinctures, or with the mineral acids, &c. and laxative electuaries may be conjoined wit sulphur, or antispasmodics, aromatics, or spices.

223. It is obvious that the *diet* of patients wh have suffered from worms should be nutritious digestible, and restorative; whilst it ought not t be too rich or full, or calculated to produce genera plethora or local congestions, as of the liver, &c The *regimen* ought to be regulated so that sufficien exercise may be taken in the open air, and that al causes of debility and exhaustion should be avoided The remarks already offered for the prevention o the human entozoa (§ 157. *et seq.*) are equally necessary to the prevention of their return afte their expulsion.

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* I may here state that the pharmacopœiæ of the United Kingdoms are very deficient in vermifuge remedies, and in formulæ for the preparation and combination of them — a remark by no means applicable to the pharmacopœiæ of most continental countries. But verminous diseases are much more prevalent on the Continent than in the British Isles, in which, however, I am confident that their prevalence has hitherto been much underrated, and their importance undervalued. The very general and noxious vice of smoking tobacco, and of otherwise using this poison — so much extended in recent times — has rendered, and will still more render, verminous diseases more prevalent, by weakening the digestive organs, and disposing them to the generation and development of the ova of worms.

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YAWS. See Venereal Diseases (§ 85. *et seq.*).

ZYMOTIC DISEASES. — *Ζυμωτιχός*, causing to ferment,—*ζύμωσις*, a fermentation—*ἥπατος ζύμωσις*, a swelling of the liver, Hippocrates.

The term *Zymotic* has recently been applied by Dr. Farr to *epidemic*, *endemic*, *infectious*, and *contagious diseases*, and has comprised small-pox, measles, scarlatina, hooping-cough, croup, thrush, diarrhœa, dysentry, cholera, influenza, ague, remittent fever, typhus, erysipelas, syphilis, hydrophobia. Viewing the Greek term to mean a *leaven* by which the organic nervous system, or the vascular system and blood, may be infected or contai nated, either successively, or contemporaneous or nearly so, the term well designates an extens class of diseases, although its application impl an hypothesis: but it is well suited to the arran ment adopted by Dr. Farr in his admiral Annual Reports of Deaths, &c., in Engla (which see).

SUPPLEMENT.

SUPRA-RENAL BODIES.—Synon:—*Glandulæ ad Plexum, Glandulæ ad Plexum Nervium*, T. Wharton; *Glandulæ supra-renales, Renes Succenturiati*, Auct.; *Supra-renal glands, Supra-renal capsules, &c.*

1. I. Structure and Functions.—In the present state of our knowledge the name "*supra-renal bodies*," or that adopted by Wharton, appears more correct than supra-renal glands, the functions of glands not having been proved in respect of them; and the term, capsules, is equally inapplicable, even to their more external structure. Succenturiati, or reserved kidneys or bodies, are not less appropriate. The earliest notice of the connections and nature of these bodies appear to have been taken by Wharton, who pointed out their relations to the ganglial nerves, as remarked by Dr. Gull. Nevertheless the functions and diseases of these bodies received no attention from physiologists and pathologists (although in several instances, organic lesions observed in them had been published in the *Ephemerides Naturæ Curiosorum*, and more recently by Vetter and Baillie), until very lately, when the structure and functions of these bodies were remarked upon by Nagel, Bergmann, Ecker, Kölliker, Leydig, and Grey; and their diseases, especially in connection with a bronzed discoloration of the skin, were first investigated by Dr. Addison, and subsequently by Mr. Hutchinson and others. It is chiefly, however, to Dr. Addison that the distinction of having first directed attention to these lesions is due. Although several cases have been recently observed and recorded — not always, however, with due care and precision — still the number of those in which a bronzed state of skin appeared more or less intimately connected with, and most probably caused by, disease of these bodies, is so great as to induce a presumption that where the former appearance exists the latter lesion will be found. In order, however, to form correct views as to the phenomena by which diseases of the supra-bodies are indicated, as well as to the nature and consequences of such disease, it becomes requisite that we should previously briefly inquire into what is known of the structure and functions of these bodies. Unfortunately opinions on these topics have been, and, notwithstanding the frequency of microscopic research in modern times respecting them, still continues to be, very unsatisfactory. Dr. Wharton, about the middle of the seventeenth century first noticed their connections with the ganglia of the solar plexus, and suggested a name for them, which appears more appropriate than any other which has more recently been given them.

2. i. Structure.—Kölliker has very recently described the microscopic appearances of these bodies, and noticed what appears to be their functions, and Dr. Harley has still more recently examined their structure.—*A*. The *cortical structure* of these bodies is described by the latter observer, as consisting of cells, arranged in irregularly-sized rows, in a fibro-areolar matrix, the rows of cells appearing like a number of dark yellow columns placed perpendicularly to the surface. The cells, when examined individually, seem to be composed of a homogeneous cell-wall, filled with granules, pigment, and some fat globules. Each cell has a well-marked nucleus, although not always visible. The cells are arranged in a number of larger and smaller masses, which are placed in regular rows, and thus give rise to the columnar appearance. In some cases, a column is composed of several cell-masses of different lengths, placed end to end; in others it consists almost entirely of one long cell-mass. Each column, as well as each cell-mass, is separated from the others by delicate fibrous tissue, in which are included the vessels and nerves. Sometimes the cell-masses present the appearance of long tubes, enclosing a single straight row of quadrilateral cells. Each cell-mass is closed at the extremities, and is surrounded by a delicate homogeneous membrane.

3. *B*. The *medullary substance*, according to Kölliker, also has a *stroma* of connective tissue, which, prolonged from the cortical lamellæ, pervades the whole interior, for the most part, in more delicate fasciculi, constituting a net-work with narrow, rounded meshes. In this network lies a pale, fine-granular substance in which, in man, and in recent preparations, pale cells of 0·008—0·16‴ are generally observed. These pale cells occasionally present, in their fine-granular contents, a few fat, or pigment granules; their frequently very distinct *nucleus* with large *nucleoli*, their angular form, and occasionally their single or multiple, or even branched processes, resembling the nerve-cells of the central organs, although they cannot definitively be declared to be such. Dr. Harley states that the dark slate-coloured medullary substance is composed of a network of fibres, in the meshes of which are a number of large nucleated cells, which

have been described by various writers as ganglion corpuscles; but he thinks that these, like the cells in the cortical substance, are true secreting cells. This great difference of opinion (so frequently observed amongst microscopists) — the same nucleated cells being considered as ganglial corpuscles by some observers, and as true secreting cells by others — prevents in the present state of our knowledge much reliance to be placed upon the results of microscopic researches, each successive observer being liable to the distrust which attaches itself to his predecessors. However the following is less liable to objection:—

4. *C.* The *nerves* of the supra-renal bodies are, according to Bergmann and Kölliker, extremely numerous; arising, according to them, from the semilunar ganglion and renal plexus, and to a small extent from the vagus and phrenic nerves; but most probably intercommunicating with, rather than arising from, the latter. In man, Kölliker counted in the right supra-renal body thirty-three trunks, eight of which were $\frac{1}{5}-\frac{1}{10}'''$ five of $\frac{1}{14}-\frac{1}{20}'''$; seven of $\frac{1}{25}-\frac{1}{33}'''$; and thirteen of $\frac{1}{45}-\frac{1}{50}'''$; and found that without exception, or at all events in a very preponderating proportion, they were constituted of dark-bordered, finer and medium-sized, or even thick fibres; were whitish or white, and furnished with isolated larger or smaller ganglia. They are especially apparent on the inferior half and inner border of the organ, and appear to be all destined for the medullary substance, in which, at least in the Mammalia, an *extremely rich plexus* of dark-bordered, finer fibres occurs, inclosed in the *trabeculæ* and connective tissue, their terminations, however, being nowhere perceptible.

5. ii. Functions.—As regards the *functions* of the supra-renal glands, in the absence of all physiological indications, and so long as the course of the nerves in them is not more accurately known than at present, only very general observations can be offered. Kölliker *considers the cortical and medullary substances as physiologically distinct*, and that the former may, provisionally, be placed with the so-termed "blood-vascular glands," and a relation to secretion assigned to it; whilst the latter, on account of its extremely abundant supply of nerves, must be regarded as an apparatus appertaining to the *nervous system*, in which the cellular elements and the nervous plexus either exert the same reciprocal action as they do in the grey nerve-substance, or stand in a relation as yet wholly unascertained towards each other.

6. According to Leydig, the *cortical* substance of the supra-renal capsules of the Mammalia corresponds to the yellow, granular, and striped supra-renal bodies of fishes and amphibia; whilst the *medullary* substance of the mammalian organ, which is abundantly supplied with nerves and cells, very like the ganglion-globules, represents the other divisions of the sympathetic ganglia: whence he concludes that Bergmann's view, according to which the supra-renal capsules are closely related to the nervous system, is undoubtedly correct, and that those organs bear the same relation to the ganglia of the sympathetic nerves, as the pituitary body bears towards the brain. Besides this relation to the nervous system, however, they have an intimate one with the vascular; and are, therefore, always pervaded by a very close capillary plexus.

7. The functions of the supra-renal bodies have been *experimentally* investigated by Brown-Sequard, Harley, and others, but with different results. We know how uncertain these results ar in the lower animals, and the amount of confidenc which may be reposed in them, not only in thos which were so frequently performed thirty an forty years since in order to determine the functions of distinct portions of the nervous system, bu also in those more recently made with these an with other views. The former of the experimenters just named removed the supra-renal bodie from fifty-one rabbits, eleven adult cats and dogs eleven young dogs and cats, eleven adult Guinea pigs, four young Guinea-pigs, and two mice; an he states that the adult animals operated on died on an average, in twelve hours, while the young or new-born animals lived thirty hours. Fron these experiments Dr. Brown-Sequard conclude that the supra-renal bodies are more necessary t life than even the kidneys; for animals will liv two, or even three days, after the removal of th latter organs. Dr. Harley quotes from a late publication of Dr. Brown, in which the latter state that, of ten rabbits from which he extirpated th supra-renal capsules, six died, between the seventh and tenth hour, and four between the tenth and fourteenth hour after the operation, and adds, tha the animals died too quickly to admit of their death being the result of peritonitis; and further that the extirpation of these capsules is followed by symptoms which do not occur after injuries o the peritoneum or liver, &c., these symptoms indicating that the supra-renal bodies have an important influence on the blood, and that their nerves have a singular power upon certain parts o the central nervous system. He states that this latter influence manifests itself very distinctly in some cases after the extirpation or the puncture of one of these bodies, the animals being sometimes seized a few minutes before death by vertigo and rolling over. Dr. Brown-Sequard concludes, *first*, "that if these organs are not essential to life, they are at least of very great importance. Secondly, that their functions appear to be at least as important as that of the kidneys, for when they are absent, death in general supervenes more rapidly than after the removal of the kidneys." (*Archives Génér.* 1857, p. 374.)

8. Dr. Harley has published experiments which furnish different results from those now stated; and from those he infers, that "the supra-renal capsules are not absolutely essential to life;" that "the removal of the right, is generally more fatal than the removal of the left capsule;" that "convulsions do not necessarily follow the removal of the capsules;" that, "when death follows upon the extirpation of the supra-renal bodies, it is in most cases in consequence of the injury done to the neighbouring tissues; perhaps more frequently the mutilation of the ganglionic system of nerves;" that "absence of the function of the supra-renal bodies is not proved to have any special effect in arresting the transformation of hæmatin, or in increasing the formation of blood-crystals;" and that the suppression of the functions of these bodies is not attended by an increased deposit of pigment in the skin, or its appendages, in certain of the lower animals; the problem of the connection of bronzed skin and supra-renal capsular disease, being more likely to be solved in the dead-house than in the physiological laboratory.

9. Viewing the structure and connections of the supra-renal bodies as altogether similar to those of the pituitary gland, and considering these organs as very intimately connected, anatomically and functionally, with the ganglia and ganglial plexuses, I have been induced to view them as organs contributing or subsidiary to the organic nervous force or influence exerted by the ganglial nervous system. Thirty-four years ago I published this opinion of the function of the pituitary gland in my Physiological Notes, &c. (in 1824), and stated, that this gland reinforced the ganglial nervous influence endowing the brain by means of the ganglial nerves distributed to the cerebral organs—that it was a portion of the ganglial nervous system contributing to the nourishment and functions of the brain, *and imparting an unity of development, of permanent nutrition and of function, to the double organs composing the cerebral mass.* It appears very probable that similar offices are performed by the supra-renal bodies as regards the ganglia and ganglial plexuses of the abdomen; these bodies contributing to the functions of the organic nervous or ganglial system, as displayed by the abdominal organs — whether digestive, assimilative, or generative. That both the pituitary body and the supra-renal bodies perform these important functions — important not only as respects the performance of their respective functions, but also as regards the life of the individual—appears to be manifest from the nature and character of the nervous communications existing between them and other parts of the ganglial nervous system; for, instead of describing these communications merely as branches of nerves detached from other ganglia or parts, it would be more correct, taking the size and appearance of these branches into consideration, to describe them as branches sent from the medullary structure of these bodies, to those ganglia, plexuses, and nervous trunks, in order to convey to these the special influences or functions of these bodies; or, otherwise, to reinforce and combine the influence exerted by these several ganglia and parts, with which they are anatomically connected. That these bodies are of the greatest vital as well as functional importance is evinced not only by the consequences following their structural lesions, and by the presumed nature of their functions, but also by the manner and the positions of their lodgements; both the pituitary and the supra-renal bodies being so located as to render them, in their respective situations, further removed, and better protected from injury, and even from structural or other disease, than any other part of the animal organisation.

10. II. STRUCTURAL DISEASE OF THE SUPRA-RENAL BODIES. — *Lesions of the Supra-renal Bodies, and their Associations, &c.*

CLASSIF.—IV. CLASS. I. ORDER (*See Preface, &c.*).

11. DEFINIT. — *General languor and debility, anæmia, feebleness of the heart's action, remarkable irritability of the stomach, frequent vomiting, and pain in the back and loins, often with a bronzed or dusky hue of the general surface, rapidly increasing exhaustion, emaciation, &c.*

12. Disease of the supra-renal bodies usually commences so gradually as not to admit of the patient's knowledge of the exact period at which he first began to experience loss of health or strength. It is almost always gradual in its early progress, although often rapid in its more advanced course. The slowness or rapidity of its progress must, in the present state of our knowledge, be attributed to the nature and extent of the organic lesion, to the circumstance of one or both bodies being affected, and to the nature and severity, local or constitutional, of the malady with which structural change of these bodies is complicated.

13. i. *Symptoms.*—Generally the patient at first complains of weakness or more marked debility, of languor, and of indisposition to bodily and mental exertion. The appetite is impaired or lost; the pulse is soft, weak, and often frequent; the whites of the eyes are pearly; the body is sometimes more or less emaciated, or, if not emaciated, leuco-phlegmatic or cachectic, or discoloured, and generally anæmied. Uneasiness or pain, often severe, is referred to the region of the stomach, epigastrium, back, or loins. Nausea, sickness, retchings, and frequent vomitings often occur, especially as the prostration, anæmia, and discoloration of the skin advance. In some cases, complicated with disease of other organs, especially when such disease is acute or disorganising, the discoloration may either be absent or overlooked. In other cases, it is slight, or in patches, consisting of a murky hue; but, in others, it amounts to a bronzed tint, and is general over the whole surface, but is commonly most marked on the face, neck, superior extremities, penis, and scrotum, in the flexures of the axillæ and limbs, around the umbilicus, &c., varying in deepness from a dingy or smoky appearance to a chestnut-brown, or colour of a mulatto. In some cases, patches of a lighter hue occur in various parts; and in many the discolouring may be remarked in some of the internal surfaces, the peritoneum, pleura, &c.

14. With the continuance and progress of disease, the languor, anæmia, loss of appetite, and feebleness of the heart's action are aggravated. The discoloration of skin becomes in some cases more marked, the commissures of the lips much darker, the pulse smaller and weaker, vomiting more frequent and urgent, and pain and weakness of the back and loins more complained of. At last the patient sinks and expires, after a period which is very indefinite, so that the disease may appear almost acute in some instances, and more or less chronic in others, most probably owing either to the severity of the disorganising lesions affecting the supra-renal bodies, or to the nature of the complications characterising particular cases.

15. Although lesions of these bodies are often uncomplicated with disease of any other organ—although no lesion or disorder of any important or vital part can be detected, in many cases, during the life of the patient, lesions of these bodies, and a peculiar anæmia, being the only or chief lesions found after death, very frequently accompanied with discoloration — yet they are often associated with other diseases, chiefly of a constitutional and cachectic nature, more especially with general or partial tuberculosis, with cancer, and with disease of the lungs, &c.

16. The following *table of cases of disease of the Supra-renal Bodies* comprises nearly all those which have been published up to this time. It is constructed according to that published by Mr. HUTCHINSON; and to it I have added some recent cases.

No.	REFERENCES.	SEX AND AGE.	OCCUPATION.	PREVIOUS HEALTH, &C.	EARLY SYMPTOMS.	BRONZING OF SKIN.—I DEGREE OR ABSENCE
1.	Dr. Addison's Work, p. 9.	Male, 32	Baker	No history. Skin white when in health.	Cough, followed by debility and bronzing of skin.	Colour of Mulatto; sc tum and penis darkest
2.	*Ibid.* p. 12.	Male, 35	Tidewaiter. Married. Exposed to weather.	Rheumatism eight years previously. Health generally good.	Acute attack of fever, followed by debility and bronzing of skin.	Dark olive-brown; als lining of lips.
3.	*Ibid.* p. 15.	Male, 26	Carpenter. Married. Intemperate.	Very good until three months before the change of colour.	Pain in the back and right leg, followed by debility, wasting, and giddiness.	Dark olive-brown, de ened in patches.
4.	*Ibid.* p. 19.	Male, 22	Stonemason	No history. Died soon after admission.	Pain in stomach; vomiting; tic douloureux.	Face, axillæ, and hand bronzed colour.
5.	*Ibid.* p. 23. (From Dr. Bright's Reports.)	Female, adult.	Not stated	No history	No history	Complexion very dark
6.	*Ibid.* p. 25.	Male	Barrister. Of middle age.	No history	No history	Surface generally da face, neck, and ar covered with deep bro patches.
7.	*Ibid.* p. 30.	Female, 60	Not stated	No history. Cancer of supra-renal bodies; consecutive of cancer of breast.	Cancer of breast	Skin of arms, chest, a face of a light bro colour.
8.	*Ibid.* p. 32.	Female, 53	A servant. Single.	Always thin; but of good health.	Cutaneous eruption four months previously; its cure being followed by stomach symptoms.	Skin generally very da with darker patches.
9.	*Ibid.* p. 35.	Male, 53	Sailor. Married. Sober.	Very good. A strong muscular man.	Two months previously began to lose appetite and be generally unwell.	Face of a yellow bron tint, becoming s darker.
10.	*Ibid.* p. 38.	Female, 28	Not stated	Died of cancer uteri. Disease of supra-renal bodies being consecutive.	Those of cancer uteri	A peculiar dingy appe ance.
11.	*Ibid.* p. 39.	Male, adult	Not stated	Died of cancer of lungs, &c.	Those of cancer of the thorax.	Face of a dingy hue, wi freckles and brown d coloured spots.
12.	Med. Times and Gaz., Dec. 15. 1855. (Dr. Burrows.)	Male, 24	Hawker, Single.	Had lumbar abscess in childhood.	Pain in the back, followed by emaciation and bronzing.	A dark copper or bronz colour generally, a lighter patches.
13.	*Ibid.* Jan. 19. 1856. (Dr. Gull.)	Male, 24	Carpenter. Temperate.	Robust	Debility; breathlessness on exertion; nausea, &c.	Skin of a sallow oliv brown, darker on insi of lips, knees, &c.
14.	*Ibid.* Jan. 19. 1856. (Mr. Bakewell.)	Male, 28	Labourer	Not known	Not known	Skin generally dark brov or bronzed, and dark over the thighs.
15.	*Ibid.* Feb. 20. 1856. (Dr. Thompson, &c.)	Male, 20	Baker. Sober	Good	Bronzing of skin	Skin of a general peculi dark dirty-brown colou
16.	*Ibid.* Feb. 28. 1856. (Dr. Rowe.)	Male, 20	Not stated	Delicate	Delicate health and bronzing of skin.	Skin generally brown, wi darker spots.
17.	*Ibid.* Mar. 8. 1856. (Dr. Farre.)	Male, 37	A publican. Intemperate.	A year before had pain in the lumbar regions, which subsided.	Admitted for delirium tremens.	Skin generally of a pecu liar yellowish brown.
18.	Dr. Addison's Work, p. 29.	Male, 60	Not stated	No history	No details	Generally dark an bronzed, with blanche patches.
19.	Med. Times and Gaz., p. 233. (Dr. Stocker.)	Male, 56	Physician	Dyspeptic, but not otherwise ill.	General malaise and irritability of stomach; increasing debility and emaciation.	Patches of brown colou which extended: smal patches on the face.

General Symptoms, Complications, &c.	Duration of Disease.	Mode of Death.	Inspection after Death.	Remarks.
xcessive debility; emaciation; emeanour puerile; urine healthy; ain in lumbar region; cough; oreness at the epigastrium.	3 years -	Acute pericarditis and pneumonia.	Supra-renal bodies both remarkably indurated and as large as eggs, and quite disorganised; recent pericarditis and pneumonia; no tubercles, nor other visceral disease.	A well-marked case. No chronic lesions but those of supra-renal bodies.
inched anxious expression; vomiting; pulse very feeble; depression; constipation; tenderness at pigastrium; numbness of extremities.	6 months	Not stated - -	Both supra-renal bodies contained compact fibrous concretions; gastric mucous surface inflamed; no tubercles; no other visceral disease.	The deposits in supra-renal bodies resembled tubercle, but there was no tubercle in other organs.
hin, pale, and feeble; fainting on ising from bed; sickness and iccup; pain in back; ang. curature of spine; leucothymia, c.	7 months	Passed into a torpid state.	Supra-renal bodies completely destroyed and converted into strumous deposits; psoas abscess and caries of lumbar vertebræ; tubercles in lungs; spleen enlarged.	The blood, both before and after death, contained a great excess of white corpuscles.
omiting and pain in stomach; reat debility; emaciation; extreme prostration, &c.	Several months.	From collapse and sinking.	Supra-renal bodies wasted and destroyed, both weighing only 49 grains. No other disease.	The disease of supra-renal bodies was an atrophy; probably consequent on inflammation.
xtreme debility; vomitings; maciation; abscess in breast, c.	Not stated	Slight wandering, gradual sinking and drowsiness.	Both supra renal bodies were enlarged, lobulated, and the seat of tubercular-like deposits, both four times the natural size; the left had suppurated.	This case was recorded by Dr. Bright before the importance of dissection of supra-renal bodies was recognised
ight emaciation; great anæmia; xtreme languor; urgent vomiting; pulse very compressible.	1 year -	Speedy sinking -	Both supra-renal bodies greatly enlarged, of irregular surface, and much indurated; natural structure lost; nucleated cells. No other important disease.	Vomiting had been so urgent in this case as to suggest the existence of malignant disease of the stomach.
o history. Died of ulcerated ancer, the bronzing being remarked at the post-mortem inpection.	Not stated	Not stated - -	Both supra-renal bodies contained much cancerous deposit; throughout their structure.	
maciated and feeble; much iriability of stomach.	4 months	Died of exhaustion in three days after admission.	Cancer of pylorus; left supra-renal body destroyed by cancer.	The extent of discoloration of skin was proportioned to that of disease of supra-renal body, one being sound.
ickness, without vomiting; weakess and loss of appetite; frequent igors; no pain; pulse 80, feeble; ody irritable.	3 months	Sunk gradually -	Tubercular deposit in one supra-renal body; in the spleen also; and the kidneys were degenerate.	The degree of bronzing appears to have been proportioned to that of disease of supra-renal body, one only being affected.
iscoloration of skin not noticed until the post-mortem inspection, when disease of supra-renal body was foretold. No history preserved.	Not stated	Died from cancer -	Right supra-renal body healthy; the vein emerging from the left obstructed by cancerous deposit; and the organ itself occupied by recent extravasation of blood.	The degree of bronzing was slight; the disease of one supra-renal body being recent.
o history preserved - -	Not stated	Died of cancer -	One supra-renal body entirely disorganised by cancer; the other healthy.	One supra-renal body was affected, and the bronzing was slight.
rritability of stomach, with vomiting; pain across the back; great debility; emaciation; urine natural, &c.	8 months	Died from exhaustion consequent upon a purgative.	Both supra-renal bodies contained pus and bodies resembling hardened tubercle. There was no other disease.	The chain of morbid phenomena was very complete in this case.
ausea; vomiting; great malaise; exhaustion; emaciation; urine healthy; blood loaded with white corpuscles.	5 months	Sudden exhaustion	Both supra-renal bodies atrophied and destroyed; the left contained cysts, the right solid concretions.	
eak and low for a long time; not much emaciation.	Unknown	From exhaustion caused by a short journey.	Both supra-renal bodies completely atrophied, and contained calcareous concretions; emphysema of lungs; fatty degeneration of heart.	
uddenly languid, and afterwards collapsed, and died after three days; tint of skin observed for six weeks.	6 weeks -	Collapse - -	Each supra-renal body enlarged to the size of half a kidney; their structure converted into a firm tubercular-like matter, and in parts softened.	This appears to have been idiopathic disease of supra-renal bodies, no tubercles being found in other organs.
ad also disease of knee-joint, and health rather improved until within three days of death. He remained fat and muscular.	8 months	Diarrhœa, followed by succession of epileptic fits, vomitings, &c.; died on fourth day of these.	Both supra-renal bodies destroyed, containing gritty, cheesy, and semi-purulent deposit. No other disease.	In this, as in case 23, a peculiar disagreeable odour exhaled from the patient for three or four weeks before death.
e died in a fortnight from delirium tremens.	3 weeks or more.	Sunk into a typhoid state, with low delirium.	Both supra-renal bodies were converted into abscesses, but their cortical substance was not wholly destroyed; circumscribed abscess in the liver.	In this case the suppuration and inflammation of supra-renal bodies had probably been acute and recent.
Anæmic; heart's action very feeble; irritability of stomach; œdema of upper extremities.	Not stated	Died of debility; cancer in mediastinum suspected.	No inspection - - -	The cachexia was precisely that of diseased supra-renal bodies.
reat debility and wasting; but no organic disease but that of supra-renal bodies indicated.	About 6 months.	From exhaustion -	No inspection - - -	The bronzed patches indicated the patient's speedy death when there were not other alarming symptoms.

No.	References.	Sex and Age.	Occupation.	Previous Health, &c.	Early Symptoms.	Bronzing of Skin.—I Degree or Absence.
20.	*Ibid.* Dec. 15. 1855. (Mr. Startin.)	Male, 12	At school. (Irish.)	Had suffered from abscesses in the neck, and cough.	Loss of appetite, flesh; increasing languor and debility.	Copper-colour general, a deepest on the face a neck.
21.	*Ibid.* Dec. 29. 1855. (Dr. Peacock.)	Female, 14	At school -	Healthy - -	Lassitude; muddy complexion; and slight cough.	A brown muddy ti deepest on face, arm, a shoulders; no mottling
22.	*Ibid.* Jan. 19. 1856. (Dr. Burrows.)	Female, 28	Married. Temperate.	Delicate - -	Menorrhagia and debility two years before the discolouration.	A fawny or yellowis brown tint; most mark on face, arms, thighs, a legs; patchy discolor tion in parts.
23.	*Ibid.* Feb. 23. 1856. (Dr. Rowe.)	Male, 45	A carter. Married. Temperate.	Robust - -	Dark spots in various regions of body. At first no illness.	Skin dusky-brown, r sembling that of a m latto; darker in son parts than in others.
24.	The Associ. Jour. Jan. 19. 1856. (Dr. Budd.)	Female, 42	Married -	Good - -	A brown tinge of skin, followed by typoid fever; after which bronzing became more marked.	Skin like that of a Nor American Indian; certa parts darker than other
25.	*Ibid.* Jan. 19. 1856. (Dr. Budd.)	Female, 40	Not stated -	Not stated - -	Not stated - - -	Very dark general disc loration; large patches mouth.
26.	Med. Times and Gaz., Feb. 23. 1856. (Dr. Thompson.)	Male, 33	Married -	Good - -	Paroxysmal pain in the abdomen; loss of strength; amenorrhœa.	Skin became suddenly a generally of a dirty-brow tinge.
27.	*Ibid.* Dec. 22. 1855. (Dr. Rankin.)	Female, 58	Married -	Formerly very stout and of large frame.	Loss of strength and flesh	Face and hands da brown — "as brown as Japanese;" other par not seen.
28	Trans. of Path. Soc., vol. viii. p. 325. (Dr. Baly.)	Male, 18	Baker - -	Headache; pains in the limbs; languor and debility; followed by pain in the loins.	As stated; with bronzing of the skin; pain increased by pressure on the loins; vomiting, &c.	Bronzing deep and gener
29.	*Ibid.* vol. viii. p. 330. (Dr. Baly.)	Not stated	Not stated -	Diseased vertebral column.	Not stated - - -	No bronzing of the skin
30.	*Ibid.* vol. viii. p. 330. (Dr. J. Ogle.)	Female, 14	Not stated -	Incontinence of urine, scalding, containing blood and pus.	Consequent on the urinary disorder; symptoms of phthisis, under which she sunk.	No bronzing of the skin
31.	*Ibid.* vol. viii. p. 332. (Dr. J. Ogle.)	Male, 36	Not stated -	Emaciation, &c. -	Symptoms of phthisis -	No bronzing of the skin
32.	*Ibid.* vol. viii. p. 333. (Drs. Peacock and Bristowe.)	Female, 18	A tent-maker	Had a fall, and severe pain in the right side.	Fever, with pains in the lower extremities; œdema, &c.	No bronzing of the skin
33.	*Ibid.* vol. viii. p. 337. (Drs. Peacock and Bristowe.)	Male, 55	Coppersmith -	Good - -	Declined in flesh and strength; pains in back and limbs.	No discoloration of th skin.
34.	Med. Times and Gaz., Nov. 21. 1857. (Mr. Wilks.)	Female, 18	Young lady -	Delicate, but of full habit.	General debility and chronic rheumatism; lassitude and sickness.	A deep bronze tint skin.

17. Mr. Hutchinson has collected a number of the cases which have been recorded, and has given a view of the chief symptoms which have characterised them. I shall notice these symptoms briefly and in succession, but independently of his account of them. — 1st. *Bronzing of the skin* was observed in the majority of cases of structural lesion of the supra-renal capsules, recorded by Dr. Addison and some others, and this physician was inclined to believe that this symptom was indicative of such lesion. Several cases have more recently been observed where lesions of these capsules have been found without this change of the colour of the skin, and without any change whatever. Several such instances are recorded in the 8th vol. of the Transactions of the Pathological Society. — 2d. *Great debility*, without any evidence of thoracic or organic disease, loss of mental energy, faintness, exhaustion, &c., were very general symptoms. — 3d. *Irritability of stomach*, nausea, occasional or frequent vomitings, were also prominently observed. — 4th. *Pain* in the epigastrium, back, and loins, sometimes acute, in some instances dull, or an aching merely, was general. — 5th. *Anæmia* was, also, generally present, this fluid being impoverished and abounding

General Symptoms, Complications, &c.	Duration of Disease.	Mode of Death.	Inspection after Death.	Remarks.
Some emaciation; great and increasing debility; oppressed aspect; urine healthy.	9 months	Sunk from diarrhœa; a succession of convulsions just before death.	No autopsy - - - -	Gradually increasing prostration for four months.
Countenance expressive of great languor; emaciation; marked debility; liability to faintings, &c.	18 months	Suddenly, from an epileptic fit.	A chalky concretion found in the medulla oblongata. The supra-renal bodies said to be free from disease.	
Appetite very bad; thirst; great debility; pain in the loins; menorrhagia; anxious expression.	7 months	Not known - -	No inspection.	
No material loss of health until within a few weeks of death; debility; loss of appetite; irritability of stomach supervened; failure of memory for some months; urine normal.	3 years -	From incessant vomitings; delirious before death.	The chief lesion observed was tubercles in the lungs. The supra-renal bodies were not examined.	A peculiar and disgusting odour a few days before death.—See case 16.
About eight months after the first bronzing she began to lose flesh and strength; harassing cough; irritability of stomach; extreme anæmia; and debility supervened.	16 months	Sank gradually from exhaustion.	No autopsy - - - -	Eight months after the change of colour began the patient had a fine healthy infant.
Anæmia and extremely feeble; sickness and vomiting.	Not stated	Gradually sank from exhaustion.	No autopsy - - - -	This case very closely resembled the preceding one.
Anæmic and feeble, followed by discoloration of skin, and by a peculiar collapse.	5 weeks -	Recovered under the use of tonics: the skin becoming simply pallid.	Recovered - - - -	Inflammatory disease of supra-renal bodies may be conjectured.
Sinking at pit of stomach; nausea; loss of appetite, strength, &c.; secretions healthy; heart's action very feeble.	Not stated	Still living - -	Living at time of Report - -	The symptoms combine to indicate disease of supra-renal bodies.
Fever; small, feeble, and quick pulse; severe pain in loins, increased by pressure; frequent vomiting; tendency to diarrhœa; abdomen flat, empty, and tender; urine albuminous; peculiar odour of skin.	12 months	Exhaustion; stupor; unconsciousness.	Both supra-renal bodies atrophied, and their entire structure destroyed. History and inspection fully given, with a plate.	The case very chronic, well-marked, and the supra-renal bodies most completely disorganised. A very interesting case.
Disease of the vertebral column, apparently causing death.	Not stated	Not stated - -	Both supra-renal bodies contained nodules of firm substance, grey and semi-transparent externally, and yellow and opaque internally. A great part of their proper structure unaltered.	Apparently an earlier stage of the lesions observed in case No. 28.
Phthisis; under which she sunk -	Not stated	Died from scrofulous deposits, and vomicæ in lungs.	Extensive deposits of crude tubercular matter in both supra-renal bodies, and in the lungs and left kidney.	No symptoms but those of phthisis mentioned.
Hectic and symptoms of phthisis	Not stated	Died from phthisis	Extensive deposit of scrofulous matter in one supra-renal body; the other not affected.	No symptoms excepting those of phthisis mentioned.
Tumour in left side of abdomen; emaciation; prostration; liver enlarged; the spine very prominent at the last dorsal vertebra, &c.	3 months	Exhaustion -	Cancer of both supra-renal bodies, and cancerous deposits in both kidneys and in other parts.	History, case, and of the diseased appearance full and interesting.
Emaciation; care-worn countenance; retraction of gums, loss of teeth, sordes on the gums, &c.; general want of power; pains in the loins, &c.; anæmia.	4 months	Exhaustion -	Supra-renal bodies both destroyed, their substance being replaced by a soft white encephaloid deposit; similar deposits in the lungs.	History and morbid appearances fully detailed.
Sickness; feeble pulse; fits of incessant vomiting, returning after short intervals, for seven weeks; emaciation.	12 months or more.	Exhaustion -	Both supra-renal bodies enlarged, inflamed, and contained purulent matter, with gritty matter in the right.	No other visceral disease observed.

with white corpuscles, the soft solids being flabby.— 6th. *Feebleness of the heart's action*, a soft, compressible, feeble, and more rarely a quick pulse were usually observed. — 7th. *A cachectic, leuco-phlegmatic, and unhealthy* appearance of the body, with or without emaciation, were frequently remarked. — 8th. *A disagreeable and peculiar odour* was exhaled from the body, in some cases, during life; and — 9th. *Several nervous and convulsive symptoms* were observed in a few instances. The tongue, the bowels, and the urine, did not present much indication of disorder. *Death* appeared to result chiefly from vital depression or exhaustion, with more or less indications of alteration of the circulating fluids. In some cases, death was attributable to the disease with which the lesion of the supra-renal bodies was complicated, as to cancer, tubercular disease of the lungs, &c. The circumstance of one of those bodies only being diseased, and the extent to which the structure of one or both had been destroyed, may be viewed as modifying or altogether altering the symptoms and the final issue.

18. ii. *The chief lesions of these bodies* which have been recorded are the following: — (*a*) Appearances of acute inflammation and its con-

sequences, suppuration, &c. — (*b*) Atrophy and total disorganisation of their structure — (*c*) Calcareous depositions, or fibro-calcareous concretions, with or without cysts, some of which contained a fluid puriform matter. — (*d*) A fibrous degeneration, with great enlargement and induration. — (*e*) Tubercular deposits, with great enlargement and loss of the healthy structure of these bodies — (*f*) Deposits of cancerous matter, consecutively of cancer in other organs, more or less of the normal structure of these bodies being still preserved. Although these structural lesions were more frequently observed in both supra-renal bodies, yet one only was not infrequently affected, and in a few cases a portion of the healthy structure of the diseased body was preserved. The disease of one body only, or the preservation of a portion of the structure of the organ, may rationally be allowed to modify or more manifestly alter the resulting phenomena.

19. The *Diagnosis* of disease of the supra-renal bodies is very difficult: — 1st, As respects the certainty with which this disease may be inferred from the symptoms present — of which, bronzing of the skin, the persistence of retchings and vomitings, the anæmia, and the weakness and smallness of the pulse, are the most characteristic; — and 2d, As regards ascertaining during life whether or no the existing discoloration is to be imputed to disease of these bodies, or to one or other of the forms of JAUNDICE, which I have described as *Green*, and as *Cachectic*, or *spurious, Jaundice*. (See §§ 46—57.) In the histories of cases of disease of the supra-renal bodies which I have perused, no such diagnosis has been made or suggested; and the appearances of the stools and the states of the biliary and urinary excretions during life, and even of the biliary apparatus after death, have been either insufficiently investigated, or entirely overlooked.

20. The *Prognosis* is most unfavourable, as it does not appear that any case has recovered where the skin had become bronzed or much discoloured. The prognosis may therefore be ranked in the same category as the green form of JAUNDICE described in that article. (See §§ 46. *et seq.*)

21. The *Treatment* should be directed according to general principles, conformably with the phenomena and with the complications characterising individual cases. These will suggest the rational indications, and the means by which they are most likely to be fulfilled, as far as this may be possible.

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